UNITED STATES DISTRICT COURT
for the
DISTRICT OF MASSACHUSETTS

UNITED STATES OF AMERICA, Plaintiff, v. METROPOLITAN DISTRICT COMMISSION, et al., Defendants.	CIVIL ACTION No. 85-0489-RGS
CONSERVATION LAW FOUNDATION OF NEW ENGLAND, INC., Plaintiff, v. METROPOLITAN DISTRICT COMMISSION, Defendants .	CIVIL ACTION No. 83-1614-RGS

NOTICE OF MWRA OF FILING
FINAL COMBINED SEWER OVERFLOW CONTROL PLAN
ANNUAL PROGRESS REPORT

It is with great pride that the Massachusetts Water Resources Authority (the “Authority”) files herewith the 20th and final Combined Sewer Overflow Control Plan Annual Progress Report in accordance with the Court's order of December 23, 1985 and subsequent orders of the Court. Schedule Seven

activity for the month of December 2015 on the Court's Schedule Seven, certified by Frederick A. Laskey, Executive Director of the Authority, is attached hereto as "Exhibit A."

Respectfully submitted,

/s/ Jonathan M. Ettinger
Jonathan M. Ettinger (BBO #552136)
Foley Hoag LLP
155 Seaport Boulevard
Boston, Massachusetts 02210
(617) 832-1000
Jettinger@foleyhoag.com

Of Counsel:

Steven A. Remsberg,
General Counsel
Christopher L. John,
Senior Staff Counsel
Massachusetts Water Resources Authority
100 First Avenue
Boston, Massachusetts 02129
(617) 242-6000

CERTIFICATE OF SERVICE

I hereby certify that a true and accurate copy of this document, which was filed via the Court's ECF system, will be sent electronically by the ECF system to the registered participants as identified on the Notice of Electronic Filing (NEF) and paper copies will be sent to those indicated as non-registered participants on March 15, 2016.

/s/ Jonathan M. Ettinger
Jonathan M. Ettinger (BBO #552136)
Jettinger@foleyhoag.com

Dated: March 15, 2016

Exhibit A

SCHEDULE SEVEN

MWRA MONTHLY COMPLIANCE REPORT
Schedule Seven Milestones for December 2015

EXHIBIT "A"

MONTH/YEAR	CSO CONTROL	LONG-TERM SLUDGE MANAGEMENT	NEW BOSTON HARBOR SECONDARY TREATMENT PLANT
December 2015	MWRA, in cooperation with Cambridge, to complete construction of CAM 004 Sewer Separation. MWRA, in cooperation with BWSC, to complete construction of Reserved Channel Sewer separation. (Completed – See Combined Sewer Overflow Control Plan Annual Progress Report 2015 dated March 2016.)		

Certification of Completed Activities

By: _____
Frederick A. Laskey
Executive Director, MWRA

Date: March 15, 2016

Massachusetts Water Resources Authority

Combined Sewer Overflow Control Plan

Annual Progress Report 2015

March 2016

MWRA Board of Directors

Matthew A. Beaton, Chairman
John J. Carroll, Vice-Chairman
Joseph C. Foti, Secretary
Austin F. Blackmon
Kevin L. Cotter
Paul E. Flanagan
Andrew M. Pappastergion
Brian Peña
Henry F. Vitale
John J. Walsh
Jennifer L. Wolowicz

Frederick A. Laskey, Executive Director
Michael J. Hornbrook, Chief Operating Officer

Prepared by: David A. Kubiak, P.E.
Nadine S. Smoske
Kelly Coughlin
Lisa Rando
David Wu
Eddie Whittaker

This CSO Annual Progress Report is published in memory of MWRA Project Engineer William G. Hartford IV (1965-2015), a son of South Boston, who along with many other dedicated MWRA employees helped plan, design and build the Long-Term CSO Control Plan for its environmental and public benefits.

Cover:

Bill Hartford's photo of his daughter at Pleasure Bay Beach, South Boston, May 2015.

TABLE OF CONTENTS

FOREWORD

It is with great pride that the Massachusetts Water Resources Authority (MWRA) submits this 20th and final Annual Progress Report to the Federal District Court District of Boston, Judge Richard Stearns presiding. In December 2015, the last CSO construction milestones in the Federal District Court Order were met, bringing the Boston Harbor Clean-up to successful completion after 30 years of planning, design, and construction.

While this Report will focus on the details of the $900 million in spending on the 82 construction contracts, 33 engineering contracts, and 10 planning and technical assistance contracts necessary to meet the 184 court milestones and complete the 35 separate projects, it is important to take a step back to reflect on the improvements that the Boston Harbor Clean-up and CSO Program have made on the quality of life for the residents of greater Boston.

In the late 1980s, the Boston area had the dubious distinction of having the dirtiest harbor in America. If someone fell into the Charles, Mystic, and Neponset Rivers, a trip to the hospital for disinfection was strongly recommended. The urban beaches were frequently closed for days, even after the most modest of rain events, and dry weather overflows marred those beaches and waterways with dry weather overflows. Much of the harbor floor was considered virtually dead with a black mayonnaise consistency. Residents living along the waterfront often had to close their windows because of the foul smell of the harbor. The situation was a national embarrassment for the region.

Today, the results of our efforts are an irrefutable success. Our beaches are now considered the cleanest urban beaches in the country. The water quality of the Charles and Mystic Rivers has been rated a B plus. In fact, swimming races are held in the Charles River and efforts are afoot to reopen a bathing beach. The greater harbor has rejuvenated itself and is swimmable, even during rain events. It is truly a great environmental success story and the CSO program has played a critical role.

While it is very common for success to have many parents, in this case, many should share in the satisfaction of this success. Obviously, the legacy of Judge A. David Mazzone looms large over the entire harbor clean-up, including his critically important decision to hand the case to Judge Richard G. Stearns. Judge Stearns has maintained a firm, but fair, oversight over these the projects. Strategically, Judge Stearns was instrumental in forging the 2006 CSO agreement that created the road map to drive this program to completion. The agreement created a consensus in which the Environmental Protection Agency, the Department of Environment Protection, the Conservation Law Foundation, and the MWRA Advisory Board all agreed on the components and schedule of the program.

The members of the MWRA Board of Directors deserve great credit for their ongoing support of this massive investment of ratepayer funds. In particular, the Board's decision early-on that the program would be funded regionally set the framework for success. The MWRA Advisory Board's support and ongoing diligence in protecting the interests of the MWRA's wastewater communities was instrumental in the establishment of the five-year assessment period at the end of construction, which was a critical component of the 2006 agreement.

Our partners at the Boston Water and Sewer Commission, Brookline, Cambridge, Chelsea and Somerville deserve high praise for their professionalism in completing the difficult projects in their communities. Further, I thank the residents and businesses for their patience through the disruptive construction on their streets and in their neighborhoods.

The many staff at MWRA who have contributed in one way or another to the success of this program deserve a tip of the hat. From the planners, engineers and constructions managers who managed the design and construction to the budget, procurement, legal and other staff, this was truly a team effort. I would be remiss if I didn't single out two critically important staff – Michael Hornbrook, who was the initial manager in charge of the CSO Program and has continued oversight in his role as Chief Operating Officer, and David Kubiak, who has skillfully managed the program for the last 15 years. They both, along with many others here at MWRA, are fine public servants who can take satisfaction in knowing that their work has left our region a better place to live, work and play.

Finally, we can never lose track of the fact that the ratepayers of the MWRA district have shouldered the cost of these important investments. The burden on the residents and businesses we serve is substantial and MWRA must be diligent to guarantee that the ratepayers' funds have been invested wisely. We are confident that this comprehensive report will clearly show that we had met that burden.

Sincerely,

Fred Laskey

A Return to the Waters of Boston Harbor







Charles River




Alewife Brook and Mystic River





Neponset River





Boston Harbor Beaches









1. INTRODUCTION

Massachusetts Water Resources Authority (MWRA) files this Combined Sewer Overflow Annual Progress Report for 2015 in compliance with Schedule Seven of the Federal District Court's Boston Harbor Case (U.S. v. M.D.C, et al., No. 85-0489-RGS). MWRA has filed annual progress reports on the implementation of its federal and state approved plan to control combined sewer overflows ("CSO") to surface waters in the metropolitan Boston area (the "Long-Term Control Plan," or "LTCP") since the 1996 progress report on February 28, 1997. The Long-Term Control Plan mandated by the Federal Court comprises 35 MWRA and community wastewater system improvement projects to bring CSO discharges at 84 outfalls in the metropolitan Boston area into compliance with the Federal Clean Water Act and Massachusetts Surface Water Quality Standards[1]. Design and construction milestones for each of the 35 projects, as well as earlier CSO planning and regulatory compliance milestones, are set forth in Schedule Seven. Figure 1 on pages 2-3 maps the locations of the 35 projects and identifies project completion dates. Figure 2 on page 4 summarizes the scope, schedule and benefits of the Long-Term Control Plan.

This report for 2015 is the twentieth – and last – annual progress report required by Schedule Seven. It follows the court mandated – and attained – completion in 2015 of the last three of the 35 CSO control projects. Accordingly, in addition to describing the progress made in 2015, this report reflects on the work, achievements and benefits of CSO control by MWRA and its many CSO control partners over the nearly 30 years since MWRA accepted responsibility for developing and implementing a regional CSO control plan in the federal court case in 1987.

