

Wastewater System Improvements



Deer Island Wastewater Treatment Plan

S. 104 Braintree-Weymouth Relief Facilities

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Fulfills a regulatory requirement*
- Extends current asset life*
- Improves system operability and reliability*

In accordance with a DEP administrative consent order, construction of relief facilities and the resulting reduction in community infiltration and inflow will provide capacity for peak sewage flow from Braintree, Hingham, Holbrook, Randolph, Weymouth, and sections of Quincy. This project will reduce surcharging in Braintree and Weymouth, and reduce frequent overflows into the Weymouth Fore River during wet weather.

Project History and Background

The Braintree-Weymouth interceptor system and pump station serves Braintree, Hingham, Holbrook, Randolph, Weymouth, and sections of Quincy. Because of population increases, the sewerage system could not handle the volume of sewage received and sewage overflows were frequent along the Weymouth Fore River during wet weather.

Interim rehabilitation work was required to ensure continued operation of the existing Braintree-Weymouth Pump Station during the long-term design and construction period. After initially proceeding with a dual track design approach for part of this project, MWRA decided to construct a deep rock tunnel rather than a marine pipeline from the new pump station to the Nut Island shaft of the Inter-Island Tunnel to Deer Island. Construction of the Emergency Mill Cove Siphon was completed in June 1998. Construction of the deep rock tunnel was completed in September 2003, and the North Weymouth Relief Interceptor was completed in June 2002. The Intermediate Pump Station and sludge pumping facilities at Deer Island were completed in April 2005. The Fore River Siphons construction contract was completed in May 2005. Construction of the Replacement Pump Station was completed in April 2008. Rehabilitation of Section 624 was completed in December 2010. Remaining phases include Braintree-Weymouth Improvements.

Scope

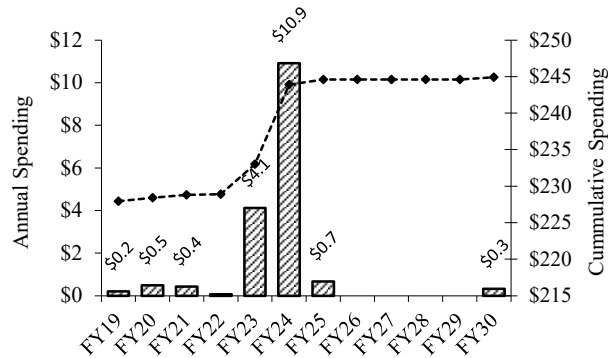
Sub-phase	Scope	Status
Design 1/CS/RI – Tunnel & IPS (5313)	Design of the tunnel and Intermediate Pump Station (IPS). Includes completion of design modifications for sludge pumping facilities at Deer Island and residuals filtrate facilities at Fore River.	Completed
Sediment Tests (6016)	Tests required as part of the evaluation of marine pipeline option.	Completed
Design 2/CS/RI – Surface (5331)	Design of remaining construction including siphons and replacement pump station.	Completed
Tunnel Construction & Rescue (5315)	Construction of a 2.9-mile, 12-foot diameter tunnel beginning at the Nut Island shaft of the Inter-Island Tunnel and ending at the Fore River Staging Area. Two 14-inch sludge pipelines within the tunnel will convey Deer Island sludge from the Inter-Island Tunnel to the pelletizing plant. 0.4 miles of twin 12-inch pipelines within the tunnel will convey filtrate from the pelletizing plant to the Intermediate Pump Station. 2.5 miles of 42-inch force main will carry flows and filtrate to the Inter-Island Tunnel. Also includes a MOA with Quincy, Braintree, and Weymouth for tunnel rescue and fire support services.	Completed
Intermediate Pump Station Construction (5316)	Construction of a 45-mgd pump station and headworks in North Weymouth. Also includes modifications to the sludge pumping facilities at Deer Island and the filtrate facilities at Fore River.	Completed
No. Weymouth Relief Interceptor Construction (5303)	Construction of 2,000 linear feet of 60-inch gravity sewer running from the Intermediate Pump Station and along the Exelon Energy site.	Completed
Fore River Siphons Construction (5373)	Construction of 36-inch, 3,900-foot long twin siphons beneath the Fore River from the Idlewell section of Weymouth to the southeast corner of the Exelon Energy site in North Weymouth. Constructing 1,000 linear feet of 36-inch to 54-inch new sewers in Idlewell.	Completed
B-W Replacement Pump Station (5375)	Construction of a new 28-mgd Braintree-Weymouth Pump Station which will handle flows from Hingham, Weymouth, and portions of Quincy.	Completed
Rehab Section 624 (5310)	Rehabilitation of 2,000 feet of Section 624 in North Weymouth.	Completed

Sub-phase	Scope	Status
Mill Cove Siphon Construction (6368)	Installation of 1,700 linear feet of 42-inch siphon pipe between Newell Playground and Aspinwall Street in North Weymouth to act as second barrel of existing Mill Cove Siphon.	Completed
Construction –Rehab (5309)	Interim rehabilitation of the existing Braintree-Weymouth Pump Station.	Completed
Community Tech Assistance (6331)	Technical assistance for the Town of Weymouth for hydraulic modeling of its sewer system, leak detection for the water system, and mitigation.	Completed
Geotechnical Consultant (6766)	Consulting services related to the tunnel shaft excavation.	Completed
Communication System (6792)	Radio systems for the intermediate and replacement pump stations.	Completed
Mill Cove Sluice Gates Design (7326) and Construction (7327)	Install a single gate to provide for system flushing to reduce sediment deposition and to control odors at the Braintree-Weymouth Pump Station.	Future
Braintree-Weymouth Improvements Design CS (7435), Construction (7366), and REI (7683)	Design/ESDC services for modifications needed to improve facility safety, reliability and performance. Design and construction improvements are required to address deficiencies in odor control, monitoring/instrumentation systems, solids screenings/handling and pumping operations. Corresponding REI services procured under separate contract. Construction awarded September 2022 with substantial completion scheduled for July 2024.	Active
IPS Transformer Replacement (7995)	Replace the transformer at the Intermediate Pump Station.	Active

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$248,035	\$228,893	\$19,141	\$4,112	\$5,301	\$10,909	\$11,580	\$3,448

Braintree-Weymouth Relief Facilities



Project Status 5/23	93.5%	Status as % is approximation based on project budget and expenditures. Braintree-Weymouth Improvements Design/Construction Services commenced in December 2018.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$243,825	\$248,035	\$4,210	Apr-26	Apr-31	60 mos.	\$9,675	\$11,580	\$1,905

Explanation of Changes

- Project cost changed due to updated cost estimates for Braintree/Weymouth Improvements based the contract award amount and Mill Cove Sluice Gates due to inflation adjustment.
- Project schedule changed due to updated schedule for Mill Cove Sluice Gates – Construction.
- Project spending changed due to updated cost estimates and schedule change listed above.

CEB Impacts

- None identified at this time.

S. 130 Siphon Structure Rehabilitation

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Extends current asset life*
- Improves system operability and reliability*

Master Plan Project 2009 Priority Rating 2 (see Appendix 3)

Design and construction of improvements to headhouses and structures.

Project History and Background

Siphon chambers are located at the upstream and downstream ends of depressed sewers. Depressed sewers are constructed to avoid obstructions in sewer alignments such as rivers and subsurface utilities. Upstream siphon chambers allow attainment of proper water elevation so that the depressed sewer flows under pressure. Downstream chambers provide transitions between depressed sewers and downstream gravity sewers.

Connecting structures are facilities at which flows from sewers are redirected to converge with or receive flows from other sewers.

There are 92 siphon chambers and 111 connecting structures in the MWRA wastewater system. Wastewater flows through many of these siphon chambers and connecting structures can be impacted by irregular maintenance due to the inaccessibility of many structures. Inadequate or reduced hydraulic capacity could in turn contribute to significant surcharges or overflows. Odor problems have also been identified at some siphon chambers and connecting structures due to hydraulic transitions.

MWRA completed a study in 1998 to evaluate rehabilitation of these structures in order to permit greater accessibility to provide regular maintenance to alleviate the above problems. 83 siphon chambers and 63 connecting structures were included in the study which recommended rehabilitation and improvements to 127 of these structures. MWRA has prioritized the design and construction of improvements to these structures. Phase 1 will provide access improvements and rehabilitation of structures at locations that are subject to inundation from potential surface flooding and are in greatest need of access and/or repair.

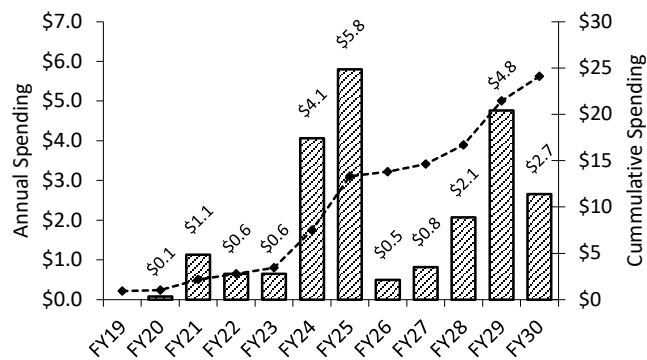
Scope

Sub-phase	Scope	Status
Planning (6017)	Identification of methods to improve accessibility and structures. Inspection of the siphon chambers and diversion structures along with recommendations for rehabilitation.	Completed
Phase 1 Design/CS/RI (6224) and Construction (6225)	Design, ESDC, REI and construction of improvements at high priority siphon locations. Scope includes 41 structures.	Active
Phase 2 Design/CA (7685), Construction (7686), and REI (7997)	Design, ESDC, and construction of improvements at high priority siphon locations. Scope anticipated to include 40 structures.	Future

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$24,362	\$2,794	\$21,568	\$648	\$2,502	\$4,065	\$13,251	\$7,669

Siphon Structure Rehabilitation



Project Status 5/23	12.7%	Status as % is approximation based on project budget and expenditures. Initial Planning subphase was completed in 1998. Design began in April 2020.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$19,423	\$24,362	4,939	Jul-27	Jan-30	30 mos.	\$13,824	\$13,251	(\$573)

Explanation of Changes

- Project cost changed due to updated Phase 2 Construction cost estimate.
- Project schedule changed due to updated Phase 2 Construction update.
- Project spending changed due to updated schedules for Phases 1 and 2.

CEB Impacts

- None identified at this time.

S. 132 Corrosion and Odor Control

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Extends current asset life*
- Improves system operability and reliability*

High sulfide levels in the Framingham Extension System cause corrosion and odors in that system and downstream in the Wellesley Extension Sewer System and West Roxbury Tunnel. A study has identified the causes of corrosion and odors and recommended corrective measures. Completion of corrosion control measures will extend the useful life of these assets and minimize the impact on the existing wastewater conveyance infrastructure. Improved odor control will mitigate the impact on surrounding areas.

Project History and Background

Hydrogen sulfide produces sewer odors and is highly corrosive to pipes and pump stations. Collapses in the Framingham Extension Sewer (FES) have alerted MWRA to problems in that area. Odor complaints have been received from residents abutting both the Framingham Extension Relief Sewer (FERS) and the Wellesley Extension Sewer (WES) systems resulting in legal claims totaling several hundred thousand dollars. Severe corrosion has occurred in the drop chamber leading to the West Roxbury Tunnel as well as documented corrosion in the tunnel itself.

While MWRA attempts to minimize odor and corrosion impacts through chemical intervention and sealing locations where odors escape, a more permanent solution is being sought. MWRA awarded a Planning/Study contract in January 1997. The consultant completed inspections in Ashland, Framingham, and Natick and drafted a report identifying, locating, and categorizing the sources and the extent of odor and corrosion problems. The Odor and Corrosion report indicated that significant levels of sulfides are discharged into the FES from Ashland and Framingham. These sulfide levels were documented to increase as the wastewater flows through the FES/FERS system. The report recommends a combination of MWRA and community actions, such as modifications to industrial discharge limits and municipal permits, chemical addition at community pump stations and the FES, and air treatment. The final planning/inspection report was completed in December 1998.

Following the Planning/Study the MWRA began the Interim Corrosion Control project. This design project included modifications to the FERS pump station, FES Tunnel, and air treatment systems. The design project was discontinued in June 2005, leaving the different project components at various levels of design. At the time, a decision was made to allow other recommendations made during the Planning/Study phase to be further implemented (i.e., modifications to community collection systems,

industrial discharge limits, municipal permit modifications). This decision has proven to be prudent given the significant reduction in hydrogen sulfide over the past decade. However, the high hydrogen sulfide levels are still prevalent enough to require chemical addition during the seasonal high period of the year to maintain hydrogen sulfide levels in an acceptable range for both corrosion control and to help reduce nuisance odors.

The Corrosion and Odor Control program has recently been expanded to include odor control and mechanical/ electrical modification to the downstream Nut Island Headworks.

Scope

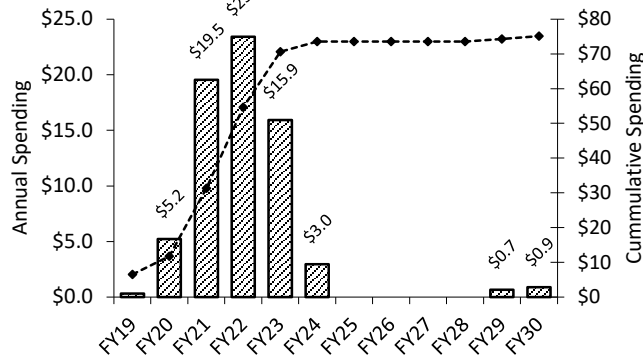
Sub-phase	Scope	Status
Planning (6137)	Identification of causes and sources of odors; collection of local sewer system information in Ashland, Natick, and Framingham; recommendations for long-term corrective measures.	Completed
Design/CS/RI (6553)	Design, construction services, and resident inspection for FERS Pump Station, FES tunnel, and air treatment systems. By June 2005, the FERS Pump Station achieved 50% Design status, the FES tunnel achieved 30% Design status and the air treatment systems achieved 100% Design status.	Completed
Interim Corrosion Control (6743)	Implementation of chemical addition program at the FERS Pump Station. The program includes the addition of potassium permanganate, and monitoring of the wastewater flows and hydrogen sulfide levels downstream.	Completed
FES/FERS Biofilters Design (6919) & Construction (7215)	FES/FERS Corrosion Control (Biofilters) is a design and construction project to make improvements in the MWRA sewers. Three air treatment systems (biofilters) are recommended to remove and treat hydrogen sulfide in the FES, FERS, WESR and WERS sewer systems. Rehabilitation of hydrogen sulfide meters will be included.	Future
Nut Island Mechanical and Electrical Upgrades Design/CA (7365), REI (7635), and Construction (7495)	This project provides design, ESDC/REI and construction for replacement/upgrades to the mechanical, electrical, instrumentation, and support systems at the Nut Island Headworks Facility.	Future
System-wide Odor Control Study (7364)	The prevalence of Hydrogen Sulfide gas in the collection system has been responsible for system wide odor complaints and infrastructure deterioration. This project will evaluate the system, identify the critical needs, and provide solutions.	Future

NI Headworks Odor Control and HVAC Improvements Evaluation (7494), Design, ESDC, REI (7517) and Construction Phase 2 (7548)	Design ESDC/REI and construction for improvements for the Nut Island Headworks Odor Control and HVAC systems and energy management system. This is the long term improvements project following the January 25-26, 2016 fire and following the Contract 7494 Odor Control, HVAC and Energy Management System Evaluation completed in February 2017. Failure of the odor control system would result in odors being released to surrounding areas and the discharge limits of the facility's air permit being exceeded.	Active
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Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$ 103,497	\$ 54,675	\$ 48,821	\$15,939	\$64,434	\$2,969	\$2,969	\$29,913

Corrosion & Odor Control



Project Status 5/23	66.4%	Status as % is approximation based on project budget and expenditures. Odor Control Evaluation was completed in February 2017. NI Odor Control & HVAC Design CA/REI commenced in March 2017 and construction began in February 2020.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$101,977	\$103,497	\$1,520	Dec-27	Dec-34	84 mos.	\$28,695	\$2,969	(\$25,726)

Explanation of Changes

- Project cost changed primarily due to change orders and amendment for Nut Island Headworks Odor Control and HVAC Improvements Design and Construction and inflation adjustments for FES/FERS Biofilters contracts.
- Project schedule changed due to updated schedule for FES/FERS Biofilters – Construction contract.
- Project spending changed primarily due to updated schedules for Nut Island Mechanical & Electrical Upgrades and FES/FERS Biofilters contracts.

CEB Impacts

- None identified at this time.

S. 136 West Roxbury Tunnel

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefit*
- Extends current asset life*
- Improves system operability and reliability*

Master Plan Project Priority Rating 1 (See Appendix 3)

Investigation and rehabilitation of the West Roxbury Tunnel sewer. This sewer, built in 1964, transports flows from the Wellesley Extension Relief Sewer System through the West Roxbury portion of Boston to the High Level Sewer. A structural failure could result in surcharging and overflows.

Project History and Background

During construction of the Wellesley Extension Replacement Sewer and inspection of the tunnel in 1999, visual observations indicated that severe corrosion due to hydrogen sulfide had occurred in a portion of the sewer directly upstream of the West Roxbury Tunnel (WRT), and that the tunnel entrance structure had lost cement lining, exposing the reinforcing steel. Manholes and other structures had been affected more severely.

A structural failure of the WRT would affect the tributary communities of Ashland, Brookline, Dedham, Framingham, Natick, Needham, Newton, Wellesley, and the Hyde Park and West Roxbury portions of Boston. Local failure of the tunnel could result in the discharge of 53 to 128 mgd of raw sewage into the Charles River until emergency repairs could be made, back-up of sewage into local residences and businesses, and the interruption of service to as many as 125,000 people. Section 138 is immediately upstream of the tunnel and crosses beneath the VFW Parkway in West Roxbury. Structural failure beneath this major transportation corridor would result in a severe public safety hazard.

Design for structural repairs to Section 138 and the West Portal of the tunnel were completed in June 2001. Construction of these repairs, Contract 6569, repairs to Sections 137 & 138, including the slipline of Section 138, were completed in June 2002. The design contract to rehabilitate the tunnel was awarded in February 2009 and ended in June 2011. The tunnel was inspected in August 2010 and there has been negligible deterioration since the 1999 inspection. Based on these findings and the significant reduction in hydrogen sulfide levels in the tributary sewers over the past decade, it was determined that the tunnel is not in need of immediate repair. In lieu of immediate repair, the West Roxbury Tunnel will be inspected to provide a condition assessment of the current conditions.

Scope

Sub-phase	Scope	Status
Inspection (6230)	Inspection of Section 137 of the West Roxbury Tunnel, which includes 12,500 linear feet of 84-inch reinforced and unreinforced concrete tunnel. Initial inspection completed in 1999.	Completed
Design/CS/RI (6570)	Design, construction services, resident inspection for corrective actions to repair/rehabilitate 1,000 feet of Section 138 and the West Portal, and a conceptual design report for the rehabilitation of the tunnel. Design/construction completed in June 2002.	Completed
Construction (6569)	Rehabilitation of 1,000 feet of Section 138 and the West Portal. Completed in June 2002.	Completed
Tunnel Inspection (6898)	Inspection contract to monitor the conditions of the tunnel in approximately 10 year intervals. Design of the non-professional services contract to perform the inspection is underway.	Active

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$10,964	\$10,314	\$ 650	\$0	\$0	\$325	\$ 650	\$0

Project Status 5/23	94.1%	Status as % is approximation based on project budget and expenditures. Tunnel Inspection is expected to begin in FY24.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$11,314	\$10,964	(\$350)	Jun-24	Oct-24	4 mos.	\$1,000	\$650	(\$350)

Explanation of Changes

- Project cost, scheduled completion date and spending changed primarily due to updated cost estimate, schedule and spending for Tunnel Inspection contract.

CEB Impacts

- None identified at this time.

S. 137 Wastewater Central Monitoring

Project Purpose and Benefits

Extends current asset life.

Results in a net reduction in operating costs

Improves system operability and reliability

To study, define, design, and implement a centralized monitoring and control system most appropriate for MWRA's wastewater transport system. Through facility automation and remote monitoring and control, SCADA implementation will result in cost savings and improve wastewater system operation and maintenance.

Project History and Background

MWRA has implemented automation and central monitoring and control of its water and wastewater systems and facilities. Substantial investments have been made in implementing such systems for the Deer Island Wastewater Treatment Plant, and Supervisory Control and Data Acquisition System (SCADA) implementation is fully operational at the wastewater transport facilities and the water conveyance and treatment system.