Chapter 2 of this report describes the CSO control progress in 2015 by MWRA, the City of Cambridge and Boston Water and Sewer Commission ("BWSC") that culminated in achieving the last three construction milestones in Schedule Seven, bringing to full implementation all 35 projects in the Long Term Control Plan.

Chapter 3 describes three decades of achievement in bringing CSO discharges into compliance with the federal Clean Water Act and state Water Quality Standards, as mandated by the Federal District Court and in accordance with federal and state CSO control policies. Chapter 3 presents the scope, benefits and cost of the now completed Long-Term Control Plan, both regionally and for each of the water resources affected by CSO. The chapter also discusses federal and state regulatory approvals, including the agreement MWRA reached with the U.S. Environmental Protection Agency, Region 1 ("EPA") and Massachusetts Department of Environmental Protection ("DEP") in 2006 that set the scope of MWRA's obligations for CSO control, including the LTCP projects and schedule, as well as a plan for DEP's continuing extension of CSO variances for the Charles River Basin and the Alewife Brook/Upper Mystic River, all through 2020.

Chapter 4 presents information on current water quality conditions in the metropolitan Boston resource areas and water quality improvement in areas affected by the implementation of the CSO controls.

Chapter 5 looks at the two remaining milestones in Schedule Seven and related regulatory requirements for a CSO post-construction monitoring program and performance assessment intended to verify attainment with the court-ordered long-term levels of CSO control, as well as related long-term CSO discharge reporting requirements in the National Pollutant Discharge Elimination ("NPDES") permits issued to MWRA and its communities with remaining CSOs. Chapter 5 also reviews the long-term Water Quality Standards ("WQS") determinations made by the Massachusetts Department of Environmental Protection ("DEP") in 1998 relative to CSO discharges for most of the CSO affected waters and the continuing compliance by MWRA and the CSO communities with the CSO variances issued by DEP for the Lower Charles River/Charles River Basin and the Alewife Brook/Upper Mystic River.

Chapter 6 describes each of the 35 CSO projects in the Long-Term Control Plan in the order they were constructed and brought into beneficial use, along with cost and benefits.

[1] The Federal Court-ordered CSO obligations are defined in Schedule Seven and in the March 15, 2006, Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflows, as amended by the Federal District Court on May 7, 2008 (the "Second CSO Stipulation").

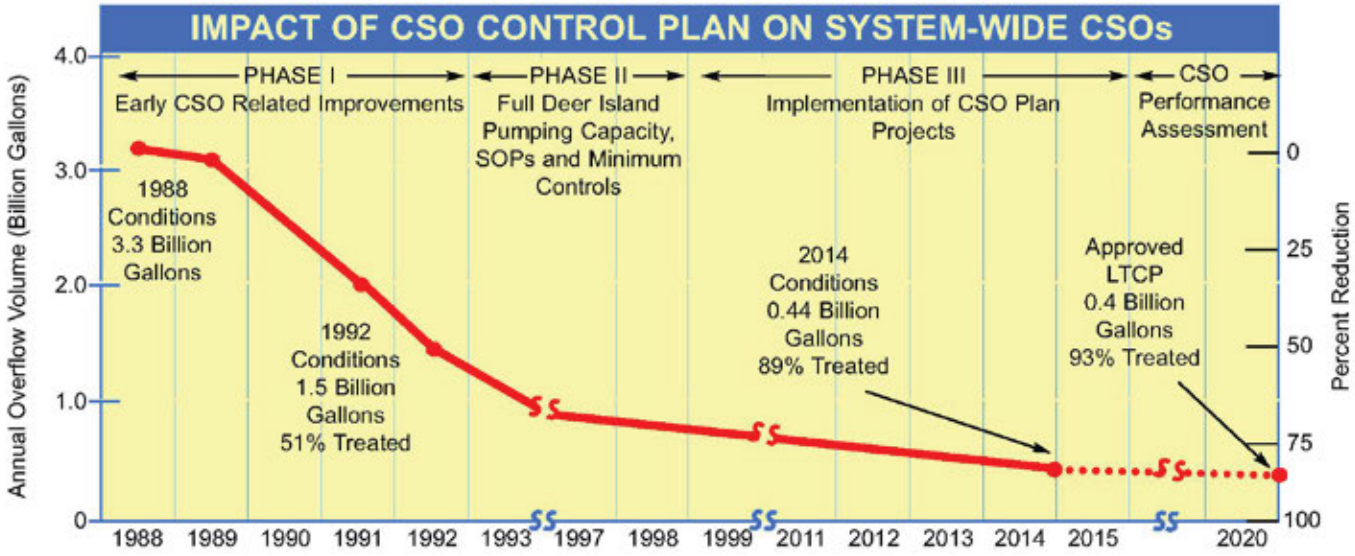

MALDEN
REVERE
ARLINGTON
MEDFORD
EVERETT
CHELSEA
SOMERVILLE
CAMBRIDGE
BOSTON
BROOKLINE
QUINCY
Alewife Brook Pump Station
Somerville Baffle Manhole Separation
MWR003 Gate and Rindge Ave. Siphon Relief
CAM004 Sewer Separation
Somerville Marginal Upgrade
Somerville Marginal CSO Facility
DeLauri Pump Station
Hydraulic Relief at BOS017
Chelsea Trunk Sewer Relief
Chelsea Creek Headworks
Caruso Pump Station
Chelsea Branch Sewer Relief
CHE008 Outfall Repair
Constitution Beach Sewer Separation
Constitution Beach CSO Facility Decommissioned
East Boston Branch Sewer Relief
Charlestown BOS019 Storage Conduit
Little Mystic Channel CSO Facility
Hydraulic Relief at CAM005
Prison Point Upgrade & Optimization
Prison Point CSO Facility
Cottage Farm Upgrade
Cottage Farm CSO Facility
Cottage Farm Brookline Connection and Inflow Controls
Bulfinch Triangle Sewer Separation
Fort Point Channel Sewer Separation and System Optimization
Union Park Detention/Treatment Facility
Union Park Detention and Treatment Facility
Brookline Sewer Separation
Ward St Headworks
Reserved Channel Sewer Separation
Conley Terminal Pump Station
North Dorchester CSO Pump Station
Pleasure Bay Storm Drain Improvements
Columbus Park Headworks
North Dorchester Bay Storage Tunnel and Related Facilities
Remote Odor Control Facility
Morrissey Blvd Storm Drain
Stony Brook Sewer Separation
Fox Point Upgrade
Fox Point CSO Facility Decommissioned
Commercial Point Upgrade
Commercial Point CSO Facility Decommissioned
Commercial Point Remote Facility Decommissioned
South Dorchester Bay Sewer Separation
Squantum Pump Station
Neponset River Sewer Separation
Logan Airport
Thompson Island
Upper Mystic River
Lower Charles River
Fort Point Channel
Reserved Channel
Upper Inner Harbor
Lower Inner Harbor
North Dorchester Bay
South Dorchester Bay
Neponset River
Legend
CSO Outfall Closed
CSO Outfall w/25-year Storm Control
Treated CSO Outfall
CSO Outfall (Discharge Minimized)
Existing Pump Station
Existing Treatment Plants
Existing Headworks
Existing CSO Treatment Facility
Decommissioned CSO Facility
New Conduit/Pipeline/Connection
Sewer Separation Area
N
0 0.25 0.5 1 Miles
3/8/2016 MwraGIS 1209-15

Completed	Projects Completed
1996	Somerville Baffle Manhole Separation
2000	Chelsea Trunk Sewer Replacement
2000	Cottage Farm CSO Facility Upgrade
2000	Hydraulic Relief at CAM005 (Cambridge)
2000	Hydraulic Relief at BOS017 (Charlestown)
2000	MWRA Floatables/Outfall Closing Projects
2000	Neponset River Sewer Separation
2000	Constitution Beach Sewer Separation
2001	Chelsea Branch Sewer Relief
2001	CHE008 Floatables Control and Outfall Repair
2001	Prison Point CSO Facility Upgrade
2001	Somerville Marginal CSO Facility Upgrade
2001	Commercial Point CSO Facilty Upgrade
2001	Fox Point CSO Facility Upgrade
2006	Pleasure Bay Storm Drain Improvements
2006	Stony Brook Sewer Separation
2007	Charlestown BOS019 Storage Conduit
2007	South Dorchester Bay Sewer Separation
2007	Fort Point Channel Sewer Separation and System Optimization
2007	Union Park Detention/Treatment Facility
2007	Regionwide Floatables Controls
2008	Prison Point Facility Optimization
2009	Morrissey Boulevard Storm Drain
2009	Cottage Farm Brookline Connection and Inflow Controls
2010	Bulfinch Triangle Sewer Separation
2010	East Boston Branch Sewer Relief
2010	Alewife Interceptor Connection Relief/Floatables Controls
2011	CAM400 Common Manhole Separation
2011	North Dorchester Bay Storage Tunnel and Related Facilities
2013	Brookline Sewer Separation
2013	CAM004 Outfall and Wetland Basin
2013	SOM01A Interceptor Connection Relief/Floatables Controls
2015	MWR003 Gate and Rindge Ave. Siphon Relief
2015	Reserved Channel Sewer Separation
2015	CAM004 Sewer Separation

Figure 1

MWRA
Approved CSO Control Plan
Completed December 2015

Figure 2
Approved Long-Term CSO Control Plan and Benefits



BENEFITS

- 84 CSO Outfalls: 34 Closed
  5 With 25-year Storm Control
  41 Reduced to a Minimal Number of CSO Discharges per year
  4 Treated
- Eliminates or Reduces CSO Activations to Achieve a Level of CSO Control Consistent with Water Quality Standards
- Treats More Frequent Discharges
- Controls Floatable Materials at Remaining Active CSO Outfalls

CSO CONTROL TECHNOLOGIES

Sewer Separation
Existing CSO Treatment Facility Upgrades
New CSO Treatment Facility
CSO Consolidation /Storage Conduits
Relief Sewers
Localized Hydraulic Relief
Outfall Repairs
Region Wide Floatables Controls
System Optimization

PROGRAM SCHEDULE

Final CSO Conceptual Plan	Dec 1994
Final Facilities Plan and EIR	Jul 1997
Final Approved Plan	Apr 2006
Design and Construction	1995 - 2015
Assessment Phase	2018 - 2020

COSTS
Planning, Design & Construction
$906.6 Million
Net Annual O&M
$1.5 Million

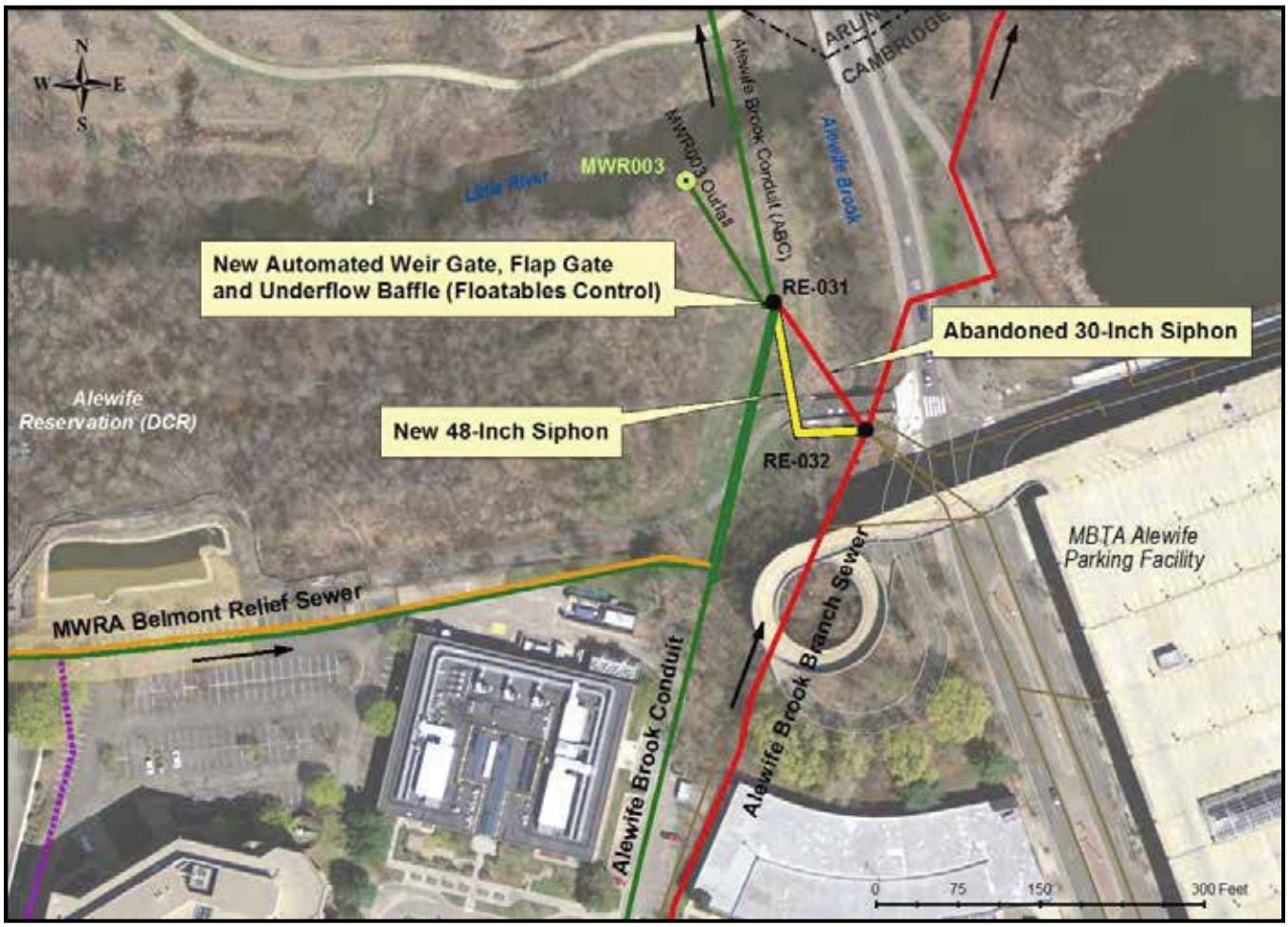
2. 2015 – A YEAR OF PROGRESS TO COMPLETION

MWRA entered 2015 having completed construction of 32 of the 35 projects in the Long Term Control Plan. The three remaining projects, described below, were each well into construction by MWRA, the City of Cambridge and the Boston Water and Sewer Commission ("BWSC"). By the end of the year, and in compliance with their respective milestones in Schedule Seven, all three projects were substantially complete, and the constructed facilities were operating for their intended uses and environmental benefits.

Control Gate and Floatables Control at Outfall MWR003 and MWRA Rindge Avenue Siphon Relief

On October 28, 2015, MWRA attained substantial completion and beneficial use of the $2.7 million contract for the Control Gate and Floatables Control at Outfall MWR003 and MWRA Rindge Avenue Siphon Relief project (the "MWR003 project"), in compliance with Schedule Seven. All components of the project, shown in Figure 3, including the automated gate and related instrumentation and controls, the underflow baffle for floatables control and the 48-inch replacement siphon, are fully operational. Through December 2015, MWRA's contractor continued to complete the remaining construction punch list items and restoration of the work site in accordance with conditions in the construction permits from the Massachusetts Department of Conservation and Recreation and the Cambridge Conservation Commission.

Figure 3: Control Gate and Floatables Control at Outfall MWR003 and MWRA Rindge Ave. Siphon Relief



The MWR003 project supports the attainment of the long-term levels of control for CSO discharges to Alewife Brook in part by improving the hydraulic performance of MWRA's Alewife Brook interceptor system by enhancing the sharing of flow between the parallel Alewife Brook Sewer and Alewife Brook Conduit through the upgraded Rindge Avenue siphon interconnection. The automated weir gate and upgraded siphon are also intended to mitigate the potential for flooding in tributary community sewer systems by providing extreme storm system relief in conjunction with the closing of nearby Outfall CAM004 in December 2015 and the closing of Outfall CAM400 in 2011.

The MWR003 project is one of several hydraulically related projects in the Alewife Brook watershed (see Figure 4 and Figure 5, on pages 7 and 8) that together have improved wet weather flow conveyance in MWRA's and Cambridge's sewer systems to attain long-term levels of CSO control, reduce sewer system surcharging, maintain service to the tributary communities of Arlington, Belmont, Cambridge and Somerville, and avoid worsening flooding conditions along the Alewife Brook. With completion of the last of these projects, CAM004 sewer separation, described below, and its removal of large quantities of stormwater from Cambridge's and MWRA's sewer systems, as well as the earlier completion of projects that increased the capacities of certain local sewer connections to MWRA's system, updated flow and system performance data will be evaluated to ensure the attainment of long-term levels of CSO control and the other system performance goals.

CAM004 Sewer Separation

In its September 15, 2015 Compliance and Progress Report, MWRA reported to the Court that the City of Cambridge had experienced delays and faced additional work in its construction contracts for this project. The delays and additional work had placed considerable risk in Cambridge's ability to complete the project by the December 2015 milestone. In response, the Court requested in its order of September 17, 2015, that MWRA and Cambridge provide the Court with an on-site tour and briefing on the status and progress of the work.

On November 2, 2015, Commissioner Owen O'Riordan of the Cambridge Department of Public Works, MWRA's Executive Director, Fred Laskey, and other City and Authority representatives met with Judge Richard G. Stearns and his staff on the project site. At this briefing, Cambridge reported that it had taken steps to accelerate its contractors' work and described recent progress gains that had brought the project back on schedule. Cambridge also described the remaining CSO related work and its schedule for completing the project by December.

On December 23, 2015, the City of Cambridge attained substantial completion of Contract 9, the last of four construction contracts totaling $100 million (of which $54 million is funded by MWRA) to separate its combined sewer systems tributary to Outfall CAM004 and to permanently close the outfall to CSO discharges. With completion of the last contract, together with the previously completed work of earlier related contracts, including major storm drain trunk work in Fresh Pond Parkway under Cambridge contracts 2A and 2B in 2000-2002 and the Alewife Wetland (Contract 12) completed in 2013, Cambridge has brought the CAM004 sewer separation project into beneficial use for CSO control and associated environmental improvement.

The CAM004 project includes four sewer separation construction contracts – 8A (Huron A), 8B (Huron B), 9 (Concord) and Concord Lane – that have separated Cambridge's combined sewer system serving a 211-acre area in the Huron Avenue and Concord Avenue neighborhoods, east of Fresh Pond Parkway (Figure 4 on the following page). Along with the renewed progress it was able to make in the last few months of 2015, Cambridge performed an aggressive water quality testing program in its newly constructed storm drain system, as well as related investigations and remediation work, to ensure the absence of any illicit sanitary connections or other sanitary contamination prior to allowing the separated stormwater flows to be removed from the MWRA sewer system and redirected to the Alewife Wetland and the Little River. Once the absence of sanitary contamination was assured, Cambridge's Contract 9 contractor completed structural modifications to "Drain Vault 5" in the Concord Avenue rotary that effected the removal of stormwater from the sewer system (see Figure 6, on page 10). With completion of the project, the separated stormwater flows now drain to the Alewife Wetland for detention and wetlands treatment prior to discharge to the Little River and Alewife Brook.