The SCADA Master Plan, which was completed in July 1999, recommended expansion of the automated control concepts developed for water system operation and identified long-term savings related to staffing reductions and optimization of operations and maintenance. Following the master planning recommendations, a detailed scope of services was prepared to procure professional services contract to provide design, integration, training, construction administration and resident inspection services for various SCADA improvements. Camp Dresser & McKee, Inc. (CDM) was awarded this contract in June 2002. The construction effort on the first and most complex of two construction packages began in March 2006 and reached substantial completion in January 2008. This construction addressed SCADA needs at most pumping and CSO facilities, as well as establishing overall data communications improvements. The second construction package provided for SCADA needs at the remote headworks facilities, taking into consideration future CIP improvements at Chelsea, Columbus Park, and Ward Street Headworks facilities. This contract reached substantial completion in July 2009.

Additional CIP sub-phases have been added and are being implemented to replace existing SCADA equipment that is nearing the end of its useful life or is no longer supported by the manufacturer. Additional efforts will be performed to enhance SCADA communications and improve on computer graphics used by operators to monitor and control facilities (Human Machine Interfaces) and PLC related systems to improve upon cyber security and maintainability.

Scope

Sub-phase	Scope	Status
Planning (6232)	Development of a plan for a monitoring and control system for the MWRA wastewater transport system.	Completed
Design and Integration Services (6532)	Includes design, integration (PLC programming, operator graphics development, MIS/CMMS data transfer), and development and implementation of training. Also covers preparation of documentation and manuals for automating equipment and systems and for remote monitoring and control of the wastewater transport systems and facilities. Includes construction administration, engineering services during and after construction, and resident inspection.	Completed
Construction 1 (CP1) (6533)	Construction and installation of SCADA equipment and systems at seven pumping facilities, three CSOs and one screen house. Also covers Operation Control Center improvements. Facilities include Alewife, Caruso, Hingham, New Neponset, Hayes, Delauri, Houghs Neck, Chelsea Screen House, Cottage Farm, Prison Point, and Somerville Marginal. This construction package included the major components of the SCADA communications infrastructure (microwave radios, routers, etc.).	Completed
Construction 2 (CP2) (6534)	Construction and installation of SCADA instrumentation and control equipment at the three older headworks facilities and Nut Island Headworks. OCC improvements were also made to support these additional facilities.	Completed
Equipment Pre-purchase (6861)	Purchase SCADA system components including computer hardware to ensure consistency with MWRA MIS infrastructure through existing Commonwealth of MA blanket contracts and low cost small quantity system components (ex. fuel tank monitoring units and interfaces, Prison Point Flow meter, CSU/DSUs), and additional instrumentation and control equipment at the Arthur St. Pump Station to ensure consistency and/or compatibility with installed systems.	Completed
Technical Assistance (6535)	Technical assistance work to support all subphases.	Completed

Wastewater Redundant Communications (7363)	To study and implement redundant communications alternatives for Wastewater facilities and improve upon existing communication systems, with an emphasis on wireless options. It is critical to have alternative communication means to ensure facility data, including important facility alarms from unstaffed facilities can reach the Operations Control Center.	Active
Wastewater SCADA/PLC Upgrades Design and Programming Services (7578), Construction (6656), and Equipment Hardware (7580)	Replacement of existing SCADA PLCs nearing their end of useful life with an updated PLC platform. New PLC platforms further provide increased security capabilities, improved programming functionality and maintainability enhancements. Secondary goals include standardizing PLC logic and HMI graphics, and upgrading aging field instrumentation. Project includes Design and Programming Services, Construction, and Equipment Hardware. During FY19 a contract was issued to provide programming to upgrade BOS019 and Framingham SCADA systems. Hardware has been purchased and the project is anticipated to be complete early FY22.	Active

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$27,482	\$19,926	\$7,556	\$0	\$ 144	\$0	\$ 3,322	\$ 4,234

Project Status 5/23	72.5%	Status as % is approximation based on project budget and expenditures. Construction 1 contract was substantially complete in December 2007. Construction 2 contract was substantially complete in July 2009. Wastewater SCADA/PLC Upgrades Design and Programming Services began in April 2018.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$27,482	\$27,482	\$0	Nov-28	Nov-28	None	\$ 7,368	\$ 3,322	(\$4,046)

Explanation of Changes

- Spending changed primarily due to updated cashflows for Design and Programming Services and Equipment Hardware.

CEB Impacts

- None identified at this time.

S. 139 South System Relief Project

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Extends current asset life*
- Improves system operability and reliability*

To protect public health and property from sanitary system overflows and back-ups into homes and businesses during extreme wet weather events. Completion of the project will also extend the useful life of system assets and potentially avoid extraordinary costs resulting from system failures.

Project History and Background

Archdale Road Diversion Structure

On October 20, 1996 a 100-year rainstorm caused the MWRA High Level Sewer (HLS) (Section 70) to overflow in the area of Archdale Road in Boston. Following this overflow event, MWRA established a task force to recommend action to mitigate and/or prevent future overflows. The task force developed an emergency response plan and examined several relief alternatives. The first component of the recommended relief plan consisted of construction of a diversion structure that includes two 30-inch by 60-inch sluice gates connecting the HLS to BWSC's Stony Brook drainage conduit. The diversion structure is located at the end of Bradeen Street in Roslindale. If, based on monitoring results, it appears that the High Level Sewer is about to overflow in the Archdale Road area due to an extraordinary storm event, the overflow volume is diverted to the Stony Brook Conduit through the sluice gates. This eliminates the need to deploy large emergency response crews to build temporary sandbag dikes. Construction of the diversion structure was completed in August 1999.

High Level Sewer Repair

Subsequent to the October 1996 storm, MWRA initiated some short-term modifications to the sewer system to reduce overflows. However, during a June 1998 storm, these modifications actually pressurized the HLS. As a result, MWRA began an emergency evaluation of the HLS in June 1998 to analyze its hydraulic capacity and structural integrity. The evaluation, which was completed in January 1999, discovered cracking at a 77-degree bend in the sewer in the Archdale Road area that required immediate attention. Inspection also indicated that approximately 40 feet of the HLS, located in the Arnold Arboretum, needed repair. A construction contract notice-to-proceed was issued in June 1999 and construction was completed in October 1999.

Outfall 023 Cleaning and Structural Improvements

Following the October 1996 storm, the City of Boston engaged a consultant to review the events and recommend remedial actions to prevent future flooding under similar conditions. One recommendation was to clean sediment and debris from the Stony Brook Conduit. Boston Water & Sewer Commission (BWSC) has cleaned the upstream portion of the conduit and MWRA has cleaned the outfall from the Metropolitan District Commission (MDC) gatehouse at Charlesgate to the Charles River. This part of the project also covers structural modifications to Outfall 023 to permit access points and diversion capabilities for future cleaning. This portion of the project has been moved out to fiscal year 2024 after a 2019 inspection discovered acceptable sedimentation levels. Staff will continue to periodically inspect the outfall for increased sedimentation levels and report if schedule modification need to be made.

Milton Financial Assistance

Two residential areas in the Town of Milton have experienced sewage backups into homes during wet weather events and periods of prolonged wet weather. One area affected is a direct tributary of MWRA's High Level Sewer and the other is a tributary to MWRA's New Neponset Valley Sewer. In September 1999, MWRA and Milton entered into a financial assistance agreement to fund design and construction of new sewers, rehabilitation of an existing pump station, and construction of a new pump station to mitigate downstream impacts from high flow conditions in the improved High Level Sewer.

Pump Station Feasibility

MWRA considered investigating the feasibility of constructing a small pump station to convey wastewater from a small area of Quincy away from the Braintree Howard Street Pump Station. The flow would be re-routed back to the Quincy collection system. The City of Quincy would own and operate the pump station. Upon further evaluation, MWRA has decided to delete this project and instead, will continue an MOU with Braintree to pay the town annually for use of 25 percent capacity of Braintree's Howard Street Pump Station.

Scope

Sub-phase	Scope	Status
Archdale Design/CS/RI (6419) and Construction (6420)	Design, construction services, and resident inspection for the Archdale Road Diversion Structure. Construction of an underground diversion structure that houses two 30-inch by 60-inch horizontal sluice gates on the sidewall of the HLS. This structure controls flow into BWSC's Stony Brook Conduit.	Completed
Sections 70 and 71 HLS Evaluation (6519), and Construction (6611)	Initial evaluation and construction of recommended improvements.	Completed
Milton Financial Assistance (6616)	Payment to the Town of Milton for local projects to mitigate downstream impacts from high flow conditions.	Completed
Construction and Improvements for Outfall 023 (6801)	Removal and disposal of sediment and debris from Outfall 023 as well as continuation of structural improvements to enable future cleaning operations.	Future

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$4,939	\$ 3,439	\$ 1,500	\$0	\$0	\$0	\$0	\$ 1,500

Project Status 5/23	69.6%	Status as % is approximation based on project budget and expenditures. All sub-phases are complete except for Outfall 023 Structural Improvements which is scheduled to commence in FY24.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$4,939	\$4,939	\$0	Dec-25	Dec-31	72 mos.	\$ 1,500	\$0	(\$ 1,500)

Explanation of Changes

- Schedule and spending change primarily due updated schedule for Outfall 023 - Structural Improvements.

CEB Impacts

- None identified at this time.

S. 141 Wastewater Process Optimization

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Extends current asset life*
- Improves system operability and reliability*

To optimize wastewater system operating procedures and make system improvements and modifications to ensure maximum wastewater treatment, minimum operating and maintenance costs, and extension of the useful life of system assets.

Project History and Background

This project was established to support MWRA Business Plan strategies, which recommend the development of a wastewater process optimization plan, central monitoring facilities for the sewerage system, rehabilitation of wastewater interceptors, and the utilization of automation and new technology to increase efficiency.

The completed planning phase included the development of an updated hydrologic and hydraulic model (InfoWorks CS) and the evaluation of optimization alternatives under typical and extreme storm events. MWRA has evaluated several of the alternatives and has been using hydraulic information gained during this phase to develop facility control logic under the Wastewater Transport SCADA Implementation Project. Two alternatives, which include pipeline modifications, will be taken further as defined below. The model developed under this project continues to be used by MWRA staff for in-house system evaluation and NPDES reporting requirements and by outside consultants to support CSO-related and collection system improvement projects.

Scope

Sub-phase	Scope	Status
Planning (6733)	Evaluate collection system and facility modification alternatives to maximize wastewater treatment and minimize operating and maintenance costs.	Completed
North System Hydraulic Study (6930)	Review the frequency and extent of sanitary sewer overflows (SSOs) in the area tributary to Chelsea Creek Headworks and to evaluate and recommend alternatives to optimize the performance of the collection system and to eliminate or reduce SSOs or relocate them to minimize potential human health risks or environmental impacts.	Completed
Hydraulic Modeling Engineering Design and Construction (7412)	Model impacts of outfall on Mass Bay which is required under the NPDES permit using the Bay Eutrophication Model. Also, phase will be for future implementation of system optimization measures or more significant system modifications which were identified during the North System study. Additional follow-up analysis or project implementation may be done under this phase.	Completed/Future

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$8,310	\$ 2,172	\$ 6,138	\$27	\$698	\$0	\$0	\$6,111
Project Status 5/23	26.5%	Status as % is approximation based on project budget and expenditures. The Notice-to-Proceed for the North System Hydraulic Study was completed in June 2015. Modeling Massachusetts Bay Water Quality contract Notice to Proceed was issued in May 2019.					

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$8,310	\$8,310	\$0	Jun-31	Jun-31	None	\$2,954	\$0	(\$2,954)

Explanation of Changes

- Spending changed due to updated cash flows for Hydraulic Modeling Engineering - Design and Construction.

CEB Impacts

- None identified at this time.

S. 142 Wastewater Metering System – Equipment Replacement Project

Project Purpose and Benefits

- Replace Existing Permanent Wastewater Metering System*
- Evaluate and Update Community’s Flow Metering Methodologies*
- Continue providing the most accurate and reliable Wastewater metering data for rates*
- Improves system operability and reliability*

The Wastewater metering system primary purpose has been to quantify wastewater flow from each of the 43 MWRA wastewater member communities for use in the formulation of sewer charges. The existing metering system is 12 years old, it was designed with a life expectancy of 7 to 10 years; it is still running reasonably well and MWRA’s staff has taken great care to ensure that the accuracy and reliability of meter data is not affected and the metering data is based upon sound engineering and business practices for rate purposes. The project will include planning, design, and Resident Engineering/Inspector (REI) services for the replacement of the wastewater metering system, conduct wastewater flow measurements in unmetered areas and incorporate them in the evaluation of existing community metering methodologies

Project History and Background

The MWRA’s permanent wastewater metering system was initially constructed in 1994. The primary purpose has been to quantify wastewater flow from each of the 43 MWRA wastewater member communities for use in the formulation of sewer charges, which includes a flow-based component. Other uses of the data include collection and treatment system analysis and planning, infiltration and inflow quantification in member communities, use in hydraulic models and to a limited extent, operations support.

In 2005 the first wastewater metering system replacement project was completed, the existing MWRA wastewater meters were installed with wireless phone communication and data collection system. Currently the wastewater metering system consist of 212 metering sites located throughout the 43 wastewater member communities, 189 are rate meters and 23 non rate meters. Of the 212 meters, 187 are located inside of sewer manholes and 25 Remote Terminal Units (RTU) are installed inside of MWRA and community facilities. The majority of the meters are installed in gravity sewer lines, owned and operated by the Authority or its member communities. These sewer lines have various pipe shapes, ranging in size from 8 inches to 150 x 138 inches, with manhole depths ranging from 5 feet to over 40 feet deep. The metering sites are located in residential, commercial and industrial areas.

Contract 6739 is comprised of two phases. Phase One includes the evaluation, planning and design of the wastewater metering system of approximately 225 permanent meter sites. Phase Two consists of the metering system replacement installation which includes Resident Engineering and Resident Inspection Services to oversee meter equipment installation and acceptance.

Under Phase One of this project, the flows from all unmetered areas will be updated, using temporary meters, weirs and instantaneous depth of flow and velocity measurements, to account for any changes in flow from those areas over time. The metered areas and meter locations will be evaluated and recommendations to improve the percentage of metered flow above the 85% threshold will be considered where is reasonably feasible bearing in mind the benefits of adding meters versus associated capital and operational/maintenance cost. All existing and any proposed new metering sites will be evaluated and for each meter location the most suitable meter type to provide flow data with a high degree of accuracy and reliability will be recommended.

Phase One also includes the evaluation of the most current and emerging wastewater metering, wireless communication, data collection and analysis software technologies, including reviews of similar systems currently in use elsewhere in the country. The metering system replacement design documents (plans and specifications) for public bidding will be prepared for Contract 7191 and title Permanent Metering System Equipment Purchase and Installation.

Phase Two will include Resident Engineering and Resident Inspection Services to oversee meter equipment installation and acceptance plus the one-year warranty period. The purchase and installation of the meters will be a separate contract overseen by the Phase 2 services.

The wastewater metering system evaluation (including field evaluation and measurement of currently unmetered areas), planning, design and bidding services for purchasing a replacement meter system and equipment is estimated to take 26 months from Notice to Proceed. Phase Two meter installation and acceptance is estimated to take 15 months, followed by a 12-month warranty period.

Scope

Sub-phase	Scope	Status
Planning/Design/REI (6739)	Development of a long-term plan to upgrade or replace the existing wastewater metering system (technology, hardware, software, telemetry). Conduct Wastewater flow measurements in unmetered areas, evaluate and update Community Flow Formulas (CFF). Oversee purchase of metering system and perform REI services during meter installation.	Active
Equipment Purchase/Installation (6793)	Purchase and installation of equipment.	Completed

Wastewater Metering Asset Protection/Equipment Purchase (7191)	Rehabilitation, replacement and upgrades (planning, design and construction) for the Wastewater Metering System to be required every 10 years over the 40 year planning period. Under this phase the Authority awarded Contract 7191 to replace 174 meters throughout the 43 wastewater member communities. The meter installations are expected to be completed by the end of calendar 2021. The next phase of meter installations are anticipated to commence in FY31.	Active
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Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$21,030	\$ 11,961	\$ 9,069	\$395	\$6,632	\$0	\$0	\$8,674
Project Status 5/23	56.8%	Status as % is approximation on project budget and expenditures. The purchase and installation of 2 nd generation of meters is complete. Planning/Design/REI contract was awarded in June 2017. Metering Equipment Purchases and Installation was substantially complete in February 2022.					

Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$21,030	\$21,030	0	Dec-30	Dec-42	144 mos.	\$0	\$0	\$0

Explanation of Changes

- Project schedule changed due to updated schedule for Equipment Purchase contract.

CEB Impacts

- Potential cost savings associated with this project have yet to be quantified.

S. 145 Interception and Pumping Facility Asset Protection

Project Purpose and Benefits

Extends current asset life

Improves system operability and reliability

Improves energy efficiency

To protect the investment of MWRA ratepayers by ensuring timely replacement of equipment and systems.

Project History and Background

This project was developed to ensure that MWRA maintains ongoing service while optimizing operations in its wastewater facilities. This project, in its current form, addresses immediate critical facility and equipment issues. This project will eventually include five areas:

1. Equipment replacement (pumps, HVAC equipment, blowers, etc.).
2. Architectural projects (concrete corrosion, etc.).
3. Utilities projects (water, sewer, drainage, electrical wiring, heating system, etc.).
4. Support Projects (process control system upgrades, etc.).
5. Specialty Projects (instrumentation upgrades, fuel storage tanks, etc.).

The Interception and Pumping Asset Protection project will be ongoing throughout the useful life of the facilities.

Scope

Sub-phase	Scope	Status
Rehabilitation of Section 93A Lexington (6798)	Rehabilitation of 4,000 linear feet of pipeline in Lexington (Section 93A). Completed in April 2004.	Completed

Sub-phase	Scope	Status
Sections 80 and 83 (6842)	Evaluation of the condition of Sections 80 and 83 and design and construct repairs to damaged portions. TV inspection revealed numerous cracks and holes, which impair the structural integrity of the pipe. Contract completed in September 2007.	Completed
Section 160 (6843)	Rehabilitation of 11,000 linear feet of Section 160 of the Mystic Valley Sewer in Winchester due to extensive deterioration of the brick and concrete sewer. Rehabilitation of sewer completed.	Completed
93A Force Main Replacement (6987)	Replacement of 1,100 feet of 24-inch ductile iron force main due to extensive corrosion from hydrogen sulfide. Contract was substantially complete in January 2007.	Completed
Mill Brook Valley Sewer Sections 79 & 92 (7004)	Rehabilitation of a portion of Section 79 pipeline in Arlington. Under MOU trust agreement, MWRA to absorb 50% of total cost of rehabilitation.	Completed
Prison Point HVAC Upgrades, Design (6938) and Construction (6795)	The HVAC system improvements are complete and included the replacement of components for the HVAC system as well as the ductwork, air handling equipment, dampers, louvers, and odor control were in need of upgrade. The conversion of the control system for the HVAC to electronic digital control was completed in FY05/FY06 under the CEB. The diesel engine fuel system modifications at this facility were completed under the SCADA contract and included the fuel oil delivery feed to the system boiler.	Completed

Sub-phase	Scope	Status
Chelsea Screenhouse Upgrades (7431), and ESDC/REI (7490)	<p>The Chelsea Screenhouse has four climber screens and seven hydraulic gates and was built to screen sewage upstream of the Chelsea Creek Siphons and Caruso Pump Station, and to provide screening of flows diverted from the Chelsea Creek Headworks during wet weather events. Most of the operating equipment has passed its useful lifespan. A preliminary evaluation of the gates in 2007 identified maintenance and operational issues. In November 2011, a conceptual design report for the facility was performed within the Remote Headworks Upgrades Design contract, with recommendations for replacements and upgrades to equipment at the facility. A task order, under the As-Needed Technical Assistance contract, was executed in August 2012 to perform final design of the upgrades. ESDC/REI was performed under a separate contract.</p>	Completed
Remote Headworks Heating System Upgrades (6796)	<p>Existing boilers at each of the remote headworks require significant maintenance and consume substantial fuel. A preliminary design report was completed and alternative energy-saving systems are recommended to replace the existing heating systems. The replacement of the existing heating system at the Chelsea Creek Headworks has been completed. The systems at Ward Street and Columbus Park will be replaced under the Ward Street and Columbus Park Headworks Upgrade Project.</p>	Completed