Figure 4: Alewife Brook CSO Control Plan (1 of 2)

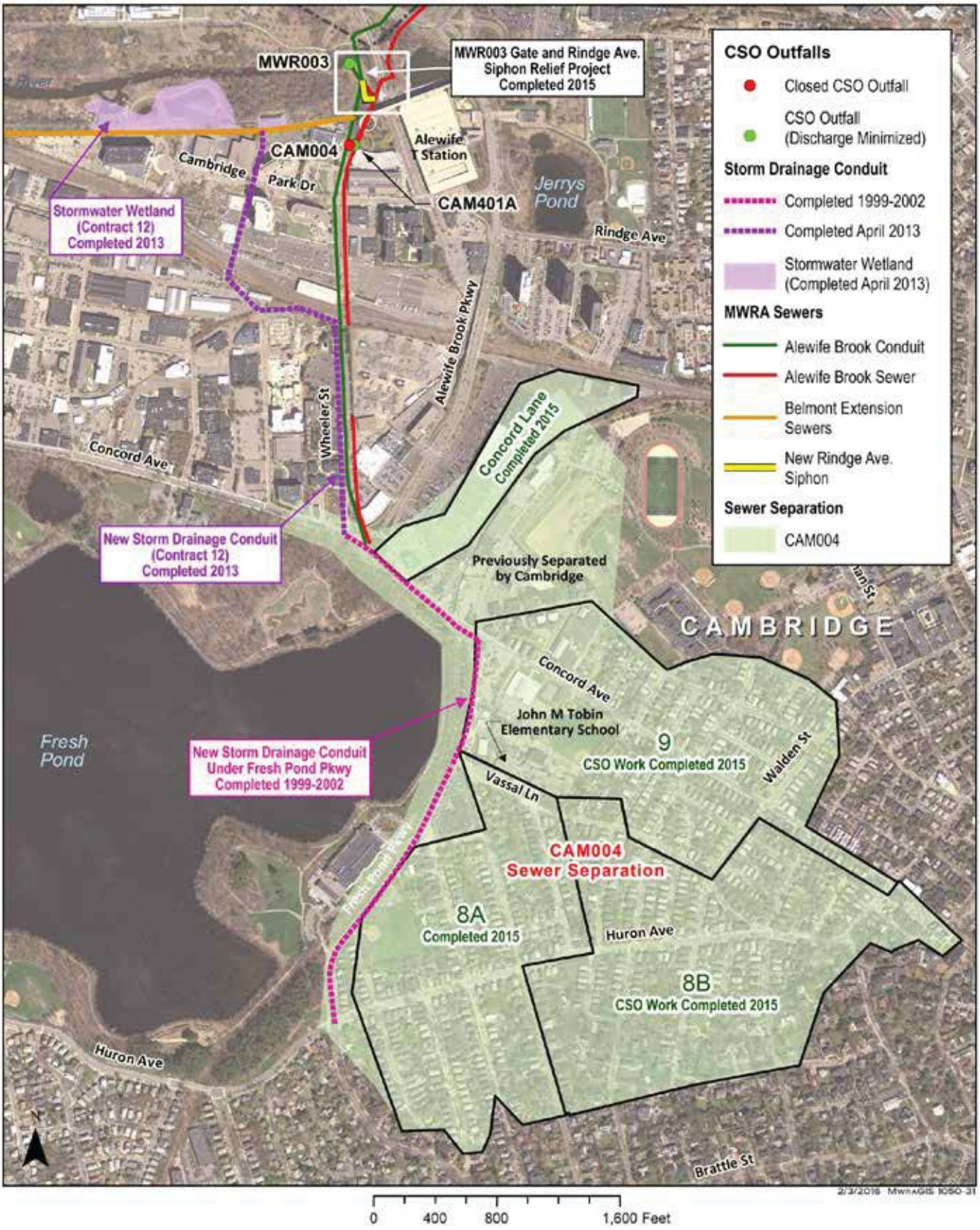
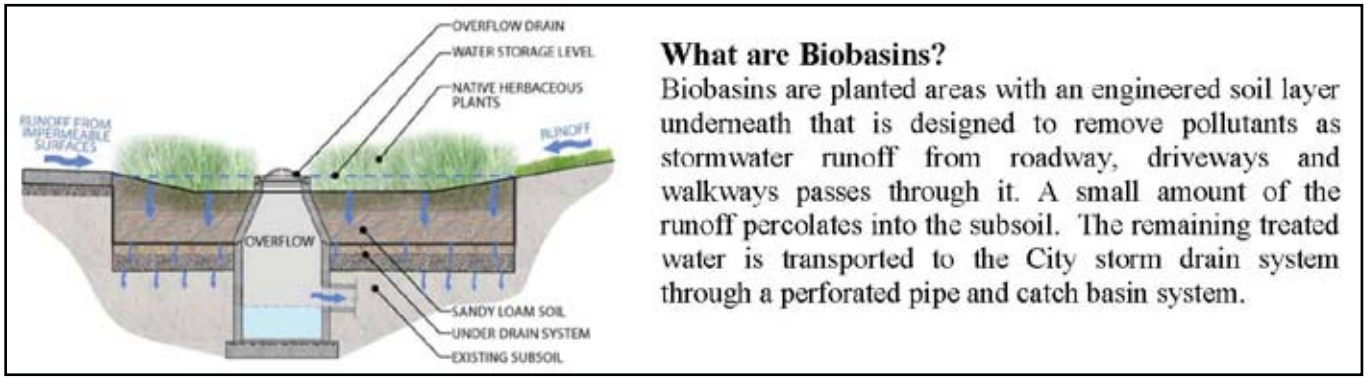


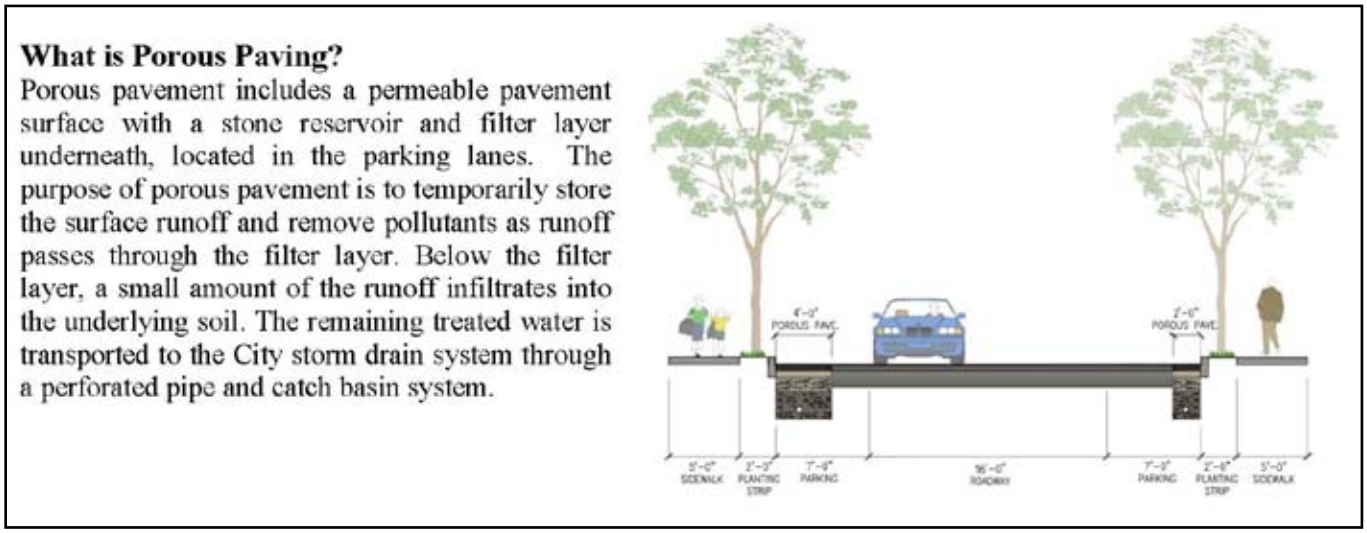
Figure 5: Alewife Brook CSO Control Plan (2 of 2)

The various CAM004 sewer separation construction contracts, though complete for CSO control, also include extensive surface restoration work along the dozens of neighborhood streets affected by the construction. In addition to roadway, sidewalk, driveway entrance and fence repairs, street markings, lighting and trees, the project includes "Green Infrastructure" improvements intended to reduce the impacts of stormwater volume and pollutants on downstream storm drain systems and receiving waters. The surface restoration work is scheduled to continue through 2016 and into 2017.

Cambridge has included Green Infrastructure in the various CAM004 sewer separation contracts (see Figure 7, on page 11). The Green Infrastructure technologies consist of porous pavement, "biobasins" with overflow connections to the storm drain system, and new street trees. The biobasins are planted areas that function as part of the stormwater system by intercepting and detaining street runoff to capture some of the sediments, provide a level of removal of other pollutants such as phosphorus and nitrogen, and potentially reduce the rate and volume of stormwater runoff to the drainage system, in part by allowing some infiltration to groundwater. Remaining runoff will be collected and conveyed to the new stormwater wetland in the Alewife Reservation for further detention and natural treatment before draining to the Little River.

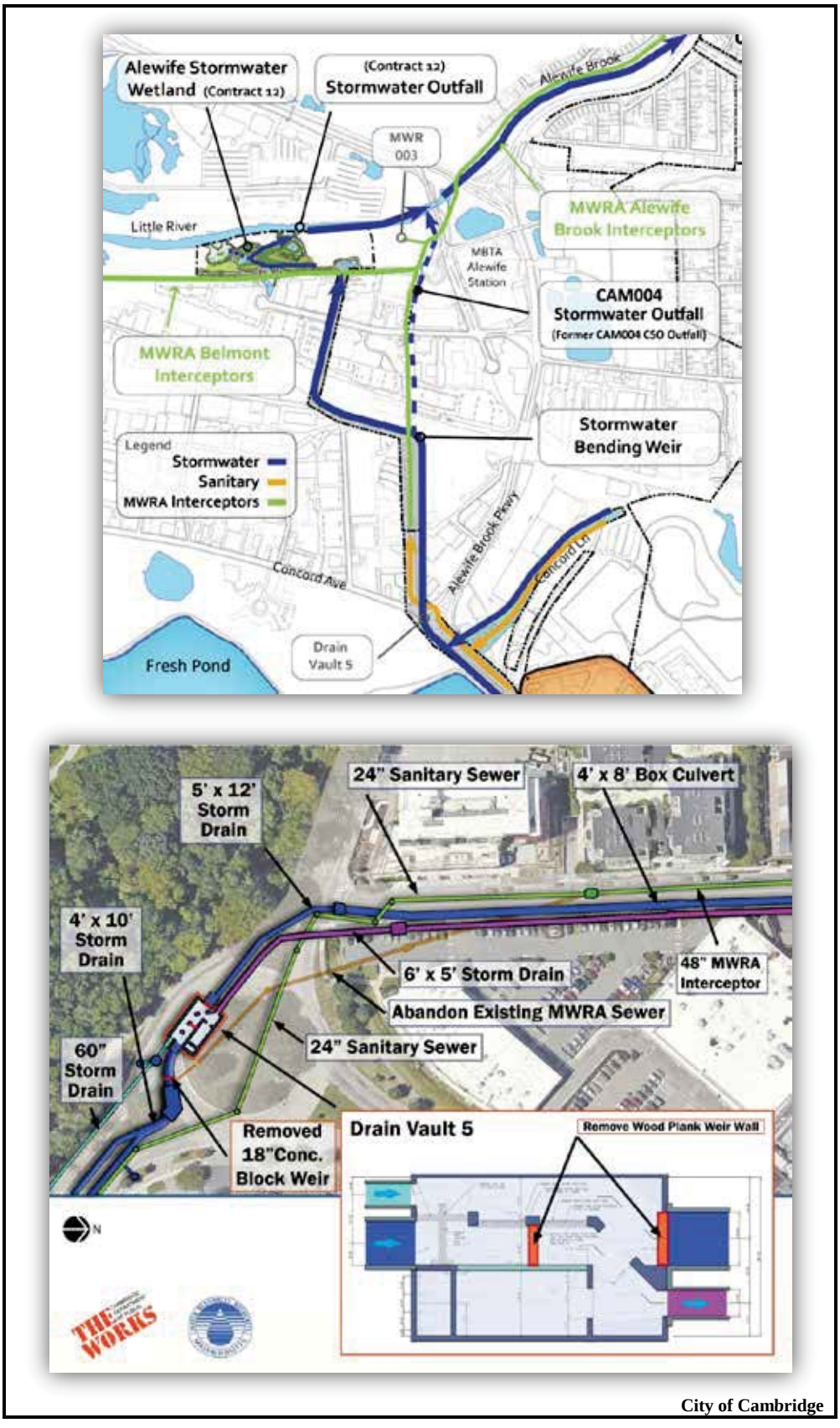


City of Cambridge



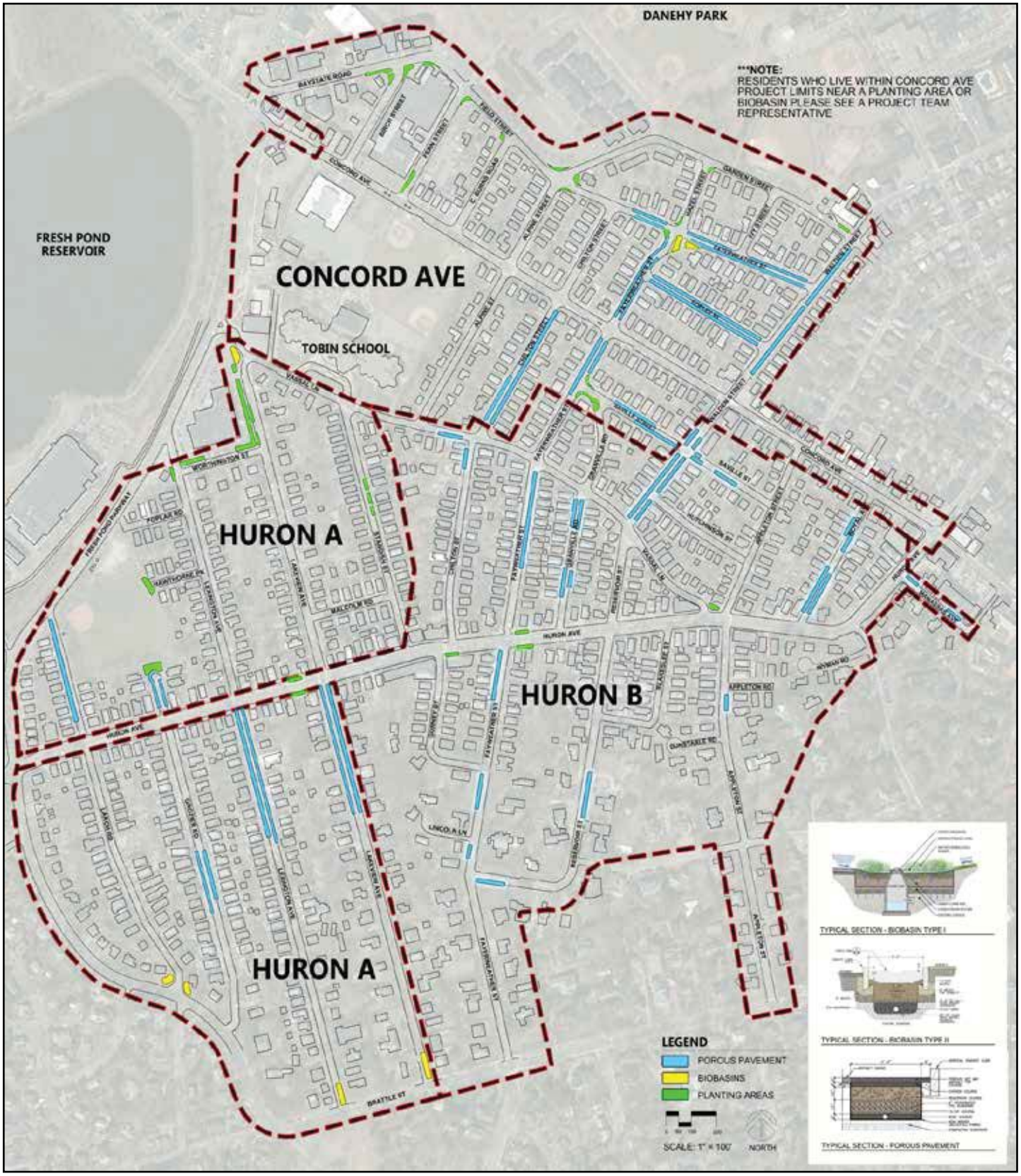
City of Cambridge

Figure 6: Stormwater Diversion to Alewife Wetland at Drain Vault 5



City of Cambridge

Figure 7: CAM004 Green Infrastructure Plan

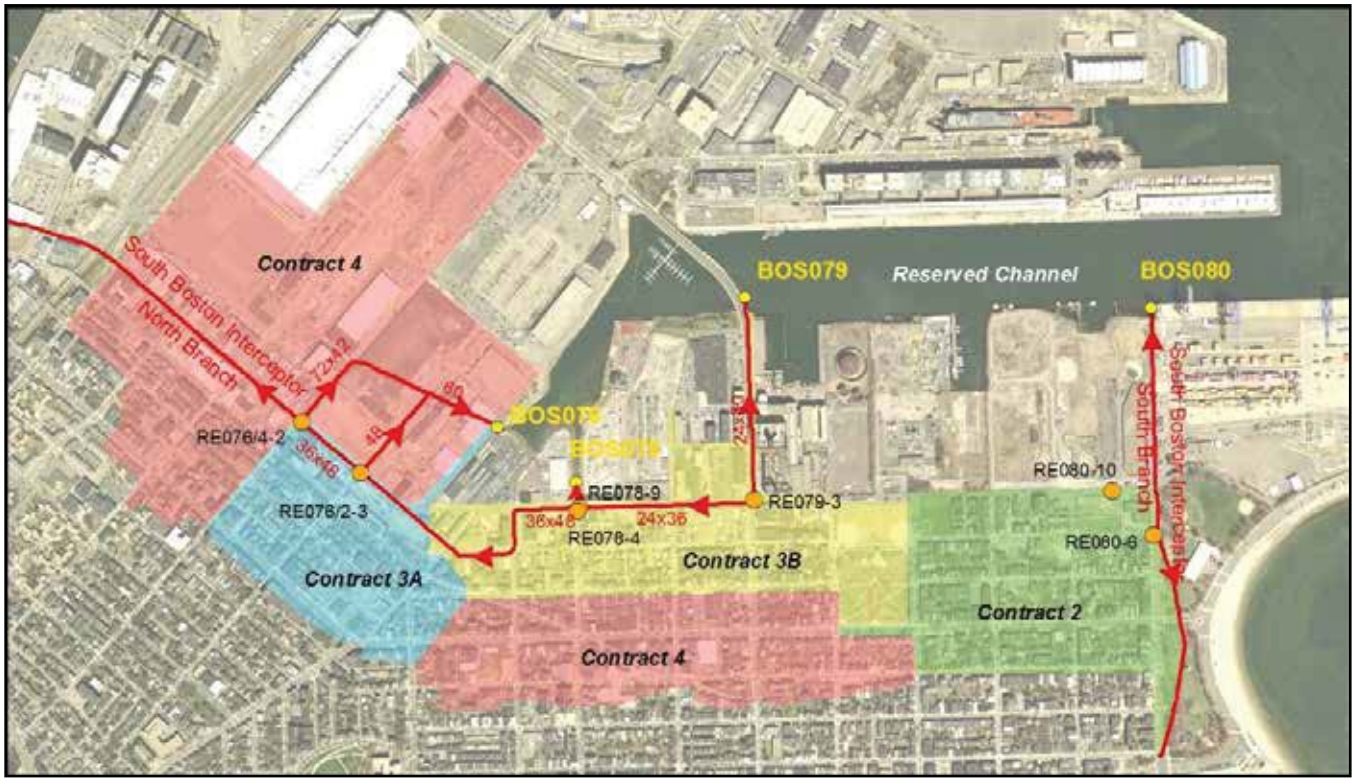


Reserved Channel Sewer Separation

On December 11, 2015, BWSC attained substantial completion and beneficial use of the last of its nine construction contracts for the $70.6 million project that separated combined sewer systems tributary to the four CSO outfalls that discharge to the Reserved Channel: BOS076, BOS078, BOS079 and BOS080 (Figure 8). The project created a new storm drain system for this part of the South Boston neighborhood, removed stormwater from the sewer system, provided structural rehabilitation to much of the old sewer system and the four outfalls, and has greatly reduced the frequency and volume of CSO discharges to the Reserved Channel.

By the end of 2014, BWSC had completed three of the four major sewer separation contracts (contracts 2, 3A, and 3B), as well as rehabilitation of the four CSO outfalls that will carry the separated stormwater flows to the Reserved Channel along with the remaining CSO flow (Contract 1) and the first of two pavement restoration contracts (Contract 7). In April 2015, BWSC substantially completed Contract 4, the last and largest sewer separation contract, and in December 2015, it substantially completed the last three contracts: Contract 5, which included pipe cleaning and lining services to rehabilitate some older sewers in the Reserved Channel project area that will remain in service for the long term; Contract 6, which removed remaining building roof drain disconnections from the sewer system; and the final pavement restoration work in Contract 8.

Figure 8: Reserved Channel Sewer Separation



With this project, BWSC separated its combined sewers serving a 365-acre area of South Boston. The work primarily involved the construction of new storm drains to capture runoff from streets, parking lots and other properties. BWSC installed approximately 44,540 linear feet (8.4 miles) of new mainline storm drain pipe and an additional 23,147 linear feet (4.4 miles) of smaller diameter drain connections. BWSC also installed or rehabilitated approximately 40,326 linear feet (7.6 miles) of sanitary sewer. To provide assurance of achieving the intended level of stormwater inflow removal and associated CSO control, BWSC also disconnected more than 600 building roof drains and downspouts from the sewer system.

BWSC attained substantial completion of Reserved Channel Sewer Separation Contract 5, Sewer Cleaning and Lining, and Contract 8, Final Paving, in December 2015.

With completion of this project, all stormwater flows removed from the BWSC and Authority sewer systems in the project area now drain to the Reserved Channel. In accordance with MWRA's approved Long-Term CSO Control Plan, the project is intended to reduce the annual number of CSO activations to the Reserved Channel from 37 events to 3 events and the total annual CSO discharge volume from 28 million gallons to 1.5 million gallons in a typical rainfall year, a 95% reduction by volume. This level of control brings the CSO discharges into compliance with the Massachusetts Water Quality Standards designation of SB(cso) for the Reserved Channel.

3. THREE DECADES OF CSO CONTROL ACHIEVEMENTS

MWRA's Long-Term Control Plan

MWRA's CSO control program began in 1987, when through a stipulation entered in the Boston Harbor Case (U.S. v. M.D.C., et al., No. 85-0489 MA) (the "First CSO Stipulation"), MWRA accepted responsibility for developing and implementing a region-wide plan to control CSOs hydraulically related to its wastewater system, including CSO discharges from its own outfalls and the outfalls permitted to and operated by BWSC and the cities of Cambridge, Chelsea and Somerville. Since then, MWRA, with the cooperation of the CSO communities, has achieved more than 180 CSO related milestones in the court ordered schedule.