Sub-phase	Scope	Status
Remote Headworks Concept Design (6886)	A Concept Design was performed to identify the needs of the three remote headworks facilities to recommend equipment replacement and upgrades for further design and construction. The Concept Design included a Condition Assessment of all equipment and non-equipment assets to establish a basis for improvements and upgrades to meet business goals and objectives.	Completed
Hingham Pump Station Isolation Gate Construction (7033)	The Hingham Pump Station was built without an influent gate. The station services the Town of Hingham and had no direct means to isolate the flow to this station. Labor intensive and inefficient means using stop logs, sand bags, sewer plugs and pumps were required to isolate and divert flow. This project included the design and installation of a sluice gate in a diversion chamber, to isolate the station and bypass flow allowing maintenance to take place in the station without interruption of service.	Completed
Study Cambridge Branch 27,26,25, 25.5, 24,23 (7511)	The Cambridge Branch Sewer was constructed between 1892 and 1895. The sewer study was completed in 2018 to evaluate rehabilitation needs, feasibility, and scope.	Completed
Melrose Sewer (7248)	Design and construct an 18-inch diameter sewer extension of an existing MWRA sewer on Melrose St. to reduce MWRA sewer overflows at the Roosevelt School. The construction contract was awarded in January 2010 and completed in September 2010.	Completed

Sub-phase	Scope	Status
Nut Island Headworks Fire Alarm/Wire Conduit (7144)	This project will replace the existing obsolete and problematic fire alarm system and faulty wiring at Nut Island Headworks. There have been significant repair costs over the past several years to keep the system functional and to correct deteriorated connections and ground faults. An engineering task order was used to design upgrades to the system and upgrades and replacements were completed in FY10.	Completed
Nut Island Headworks Electrical & Grit/Screenings Conveyance System Design CA/RI (7312) and Construction (7313)	This subphase includes the design and construction of improvements to the electrical system, which is subject to groundwater infiltration, and to the grit and screenings conveyance system which have alignment and operations problems, at the Nut Island Headworks. Based on final preliminary design reports completed in July and August 2011, recommendations were made to improve or replace these systems. Design recommendations were included in one construction contract.	Completed
Cottage Farm Fuel System Upgrade (7281)	Replacement of existing fuel oil system to meet current code requirements, ensure reliable operation, and provide safeguards against accidental oil spills.	Completed

Sub-phase	Scope	Status
Somerville/Marginal Influent Gates and Stop-Log Replacement (7344)	<p>The Somerville Marginal facility has two 5'X6' sluice gates that were installed in 1987. These 22-year old gates are used to hold wastewater in the upstream combined sewer system until the level reaches a predetermined elevation, at which point the sluice gates are opened and the facility is activated (chemicals added, screenings removed). The treated CSO is conveyed to the MWRA permitted CSO discharges MWR205 or MWR205A, upstream and downstream of the dam on the Mystic River. During October of 2009, MWRA staff discovered non-continuous, wet weather gate leakage. Repairs to the gates were made and an air barrier was created using stop planks and temporary sump pumps upstream of the gates to minimize gate leakage. However, given the age and frequent problems with these gates and need to create a more permanent and effective barrier between the CSO system and downstream receiving waters, this project was initiated. The project will replace the facility gate, as well as upstream and downstream stop planks and install permanent sump pumps downstream of the gates to create an air void to ensure CSO does not enter the receiving waters until a facility activation is required. Project design was completed under Task Order 20 (contract 7070) and construction was substantially complete in November 2011.</p>	Completed

Sub-phase	Scope	Status
<p>Caruso Pump Station Improvements Design/CA/RI (7037), and Construction (7362)</p>	<p>This project will replace the existing standby generator, HVAC system, fire detection/suppression system and security system at the Caruso Pump Station. The standby generator is 25 years old and is a one of a kind of this type of generator. The manufacturer is no longer making spare parts and there is only a limited quantity of available spare parts. The generator is being replaced with a newer model with readily available parts to ensure reliable back-up power and increased to 1,000 kW to provide power for the full design capacity of the station. The HVAC system is in need of improvement as is the fire detection/ suppression system and security system. Construction contract 7362 was awarded with an NTP dated March 24, 2016. Project substantial completion achieved June 9, 2017.</p>	<p>Completed</p>
<p>Prison Point/Cottage Farm Facilities Diesel Engine Upgrades/Pump and Gearbox Rebuilds ESDC (7330) and Construction (7452)</p>	<p>Refurbishment of the Prison Point CSO Gearboxes and pumps based on an inspection report performed in May 2010. It is critical during major wet-weather events to have all four pumps operational to provide maximum station capacity and provide redundancy at this critical CSO facility. Also, MWRA non-emergency generator upgrades required by EPA National Emissions Standards for Hazardous Air Pollutants (NESHAP) regulations for Prison Point and Cottage Farm CSO facilities.</p>	<p>Completed</p>

Sub-phase	Scope	Status
Section 156 Design/Build (7393)	Rehabilitation of sewer Section 156 and a portion of adjacent Sections 17 and 19, and associated structures/manholes located between Air Force Road and the Malden River in the City of Everett. The sewer is a 120-year old, 61-inch by 56-inch rounded horseshoe brick sewer, which conveys flows of up to 40 million gallons per day from Wakefield, Stoneham, Woburn, Winchester, and parts of Medford. The sewer is 1,800 feet long of which 125 feet was repaired in 2001. The design/build contract, including Cured-in-Place lining was completed.	Completed
Design/ESDC/REI (7410) and Construction (6936) Cambridge Branch Sewer 1 Sections 23, 24,25,26 (Spot Repair)	Design and construction of the Rehabilitation of Cambridge Branch Sewer Sections 27 and 26 in Charlestown, Somerville, and Cambridge.	Future
Prison Point Piping Rehabilitation (7549)	As a recommendation of the Prison Point/Cottage Farm CSO Preliminary Design/Study, this project will repair weak spots, replace pipe saddle supports, and install an erosion/corrosion liner in the discharge piping.	Completed
Quincy/Hingham Pump Station Fuel Storage Upgrades Construction (7534)	Project to improve diesel fuel storage capacity at Quincy and Hingham pump stations. Hingham's underground tank failed and will be replaced with an above ground tank. Quincy tank storage to be increased from 1 day to 5 days of storage with the addition of an above ground tank.	Completed
Design/ESDC/REI (7513) and Construction (7280) Cambridge Branch Sewer 2 Everett Sections 23 and 24	Design and Construction of the Rehabilitation of Cambridge Branch Sewer Sections 23 and 24 in Everett and Charlestown.	Future

Sub-phase	Scope	Status
Design/ESDC/REI (8014) and Construction (8015) Cambridge Branch Sewer 3 Everett Sections 25 and 26	Design and Construction for the rehabilitation of Cambridge Branch Sewer Section 25 and 26 in Everett.	Future
Interceptor Renewal 7 Malden & Melrose Study/Design/CA (7216), Construction (7217), and REI (7751)	Rehabilitation of Melrose, Malden Sections 41,42,49,54 and 65.	Active
Interceptor Renewal No. 6 Chelsea Sections 12/14/15/62 Design/CA/REI (7514) and Construction (7329)	Rehabilitation of portions of Sections 12/14/15/62 in Chelsea.	Future
Ward Street and Columbus Park Headworks Upgrades Design/ESDC (7429), REI Services (7636), Ward Street Headworks Construction (7430), and Columbus Park Headworks Construction (7587)	Upgrade to include replacement of the screens, grit and screenings collection and conveyance systems, odor control, HVAC, mechanical, plumbing, instrumentation, and electrical systems, as well as the antenna tower at Columbus Park Headworks. It also includes an evaluation of a new facility to replace the existing superstructure at Ward Street and Columbus Park, and rehabilitation of the effluent channels and shafts at Ward Street and Columbus Park.	Active

Sub-phase	Scope	Status
Hayes Pump Station Rehab Design (7162), Construction (7375), and REI (7668)	Design and construction of improvements to Hayes Pump Station, which was constructed in 1987. Due to its age, all major facility components require replacement or rehabilitation including the following: sluice/slide gates, climber screen and grinder system, pumps, valves, instrumentation, motor control center, and emergency generator. The odor control system will be redesigned with the odor control fan relocated outside of the Reading Pump Station. The architectural, fire protection, and building code requirements identified in the previous Code Evaluation Technical Memorandum will be constructed or waivers pursued where applicable. Hazardous materials identified from previous testing will be abated during construction. The project will also improve site drainage. Corresponding REI services to be procured under separate contract.	Active
Somerville-Marginal CSO Facility Rehabilitation Design/CA (7689), Construction (7688) and REI (7829)	Design & construction of upgrades to DeLauri, Hingham, and Hough's Neck Pump Stations & Somerville Marginal CSO Facility. At pump stations and CSO facilities, operability of mechanical equipment and maintenance of electric/standby power systems are key elements to minimize risk of facility failure. Malfunction of mechanical equipment may impact sewer service. Replacement of aging equipment will reduce emergency and corrective maintenance requirements. Somerville	Active
DeLauri Pump Station Rehabilitation Design/CA (7824), Construction (7826) and REI (7825)		
Hingham Pump Station Rehabilitation Design/CA (7827), Construction (7797), and REI (7796)		

Sub-phase	Scope	Status
Houghs Neck Pump Station Rehabilitation Design/CA (7798), Construction (7828), and REI (7799)	Marginal CSO followed by Hingham Pump Station have been selected as the first two facilities for rehabilitation. Scopes of services are under development with Design/ESDC services and are expected to commence in FY24.	
Cottage Farm Rehab and Chemical Building Improvements Design CA/REI (7970) and Construction (7971), and PCB Abatement Design CA/REI (7392), and Construction (7389)	The Cottage Farm CSO Facility was placed into operation in 1971. The Cottage Farm Chemical Building was built adjacent to the Cottage Farm CSO Facility and placed into operation in 1999. The rehabilitation of these facilities will be performed under two main phases as agreed to with EPA in the PCB abatement plan. The first phase will include PCB abatement to remove approximately 80-90% of PCBs within the facility. The second phase will include major equipment upgrades including pumps, engines, sluice gates, gearboxes for coarse screens, electrical distribution systems, and repair/replacement of miscellaneous equipment and structures as identified in the 2012 Cottage Farm CSO Planning Report. Improvement/installation of systems as appropriate for energy efficiencies, security and fire alarm will also be included. Chemical building improvements will also be addressed in phase 2 along with the remaining PCB abatement after completion of Phase 1.	Active

Sub-phase	Scope	Status
<p>Fuel Oil Tank Replacements at Various Facilities Construction Phases 1,2, 3, 4 and 5 (7554, 7555, 7637, 7986, 7987)</p>	<p>Fuel tank replacement at all facilities (water and wastewater) to avoid tank failures. Phase 1 includes two tanks at Gillis Pump Station (one is out of service), one tank at Lexington Street Pumping Station, and one tank at Hayes Pumping Station. For Phase 2, two vehicle fuel tanks (one diesel, one gasoline) will be replaced at the Lonergan Intake Lower Garage and two vehicle fuel tanks (one diesel, one gasoline) at Southborough Facilities. Vehicle fuel management systems to be replaced at these two facilities. For Phase 3, six tanks will be replaced at five facilities. Phases 4 and 5 for fuel tank replacements at all facilities to avoid tank failures based on priorities (1) single wall tanks in vaults (2) double wall steel tanks, approximately 20 years old, and (3) double wall fiberglass tanks over 25 years old.</p>	<p>Completed/Active/Future</p>
<p>Interceptor Renewal No. 3 Dorchester Interceptor Sewer Design CA/RI (7512), and Construction (7279)</p>	<p>Rehabilitation of Dorchester Interceptor Sewer Sections 240, 241, and 242.</p>	<p>Completed</p>
<p>Interceptor Renewal No. 5 New Neponset Valley Sewer Sections 607/608/609/610 Design/CA/REI (7515), and Construction (7328)</p>	<p>Rehabilitation of 15,000 linear feet of New Neponset Valley Sewer in Milton.</p>	<p>Future</p>

Sub-phase	Scope	Status
<p>Interceptor Renewal No. 1 Reading Extension & Metropolitan Sewer Design CA/RI (7163) & Construction (7164)</p>	<p>Reading Extension Sewer (Sections 75, 74, and 73), rehabilitation of 12,400 linear feet of 15, 18, 20-inch Vitrified Clay (V.C.) pipe, primarily in Stoneham, with short reaches in Wakefield and Woburn. Approximately 1,400 linear feet of Reading Extension Sewer Section 74 were CIPP lined in the mid 1990's. Also, included is rehabilitation of 2,280 linear feet of 15-inch V.C. pipe of the Metropolitan Sewer Section 46 in Stoneham. Construction contract 7164 was issued a NTP in August 2017. Project substantial completion achieved on December 10, 2018.</p>	<p>Completed</p>
<p>Alewife Brook Pump Station Rehabilitation Design CA/RI (6937), and Construction (6797)</p>	<p>The Alewife Brook Pump Station was built in 1951. The wet weather pumps are original equipment. The rehabilitation includes replacing the three wet weather pumps, motors, and piping, replacing the influent screens and grinders, updating the HVAC system, upgrading the electrical system, remediating PCB-containing paints, and modifying the building interior to meet current building codes, energy efficiency improvements, flood protection measures, and security improvements.</p>	<p>Completed</p>

Sub-phase	Scope	Status
Remote Headworks Shaft Study (7237)	<p>At each of the four remote Headworks, Chelsea Creek, Ward Street, Columbus Park and Nut Island, the wastewater is discharged into a vertical shaft connected to a tunnel that conveys the sewage to the Deer Island Treatment Plant. A past inspection of the shaft at Chelsea Creek indicated that the walls of the shaft are severely deteriorated. Failure of a shaft could incapacitate the Headworks facility. There is concern this may cause additional problems at Deer Island. To-date, there have been no reported issues but it is suggested that deterioration of the interior surfaces could be detrimental to pumps or other wastewater equipment. The Remote Headworks Shaft Study was completed and evaluated the condition and rehabilitation needs of the four effluent shafts and connecting structures receiving flow from the remote headworks facilities, and the three shafts located at Deer Island. The Study recommendations for the shafts at the Ward Street and Columbus Park Headworks will be carried forward under the upcoming Ward Street and Columbus Park Headworks Upgrade design and construction subphase. A smaller project was designed under the current study to remove grating in the three older Headworks and replace the shaft covers. Construction at Ward Street and Columbus Park will be performed under the Remote Headworks Shaft Access Improvements project.</p>	Completed

Sub-phase	Scope	Status
<p>Remote Headworks Shaft Access Improvements Construction (7550), and ESDC & REI (7781)</p>	<p>Removal of grating/ associated supports and shaft cover replacement at Ward Street and Columbus Park Headworks. This project will allow for improved access to the shafts at the remote headworks for inspections and rehabilitation under the upcoming Ward Street and Columbus Park Headworks Upgrade design and construction subphase.</p>	<p>Active</p>
<p>Chelsea Creek Headworks Upgrades Design/ESDC (7206), REI (6802) and Construction (7161)</p>	<p>The Remote Headworks Preliminary Design proposed recommendations to upgrade the Chelsea Creek, Columbus Park, and Ward Street Headworks, to be included in final design and construction documents. The recommendations include replacement/upgrades to the screens; grit and screenings collection and conveyance systems; odor control, HVAC, mechanical, plumbing, instrumentation, and electrical systems; PCB removal; and antenna towers at Chelsea Creek and Columbus Park. Construction at Chelsea Creek Headworks has been completed. Design of upgrades at Ward Street and Columbus Park is ongoing. Construction and REI contracts for Ward Street and Columbus Park Headworks will be procured under separate subphases.</p>	<p>Completed</p>

Sub-phase	Scope	Status
Prison Point Rehabilitation Design/CA/RI (7359) and Construction (8020)	The Prison Point CSO Facility was constructed in 1981. This rehabilitation will include upgrades to the facility including replacement of diesel pump engines, dry weather screen, wet weather screens, sluice gates, chemical tanks, updating of other facility equipment including electrical distribution and chemical disinfection systems, and repair/replacement of miscellaneous equipment as identified in the 2012 Prison Point CSO Planning Report. Improvement/installation of systems as appropriate for energy efficiencies, security, and fire suppression and alarming systems will also be included. This project will also update the chemical feed/storage facility at Prison Point, including the replacement of chemical tanks and pumps. This project is the successor to Design/CA/RI Contract 7359 and Construction Contract 7462 for which work ceased in 2022.	Future
Study (7423) and Rehabilitation of Sections 186, 4, 5, and 6 Design CA/RI (7421), and Construction (7422)	Rehabilitation projects in 1991 and 1997 lined Sections 4, 5, and 6 with silica/shotcrete covered with epoxy. Emergency removal of delaminated plastic liner from Section 186 was performed in June 2011. A Preliminary Engineering Report, completed in April 2018, included a manned inspection which identified rehabilitation needs, feasibility, and scope. Scope development for the design of the recommended rehabilitation improvements is on hold pending decision on construction packaging to minimize community impacts.	Future

Sub-phase	Scope	Status
DeLauri Pump Station Screens & Security (7361)	This project replaces the existing catenary bar screens and will install security upgrades. Design was developed in-house with the security improvements reviewed by an outside consultant. The security improvements include motion detectors, door switches, small security items in the main building and emergency generator room. This includes work associated with bringing signals underground into underground conduit to run sensor lines for SCADA. The Construction contract was awarded in January 2018. Substantial completion was achieved in February 2019.	Completed
Wiggins Terminal Pump Station Design and Construction (7552)	The Wiggins Terminal Pump Station services a small seasonal flow from Castle Island and Conley Terminal. The Station is in need of rehabilitation and updating of remote operational control. The facility is located within Conley Terminal and requires MassPort security clearance to access.	Future
Section 191 & 192 Rehabilitation (Charles River Valley Sewer) (7643)	Section 192 of Charles River Valley Sewer is approximately 4,500-ft in length and is located in the City of Newton. Section 191 of Charles River Valley Sewer, located immediately downstream of Section 192, is approximately 3,738-ft in length. Inspections performed by MWRA found crown cracks in portions of both Sections 192 and 191. Due to these structural deficiencies of both Section 192 and 191, the affected sections require rehabilitation. A cured in place pipe system was designed by in-house engineering staff to rehabilitation the sewers. The construction contract was awarded in January 2020 with a 6-month contract duration. Construction was completed in June 2020.	Completed

Sub-phase	Scope	Status
Chelsea Creek Headworks Radio Equipment (7785)	This project will provide furnishing and installation of radio equipment at the Chelsea Creek Headworks and the Chelsea Tower Equipment Building at 2 Griffin Way in order to establish a radio communications link between the Chelsea Creek Headworks and the Chelsea Main Office. The scope of this project will include furnishing & installing a list of proprietary radio equipment, waveguide, required cabling & training.	Active
Prison Point Construction 2 Discharge Piping Rehab (8013)	This project will structurally update and line the existing discharge header at Prison point CSO facility.	Active
Belle Isle Sandcatcher Rehab Design/ESDC/REI (7989), and Construction (7988)	This project will rehabilitate the existing Belle Isle Sandcatcher which is structurally deficient and requires repair. The project will also provide rehabilitation of the two associated siphon Headhouses, located in East Boston and Winthrop. The scope of this project will include design, construction administration and resident engineering services.	Active
Intermediate Pump Station Rehab Design/ESDC (8049), Construction (8051), and REI (8050)	IPS receives wastewater from Braintree, Holbrook, Randolph, a small portion of Weymouth, and a very small area of Quincy (via the Braintree Howard Street Pump Station). The facility is critical to prevent SSOs and maintain level of service to the upstream communities. With many critical facility components (electrical, pumps, etc.) nearing the end of their useful life, rehabilitation is needed.	Future

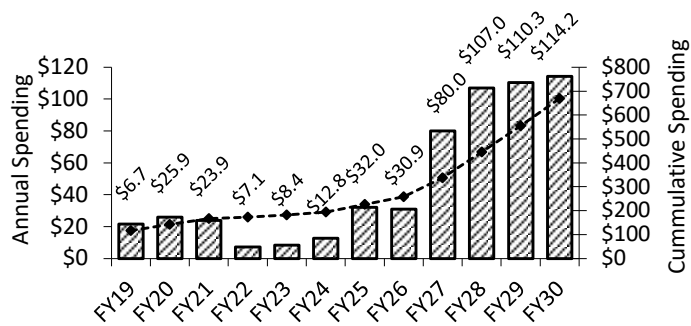
Sub-phase	Scope	Status
<p>New Neponset Pump Station Rehab Design/ESDC (8038), Construction (8037), and REI (8039)</p>	<p>The New Neponset Valley Sewer Pump Station was built in 1995. With many facility components near the end of their useful live, near term rehabilitation is required to ensure reliable facility operation. The facility was constructed to supplement the hydraulic capacity of the 60-inch New Neponset Valley Sewer (NNVS). The facility pumps wastewater through a 48-inch force main parallel to the NNVS to a downstream location where the capacity of the gravity sewer is greater. The tributary area includes Canton, Norwood, Stoughton, and Walpole and is served by separate sanitary sewers.</p>	<p>Future</p>
<p>Framingham Pump Station Rehab Design/ESDC (8040), Construction (8042), and REI (8041)</p>	<p>Although not operated frequently, during high flow conditions the facility is critical to prevent SSOs and maintain level of service to the upstream communities. With many critical facility components (electrical, pumps, etc.) nearing the end of their useful life, rehabilitation is needed.</p>	<p>Future</p>
<p>Quincy Pump Station Rehab Design/ESDC (8043), Construction (8045), and REI (8044)</p>	<p>The Quincy Pump Station lifts wastewater from upstream community-owned sewers in Quincy to the High Level Sewer that connects to the Nut Island Headworks. The facility is critical to prevent SSOs and maintain level of service to the upstream communities. With many critical facility components (electrical, pumps, etc.) nearing the end of their useful life, rehabilitation is needed.</p>	<p>Future</p>

Sub-phase	Scope	Status
Quantum Pump Station Design/ESDC (8046), Construction (8048), and REI (8047)	The Quantum Pump Station lifts wastewater from upstream community-owned sewers in Quincy to the High Level Sewer that connects to the Nut Island Headworks. The facility is critical to prevent SSOs and maintain level of service to the upstream communities. With many critical facility components (electrical, pumps, etc.) nearing the end of their useful life, rehabilitation is needed.	Future

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$936,696	\$ 173,533	\$ 763,163	\$8,392	\$86,875	\$12,756	\$262,765	\$492,005

I&P Asset Protection



Project Status 5/23	19.1%	Status as % is approximation based on project budget and expenditures. Chelsea Creek Headworks Upgrades Construction commenced in November 2016. Alewife Brook Pump Station Rehabilitation was substantially complete in March 2019. Fuel Oil Tank Replacement Phase 1 Construction commenced in March 2020. Dorchester Interceptor Sewer Rehabilitation was awarded in March 2020. Interceptor Renewal 7 Malden/Melrose Design/ESDC was awarded in June 2020. Section 191 & 192 Rehabilitation was substantially complete in June 2020. Ward Street & Columbus Park Headworks Design/CA was awarded in December 2020.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$618,450	\$936,696	\$318,246	Jun-32	Jul-34	25 mos.	\$305,695	\$262,765	(\$42,930)

Explanation of Changes

- Project cost changed primarily due to updated cost estimates for Columbus Park Headworks – Construction, Belle Isle Sandcatcher Rehabilitation, Somerville-Marginal CSO Facility Rehabilitation - Design/CA, Fuel Oil Tank Replacement - Construction Phase 3, Interceptor Renewal 7, Malden & Melrose – Construction, Ward St. Headworks – Construction, Hayes Pump Station Rehabilitation – Construction, addition of New Neponset Pump Station Rehabilitation, Quincy Pump Station Rehabilitation, Framingham Pump Station Rehabilitation, Squantum Pump Station Rehabilitation, and Intermediate Pump Station, award greater than budgeted for Fuel Oil Tank Replacement - Construction Phase 2, as well as inflation adjustments on unawarded contracts.
- Schedule change due to addition of New Neponset Pump Station Rehabilitation and Framingham Pump Station Rehabilitation contracts.
- Spending change primarily due updated cost estimates and inflation adjustments listed above, updated schedules for Prison Point Rehabilitation, Columbus Park Headworks, Cambridge Branch2 - Sections 23 & 24, Ward Street & Columbus Park Headworks – REI, Interceptor Renewal 5, New Neponset Valley Sewer, Interceptor Renewal 6 - Chelsea Sections 12, 14, 15 & 62, Hingham Pump Station Rehabilitation, Fuel Oil Tank Replacement - Construction Phase 5, Wiggins Terminal Pump Station, Sections 4, 5, 6 & 186 – Construction in addition to updated cashflows.

CEB Impacts

- None identified at this time.

S. 146 Inspection of Deer Island Cross Harbor Tunnels

Project Purpose and Benefits

<p><i>☑ Contributes to improved public health</i></p> <p><i>☑ Provides environmental benefits</i></p> <p><i>☑ Extends current asset life</i></p> <p><i>☑ Results in a net reduction in operating costs</i></p> <p><i>☑ Improves system operability and reliability</i></p> <p>Master Plan Project ☑ 2008 Priority Rating 2 (see Appendix 3)</p>
<p>To inspect, design, and repair MWRA deep rock tunnels to ensure proper wastewater system operation.</p>

Project History and Background

The MWRA sewer system includes three deep rock tunnels that carry wastewater from the headworks to the DITP. The MWRA currently does not have the technology and capability of inspecting deep rock tunnels.

Scope

Sub-phase	Scope	status
Tunnel Inspection and Condition Assessment (7199)	The MWRA sewer system includes three deep rock tunnels that carry wastewater from the headworks to the DITP. The MWRA currently does not have the technology and capability of inspecting deep rock tunnels. This subphase includes inspection and condition assessment.	Future

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$5,000	\$0	\$5,000	\$0	\$0	\$0	\$5,000	\$0

Project Status 5/23	0.0%	Status as % is approximation based on project budget and expenditures.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$5,000	\$5,000	\$0	Jun-29	Jun-29	None	\$0	\$0	\$0

Explanation of Changes

- N/A.

CEB Impacts

- None identified at this time.

S. 147 Randolph Trunk Sewer Relief

Project Purpose and Benefits

<p><input checked="" type="checkbox"/> <i>Contributes to improved public health</i></p> <p><input checked="" type="checkbox"/> <i>Provides environmental benefits</i></p> <p><input checked="" type="checkbox"/> <i>Extends current asset life</i></p> <p><input checked="" type="checkbox"/> <i>Results in a net reduction in operating costs</i></p> <p><input checked="" type="checkbox"/> <i>Improves system operability and reliability</i></p> <p>Master Plan Project <input checked="" type="checkbox"/> 2009 Priority Rating 3 (see Appendix 3)</p> <p><i>To identify system improvements to reduce sanitary sewer overflows that occur at MWRA's Sewer section 628 and Pearl Street siphon.</i></p>

Project History and Background

The Randolph Trunk Sewer was constructed in 1958 and consists of three sections: 627, 628 and 628A. Section 628 is a 42-inch diameter reinforced concrete sewer located in Braintree. During extreme wet weather events, Section 628 experiences overflows, particularly at a 50-foot long double-barrel siphon located at Pearl Street next to residential property. A study will be performed to determine the best method of reducing excessive wet weather flows or to provide hydraulic relief to this section of the Randolph Trunk Sewer.

Scope

Sub-phase	Scope	Status
Study (7220)	Study to identify system improvements at Sewer Section 628 and Pearl Street Siphon.	Future

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$698	\$0	\$698	\$0	\$0	\$0	\$0	\$698

Project Status 5/23	0.0%	Status as % is approximation based on project budget and expenditures.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$698	\$698	\$0	Jun-25	Jun-30	24 mos.	\$698	\$0	(\$698)

Explanation of Changes

- Project spending and schedule changed due to updated schedule for Study contract.

CEB Impacts

- None identified at this time.

S. 206 Deer Island Treatment Plant Asset Protection

Project Purpose and Benefits

- Contributes to improved public health*
- Fulfills a regulatory requirement*
- Extends current asset life*
- Improves system operability and reliability*
- Improves energy efficiency*

To protect the investment of MWRA ratepayers in the Deer Island Treatment Plant by ensuring timely replacement of DI's systems, which contain more than 60,000 pieces of equipment with an approximate value of \$1 billion. Based on the Master Plan developed in 2006, most recently updated in 2013, MWRA expects to sequentially replace equipment and structures in the facility as they reach the end of their useful life. Staff are in the process of updating the Master Plan, which may result in additional changes being incorporated in FY25 for future projects beyond FY35.

Construction of the Deer Island Treatment Plant was one of the largest wastewater projects ever undertaken in the United States. DITP construction was a 12-year, \$3.8 billion effort (not including the cost of off-island residuals facilities) started in 1988. MWRA commenced primary treatment in 1995 and secondary treatment in 1997. With the Effluent Outfall Tunnel completion in September 2000, the plant discharges treated effluent 9.5 miles offshore into the Massachusetts Bay through 55 diffusers spaced along the last 1.25 miles of the tunnel.

Project History and Background

At an expansive and complex facility like the Deer Island Treatment Plant (DITP), unanticipated equipment and system failures can cause operational and/or maintenance crises. It is prudent industry practice to take a proactive approach by establishing programs to anticipate when equipment and systems are near the end of their reliable service lives, and then overhaul, upgrade, or replace the equipment, systems, and structures as needed.

DITP staff implemented a "reliability-centered maintenance" (RCM) program to monitor, evaluate, and maintain all of the equipment and major systems within the facility. RCM includes using non-invasive methods of assessing the operational condition of equipment through programs such as vibration monitoring, lubricant and oil testing, thermography, and ultrasonics (audible sound). These programs involve developing a "base line" for equipment when it is relatively new or rehabbed, then comparing future test results to determine if there is a change in the base line which warrants invasive action or other maintenance procedures to mitigate the problems. In addition to RCM, staff follows original equipment manufacturer (OEM) maintenance protocols when appropriate. To assist staff in keeping all of the historic data; storing OEM maintenance instructions; monitoring costs associated with maintaining the equipment; providing work orders as needed, etc. - the maintenance software program MAXIMO was implemented at DITP and other Authority locations.

To augment the DITP maintenance program, contracts are issued to obtain the services of factory-authorized technicians with the expertise to maintain specialized equipment and systems, such as electricity-generating turbines (hydro, wind, steam and combustion-driven), the oxygen generation facility, Thermal Power Plant equipment, etc. Recommendations to add capital projects to the budget also come from staff managing these maintenance programs and service contracts.

The DITP Asset Protection project encompasses the following major functional categories:

1. Equipment Replacement (chains, pumps, motors, control systems, discrete process equipment, etc.).
2. Architectural projects (expansion joint replacements, concrete corrosion, etc.).
3. Utilities projects (water, sewer, drainage, piping, electrical wiring, heating systems, etc.).
4. Support projects (Technical Information Center projects, security projects, etc.).

5. Specialty projects (chemical pipelines and storage tanks, fuels storage tanks, etc.).

Scope

Sub-phase	Scope	Status
<i>Equipment Replacement:</i>		
Equipment Condition Monitoring (6594)	Installed temperature & vibration-monitoring equipment in NMPS and Winthrop Terminal Facility. Complete January 2005.	Completed
CEMS Equipment Replacement (6882)	Replaced data collection computers, upgraded software, and added PLCs to the Continuous Emissions Monitoring Systems on the two high-pressure Zurn boilers. Complete March 2006.	Completed
Pump Packing Replacement (6422)	Replace pump packing seals with mechanical seals in the North Main, South System, and Winthrop Terminal pump stations. Purchases completed in FY08, installations completed in FY09.	Completed
Cathodic Protection Construction (7056) (Designed under Digester & Storage Tank Rehab project, 7052)	Construction project to replace DI's cathodic protection systems as required. Design will be performed under the Digester & Storage Tank Rehab Design.	Future
Digester Chiller Replacement (7005)	Replaced the refrigeration-based digester gas chiller with a chilled water system that performs better at low operational loads. Completed in May 2006.	Completed
Dystor Tank Membrane Replacement (7006)	Emergency replacement of a torn gas membrane on one digester storage tank, and preventive replacement on the second. Completed both by October 2005.	Completed
Dystor Membrane Replacements (7135)	Periodic replacement of the two gas & sludge storage tank membranes in the digester complex. Replaced both in 2005; expect 15 year life cycle. The membranes are scheduled to be replaced in FY24	Future
Digested Sludge Pump Replacement Design, and Construction (Phase 1) (7123)	The three positive displacement Abel pumps caused pipe vibration and required extensive maintenance. In Phase 1, one centrifugal pump and a flushing pump were installed in 2011, and tested to ensure they worked well before the three remaining pumps were replaced. (See Phase 2, below).	Completed
Digested Sludge Pump Replacement (Phase 2) (6821)	Sub-phase added in FY14, to complete replacement of the Abel pumps. Centrifugal pumps with higher flow rates were installed to minimize grit settlement in the pipes. Completed July 2017.	Completed
Centrifuge Back-drive Replacements (7057)	Replaced the centrifuge back-drives, which had become obsolete. Completed March 2015.	Completed
Grit & East/West Odor Ctrl Air Handler Unit (AHU) Replacements (6881)	Replaced deteriorated air handlers in FY09-16, then every 15 years. Grit AHU replacement completed in June 2010. The E/W Odor Control AHU Replacements are now in the HVAC Equipment Replacement project, below.	Completed
Fire Alarm System Replacement – Design (6904), Construction (7051), and REI (7426)	To replace obsolete fire alarm monitoring & control systems. Design awarded October 2015; construction phase to commence in FY23 and approximately every 20 years thereafter.	Active

Sub-phase <i>Equipment Replacement:</i>	Scope	Status
Bidirectional Radio Repeater System Upgrade 1 (7122) and 2 (7134)	Install a bidirectional radio amplification system in throughout Deer Island to maintain emergency radio communications for Boston/Winthrop Fire Departments to meet current safety code. Equipment for Phase 1 was completed in 2020. Phase 2 Construction to completed in FY24.	Completed and Active
HVAC Equipment Replacement – Design/ESDC (7110, 7111), HVAC Control System Replacement (7745), HVAC Fume Hoods Replacement (7746), HVAC Mechanical Equipment Replacement Construction (7605, 7747) and REI (7094)	Replace the system-wide HVAC control system due to obsolescence. Redesign is required to include three separate construction contracts to ensure competitive bidding.	Active
Centrifuge Replacements – Design (7137), and Construction (7138)	Replace the sludge centrifuges are at the end of their useful life or after a catastrophic failure. Centrifuges thicken secondary waste sludge before it goes to the digesters. Units have a 25 to 30-year life.	Future
Cryogenics Plant Equipment Replacement – Design (7139), and Construction (7140)	Design and construction to the existing compressors, cold boxes, lox tanks and appurtances due to end of useful life and obsolescence. Replacement of 3 chillers was necessary in FY16; see below. Remaining plant overhaul construction work to commence in FY27-30 with future rehab and upgrade work occurring every 20 years. An annual maintenance contract keeps this facility in good operating condition, since it is critical to secondary treatment.	Future
Cryogenics Chillers Replacement (7398)	Replaced failing air chillers that required frequent maintenance in the oxygen generation plant. Completed in September 2016.	Completed
Digester Modules 1 & 2 Pipe Replacement Design and Construction (7055)	During digester cleaning in 2007, deterioration of the glass lining was noted. This project was completed by August 2014. Scope included plug valve replacements. A project for additional digester storage tank rehab work was added in FY13; see the DITP Digester & Storage Tank Rehab project under “Specialties”.	Completed
Butterfly Valve Replacements at North Main Pump Station (NMPS) & Winthrop Terminal Facility (WTF) (7275)	There are twenty 60-inch butterfly valves in NMPS and eight 36-inch plug valves in WTF, for isolating the pumps when maintenance is required. One valve in NMPS was replaced; several others began to leak (gaskets and seals were failing). Scope revisions in FY10 added replacement of the magnetic flow meters, replacement of PSL piping and Eight (8) hydraulic actuators for the SSPS pump check valves. Work began in June 2014 and was completed in September 2017.	Completed

Sub-phase	Scope	Status
<i>Equipment Replacement:</i>		
Gas Protection Systems Replacement (7169)	Replace gas detection devices in 13 DITP locations: pump stations (NMPS, SSPS, Winthrop Terminal), odor control (East/West, Residuals, Winthrop Terminal) and process areas (Thermal Power Plant, Digesters, gas handling, primary & secondary galleries, disinfection, Grit Facility, and gravity thickeners). These detectors measure levels of oxygen, hydrogen sulfide, sulfur dioxide, chlorine, and other combustible gases. They are integral to ensuring the health & safety of employees and contractors. Scheduled in FY20 in two phases; First phase completed in FY22, Second phase to commence in FY24.	Future

Sub-phase	Scope	Status
<i>Architectural:</i>		
Expansion Joint Repairs Design (6668), Construction 1 (6669), Construction 2 (6704)	Replace failed expansion joints in the concrete clarifier decks and/or various retaining walls. Phase 1 complete November 2003; phase 2 February 2014, Phase 3 has been included in Contract 7395.	Active
Eastern Seawall Design/ESDC/REI (6723), and Construction (6724)	Design and construction of repairs to the base of the seawall from tidal damage, exposing rebar. Seawall condition is monitored on a biannual basis. Design was awarded in FY20.	Active
Roof Replacement Phase 1 (S464)	Added in FY10, based on decision to capitalize these costs. Replaced the rubber membrane roof at Winthrop Terminal, the Admin./Warehouse building, the Cryogenics Facility, and the lower roofs on the Digester Modules. Completed March 2010.	Completed
DITP Roof Replacements Phase 2 (6196)	Added in FY10 to replace roof membranes at the North & South Main Pump Stations; East & West Odor Control; the Grit Facility; and the Centrifuge Thickener building. Completed July 2011.	Completed
Personnel Dock Rehabilitation (7168)	Rehabilitate the floating docks at Deer Island. To improve the safety, appearance, and reliability of the floating docks. Awarded in FY17, completed in mid-FY18.	Completed
Barge Berth and Facility Replacement Design/ESDC (6725), and Construction (6726)	Major rehabs of the barge berth & pier facilities due to damage and/or normal wear. Added per the Master Plan. Barge berth/facility work in FY25-30, then on a 20-year repeat cycle.	Future
Rip-rap Material (6727)	Purchased 6,400 tons of rip-rap to reduce and prevent ocean wave soil erosion along the northeast and eastern shoreline at Deer Island. Placement completed by staff in June 2017.	Completed
DITP Roof Replacement Phase 3 (7424)	New roofing was needed at the Grit Facility, North Main Pump Station, Main Switchgear Building, and the gravity thickeners to protect the equipment in the buildings. Completed in July 2014.	Completed
DITP Roofing Replacement (7734)	Replacement of the following rubber roofs that are in need of replacement: Cryogenics, Residuals (Mod #1 and #2 Vestibule Roof), Gravity Thickener Buildings), Garage Building, Reception Training (slate tiles), and Admin Lab Building. Work to start in FY24.	Active

Sub-phase <i>Utilities:</i>	Scope	Status
Outfall Modifications (6811)	Inspection of the old outfall tunnels (decommissioned after startup of the new outfall tunnel). Inspection completed in July 2002.	Completed
Electrical Equipment Upgrades Design (7130, 7750), and Construction (including future cycles from the Master Plan) (6767, 6855, 6901, 7124, 7414)	Replace substation equipment. Phase 1-Bus duct 2 & 22 replacement completed October 2001; Phase 2 completed by March 2007; Phase 3 completed in August 2011. Phase 4 completed in June 2016; Phase-5 design to commence in FY29; Phase 6 to commence in FY31.	Future
VFD Replacements (6875, 6902, 6903, 7062, 7125, 7126, 7127, 7128, 7129, 7131)	Replace obsolete variable frequency drives (VFDs) in the North Main Pump Station (in FY12-16); South System Pump Station in FY07-08, with the next cycle to start in FY23 (South System Pump Station Lube System Replacement was added to the scope in the FY19; Winthrop Terminal Facility (FY16-21); and miscellaneous smaller VFDs throughout the plant (on-going). Future replacements every 12-15 years.	Active
Power System Improvement Design and Construction (7061, 7061A, 7061B, 7061C, 7061D)	For modifications to DITP's electrical system as recommended in the consultant report after an FY04 power outage. Design completed in FY09-11. Completing the construction in a series of projects in FY09-14; added 7061C, dump condenser replacement and 7061D for NMPS fuel tank removal in FY11. Two awarded in FY09, two in FY11. The last, 7061A, Thermal Power Plant Fuel System Upgrade was substantially completed by May 2017.	Completed
TPP Boiler Control Replacement (7401)	Replaced boiler controls in the Thermal Power Plant that were obsolete. Completed by November 2016.	Completed
Switchgear Replacements Design/ESDC/REI and Construction including future cycles added per the Master Plan (7133)	On-going program to replace obsolete electrical switchgear. Future cycles beyond that time are not currently funded.	Future
Transformer Replacements (6813)	Approximately 42 electrical substations and 87 transformers have been in service since DITP start-up. Sub-phase eliminated in FY14; replacements are now done in Electrical Equipment Upgrades.	Completed
PICS Replacement including future cycles from the Master Plan (6884)	Replace or upgrade the Process Information Control System (PICS) including keypads, consoles, and software when obsolete. Completed in FY16; may need to be repeated every 10-15 years.	Completed
PICS Fiber Loop Replacement (7172)	Replace the PICS system "backbone", the fiber optic loop.	Future
Chemical Tank & Pipe REI and Construction (to include Gravity Thickener Overflow Pipe Replacement) (7373)	Strip and reline three of the four Sodium Hypochlorite Tanks and the two Sodium Bisulfite Tanks, which are in fair condition on the outside (shows staining, rusting, and corrosion). If one bisulfite tank fails, there is no longer any back-up. (Tanks have been in service for 26 years; Hypo tanks 1 & 3 were relined in 2007, tanks 2 & 4 in 2008). Added the replacement of the Gravity Thickener overflow pipe in this project. Work complete in FY22.	Completed