MWRA's CSO efforts included development and implementation of projects to eliminate dry weather overflows and development of a first recommended CSO control plan (the Deep Rock Storage Tunnel Plan[2]) (1987 to 1991); development and implementation of more than 100 system optimization improvements that reduced average annual CSO discharge volume by nearly 25% (1992-96); development of the Long-Term CSO Control Plan (1992-97); reassessment and refinement of several CSO projects recommended in the 1997 plan, including the addition of several CSO projects to increase level of control for the Charles River (2006); and design and construction of the 35 CSO projects (1996-2015) in compliance with Schedule Seven. MWRA's efforts also included additional system optimization strategies that further reduced CSO discharges, including enhancements to the operational protocols for the Cottage Farm, Prison Point and Somerville Marginal CSO treatment facilities (2007-08). And through all of this, MWRA has continuously tracked the effect of these improvements on system performance and CSO discharges.

[2] In 1990, MWRA recommended a Deep Rock Storage Tunnel for CSO control, at an estimated capital cost of $1.2 billion in 1990 dollars (approx. $2.5 billion today), that conformed to the 1989 EPA CSO Strategy. In 1992, with the prospect of a more flexible EPA CSO policy (the 1994 National CSO Policy), MWRA began a new planning effort that culminated in the current Long-Term CSO Control Plan.

Development and implementation of the Long-Term Control Plan closely followed and conformed to the requirements of the National CSO Policy and EPA CSO-related guidelines, as well as Massachusetts Department of Environmental Protection CSO Policy and CSO Guidance, even as these federal and state CSO policies were evolving. Major elements of MWRA's CSO control efforts included:

- characterization of the regional sewer system, assessment of system performance and quantification of CSO discharges at every outfall, accomplished with MWRA and community system inspections, CSO regulator inspections, flow metering, and development and use of a detailed hydraulic model of MWRA's entire system along with key components of community systems;

- watershed-based water quality evaluations, including the characterization of baseline water quality conditions and identification of the contributions of various pollution sources, CSO and non-CSO, to water quality degradation in 14 receiving water segments affected by CSO;

- water quality monitoring within all 14 water segments and annual water quality assessments to track changes to water quality conditions as MWRA implemented its Boston Harbor Cleanup projects and the communities along these waters implemented their own sewer and storm drain system improvements;

- a CSO master planning framework that included build-out of the Deer Island secondary treatment plant and planned transport to treatment system improvements and the potential for reducing system demands with infiltration and inflow ("I/I") removal;

- evaluation of a full range and mix of CSO control strategies that considered levels of CSO control including elimination, attainment of water quality standards and designated uses, water quality improvement, various CSO control technologies, and cost-benefit and affordability analyses;

- site-specific facilities planning and environmental review of the recommended CSO control plan and CSO control alternatives;