Sub-phase	Scope	Status
<i>Utilities:</i>		
Chemical Pipe Replacement Design (6851) and Construction (6852)	Planned periodic replacement of the various chemical pipelines in the odor control and disinfection facilities due to deterioration from corrosion.	Future
Heat Loop Pipe Replacement Construction (6876)	Rerouted heat loop piping into galleries to reduce underground corrosion and improve accessibility. Phase 1 complete Dec. 2005, Phase 2 complete February 2008. Phase 3 complete June 2011. Includes periodic valve replacements. Another project phase needs to be added to provide redundancy to the heat loop.	Completed
Fuel Pipe Abandonment (7415)	Cleaned and cemented the existing fuel pipeline in place instead of removing it. Completed December 2012.	Completed
North Main Pump Station Motor Control Center (MCC) Construction (6972)	Replaced MCC equipment that had become obsolete and unreliable. Designed by As-Needed Design task order, construction completed in two phases in FY12-13. See Phase 2 below.	Completed
Motor Control Center (MCC) and Switchgear Replacement Design ESDC/REI (7419) and Construction (7420)	Sub-phase pulled from the project above, second phase being done FY20-22. In FY17, the design scope was revised to include replacement of switchgear in the Admin/Lab building. Construction is scheduled for FY24-FY28.	Active
Combustion Turbine Generator (CTG) Rebuilds (7136)	Rebuilds of the combustion turbines in the Thermal Power Plant. Scheduled for FY27-30 with repeat cycles every 20 years. With the addition of the "Combined Heat & Power" facility, this work may eventually be eliminated.	Future
STG System Modifications Design (6967), and Construction (6973)	Added equipment to the steam turbine generator to increase electricity output by using the current steam production more efficiently. Helps the MWRA meet energy goals set out by executive order. Completed in February 2011. Added Pressure Reducing Valve to maximize electrical generation by July 2014.	Completed
DI Digester Flare No. 4 Design/ESDC (6728) and Construction (6729)	Install a fourth gas flare to reduce the potential for air permit violations when an existing flare is out of service and/or the boilers have to be taken off-line. Unit will be replaced under Contract 7088.	Future
Hydroturbine Replacements Design (7570) and Construction (7571)	There are two 1.1 megawatt hydroturbine generators (HTGs) at Deer Island. Electricity is generated using the force of plant effluent as it drops from the disinfection basins into the intake channel beneath each HTG. This facility came on line in July 2001. The HTGs have reached the end of their useful life, and repairs are costly. A condition assessment and LCCA will be performed to determine future repair/replacement options.	Future

Sub-phase Support:	Scope	Status
DISC Application (6241)	Hardware, software, and contract services to implement a plant-wide computerized database of all plant utility systems. Existing programs deemed sufficient, project removed in FY14.	Completed
Document Format Conversion (6791)	Convert DITP construction documents into electronic format and develop a document-reference database. Work is in process, and has several phases. Completed by the end of FY19.	Completed
As-Needed Design Phases 5, 6, 7, 8, 9, and 10 (7090, 7091, 7399, 7400, 7434, 7501, 7502, 7503, 7644, 7645, 7646, 8018, 7981, 7982)	On-going technical design services and/or construction support to supplement existing engineering resources for specialized or complex engineering issues. Initially, two contracts were issued and ran for two years each. For Phase 6, contract length was extended to three years each. Phases 6-1 and 6-2 ended by October 2012, phase 7-1, 7-2, and 7-3 (at \$1.6M each, end April 2016). Phases 8-1, 8-2, and 8-3 were awarded in FY16 at \$1.6M each, for FY17-FY19. Phase 9 Phases 9-1, 9-2, 9-3 were awarded in FY20 and completed in FY23. Phase 10 expected in FY24.	Active
Deer Island As-Needed Technical Design (7121)	A placeholder used to continue the technical design services as described above. Each series of new contracts will be deducted from this placeholder. Funding now runs from FY26 to FY30.	Future

Sub-phase Specialties:	Scope	Status
Sodium Hypochlorite Tank Liner Removal (7089)	Removed the failed lining in tank #1 of the four sodium hypochlorite storage tanks. Completed in September 2006.	Completed
Hypochlorite Tanks 1 & 3 Reline (6764)	Renamed the "Sodium Hypo Tank Repair 1" sub-phase. Included stripping, repairs and relining tank 3. Completed November 2007.	Completed
Hypochlorite Tanks 2 & 4 Reline (6849)	Strip & reline the two remaining sodium hypochlorite storage tanks. Scope included removing ladders and replacing safety railings on the tanks. Completed in October 2008.	Completed
Sodium Hypochlorite and Bisulfite Tanks Replacement Design/ESDC (7749), and Construction (7142)	Based on condition assessments, expect to start replacing tanks.	Future
Primary & Secondary Clarifier Rehab – Design ESDC/REI (6965)	ESDC/REI Services during the Primary & Secondary Clarifier Rehab Constr., below (design by As-Needed Design consultant). Included secondary clarifiers due to deterioration in the longitudinal chains and scum collection systems. Completed September 2013.	Completed
Primary & Secondary Clarifier Rehab Construction (6899)	Replace longitudinal & cross collector chains and sprockets, chain drives, wear shoes; modify tip tubes, replace hose bibs; repair wall expansion joints, add more drop boxes, etc. Added secondary clarifier work in FY09, specified a higher-grade stainless steel which increased the cost by \$30M. Separated out the gravity thickener scope due to the need for separate, distinct schedules. Project awarded at \$59.4M; completed February 2012.	Completed

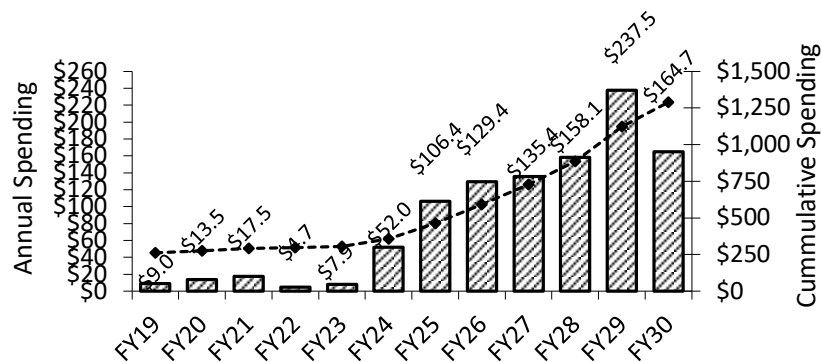
Sub-phase <i>Specialties:</i>	Scope	Status
Gravity Thickener Improvements – Construction (6966)	This subphase was eliminated in FY08, and the scope was included with the Primary Clarifier Rehab work above. Made a stand-alone project again in FY09. The first phase (6966) involved replacing failed fiberglass covers in FY10-12. 6966A, B, and C were added for emergency repairs to center columns in three tanks in FY11. Project completed in June 2012.	Completed
Gravity Thickener Rehabilitation (7428)	Sub-phase pulled from the project above. This phase involves installing catwalks around the perimeter of several tanks, removing concrete blocks in the effluent channels, and modifying the sludge thickener roofing to improve staff access and the operating efficiency.	Completed
Gravity Thickener Center Column Replacement (7427)	Complete replacement of the center columns in all 4 tanks with a higher grade steel, due to the failures experienced in FY11. Contract awarded in FY13, completed by January 2014.	Completed
Odor Control Rehabilitation Design/ESDC (7088), Construction (6538), and REI (6592)	Dropped the Preliminary Design phase and added ESDC/REI to the scope in FY11. The project involves modifications to the plant-wide odor control systems, including the digester gas systems and wet scrubber improvements.	Future
Clarifier W3H Flushing System (7374)	Replaced deteriorated water flushing lines in the clarifier batteries, completed July 2013.	Completed
Clarifier Rehabilitation Phase 2 Design/ESDC (7394), REI (7397), and Construction (7395)	Project to correct deficiencies noted during the first Primary & Secondary Clarifier project. Influent gates not sealing off tanks adequately; effluent launders and aeration systems need repair; and concrete corrosion in primary clarifiers above the water line needs repair and coating to prevent future corrosion. The sludge removal system in primary tanks and aeration/recirculation systems in secondary tanks need to be rehabilitated as well. Design/ESDC contract began in FY15, and construction is currently scheduled for FY23-29.	Active
Scum Skimmer (Clarifier Tip Tube) Replacement (7396)	Scum tip tubes not working properly results in scum build-up in clarifiers that has to be manually collected and transported to the gravity thickeners. Secondary tip tubes replacement was added to the scope, greatly increasing the cost. Completed Oct-13 to Oct-16.	Completed
Digester and Storage Tank Design/ESDC/REI (7052), and Rehabilitation Phase 2 (6240)	The DITP residuals facility includes twelve digesters and two gas handling/sludge storage tanks. During Digester Mods Pipe Replacement (7055), it was noted that additional digester work was needed. Issues with plugged digester recirculation pipes, mixer failures, and overflow box deterioration resulted in increasing the scope needed to correct all deficiencies. Some steel plates in the digesters may also need repair or replacement, and the interior of the digesters needs to be coated.	Active/Future

Sub-phase <i>Specialties:</i>	Scope	Status
Combined Heat & Power (CHP) Study (6963), Design (6730), and Construction (6964)	A system review was done to determine possible options for optimizing the use of methane gas produced from the existing sludge processing system. One option is to construct a CHP facility containing more efficient gas-fired turbines to increase electrical self-generation, and ensure beneficial re-use of all methane gas in the summer while still meeting all plant heat requirements. The CHP facility would be designed to handle the increased methane gas produced by co-digestion, if that project becomes feasible. Depending on the CHP facility design, portions of the 17-year old Thermal Power Plant will be modified or eliminated. A detailed energy alternatives project commenced in FY19, and will be followed by design and construction.	Active
Co-Digestion Design/ESDC/REI and Construction (6822)	Co-digestion construction is for the addition of piping and a receiving tank for the liquid food waste to be delivered to Deer Island. Food waste would be barged to the plant, pumped into the receiving tank, and from there pumped into the digesters.	Future
Co-Digestion Temporary Facility (7148)	Moved from the Residuals CIP to DITP in FY16. The budget was reduced to actual costs incurred since this project is not likely to be continued.	Completed

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$1,556,032	\$ 297,107	\$1,258,925	\$7,850	\$52,598	\$52,038	\$581,371	\$669,704

DI Asset Protection



Project Status 5/23	19.6%	Status as % is approximation based on project budget and expenditures. Several previously completed phases for this project are included in the Completed Project list. Contracts in process include the following: As-Needed Design Phase 9-1, 9-2 and 9-3, Clarifier Phase 2 Design and REI, Fire Alarm System Replacement Design, DITP MCC & Switchgear Replacement Design, ESDC and REI, and SSPS VFD Replacement Design. Contracts scheduled to begin in FY23 are: Clarifier Rehab Phase 2 – Construction and REI, Fire Alarm System Replacement Construction, Odor Control Rehab Design, MCC Switchgear Replacement, Digester and Storage Tank Rehab Design, Dystor Membrane Replacement, Cryogenics Plant Equipment Replacement Design among others.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$1,308,809	\$1,556,032	\$247,223	Dec-32	Dec-35	36 mos.	\$145,502	84,632	(\$60,870)

Explanation of Changes

- Project cost change primarily due to award greater than budget for Clarifier Rehabilitation Phase 2 – Construction contract, updated cost estimates for South System Pump Station VFD Replacement – Construction, Fire Alarm System Replacement – Construction, Deer Island Switchgear Replacement – Construction, Deer Island Dystor Membrane Replacements, Deer Island CTG Rebuilds, Centrifuge Replacements - Design/ESCD/REI, Hydroturbine Replacement, Electrical Equipment Upgrades 6, As-Needed Design 10-1, 2 & 3, East/West Odor Control Air Handler Replacement, PICS Fiber Loop Replacement, Chemical Pipe Replacement – Construction, Barge Berth and Pier Facilities Rehabilitation – Construction, Odor Control Rehabilitation Construction, Digester Storage Tank Rehabilitation – Construction, MCC Switchgear Replacement – Construction, Replace Hypochlorite and Bisulfite Tanks, and DI Roof Replacement. Also, inflation adjustments on unawarded contracts.
- Schedule changed primarily due to updated schedule for North Main Pump Station VFD Replacement – Construction contract.
- Spending change primarily due to updated schedules for Electrical Equipment Upgrade 5, NMPS VFD Replacement, Switchgear Relay Replacement - Construction, Digester & Storage Tank Rehabilitation Design/ESDC, Centrifuge Replacements, Cryogenics Plant Equipment Replacement, Odor Control Rehabilitation - Design/ESDC, HVAC Control System Replacement, Hydroturbine Replacement – Construction, HVAC Fume Hoods Replacement, HVAC Mechanical Equipment Replacement, PICS Fiber Loop Replacement, Co-Digestion Design/Build, Chemical Pipe Replacement – Design, Eastern Seawall Construction – 1, Barge Berth and Pier Facilities Rehabilitation – Construction, Combined Heat and Power, Digester Storage Tank Rehabilitation – Construction, and updated cost estimates listed above.

CEB Impacts

- The majority of the projects are required to replace obsolete equipment and systems. Some of the projects are expected to result in decreased maintenance and/or operating costs such as the HVAC equipment replacement. However, the potential benefits from most of the projects are not quantified at this time.

- Benefits of several energy-related projects have been estimated resulting in anticipated annual electrical savings. Some examples include: HVAC Equipment Replacement of \$140,000 (starting in FY31), Future SSPS VFD Replacements (\$120,000 beginning in FY30), and Hydroturbine replacement (\$50,000 in FY33). Any potential impacts of co-digestion and the combined heat and power facility have not yet been quantified or included in the planning estimates due to uncertainty regarding the scope and feasibility of the projects.
- Projects that are expected to reduce maintenance time and other resources are the Cryogenic Plant Equipment Replacement and the Hydroturbine Replacement.

S. 210 Clinton Wastewater Treatment Plant

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Extends current asset life*
- Improves system operability and reliability*

Project History and Background

The Clinton Wastewater Treatment Plant Rehabilitation was completed in 1992. The plant is generally in good condition. Some equipment rehabilitation and replacement projects were recommended in past CIP cycles. Operability of mechanical equipment and maintenance of electric/standby power systems are key elements to minimizing the risk of component failure. Any malfunction of mechanical equipment may impact wastewater treatment, particularly during large storm events that stress the hydraulic capacity of the facility. Key decision making to minimize risks includes the cost/benefit of when to replace aging equipment and which/how many spare parts to pre-purchase. Other uncertainties include technology upgrades to meet future regulatory requirements.

Scope

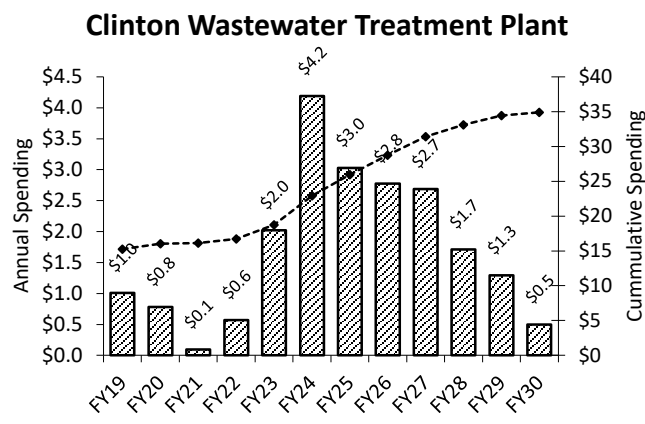
Sub-phase	Scope	Status
Clinton Soda Ash Replacement (7075)	The soda ash delivery system needed for pH control in the activated sludge process was replaced. Completed August 2008.	Completed
Clinton Permanent Standby Generator (7095)	Install a permanent standby generator at the Clinton Wastewater Treatment Plant. Completed November 2007.	Completed
Clinton Digester Cleaning & Rehabs (added concrete repairs and Influent Gates) (7277)	Clinton's two digesters were 20% filled with compacted grit, limiting their efficiency. The new discharge permit's phosphorus limits require both digesters to be used at all times. Therefore, the digesters needed to be emptied, cleaned, and rehabilitated. In FY12, the scope expanded to include installation of two 36-inch influent gates to control flow, to prevent flooding and protect plant assets. In FY14, plant-wide concrete repairs were added to the scope because rebar was exposed in walls, walkways and structural support beams across the primary clarifiers. All construction was completed in FY16; the warranty period ended in FY17.	Completed
Clinton Aeration Efficiency Improvement (and Auxiliary Pumps) (7278)	A study by FS&T recommended replacing mechanical mixers with fine bubble diffusers in three of the six secondary aeration tanks to improve the oxygen transfer and reduce electric costs. In FY12, the scope was expanded to include installation of four submersible auxiliary pumps to increase pumping capacity during high flow conditions. This avoids renting pumps, which was required four times in two prior years. Work completed February 2013.	Completed

Sub-phase	Scope	Status
Phosphorus Reduction Design/ESDC (7377), and Construction (7411)	The new NPDES permit requires compliance with lower phosphorus limits by April 2019 (18 months after the December 2017 start-up). New process equipment was installed to meet the set limit. Design began in FY14, construction in FY16 (which included adding a natural gas line for building heating, and a new electrical back-up generator) completed December 2017. The warranty extends to March 2019.	Completed
Clinton Roofing Rehabilitation (7450)	Replace the tar and gravel roofing on the Administration Building, Chemical Building, Headworks, Digester building, and the Dewatering and Maintenance Shop with EPDM rubber in FY19.	Completed
Clinton Facilities Rehab Design/ESDC/REI (7371), and Construction (7451)	Rehabilitate or replace the grit removal facilities, two belt filter presses, and design for closure of the landfill. Contract will also include Clinton fire alarm replacement work.	Future
NGRID Gas Line (7528)	Agreement with NGrid to construct a natural gas pipeline to convert the plant from oil to natural gas heating. Completed FY17.	Completed
Screw Pumps Replacement Phase 1 (7704), and 2 (7591) and Valves and Pipe Replacement (7372)	There are fifty 4-inch to 8-inch return aerated sludge valves that need replacing, and six 48-inch screw pumps that are 25 years old. Design by As-Needed Consultant. Replace three plant influent screw pumps that are functioning poorly. The three intermediate screw pumps are scheduled to be replaced after Phase 1 is completed; and the valves and pipe replacements were completed in FY22 in a separate project. Phase 1 Screw Pump construction commenced in FY22. Phase 2 will commence in FY25.	Complte/Active/Future
Digester Cover Replacement (7648)	The primary digester cover has reached it's useful life and needs to be replaced. Project broken out from the Clinton Facilities Rehab project. Construction to commence in FY24.	Active
Clinton Storage Facility (7693)	A new facility to be built for parts storage, (valves, pumps, motors, etc.) receiving freight deliveries, and PVC pipe storage.	Future
Clinton SCADA Upgrades (7736)	Replace existing plant control system with a PLC based system. Existing system is obsolete and cannot attain spare parts. System is over 20 years old.	Future
Clariflocculator Valve Replacement (7735)	This project will provide three new 24-inch plug valves on the 24-inch clariflocculator influent piping as well as demolition of four 24-inch stop gates in Distribution Box 4 and installation of three new slide gates with extended stems and handwheel operators supported on the roof of the Sludge Pumping and Chemical Building.	Future

Sub-phase	Scope	Status
Clinton Landfill Closure (7754)	Closure of Clinton Landfill will need to be capped and will include proper drainage. This is regulated per Dep – 310 CMR 19 (Mass Solid Waste Management Facility Regulations).	Future

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$35,628	\$16,721	\$18,907	\$2,021	\$4,477	\$ 4,190	\$14,391	\$2,494



Project Status 5/23	51.3%	Status as % is approximation based on project budget and expenditures. Phosphorus Reduction Construction completed by March 2018. The Clinton Roofing Rehab work was completed in September 2019. Valve and Pipe Replacement was completed in December 2021. Screw Pumps Replacement Phase 1 commenced in January 2022.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$34,925	\$35,628	\$703	Jun-27	Jun-32	60 mos.	\$11,859	\$14,391	\$2,532

Explanation of Changes

- Project cost change primarily due to updated cost estimates for Clinton WWTP Rehabilitation Design/ESDC/REI and Clariflocculator Valve Replacement contracts.
- Schedule changes due to updated schedule for Equipment Storage Building.

- Project spending changed due to updated cost estimates and schedule change listed above, and updated schedules for Landfill Cell No. 1 Closure, and updated cash flows for Screw Pumps Replacement Phase 1 – Construction, Digester Cover Replacement, and Clinton Wastewater Treatment Plant Rehab Design/ESDC/REI.

CEB Impacts

- The projects are required to replace obsolete equipment and systems. The plant influent screw pump and valve and pipe replacements may result in decreased maintenance and/or operating costs although the potential benefits have not been quantified at this time.

S. 271 Residuals Asset Protection

Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Extends current asset life*
- ☑ *Results in a net reduction in operating costs*
- ☑ *Improves system operability and reliability*
- ☑ *Improves energy efficiency*

Master Plan Project ☑ 2008 Priority Rating 1 (see Appendix 3)

To protect the investment of MWRA ratepayers by ensuring timely replacement of equipment and systems. MWRA expects to replace equipment and structures in the facility as they reach the end of their useful life.

Project History and Background

The Residuals Asset Protection program was created in FY08 as part of the Master Plan. The program consists of the anticipated contracts for maintaining and improving the operations and infrastructure of the biosolids processing plant in the long term. MWRA's Biosolids Processing Facility (aka the "pellet plant") was built in 1991 and expanded in 2001. By 2019, most of the major pieces of processing equipment will be 30 years old. The facility is currently in good condition, but some reinvestment is planned in the FY18-22 timeframe, as discussed in more detail below. For this facility, operability of mechanical equipment and maintenance of electric/standby power systems are key elements to minimizing the risk of component failure. Key decisions to minimize risk hinge on the results from cost/benefit analyses, to determine when to replace equipment. The residuals pelletizing process is also currently energy-intensive; future uncertainties include long-term energy costs and supply.

Under the terms of the contract for operation of the biosolids processing facility, New England Fertilizer Company (NEFCO) was responsible for all facility operation and maintenance including any necessary capital improvements until December 2015. They were obligated to turn the facility back over to the MWRA in an operable condition. The Asset Protection phase is intended to provide a dual-track planning approach addressing: (1) the existing facility capital improvement needs beyond the year 2015, if the Authority continues with pelletization, and (2) the option of assessing alternative technologies prior to the current contract expiration date; which culminated in a decision point in FY15, and was performed as mentioned below.

A comprehensive Residuals Condition Assessment/Reliability Study begun in May 2009 was completed in July 2010. The study found the facility to generally be in good condition with only a few recommendations for improvement. A study to assess the latest technology and regulatory trends planned as a second phase started in FY13 and finished in FY14. The study was intended to narrow the list of viable options for the Authority to consider for long-term implementation. The study examined the feasibility of co-digestion which involves digestion of food wastes and/or fats, oils, and greases (in the digesters at Deer Island Treatment Plant (DITP) and Clinton Wastewater Treatment Plant) to generate additional methane, and determine if there are any changes in the sludge characteristics that may impact the pellet plant. This study also reviewed the adequacy of existing facility components and processes, to provide replacement recommendations based upon the latest existing or alternative technologies. Information developed by these projects will be used by MWRA to produce a prioritized list of recommended design and construction projects that will be scheduled over a 10-year period (FY19-28). Scheduling of upgrade projects will be based on equipment failure risk, construction sequencing to maintain facility operations, and capital expenditure planning.

The Technology and Regulatory Review study provided several major recommendations to the Authority. First, the study found co-digestion to be feasible and potentially beneficial and therefore recommended that the Authority proceeds with projects needed to further evaluate the benefits of that process. As a result, several projects were added to the DITP CIP to achieve that goal. Throughout 2016, efforts were made to determine the best means to transport food waste to DITP. It was determined that barging food waste was the primary acceptable option, but the collection, transport, and delivery via barge was not economically feasible at this time, so co-digestion is currently on hold until the market becomes more developed and associated costs can be more accurately predicted.

Secondly, it was determined that the Authority should continue with pelletization and pursue a five-year extension to the NEFCO contract. Third, it was recommended that larger sludge dryers be installed for increased pelletization capacity at a lower energy cost per ton of sludge processed (further cost-benefit analysis is needed before proceeding). Funding for this element of the project (and other capital expenditures) were also to be points of negotiation with NEFCO.

After considering these recommendations, Authority staff decided to continue with pelletization and negotiated a five-year extension to the pellet plant operations contract with NEFCO. On March 11, 2015 the Board of Directors approved Amendment 1 to contract S345 with NEFCO, which extends the end date to December 31, 2020 and included a \$7 million capital budget funding commitment by the Authority for potential capital projects identified as being necessary over the five-year extension. The projects deemed necessary are being separately bid by the MWRA, and awarded subject to Board approval. This extension will be followed by another long-term competitive procurement. The additional time in this extension allows for a potential increase in competition over the five-year extension; the Authority to better define the operating parameters which may potentially increase competition for the next long-term competitive bid.

For the residuals biosolids processing facility, proposed spending of \$180.3 million on eighteen projects was identified in the 40-year master plan timeframe of FY07 through FY48. The projects identified were merely placeholders in recognition that some capital improvements will likely be required at DITP and/or the pellet plant. Fifteen projects (equaling \$148.6M) out of the eighteen were included in the FY08 CIP. The other three (addressing the rehabilitation of the polymer system, building envelope, and thermal oxidizers) have a priority rating of 3, and therefore have not yet been included in the CIP.

In the FY14 Proposed CIP cycle, the conceptual plan for future design and construction projects was modified; the overall project cost estimate was reduced to \$103.83 million and fewer sub-phases included funding to cover the potential construction projects, since the plan for the future would not be fully developed until after the technology study mentioned above was completed and the findings evaluated, which has been done.

Scope

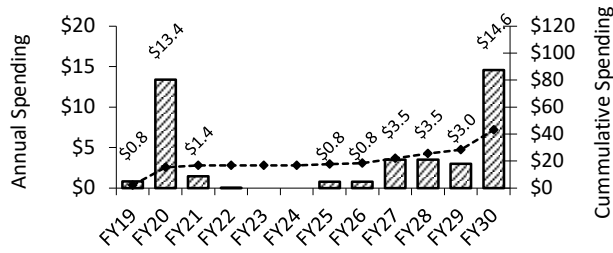
Sub-phase	Scope	Status
Condition Assessment/Reliability Study (7147)	Evaluate the condition of the entire facility at the mid-point of the current contract and then assess other residuals processing options and regulatory changes which may provide cost-saving opportunities. First phase work (present condition assessment) began in May 2009 and finished in July 2010. Work on implementing any short-term recommendations from this phase began in FY11. The 2 nd phase, Technology & Regulatory review began in FY13 and finished in January 2014; recommendations were as discussed above.	Completed

Sub-phase	Scope	Status
Residuals Plant Facility Plan/EIR (7143)	The design and construction of improvements to the plant utilities infrastructure (electric, water, sanitary, and drainage) may be necessary. This CIP project will address issues and/or recommendations identified during the initial study.	Future
Residuals Plant Upgrades – Phase 1 Design & Construction (7153) (includes initial phases to repaint sludge storage tanks and silos; mechanical and electrical improvements as part of the \$7M commitment to NEFCo). Dryer Drum Replacements was added to the scope.	The \$7M included in the NEFCo agreement is under Construction Phase 1, as part of the 5-year NEFCo extension. Funding of \$10.5M is allocated in the Final FY21 CIP for (repainting the sludge storage tanks and pellet storage silos; mechanical improvements and electrical improvements) as agreed to by MWRA and NEFCo. Dryer Drum Replacements was added to the scope and \$3.4M were used from the Residuals Phase 2 Construction Phase.	Completed
Residuals Phase 2 Design (7149), and Construction (7150)	For selection of a consultant to design a series of equipment replacements funded at \$15M for design/ESDC and \$71.6M for various unspecified construction phases. Following approval of the five year extension with NEFCo, phase 2 design work was moved out to begin in FY27; first construction project in FY29. Late in FY18, NEFCo staff informed DITP management that 2 of the 8 dryer drums were no longer functional, and a third drum was nearing the point of failure. NEFCo needs 6 dryer drums to process delivered sludge over a 5-day work week. Failure of a third drum would require adding weekend operations, increasing processing costs.	Future
Residuals Pellet Conveyance Piping Relocation (7173)	Build a separate support system to relocate the pipes (that convey pellets to the "high silo system") that are currently attached to the wall of a building that the MWRA does not own. This project commenced in FY20 and was completed in FY21.	Completed

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$107,515	\$16,886	\$90,629	\$0	\$15,649	\$0	\$8,586	\$82,043

Residuals Asset Protection



Project Status 5/23	15.7%	Status as % is approximation based on project budget and expenditures. The Residuals Plant Condition Assessment/Reliability Study was completed in July 2010. The Technology & Regulatory Review contract was completed in January 2014. Residuals Sludge Tank and Silo Coating was completed in September 2018. The Mechanical Improvements/Electrical/Drum Dryer Replacement contract began in June 2019. Pellet Pipe Relocation contract commenced in August 2019. Both were substantially completed by December 2020.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$107,527	\$107,515	(\$12)	Apr-35	Apr-35	none	\$8,986	\$8,586	(\$400)

Explanation of Changes

- Project spending change due to schedule change for Residuals Facility Upgrades – Design.

CEB Impacts

The majority of the projects are required to replace obsolete equipment and systems. Some of the projects may result in decreased maintenance and/or operating costs, however the potential benefits are not quantified at this time.

Introduction to Combined Sewer Overflow (CSO) Program

In 1987, MWRA entered a stipulation in the Federal District Court Order in the Boston Harbor Case ("First Stipulation") by which it accepted responsibility for developing and implementing a long-term CSO control plan for all combined sewer overflows hydraulically connected to MWRA's system, including the outfalls owned and operated by the communities of Boston (BWSC), Cambridge, Chelsea and Somerville (the "CSO communities"). In response to the First Stipulation, MWRA conducted site-specific and watershed based planning both to meet short-term CSO control requirements pursuant to federal regulations, including EPA Nine Minimum Controls ("NMC"), and to develop a long-term control plan to bring Boston area CSOs into compliance with the Federal Clean Water Act and Massachusetts Surface Water Quality Standards. MWRA developed these plans in conformance with federal and state CSO policies and associated guidance documents, which evolved during MWRA's nearly 20-year planning period, to 2006.

EPA's National CSO Policy (April 1994) requires CSO permittees to develop and implement a set of system optimization measures and reporting procedures intended to quantify and minimize CSO discharges in the short term, in part using detailed system characterization, easily implemented and less expensive system improvements and optimized operations and maintenance. In compliance with the policy, MWRA submitted its NMC compliance documentation by January 1, 1997, as required. While most of the reported compliance measures involve operations, maintenance and regulatory functions of MWRA that are funded through the Current Expense Budget, system characterization and hydraulic optimization measures described below were funded through the CIP.

The National Policy also requires permittees to develop and implement a long-term control plan in accordance with the provisions of the policy. In the CIP, MWRA undertook two major planning efforts: one in the period 1986 through 1990, which produced the 1990 CSO Facilities Plan primarily in accordance with the EPA CSO Strategy of 1989, and a second and final planning effort in 1992-1997, which produced a revised long-term plan for CSO control that MWRA recommended in July 1997. With subsequent modifications to the plan, MWRA attained full regulatory and court approval of the revised control plan in April 2006.

MWRA's CSO planning efforts were primarily conducted under the System Master Planning phase of the CIP and produced the following components of a broad plan to control CSO discharges and meet water quality standards:

- Through extensive inspections, system monitoring and modeling, MWRA developed a detailed, field-calibrated assessment of its planned collection and treatment system performance in advance of developing a long-term CSO control plan. The performance assessment incorporated major capital investments in the sewer system already underway or planned by MWRA, including upgrades to the transport system, pumping stations, headworks and Deer Island Treatment Plant. Together with MWRA's and the CSO communities' efforts in the late 1980's and the 1990's to operate and maintain their respective systems more efficiently, these improvements were shown to effectively maximize the system's capacity to control wet weather flows and markedly reduce CSO discharges system-wide. In the period 1988 through 1992, total annual CSO discharge predicted for the Typical Year Rainfall dropped from 3.3 billion gallons to 1.5 billion gallons, with approximately 51% of the remaining discharge treated at five MWRA CSO screening and disinfection facilities. The Charles River especially benefited from these improvements.
- In 1993-1994, MWRA presented a System Optimization Plan ("SOP"), which recommended approximately 160 low cost, easily implemented system modifications to maximize wet weather storage and conveyance. The SOP projects, which were fully implemented by MWRA and the CSO communities by 1997, further reduced CSO discharge by about 20 percent.
- MWRA recommended an extensive set of larger projects covering a range of control technologies to achieve long-term, site-specific CSO control goals using watershed-based assessments of receiving water impacts and uses. MWRA presented a conceptual plan of these improvements in 1994 and refined the recommendations in a facilities plan and environmental impact report it issued in 1997. The long-term plan received initial federal and state approvals in early 1998, allowing MWRA to move the projects into design and construction.
- As MWRA proceeded with implementation of the projects, it evaluated and recommended several adjustments and additions to the long-term plan in the period 1998 through 2006. These adjustments and additions responded to regulatory inquiries seeking higher levels of control (Charles River) or to new information that

raised concerns about construction requirements, cost or CSO control performance (North Dorchester Bay, Reserved Channel, East Boston, and Alewife Brook). A final, comprehensive long-term control plan was approved by EPA and DEP in March 2006 and accepted by the Federal Court in April 2006. This plan and its predicted level of CSO control for each outfall was formally amended in May 2008 to revise the long-term CSO discharges at the Prison Point Facility, based on hydraulic optimization MWRA incorporated into the operations of the facility pursuant to milestones in Schedule Seven. MWRA predicts that the long-term plan, scheduled to be completed in December 2015, will reduce total annual CSO discharge for the Typical Year Rainfall to 0.4 million gallons (an 88% reduction from the 1988 level), with 93% of the remaining discharge to be treated at four MWRA screening and disinfection/dechlorination facilities.

On April 27, 2006, Federal District Judge Richard G. Stearns approved a joint motion of the U.S. Department of Justice (DOJ), EPA, and MWRA that provides a comprehensive resolution of outstanding issues related to MWRA's CSO program. Under the approved motion, MWRA entered a Second CSO Stipulation by which it agreed to implement its previously recommended plans for Alewife Brook/Upper Mystic River and East Boston and to undertake additional work to further reduce CSO discharges to the Charles River from its Cottage Farm CSO Facility. The Cottage Farm facility had been the subject of discussions between EPA and MWRA and related investigations by MWRA since MWRA first issued its long-term control plan in 1997. The additional Charles River work is predicted to reduce CSO discharges from Cottage Farm to 2 activations and 6.3 million gallons in the Typical Year, from the previous goal of 6 activations and 23.6 million gallons. The scope, milestones and performance goals of other CSO projects remain unchanged.

The Federal Court ordered schedule had also contained three unmet milestones related to completion of the CSO control plans for Alewife Brook/Upper Mystic River, East Boston, and region-wide floatables control and outfall closings. The accepted joint motion and the revised court schedule ("Schedule Seven") that was created from it adjusted several previous project milestones and added milestones for the revised Charles River CSO control plan.

In exchange for MWRA agreeing to implement its revised long-term control plan, DEP agreed to issue a series of five (5), up to three-year extensions to the water quality variances for the Lower Charles River Basin and the Alewife Brook/Upper Mystic River through 2020. As they relate to MWRA, the terms and conditions of the variance extensions would be limited to the requirements of the Court Order (i.e. MWRA's responsibility is to implement the long-term control plan contained in the revised Schedule Seven). Pursuant to an agreement reached by MWRA, DEP and EPA in the spring of 2019, MWRA will perform water quality modeling of Alewife Brook/Upper Mystic River and Lower Charles River Basin as part of its CSO performance assessment. In turn, DEP issued 5-year variances for these water bodies on August 30, 2019, effective through August 31, 2024. These variances, issued to MWRA, the City of Cambridge (Charles River, Alewife Brook/Upper Mystic River) and the City of Somerville (Alewife Brook/Upper Mystic River), also require public notification of CSO discharges, progress reports and public briefings on the 2018-2021 CSO Performance Assessment, the evaluation of additional CSO mitigation projects defined in the variances, and the development of updated CSO control plans for these waters, among other CSO and CSO impact mitigation requirements.

The Second CSO Stipulation (2006) replaces the stipulation entered in 1987 that established MWRA's responsibility to develop and implement a region-wide CSO long-term control plan. The Second CSO Stipulation states that once MWRA has implemented the recommended plan and demonstrated that it meets the specified goals for activation frequency and discharge volumes, each CSO community will be solely responsible for level of control and other regulatory requirements at the CSO outfalls it owns and operates in accordance with its NPDES discharge permit. These important conditions in the Second Stipulation provided much greater certainty to the MWRA and its ratepayers relative to the scope and cost of the CSO program and its projects through 2020. The elements of the final long-term CSO control plan and its numerical CSO discharge goals for each receiving water segment are presented in Table 1 on the following page.

The CSO project schedules in Schedule Seven are aggressive and reflect project-specific design, permitting and construction requirements. Cost risks include unforeseen subsurface conditions, utility conflicts and the need to manage traffic and community impacts in densely populated neighborhoods. MWRA entered into memoranda of understanding (MOU) and financial assistance agreements (FAA) with BWSC, City of Cambridge and Town of Brookline, by which each community implemented one or more of the 35 CSO projects and MWRA funded eligible engineering, construction and force account costs. The BWSC MOU/FAA (9 projects) ended on June 30, 2017. MWRA and BWSC entered into a new four-year financial assistance agreement for Dorchester Interceptor Inflow Removal (formerly part of the South Dorchester Bay sewer separation project) effective beginning July 1, 2017.

Under this agreement, BWSC completed an inflow removal construction contract by June 30, 2021 when the Dorchester Agreement came to an end. In June 2021, MWRA and BWSC entered a new financial assistance agreement transferring \$2.2 million of remaining funds in the Dorchester Agreement for construction of “East Boston Sewer Separation Contract 3 and Other CSO Improvements”. The Town of Brookline MOU/FAA (1 project) ended on July 31, 2014, and the City of Cambridge MOU/FAA (5 projects) ended on June 30, 2018. East Boston sewer separation work is ongoing and other construction includes the replacement of the tide gate at MWR205. Design work includes Somerville Marginal CSO Facility New Pipe, CHE008 Pipe Replacement. MWRA and BWSC are drafting a new FAA/MOU for consideration by the Board of Directors in association with the design and construction of improvements to BOS017, BOS062, BOS065 and BOS070.

Table 1: Approved CSO Control Plan and Capital Cost by Receiving Water Segment

Receiving Water	CSO Discharge Goals (Typical Year Rainfall)		Projects*	Capital Cost* (\$ millions)
	Activations	Volume (million gallons)		
Alewife Brook/Upper Mystic River	7 untreated and 3 treated @ Somerville Marginal	7.3 3.5	<ul style="list-style-type: none"> Cambridge/Alewife Sewer Separation MWR003 Gate and Rindge Siphon Relief Interceptor Connections/Floatables Connection/Floatables at Outfall SOM01A Somerville Baffle Manhole Separation Cambridge Floatables Control (portion) 	110.0
Mystic River/Chelsea Creek Confluence and Chelsea Creek	4 untreated and 39 treated @ Somerville Marginal	1.1 57.1	<ul style="list-style-type: none"> Somerville Marginal CSO Facility Upgrade Hydraulic Relief at BOS017 BOS019 Storage Conduit Chelsea Trunk Sewer Replacement Chelsea Branch Sewer Relief CHE008 Outfall Repairs East Boston Branch Sewer Relief (portion) 	96.1
Charles River (including Stony Brook and Back Bay Fens)	3 untreated and 2 treated @ Cottage Farm	6.8 6.3	<ul style="list-style-type: none"> Cottage Farm CSO Facility Upgrade Stony Brook Sewer Separation Hydraulic Relief at CAM005 Cottage Farm Brookline Connection and Inflow Controls Brookline Sewer Separation Bulfinch Triangle Sewer Separation MWRA Outfall Closings and Floatables Control Cambridge Floatables Control (portion) 	88.9
Inner Harbor	6 untreated and 17 treated @ Prison Point	9.1 243.0	<ul style="list-style-type: none"> Prison Point CSO Facility Upgrade Prison Point Optimization East Boston Branch Sewer Relief (portion) 	49.7
Fort Point Channel	3 untreated and 17 treated @ Union Park	2.5 71.4	<ul style="list-style-type: none"> Union Park Treatment Facility BOS072-073 Sewer Separation and System Optimization BWSC Floatables Control Lower Dorchester Brook Sewer Modifications 	72.0
Constitution Beach	Eliminate		<ul style="list-style-type: none"> Constitution Beach Sewer Separation 	3.7
North Dorchester Bay	Eliminate		<ul style="list-style-type: none"> N. Dorchester Bay Storage Tunnel and Related Facilities Pleasure Bay Storm Drain Improvements Morrissey Blvd Storm Drain 	253.7
Reserved Channel	3 untreated	1.5	<ul style="list-style-type: none"> Reserved Channel Sewer Separation 	70.5
South Dorchester Bay	Eliminate		<ul style="list-style-type: none"> Fox Point CSO Facility Upgrade (interim improvement) Commercial Pt. CSO Facility Upgrade (interim improvement) South Dorchester Bay Sewer Separation 	124.4
Neponset River	Eliminate		<ul style="list-style-type: none"> Neponset River Sewer Separation 	2.4
Regional			<ul style="list-style-type: none"> Planning, Technical Support and Land Acquisition 	61.9
TOTAL		410 381		933.2

Treated				
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*Floatables controls are recommended at remaining outfalls and are included in the listed projects and capital budgets.