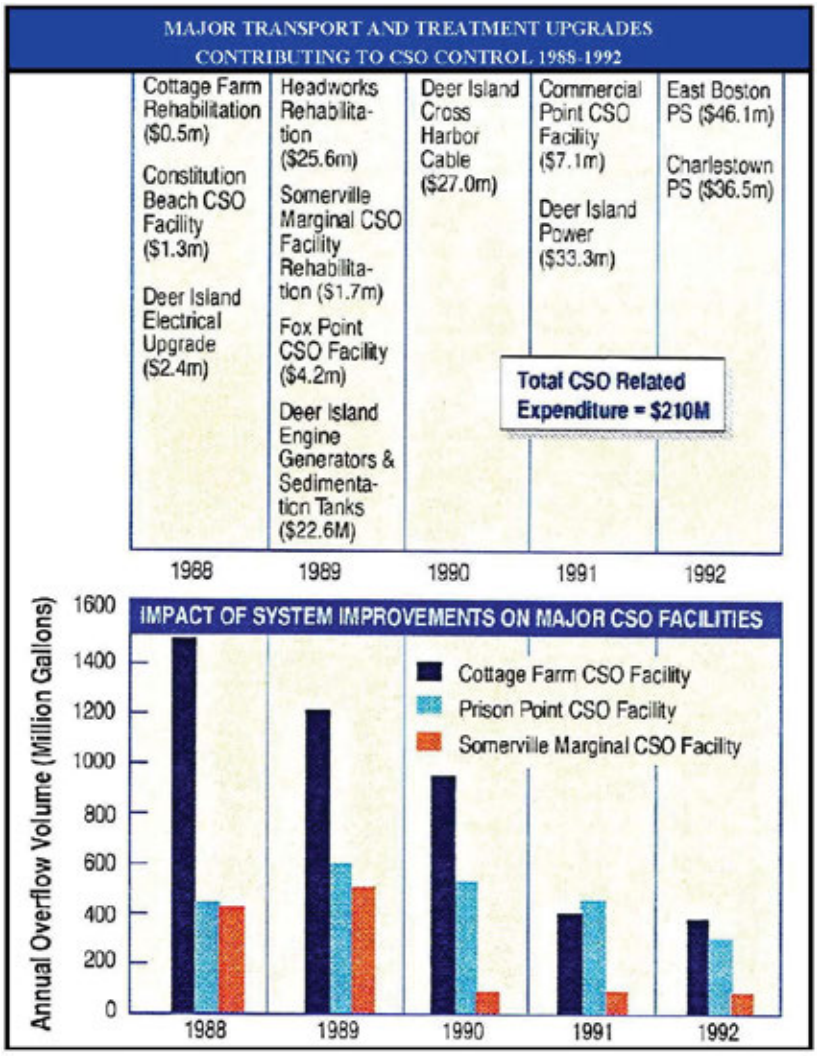
- collection or development of information necessary to support DEP water quality standards determinations and EPA and DEP plan approvals;

- reassessment of recommended improvements as the plan was developed and regulatory approvals were obtained, and even later as new information arose during implementation; and

- design and construction of the recommended projects on an aggressive, 20-year schedule, in compliance with project specific design and construction milestones in the court schedule.

Through extensive inspections, system monitoring and modeling beginning in 1992-93, MWRA conducted a detailed performance assessment of its existing collection and treatment system, along with major capital improvements already planned. This performance assessment established a planned baseline from which MWRA could understand the remaining CSO conditions and system causes of those conditions, in advance of developing a long-term CSO control plan. The 1992 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 (see Figure 9, on the following page). 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 early system improvements.

Figure 9



EPA's National CSO Policy requires CSO permitees to develop and implement system optimization measures and reporting procedures intended in part to quantify, minimize and report CSO discharges in the short term, ahead of the implementation of a long-term control plan, as well as for the long term. These include detailed system characterization, easily implemented and less expensive system improvements that can reduce CSO, and optimized operations and maintenance. In compliance with the policy, MWRA submitted its Nine Minimum Controls ("NMC") compliance documentation by January 1, 1997, as required by the Policy. While most of the NMC measures involve operations, maintenance and regulatory functions of MWRA that are funded through the Current Expense Budget, the system characterization and hydraulic optimization measures referenced below were funded through MWRA's Capital Improvement Program. In 1993-1994, MWRA completed 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 from the 1992 level.

MWRA's CSO planning culminated in the recommendation of 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 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 in response to federal and state regulators' requests and in compliance with related milestones in Schedule Seven. The final approved plan called for reducing total annual CSO discharge in the Typical Year to 0.4 billion 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.

MWRA began design and construction of the CSO projects in 1996 in compliance with milestones in the federal court schedule and with cooperation from its member communities with permitted CSO outfalls. MWRA executed memoranda of understanding ("MOUs") and financial assistance agreements with BWSC, the City of Cambridge and the City of Somerville in 1996 by which each municipality agreed to implement the projects within the Long-Term Control Plan involving facilities that would be owned and operated by each community, such as the new storm drain systems that would be constructed in sewer separation projects. MWRA agreed to fund the "eligible" costs, the costs of work to construct the facilities necessary to attain the long-term level of CSO control at each outfall.

Within a timeframe of only 20 years, MWRA and the CSO communities completed the design and construction of all 35 projects (see Table 1 on the following page). The capital cost of these projects ranged from less than $100,000 (for Prison Point CSO Facility Optimization) to $228.4 million (for the North Dorchester Bay CSO Tunnel). Most of the projects were major undertakings involving the construction of new wastewater facilities or extensive new storm drain or sewer systems, all in historical, densely-developed residential and commercial areas. In addition to the design and construction work, the projects also required extensive coordination with landowners, permitting agencies, transportation authorities and neighborhood residents. In some of the project areas, construction impacts were significant and unavoidable, and the collaboration, support and patience of residents and business owners should not be overlooked in understanding the effort borne by many parties to bring these projects to completion and achieve their benefits.

The MWRA and community CSO efforts included the management of 125 contracts, including 82 construction contracts, 33 engineering contracts and 10 planning and technical support contracts, as well as financial assistance agreements with five communities that assisted in designing and constructing the plan (represented below) with total award value of $421 million, 46% of the total $907 million budget for CSO control in MWRA's Proposed FY17 CIP. MWRA, BWSC, the City of Cambridge and the Town of Brookline installed nearly 100 miles of new storm drain and sewer pipe with the sewer separation, interceptor relief, hydraulic relief and storage projects in the Long-Term Control Plan. The sewer separation projects involved street-by-street separate storm drain and/or sewer construction that removed more than 4,300 acres of stormwater runoff from sewer systems in Boston, Brookline and Cambridge.

BWSC Town of Brookline City of Cambridge City of Chelsea City of Somerville

Table 1: Long-Term CSO Control Plan Project Implementation Schedules

Project		Commence Design	Commence Construction	Complete Construction
North Dorchester Bay Storage Tunnel and Related Facilities		Aug-97	7-Aug	11-May
Pleasure Bay Storm Drain Improvements		4-Sep	5-Sep	6-Mar
Hydraulic Relief Projects	CAM005 Relief	Aug-97	Jul-99	May-00
	BOS017 Relief		Jul-99	Aug-00
East Boston Branch Sewer Relief		Mar-00	3-Mar	10-Jul
BOS019 CSO Storage Conduit		2-Jul	5-Mar	7-Mar
Chelsea Relief Sewers	Chelsea Trunk Sewer Relief	Jun-97	Sep-99	Aug-00
	Chelsea Branch Sewer Relief		Dec-99	1-Jun
	CHE008 Outfall Repairs		Dec-99	1-Jun
Union Park Detention/Treatment Facility		Dec-99	3-Mar	7-Apr
CSO Facility Upgrades and MWRA Floatables Control	Cottage Farm Upgrade	Jun-96	Mar-98	Jan-00
	Prison Point Upgrade		May-99	1-Sep
	Commercial Point Upgrade		Nov-99	1-Sep
	Fox Point Upgrade		Nov-99	1-Sep
	Somerville-Marginal Upgrade		Nov-99	1-Sep
	MWRA Floatables Control and Outfall Closings		Mar-99	Mar-00
Brookline Connection and Cottage Farm Overflow Interconnection and Gate		6-Sep	8-Jun	9-Jun
Optimization Study of Prison Point CSO Facility		6-Mar	7-Mar	8-Apr
South Dorchester Bay Sewer Separation		Jun-96	Apr-99	7-Jun
Stony Brook Sewer Separation		Jul-98	Jul-00	6-Sep
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		2-Jul	5-Mar	7-Mar
Morrissey Boulevard Storm Drain		5-Jun	6-Dec	9-Jul
Reserved Channel Sewer Separation		6-Jul	9-May	15-Dec
Bulfinch Triangle Sewer Separation		6-Nov	8-Sep	10-Jul
Brookline Sewer Separation		6-Nov	8-Nov	13-Apr
Somerville Baffle Manhole Separation			Apr-96	Dec-96
Cambridge/Alewife Brook Sewer Separation	CAM004 Stormwater Outfall and Detention Basin		11-Apr	13-Apr
	CAM004 Sewer Separation	Jan-97	Jul 98/Sep 12	15-Dec
	CAM400 Manhole Separation	8-Oct	10-Jan	11-Mar
	Interceptor Connection Relief/Floatables Control at Outfalls CAM002, CAM401B and CAM001	8-Oct	10-Jan	10-Oct
	MWR003 Gate and Rindge Ave. Siphon Relief	12-Mar	14-Aug	15-Oct
	Connection Relief/Floatables Control at SOM01A	12-Mar	13-Sep	13-Dec
Region-wide Floatables Control and Outfall Closings		Sep-96	Mar-99	7-Dec

Prior to 1988, treated and untreated CSO discharges occurred in every rainfall event, approximately 100 times a year. Today, untreated CSO discharges occur zero to 7 times a year in a typical rainfall year, depending on the outfall. The plan reduces total CSO discharge volume in a typical rainfall year by approximately 88%, from 3.3 billion gallons a year to 0.4 billion gallons, and 93% (0.38 million gallons) of this remaining discharge volume is treated at MWRA's four new or upgraded CSO treatment facilities. Figure 10 shows the levels achieved by the end of 2014. MWRA is currently incorporating the projects completed in 2015 and other new information about the system and system operations into its wastewater system computer model to be able to report 2015 CSO discharge estimates to EPA and DEP by April 30th, as required.

Table 2, on the following page, identifies the Long-Term Control Plan and its intended levels of control for each of the receiving water segments. Figure 11 on page 20 shows CSO reduction over time for each of these receiving water segments, which are shown in the Figure 12 map, also on page 20.