MWRA commenced implementation of the long-term CSO control plan projects in 1996. Project schedules, which reflect compliance with Federal Court milestones, are presented in Table 2 on the following page. By December 2015, MWRA and the CSO communities had completed all 35 projects in the plan. The completed CSO projects, together with earlier improvements to MWRA's wastewater conveyance and treatment systems, including the upgraded Deer Island Treatment Plant and associated pump stations, are predicted and intended to reduce the total annual volume of CSO discharge in MWRA's federal and state regulatory-approved Typical Rainfall Year from 3.3 billion gallons in 1988 to 0.4 billion gallons, an 88% reduction, with 93% of the remaining overflow receiving treatment at MWRA's four long-term CSO facilities.

Table 2: CSO Control Plan Project Schedules

Project		Commence Design	Commence Construction	Complete Construction
North Dorchester Bay Storage Tunnel and Related Facilities		Aug 97	Aug 07	May 11
Pleasure Bay Storm Drain Improvements		Sep 04	Sep 05	Mar 06
Hydraulic Relief Projects	CAM005 Relief	Aug 97	Jul 99	May 00
	BOS017 Relief		Jul 99	Aug 00
East Boston Branch Sewer Relief		Mar 00	Mar 03	Jul 10
BOS019 CSO Storage Conduit		Jul 02	Mar 05	Mar 07
Chelsea Relief Sewers	Chelsea Trunk Sewer Relief	Jun 97	Sep 99	Aug 00
	Chelsea Branch Sewer Relief		Dec 99	Jun 01
	CHE008 Outfall Repairs		Dec 99	Jun 01
Union Park Detention/Treatment Facility		Dec 99	Mar 03	Apr 07
CSO Facility Upgrades and MWRA Floatables Control	Cottage Farm Upgrade	Jun 96	Mar 98	Jan 00
	Prison Point Upgrade		May 99	Sep 01
	Commercial Point Upgrade		Nov 99	Sep 01
	Fox Point Upgrade		Nov 99	Sep 01
	Somerville-Marginal Upgrade		Nov 99	Sep 01
	MWRA Floatables Control and Outfall Closings		Mar 99	Mar 00
Brookline Connection and Cottage Farm Overflow Interconnection and Gate		Sep 06	Jun 08	Jun 09
Optimization Study of Prison Point CSO Facility		Mar 06	Mar 07	Apr 08
South Dorchester Bay Sewer Separation		Jun 96	Apr 99	Jun 07
Stony Brook Sewer Separation		Jul 98	Jul 00	Sep 06
Neponset River Sewer Separation			Apr 96	Jun 00
Constitution Beach Sewer Separation		Jan 97	Apr 99	Oct 00
Fort Pt Channel Conduit Sewer Separation and System Optimization		Jul 02	Mar 05	Mar 07
Morrissey Boulevard Storm Drain		Jun 05	Dec 06	Jul 09
Reserved Channel Sewer Separation		Jul 06	May 09	Dec 15
Bulfinch Triangle Sewer Separation		Nov 06	Sep 08	Jul 10
Brookline Sewer Separation		Nov 06	Nov 08	Apr 13
Somerville Baffle Manhole Separation			Apr 96	Dec 96
Cambridge/Alewife Brook Sewer Separation	CAM004 Stormwater Outfall and Detention Basin		Apr 11	Apr 13
	CAM004 Sewer Separation	Jan 97	Jul 98/Sep 12	Dec 15
	CAM400 Manhole Separation	Oct 08	Jan 10	Mar 11
	Interceptor Connection Relief/Floatables Control at Outfalls CAM002, CAM401B and CAM001	Oct 08	Jan 10	Oct 10
	MWR003 Gate and Rindge Ave. Siphon Relief	Mar 12	Aug 14	Oct 15
	Connection Relief/Floatables Control at SOM01A	Mar 12	Sep 13	Dec 13
Region-wide Floatables Control and Outfall Closings		Sep 96	Mar 99	Dec 07

MWRA's CSO program includes temporary flow metering and other efforts to collect and evaluate new data to track system performance. The performance of the MWRA and CSO community sewer systems is continuously improving as CSO and non-CSO projects are completed. Updated assessments of the system's hydraulic performance and updated estimates of CSO discharges using actual field data and computer model simulations are essential to verify the predicted benefits of the CSO-related improvements as they are completed, to ensure that the system hydraulic model reflects updated conditions, and to support continuing CSO mitigation efforts and long-term goal tracking.

MWRA's NPDES permit and the variances for the Charles River and Alewife Brook/Upper Mystic River require MWRA to estimate CSO discharges at each permitted outfall for all storm events on an annual basis. This is accomplished by MWRA staff using the InfoWorks collection system model and data from permanent and temporary meters located in the interceptor system, at CSO treatment facilities, and at other CSO outfalls. In addition, the Federal Court schedule requires MWRA to conduct a system-wide performance assessment after completing the CSO projects. The court schedule requires MWRA to commence the performance assessment by January 2018 and submit a report on the assessment findings to EPA and DEP by December 2021. MWRA issued the Notice to Proceed with Contract 7572, CSO Post-Construction Monitoring and Performance Assessment, on November 8, 2017, ahead of and in compliance with the January 2018 milestone.

Anticipated operating cost impacts of the CSO program are summarized below and will be further developed as part of the planning and design phases for individual projects.

Program

The following projects are court mandated, are recommended in MWRA's approved long-term CSO control plan, and are required to meet Massachusetts Surface Water Quality Standards.

Project	Purpose
MWRA Managed	
North Dorchester Bay & Reserved Channel	Virtually eliminate CSO discharges (25-year storm control) and provide a 5-year storm level of separate stormwater control to minimize beach closings along North Dorchester Bay in South Boston.
Hydraulic Relief	Eliminate hydraulic restrictions between local and MWRA systems at two locations, in Boston (Outfall BOS017) and Cambridge (Outfall CAM005) to improve collection and conveyance of wet weather flows, thereby reducing CSO discharges into the Mystic and Charles Rivers, respectively. Somerville Marginal New Pipe Connection was added in FY23 that will allow for by-pass of the existing Somerville Marginal CSO facility and carry higher flows to the Prison Point Facility in storm events.
East Boston Branch Sewer Relief	Increase hydraulic capacity and provide long-term structural integrity to MWRA's East Boston Branch Sewer through the replacement or rehabilitation of the existing sewers. Completion of this project will increase wet weather transport capacity and reduce CSO discharges along the East Boston shoreline, minimizing CSO impacts to the Mystic/Chelsea Confluence, Chelsea Creek and Boston Inner Harbor and facilitating the beneficial uses of these receiving water segments.
BOS019 Storage Conduit	Control CSO discharges at Outfall BOS019, which discharges to the Little Mystic Channel in Charlestown, by storing most of the overflows and pumping them back into the interceptor system after storms.
Chelsea Trunk Sewer Relief	Control CSO discharges at Outfalls CHE002, CHE003, CHE004, and CHE008, which discharge to the Mystic/Chelsea Confluence and Chelsea Creek, by relieving a local trunk sewer and the MWRA Chelsea Branch Sewer and by repairing Outfall CHE008. The Chelsea Branch Sewer relief project also provides relief to the lower portion of the Revere Extension Sewer to improve service and control surcharging.
Union Park Detention Treatment Facility	Reduce the frequency and impacts of CSO discharges from the BWSC Union Park Pumping Station, which discharges into the Fort Point Channel at Outfall BOS070, by providing fine screening, disinfection, dechlorination and a level of detention and solids removal.

Project	Purpose
Upgrade Existing CSO Facilities and MWRA Floatables Control	Minimize CSO impacts to the Lower Charles River, Upper Inner Harbor, Mystic/Chelsea Confluence and South Dorchester Bay receiving waters by upgrading five MWRA CSO treatment facilities (Fox Point, Commercial Point, Cottage Farm, Prison Point, and Somerville Marginal), and providing floatables control at MWRA CSO outfalls along the Lower Charles River Basin that are not associated with treatment facilities.
MWR003 Gate, Rindge Ave. Siphon Relief and SOM01A	Minimize CSO discharges to Alewife Brook as part of MWRA's Alewife Brook CSO control plan and provide sewer system flood control in extreme storms with a control gate at outfall MWR003 and relief of MWRA's Rindge Ave. Siphon. Upgrade local connection capacity and provide floatables control at the City of Somerville's Outfall SOM01A.
Charles River CSO Controls	Bring the MWRA's "Brookline Connection" into service and implement Cottage Farm influent gate controls and other facility inflow controls to minimize treated discharges to Lower Charles River Basin at the Cottage Farm facility.
Community Managed	
South Dorchester Bay Sewer Separation (Fox Point)	Eliminate CSO discharges to South Dorchester Bay by separating combined sewer systems in Dorchester. This project allows MWRA to decommission the Fox Point CSO Facility. Includes additional inflow removal by BWSC from its Dorchester Interceptor system following the closing of CSO outfalls.
South Dorchester Bay Sewer Separation (Commercial Point)	Eliminate CSO discharges to South Dorchester Bay by separating combined sewer systems in Dorchester. This project allows MWRA to decommission the Commercial Point CSO Facility.
East Boston CSO Control	As part of the CSO Post construction assessment, it was determined that although BWSC CSO outfall BOS003, BOS009 and BOS014 have been substantially reduced as part of the East Boston Branch Sewer Relief project, additional work is needed to meet Long Term Control Plan (LTCP) goals. Therefore, MWRA has entered into a new financial assistance agreement to contribute to the construction of "East Boston Sewer Separation Contract 3" to begin in June 2021, and includes the replacement of 2,300 L.F. of sewer, 4,000 L.F. of sewer rehabilitation, and the installation of 7,600 L.F. of storm drains and a new connection from BOS014-2 to the East Boston Branch Relief Sewer (Condor St. Sewer) which is expected to achieve LTCP goals.
Stony Brook Sewer Separation	Minimize CSO discharges to Stony Brook Conduit and the Back Bay Fens, both of which drain to the Lower Charles River Basin, by separating combined sewer systems in parts of Roxbury and Jamaica Plain. Implementation of this project is intended to reduce the number of overflows to the Stony Brook Conduit from as many as 22 to 2 in the Typical Year and reduce annual CSO discharge volume by 99.7%.
Neponset River Sewer Separation	Eliminate CSO discharges to the Neponset River and protect water quality at downstream swimming areas in South Dorchester (primarily Tenean Beach) by separating combined sewer systems in the Neponset section of Dorchester and by permanently closing CSO regulators associated with Outfalls BOS093 and BOS095.
Constitution Beach Sewer Separation	Eliminate CSO discharges at the Constitution Beach CSO Facility, allowing decommissioning of the facility, by separating combined sewer systems in parts of East Boston.
Cambridge Alewife Brook Sewer Separation	Minimize CSO discharges to Alewife Brook by separating combined sewer systems in parts of Cambridge and upgrading local system connections to MWRA's Alewife interceptors. Close certain outfalls.
BWSC Floatables Control	Limit the discharge of floatable materials from five BWSC combined sewer outfalls along Boston Inner Harbor and Fort Point Channel.
Cambridge Floatables Control	Limit the discharge of floatable materials from Cambridge CSO outfalls that will remain following completion of MWRA's CSO control plan.

Project	Purpose
Fort Point Channel Sewer Separation	Minimize CSO discharges to Fort Point Channel by separating sewer systems tributary to Outfalls BOS072 and BOS073. Implementation of the recommended sewer separation plan will reduce the number of overflows from these outfalls from as many as 23 to zero in the Typical Year. Also, relocate a CSO regulator and perform limited sewer separation to reduce CSO discharges from the Lower Dorchester Brook Sewer to Fort Point Channel with a MWRA funding cap of \$2.03 million to BWSC. The work associated with the Fort Point Channel & Mystic includes modification to a siphon structure to divert flows away from BOS017; a secondary connection at BOS062; the raising of a weir at BOS065 and potential adjustments at BOS064 to address a slight increase given modification to 062 and 065; and, modifications to the Boston Main Interceptor to reduce CSO volumes and activations at 070 DBC.
Morrissey Boulevard Drain	Reroute stormwater away from the Outfall BOS087 tributary area and the North Dorchester Bay storage tunnel to Savin Hill Cove in large storms, to increase the level of stormwater control along the South Boston beaches provided by the tunnel.
Reserved Channel Sewer Separation	Minimize CSO discharges to Reserved Channel by separating combined sewer systems in a portion of South Boston. Implementation of the recommended sewer separation plan will reduce the number of overflows to Reserved Channel from as many as 37 to 3 in the Typical Year.
Brookline Sewer Separation	Separate several areas of Brookline, totaling 72 acres, where there are remaining combined sewers tributary to MWRA's Charles River Valley Sewer. The project is intended to reduce treated CSO discharges to the Lower Charles River Basin at the Cottage Farm Facility.
Bulfinch Triangle Sewer Separation	Separate the combined sewers in a 61-acre area of Boston bounded by North Station, Haymarket Station, North Washington St., and Cambridge St. The project is intended to reduce CSO discharges to the Lower Charles River Basin and Upper Inner Harbor, reduce overflows to the Prison Point CSO Facility, and close outfall BOS049.
CSO Support	
CSO Planning and Support	The goals of the CSO Program are to minimize CSO discharges, greatly reduce beach closings following wet weather events, and maximize the beneficial use of CSO receiving waters, in compliance with state water quality standards. This project includes CSO conceptual planning, system master planning, and facilities planning/environmental review that support these goals. It also includes directly related watershed planning activities, development of short-term CSO control measures (known as System Optimization Plans, or SOPs), various as-needed technical support and system performance assessments, including the court-mandated CSO performance assessment in the period 2018-2021, project evaluations required by conditions in CSO variances, and the acquisition of land, easements and construction permits required for CSO project implementation. Future Design phase for further CSO control scope to be defined.

Expenditure Forecast (in \$000s) and Program Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$933,246	\$911,927	\$21,319	\$2,800	\$12,331	\$7,459	\$16,353	\$2,167

Program Status 5/23	97.9%	Status as % is approximation based on project budget and expenditures. MWRA and the CSO communities completed the remaining Long-Term CSO Control projects in December 2015 in compliance with Schedule Seven. (See individual project status and background information).
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Changes to Program Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$ 916,743	\$933,246	\$16,503	Jan-24	Nov-25	22 mos.	\$2,068	\$16,353	\$14,285

Explanation of Changes

- Project cost and spending change due to addition of Fort Point Channel & Mystic, and CSO Updated Control Plan Design contracts, and updated cost estimates for Somerville Marginal New Pipe Connection contracts, and Chelsea 008 Connection Relief work.
- Schedule changed due to additional CSO control work added for Fort Point Channel & Mystic.

CEB Impacts

- \$500,000 for South Boston CSO Tunnel Inspection/Cleaning and Outfalls Inspection in FY27.

S. 349 Chelsea Trunk Sewer Relief

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Fulfills a regulatory requirement*
- Improves system operability and reliability*

To control CSO discharges at outfalls CHE002, CHE003, CHE004, and CHE008 in accordance with MWRA’s approved long-term CSO control plan. These outfalls discharge to the Mystic River/Chelsea Creek Confluence and Chelsea Creek. In addition, the project will relieve the MWRA Chelsea Branch Sewer as well as the lower portion of the Revere Extension Sewer to improve service and control surcharging. The project is court mandated, is in accordance with MWRA’s approved long-term CSO control plan, and is required to meet DEP water quality standards.

Project History and Background

This project combines three components recommended in MWRA’s long-term CSO control plan: 1) relief of a City of Chelsea-owned trunk sewer to minimize CSO discharges to the Inner Harbor at three outfalls, 2) relief of the MWRA Chelsea Branch Sewer and Revere Extension Sewer to minimize CSO discharges to Chelsea Creek and reduce surcharging in the upstream transport system, and 3) repair of the existing CSO pipe in Chelsea at outfall CHE008. All of the work is complete and the contracts have been closed out.

Scope

Sub-phase	Scope
Design/CS/RI (6198)	Design, construction services, and resident inspection for the entire project.
Chelsea Trunk Relief (6262)	The existing Chelsea Trunk Sewer, which varies in diameter from eight to 15 inches, was replaced with 2,300 feet of 30-inch diameter pipe. Information obtained during design about the physical conditions of the CHE002, CHE003, and CHE004 outfalls led to a decision to include rehabilitation of sections of the CHE002 and CHE003 outfalls. Underflow baffles were installed at each regulator to provide floatables control.
Chelsea Branch Sewer (6263)	The MWRA Chelsea Branch and Revere Extension Sewers, which run in parallel along Eastern Avenue in Chelsea, were replaced and/or relieved with approximately 4,200 feet of 42-inch pipe and 3,500 feet of 66-inch pipe along or near Cabot Street and along Eastern Avenue in Chelsea. The construction also included repairs at outfall CHE008. One underflow baffle was installed at the sole regulator structure associated with this outfall to provide floatables control.
Rehab/Chelsea Branch/Revere Extension (6370)	Cured in place pipe rehabilitation methods were used to line approximately 4,200 feet of 36-inch pipe in the Chelsea Branch and 3,000 feet of 54-inch pipe in the Revere Extension Sewer.
Modify Chelsea Screen House (6371)	Installations of connection points and provision of flow control at the Chelsea Screen House in support of the Chelsea Branch Sewer rehabilitation.
Chelsea 008 Pipe Replacement (7915)	Replacement of the existing 30-inch ductile iron cement-lined pipe with a new 48-inch pipe that will likely result in attainment of the LTCP goals for the CHE008 outfall. The pipe replacement is approximately thirty feet in length connecting the City of Chelsea’s CHE008 regulator (RE-081) to the MWRA’s Chelsea Branch Sewer at Structure C. The work includes modifications to RE-081 and Structure C to accommodate for the pipe increase, installation of a steel plate and the demolition of an existing weir wall in Structure C.

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$31,779	\$29,779	\$ 2,000	\$1,000	\$1,000	\$1,000	\$1,000	\$0

Project Status 5/23	94.3%	Status as % is approximation based on project budget and expenditures.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$31,179	\$31,779	\$600	Jun-23	Sep-23	3 mos.	\$0	\$1,000	\$1,000

Explanation of Changes

- Project cost and spending changed due to updated cost and schedule for Chelsea 008 Connection Relief work.

CEB Impact

- No impacts identified at this time.

S. 354 Hydraulic Relief

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Fulfills a regulatory requirement*

Elimination of hydraulic restrictions between local and MWRA systems at locations in Boston and Cambridge to improve transport of wet weather flows, thereby reducing CSO discharges into the Mystic and Charles Rivers. The project is court mandated, is in accordance with MWRA's approved long-term CSO control plan, and is required to meet DEP water quality standards.

Project History and Background

This project combines two local hydraulic relief projects, one in Cambridge to minimize CSO discharges at CAM005 and one in Charlestown to minimize CSO discharges at BOS017.

In Cambridge, the 24-inch, 40-foot long dry weather connection between the CAM005 regulator and the North Charles Metropolitan Sewer, adjacent to Mount Auburn Hospital, was relieved with a new 54-inch connection.

In Charlestown at BOS017, 190 feet of 36-inch pipe were installed in Sullivan Square to divert two local (BWSC) combined sewers to a direct connection with the Cambridge Branch Sewer. In addition, a 10-foot long restriction between the Charlestown and Cambridge Branch Sewers, adjacent to Sullivan Square, was eliminated. This improvement is expected to lower hydraulic grade lines in the Charlestown Branch Sewer during wet weather.

Somerville Marginal New Pipe Connection was added since additional CSO control was needed. The new pipe will allow for by-pass of the existing Somerville Marginal CSO facility and carry higher flows to the Prison Point Facility in storm events. The new pipe will include 20feet of 36-inch diameter pipe, a connection chamber and associated monitoring systems.

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$4,458	\$2,295	\$ 2,163	\$0	\$0	\$ 1,300	\$2,163	\$0

Project Status 5/23	51.5%	Status as % is approximation based on project budget and expenditures.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$3,555	\$4,458	\$903	Jan-24	Dec-24	12 mos.	\$1,260	\$2,163	\$903

Explanation of Changes

- Project cost and spending change due to updated cost estimates for Somerville Marginal New Pipe Connection.
- Project schedule change due to updated schedule for Somerville Marginal New Pipe Connection.

CEB Impact

- No impacts identified at this time.

S. 341 South Dorchester Bay Sewer Separation (Commercial Point)

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Fulfills a regulatory requirement*

This project, together with sewer separation at Fox Point, will eliminate CSO discharges to South Dorchester Bay by separating combined sewer systems in Dorchester. The project is court mandated, is in accordance with MWRA's approved long-term CSO control plan, and is required to meet DEP water quality standards.

Project History and Background

This project involves the construction of new storm drains and appurtenant structures, relocation of storm runoff connections from the existing combined sewers to the new storm drains, and rehabilitation of the existing combined sewers for use as sanitary sewers. The plan calls for construction of approximately 65,000 feet of new storm drains. BWSC is implementing the project with MWRA funds.

A contract for design services was executed by Boston Water & Sewer Commission (BWSC) in June 1996, and a preliminary design report was submitted in December 1997. BWSC executed a separate contract for construction management services in December 1998 and commenced construction in April 1999. BWSC completed all of the sewer separation contracts and closed all of the CSO regulators tributary to South Dorchester Bay by June 2007, and MWRA decommissioned the Commercial Point CSO Facility in November 2007. BWSC is conducting flow monitoring and hydraulic model evaluations to verify that sufficient inflow has been removed from the sewer system and the project performance objectives for the sewer system have been achieved. Downspout disconnection and other infiltration/inflow removal is scheduled to continue through June 2021.

Scope

Sub-phase	Scope	Status
Design (6154)	Design services for construction contracts to be bid, awarded, and managed by BWSC.	Completed
Construction (6248)	Construction of 65,000 feet of new storm drains and appurtenant structures, managed by BWSC. Relocation of storm runoff connections from the existing combined sewers to the new storm drains, rehabilitation of the existing combined sewers for use as sanitary sewers, individual building downspout removal and street paving are also included.	Completed
Dorchester Interceptor Inflow Removal Construction (7576)	Phase to address Dorchester Interceptor Inflow Removal work with funding pursuant to a phase-specific financial assistance agreement with BWSC. Previously, work was included in Construction phase listed above.	Completed

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$61,443	\$61,443	\$0	\$0	\$1,581	\$0	\$0	\$0

Project Status 5/23	100%	Status as % is approximation based on project budget and expenditures.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$61,443	\$61,443	\$0	Jun-21	Jun-21	None	\$0	\$0	\$0

Explanation of Changes

- N/A.

CEB Impacts

- No impacts identified at this time.

S. 356 Fort Point Channel Sewer Separation

Project Purpose and Benefits

- ☑ *Contributes to improved public health*
- ☑ *Provides environmental benefits*
- ☑ *Fulfills a regulatory requirement*
- ☑ *Extends current asset life*

To minimize CSO discharges to Fort Point Channel by separating combined sewer systems tributary to outfall BOS073 and implementing system optimization measures at BOS072. Implementation of the recommended sewer separation plan will reduce the number of overflows from these outfalls from as many as 23 to zero in a typical year. This project is court mandated, is in accordance with MWRA's approved long-term CSO control plan, and is required to meet DEP water quality standards.

Project History and Background

On August 14, 2003, MWRA received a Certificate from the Secretary of Environmental Affairs accepting the Notice of Project Change that recommended replacing the Fort Point Channel CSO Storage Conduit project (1997 FEIR recommended plan) with a plan for sewer separation and system optimization. On September 17, 2003, the Board of Directors authorized the Executive Director to negotiate related revisions to the Federal Court Order in the Boston Harbor Case. On February 27, 2004, MWRA's motion to revise the court schedule was approved by the Federal Court.

MWRA and BWSC agreed that this project, like other sewer separation projects in the CSO control plan, would be implemented within the MOU and FAA, with BWSC performing final design, construction services and construction and MWRA funding eligible costs. BWSC would also own and operate the separated systems upon construction completion.

The project is intended to eliminate CSO discharges in a typical year at outfalls BOS072 and BOS073. On March 30, 2007, BWSC substantially completed construction of the project, in compliance with Schedule Seven. BWSC installed 4,550 linear feet of new storm drain and completed weir raising and floatables controls at the related CSO regulators. BWSC is conducting flow monitoring and hydraulics evaluations to verify that the CSO control goals have been met.

To reduce CSO discharges from the Lower Dorchester Brook Sewer to Fort Point Channel and to bring CSO discharges to the Fort Point Channel in line with the long-term level of control an additional phase was added to this project. BWSC has agreed to relocate a CSO regulator and perform limited sewer separation with a MWRA funding cap of \$2.03 million.

Scope

Sub-phase	Scope
Design (6991)	Design services for construction contracts to be bid, awarded and managed by BWSC.

Sub-phase	Scope
Construction (6992)	Construction of approximately 4,550 linear feet of new storm drains and appurtenant structures tributary to outfalls BOS072 and BOS073, managed by BWSC. Relocation of storm runoff connections from the existing combined sewers to the new storm drains and rehabilitation of the existing combined sewers for use as sanitary sewers are also included.
Fort Point Channel and Mystic (8054)	The work associated with the Fort Point Channel & Mystic includes modification to a siphon structure to divert flows away from BOS017; a secondary connection at BOS062; the raising of a weir at BOS065 and potential adjustments at BOS064 to address a slight increase given modification to 062 and 065; and, modifications to the Boston Main Interceptor to reduce CSO volumes and activations at 070 DBC.

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$21,507	\$ 11,507	\$ 10,000	\$ 625	\$ 625	\$ 3,813	\$ 9,375	\$0

Project Status 5/23	57.0%	Status as % is approximation based on project budget and expenditures. Construction reached substantial completion in March 2007.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$11,507	\$21,507	\$10,000	Dec-10	Nov-25	179 mos.	\$0	\$9,375	\$9,375

Explanation of Changes

- Project cost, schedule and spending change due to additional CSO work for Fort Point Channel and Mystic .

CEB Impact

- No impacts identified at this time.

S. 362 East Boston CSO Control

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Fulfills a regulatory requirement*

This project will further reduce CSO discharges from BWSC CSOs (BOS003, BOS009 and BOS014). As part of the CSO Post construction monitoring and performance assessment, it was determined that although these BWSC CSO outfalls (BOS003, BOS009 and BOS014) have been substantially reduced as part of the East Boston Branch Sewer Relief project, additional work is needed to meet court-mandated CSO Long Term Control Plan (LTCP) goals. Therefore, MWRA has entered into a new financial assistance agreement to contribute to the construction of further sewer separation and system improvement.

Scope

Sub-phase	Scope	Status
East Boston Sewer Separation - BOS014 (7925)	MWRA has entered into a new financial assistance agreement to contribute to the construction of "East Boston Sewer Separation Contract 3" to begin in June 2021, and includes the replacement of 2,300 L.F. of sewer, 4,000 L.F. of sewer rehabilitation, and the installation of 7,600 L.F. of storm drains and a new connection from BOS014-2 to the East Boston Branch Relief Sewer (Condor St. Sewer).	Completed

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$ 2,182	\$ 2,182	\$0	\$2,182	\$0	\$0	\$0	\$0

Project Status 5/23	100%	Status as % is approximation based on project budget and expenditures.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$2,182	\$2,182	\$0	Jun-23	Jun-23	None	\$0	\$0	\$0

Explanation of Changes

- N/A.

CEB Impacts

- No impacts identified at this time.

S. 324 CSO Planning and Support

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Fulfills a regulatory requirement*

The goals of the CSO Program are to minimize CSO discharges and their impacts, eliminate beach closings caused by CSOs, and maximize the beneficial use of CSO receiving waters, in accordance with national and state CSO policies and in compliance with state water quality standards. This project includes CSO conceptual planning, system master planning, and facilities planning/environmental review. It also includes directly related watershed planning activities, development of short-term CSO control measures (known as System Optimization Plans or SOPs), various as-needed technical support activities and project evaluations required by conditions in CSO variances, and acquisition of land and easements required for CSO control plan implementation.

Project History and Background

MWRA CSO planning work began in 1986. A revised Final Conceptual Plan and System Master Plan were completed in 1994, and a Final CSO Facilities Plan and Environmental Impact Report were filed with MEPA in August 1997. A MEPA certificate was issued in October 1997. In December 1997, DEP issued water quality determinations that were necessary for final CSO plan approval by DEP and EPA. DEP issued a two-year variance for the Charles River in October 1998 and has extended this variance several times. DEP issued a three-year variance for Alewife Brook and Upper Mystic CSOs in March 1999 and has extended the term of the variance several times. Consultant services have included assistance to MWRA in satisfying variance conditions.

As part of CSO Planning and Support, MWRA provided financial and technical assistance to the Charles River Watershed Association in its watershed planning efforts for the Charles River in the 1990s, known as the IM3 Study. MWRA also funded a portion of the costs of a U.S. Geological Survey (USGS) water quality study of the Charles River Basin. Results of these studies will provide additional technical information to support the reassessment of the appropriateness of the recommended Charles River controls in MWRA's CSO plan. To comply with its requirements under the Charles River CSO variance, in 1999 MWRA began funding USGS efforts to collect updated information on Charles River water quality. Final payments to the Charles River Watershed Association and USGS were made in the fall of 1998 and the fall of 2001, respectively.

The federal court order in the Boston Harbor Case required MWRA to develop, by June 1993, a plan for optimizing the existing combined sewer systems to maximize transport and in-system storage capacities, thereby minimizing CSO discharges prior to developing and implementing a long-term control plan. In June 1993, MWRA completed a report entitled System Optimization Plans (SOP) for CSO Control, which recommended more than 100 relatively low cost and easily implemented projects to optimize operation of existing systems. The projects were designed and constructed primarily by the CSO communities, pursuant to SOP financial assistance agreements executed between MWRA and each CSO community. Under the agreements, MWRA reimbursed the communities for design and construction costs. SOP work also includes two projects that are part of the long-term plan: Somerville Baffle Manhole Separation and Somerville Floatables Control. Short-term plans for CSO SOPs were completed in 1997 and MWRA obtained regulatory approvals for its long-term plan in 1997 and 1998.

Various CSO plan reevaluations and systems assessments have been performed under amendments to the CSO Master Planning contract. These include: reevaluation of the Alewife Brook sewer separation plan; assessment of Cottage Farm CSO Facility performance; reevaluation of the need for the Dorchester Brook In-line Storage Project (not included in the CSO Plan or the CIP); reevaluation of the feasibility of closing MWR010; reassessment of CSO discharges from the Boston Marginal Conduit to reevaluate the need for floatables control; and reevaluation of the cost-effectiveness of the East Boston Branch Sewer Relief project in light of cost increases.

By amendment to the Master Planning contract MWRA also added system modeling services to estimate and report actual CSO discharges on an annual basis (through 2003), in compliance with provisions in MWRA's renewed NPDES permit. Since 2004, the annual modeling activities have been conducted by MWRA staff.

The performance of the sewerage system is constantly improving as CSO and non-CSO projects are completed and as maintenance efforts continue to increase the system's capacity. Updated assessments of the system's hydraulic performance and estimates of CSO discharges based on actual field data are essential to verify the predicted benefits of various CSO-related improvements, to recalibrate the system hydraulic model to reflect updated conditions, and to provide up-to-date information to support CSO planning and design efforts. This project provides for temporary flow metering and other efforts to gather and evaluate new data and track system performance. It also includes technical support and system assessments to support the CSO performance assessment required by Schedule Seven and project evaluations required by conditions in CSO variances.

This project has also supported land and easement acquisitions and funded permit costs for all MWRA managed projects in the long-term CSO Control Plan.

Scope

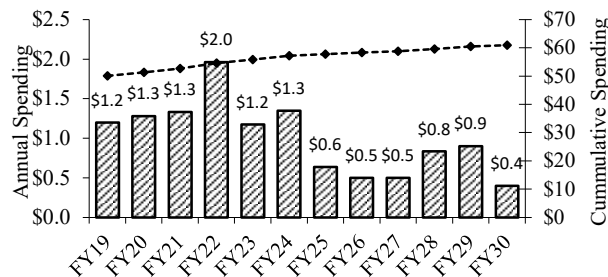
Sub-phase	Scope	Status
Technical Assistance (5790)	Preliminary planning services prior to and in support of the 1988-90 Facilities Planning/EIR efforts.	Completed
Planning/EIR (5791)	Facilities planning and environmental review of CSO control alternatives (1990 Recommended CSO Control Plan).	Completed
Master Planning (5716)	System inspections, flow monitoring, water quality monitoring, and performance assessments to improve MWRA's understanding of the combined sewer and regional wastewater systems, optimize the performance of the existing systems, and reassess CSO control needs in the context of evolving EPA policy and a system master plan. Development of the 1997 Facilities Plan/EIR and subsequent reassessments of, and revisions to, that plan.	Completed
Watershed Planning (6036)	External watershed planning efforts that may affect CSO control needs, including the Charles River Watershed Association IM3 Study and ongoing USGS water quality studies.	Completed
Modeling (5795)	Receiving water quality modeling support to the Master Planning efforts.	Completed
SOP Program (5767)	Development and implementation of System Optimization Plans for short-term CSO control. Implemented by CSO communities. Also includes funding for Somerville Baffle Manhole Separation in the long-term control plan.	Completed
System Assessment (6372)	Temporary flow metering and other efforts to gather and evaluate new data on system performance.	Active
Technical Review (6150)	Technical assistance for the entire CSO control plan including affordability analysis.	Active
CSO Performance Assessment (7572)	Study to assess the performance of completed CSO projects to verify whether CSO control goals are met.	Active
Land/Easements (6169)	Acquisition of land and easements for construction of MWRA-implemented projects. Also, permits not covered in design and construction contracts.	Active
Somerville Marginal In-System Storage (7539)	Memorandum of Agreement between MWRA and the City of Somerville approved on September 14, 2016 and executed on August 29, 2018. MWRA agreed to share the cost of the City's rehabilitation of a major combined sewer upstream of the Somerville Marginal CSO treatment facility, since MWRA's CSO control plan utilizes both the in-line storage and conveyance capacity of the current brick sewer to control and reduce the CSO volume discharged to the Mystic River from the CSO facility.	Completed

CSO Updated Control Plan Design (8057)	The MWRA, Cambridge and Somerville are expected to complete a Updated CSO Control plan for CSO discharges to the variance waters by Dec. 2026. This plan is expected to include project that will require design of projects to further reduce CSOs under this phase that may include new MWRA or community infrastructure (tunnels, relief pipes, green infrastructure, etc.).	Future
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Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$61,769	\$ 54,613	\$ 7,156	\$ 1,175	\$ 6,942	\$ 1,346	\$ 3,815	\$ 2,167

CSO Support



Project Status 5/23	89.9%	Status as % is approximation based on project budget and expenditures. Master Planning was substantially complete in September 2004. On September 14, 2005, the MWRA Board of Directors approved an MOU with Massport that governs the Authority’s construction and long-term operation on land owned by Massport, including the North Dorchester Bay tunnel mining shaft and dewatering pump station. Payments to Massport for temporary and permanent easements are complete. Schedule Seven requires MWRA to complete a CSO performance assessment in the period 2018-2021. MWRA issued the Notice to Proceed for Contract 7572, CSO Post-Construction Monitoring and Performance Assessment, on November 8, 2017, ahead of and in compliance with the January 2018 milestone. Five-year CSO variances issued by DEP effective September 1, 2019 include conditions requiring additional CSO control measures for the Lower Charles River and the Alewife Brook/Upper Mystic River, including but not limited to the evaluation of CSO optimization measures and the evaluation of alternatives that may provide further control of treated discharges from the Somerville-Marginal CSO Facility (outfalls MWR205 and SOM007/MWR205A). These were added to the scope of Contract 7572.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$56,769	\$61,769	\$5,000	Apr-25	Jun-32	86 mos.	\$808	\$3,815	\$3,007

Explanation of Changes

- Project cost, schedule, and spending changed due to addition of design phase for CSO Updated Control Plan.

CEB Impacts

- No impacts identified at this time.

S. 128 Infiltration/Inflow (I/I) Local Financial Assistance Program

Project Purpose and Benefits

- Contributes to improved public health*
- Provides environmental benefits*
- Fulfills a regulatory requirement*

Infiltration and inflow (I/I), groundwater and storm water that enter the collection system, contributes significantly to the total wastewater flow treated by MWRA. This depletes capacity that would otherwise be available to transmit sanitary flows, resulting in sewer surcharging, overflows of untreated sewage, more frequent combined sewage overflows, and higher pumping and treatment costs. The I/I Local Financial Assistance Program provides funding assistance for communities to rehabilitate their collection systems with the goal of structurally reducing I/I flows. Funding assistance for local projects complements other MWRA strategies for regional I/I reduction including wastewater metering to support flow based rates, provision of I/I estimates to communities, technical assistance to communities on local projects, regional coordination of I/I policy issues, and interaction with DEP and EPA.

Project History and Background

MWRA's Deer Island Wastewater Treatment Plant receives flow from 43 communities. The collection system encompasses 230 miles of MWRA interceptors and over 5,300 miles of community sewers. These sewers are of varying size, shape, age, material, depth, and conditions. All contribute some quantity of infiltration and inflow.

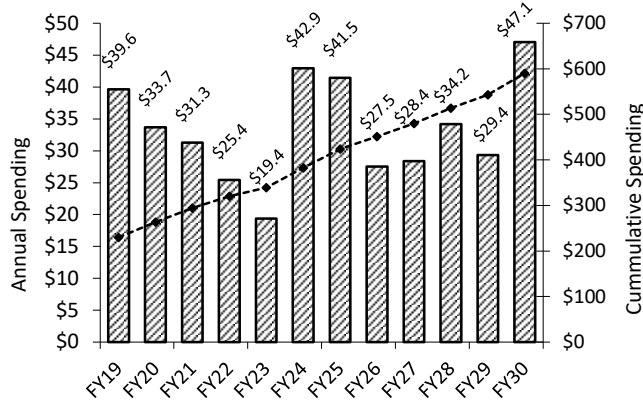
In August 1992, the Board of Directors approved \$25 million to fund the initial phase of the I/I Local Financial Assistance Program. In June 1995, the Board approved \$38.8 million to fund a second phase of the program. Both Phase 1 and 2 funds were distributed as 25% grants and 75% interest-free loans. The Board approved \$37 million to fund a third phase of the program in June 1998, an additional \$40 million for Phase 4 in June 2001, an additional \$40 million for Phase 5 in June 2004, an additional \$40 million for Phase 6 in June 2006, an additional \$40 million for Phase 7 and an additional \$40 million for Phase 8 in June 2009. The grant/loan ratio was revised for Phases 3 through 8 to 45% grants and 55% interest-free loans. During the FY15 Final CIP development in June 2014, Phases 9 and 10 were added to the CIP at \$80 million each to be distributed as 75% grants and 25% interest-free loans. Payback period for Phases 9 and 10 loans was also extended from 5 years to 10 years. During the FY19 Final CIP development, Phases 11 and 12 were added at \$100 million each to be distributed as 75% grants and 25% interest-free loans. During the FY19 Final CIP, \$100 million in Phase 13 I/I Loans only was also added. Phase 14 was added during the FY24 Final CIP process at \$100 million to be distributed as 75% grant and 25% interest free loans. All program funds are allocated to the 43 member communities based on their share of MWRA's wholesale sewer assessment. Binding commitments for funds are issued by MWRA in the form of Financial Assistance Agreements. Distribution of funds is authorized through FY2030.

Expenditure Forecast (in \$000s) and Project Status

Total Budget	Payments thru FY22	Remaining Balance	FY23	FY19-23	FY24	FY24-28	Beyond FY28
\$467,585	\$ 320,072	\$ 147,513	\$19,371	\$149,407	\$42,935	\$174,500	(\$46,358)

Project Distribution Status 5/23	61.4%	Through May 2023, MWRA has distributed \$285.5 million in grants and \$243.2 million in interest-free loans to fund 664 separate projects in 43 communities under the I/I Local Financial Assistance Program.
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I/I Local Financial Assistance



Project Repayment Status 5/23	50.2%	Through May 2023, a total of \$197.2 million has been repaid by member communities receiving interest-free loans.
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Changes to Project Scope, Budget, and Schedule

Project Cost			Scheduled Completion Date			FY24-28 Spending		
FY23	FY24	Chge.	FY23	FY24	Chge.	FY23	FY24	Chge.
\$392,585	\$467,585	\$75,000	Jun-40	Jun-40	None	\$ 109,924	\$ 174,500	\$ 64,576

Explanation of Changes

- Project cost changed due to additional funding for Phase XIV.
- Schedule change due to addition of Phase XIV.
- Project spending changed primarily due to addition of Phase XIV and updated cash flows.

CEB Impacts

- No impacts identified at this time.