Long-term levels of control will be maintained or improved upon with the continuing efforts by MWRA, its member communities with permitted CSO outfalls (Boston Water and Sewer Commission, Cambridge, Chelsea and Somerville) and all of its other member communities to improve wastewater system management, remove stormwater flows through continuing CSO community-initiated sewer separation and "green infrastructure" programs, and control groundwater infiltration and stormwater inflow that can enter the several-thousand miles of sewers and individual property sewer service connections in the MWRA district.

Figure 10: Region-wide CSO Discharge Volume Reduction

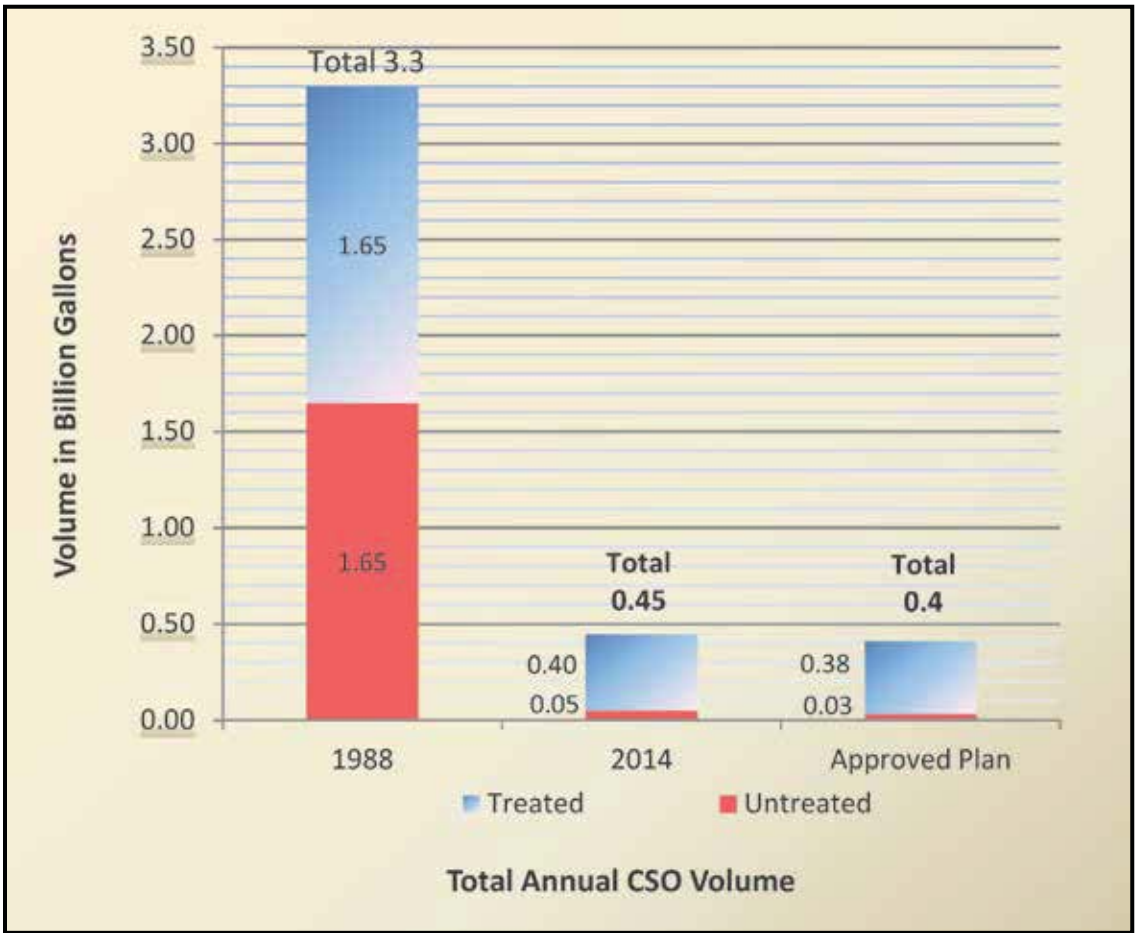


Table 2: Long-Term CSO Control Plan by Receiving Water

Receiving Water	CSO Discharge Goals (Typical Year Rainfall) Activations	Volume (million gallons)	Projects*	Capital Cost* (millions)
Alewife Brook/Upper Mystic River	7 untreated and 3 treated @ Somerville Marginal	7.3 3.5	•Cambridge/Alewife Sewer Separation •MWR003 Gate and Rindge Siphon Relief •Interceptor Connections Upgrades •Connection/Floatables at Outfall SOM01A •Somerville Baffle Manhole Separation •Cambridge Floatables Control (portion)	$ 108.3
Mystic River/Chelsea Creek Confluence and Chelsea Creek	4 untreated and 39 treated @ Somerville Marginal	1.7 57.1	•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)	92.0
Charles River (including Stony Brook and Back Bay Fens)	3 untreated and 2 treated @ Cottage Farm	6.8 6.3	•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)	88.8
Inner Harbor	6 untreated and 17 treated @ Prison Point	8.5 243.0	•Prison Point CSO Facility Upgrade •Prison Point Optimization •East Boston Branch Sewer Relief (portion)	47.5
Fort Point Channel	3 untreated and 17 treated @ Union Park	2.5 71.4	•Union Park Treatment Facility •BOS072-073 Sewer Separation and System Optimization •BWSC Floatables Control •Lower Dorchester Brook Sewer Modifications	62.4
Constitution Beach	Eliminate		•Constitution Beach Sewer Separation	3.7
North Dorchester Bay	Eliminate		•N. Dorchester Bay Storage Tunnel and Related Facilities •Pleasure Bay Storm Drain Improvements •Morrissey Blvd Storm Drain	253.8
Reserved Channel	3 untreated	1.5	•Reserved Channel Sewer Separation	70.6
South Dorchester Bay	Eliminate		•Fox Point CSO Facility Upgrade (interim) •Commercial Pt. CSO Facility Upgrade (interim) •South Dorchester Bay Sewer Separation	126.8
Neponset River	Eliminate		•Neponset River Sewer Separation	2.5
Regional			•Planning, Technical Support and Land Acquisition	50.3
TOTAL Treated Portion		410 381		$ 906.6

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

Figure 11: CSO Volume Reduction by Receiving Water

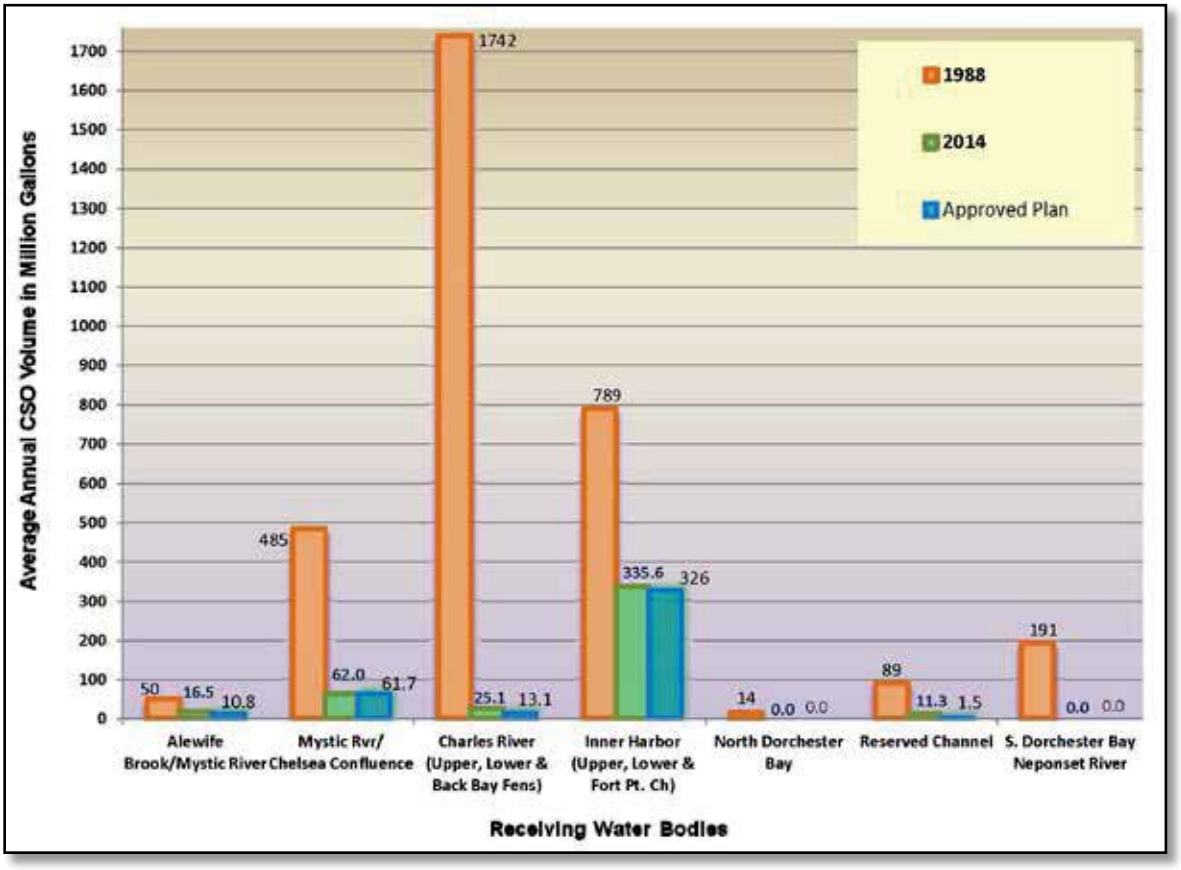
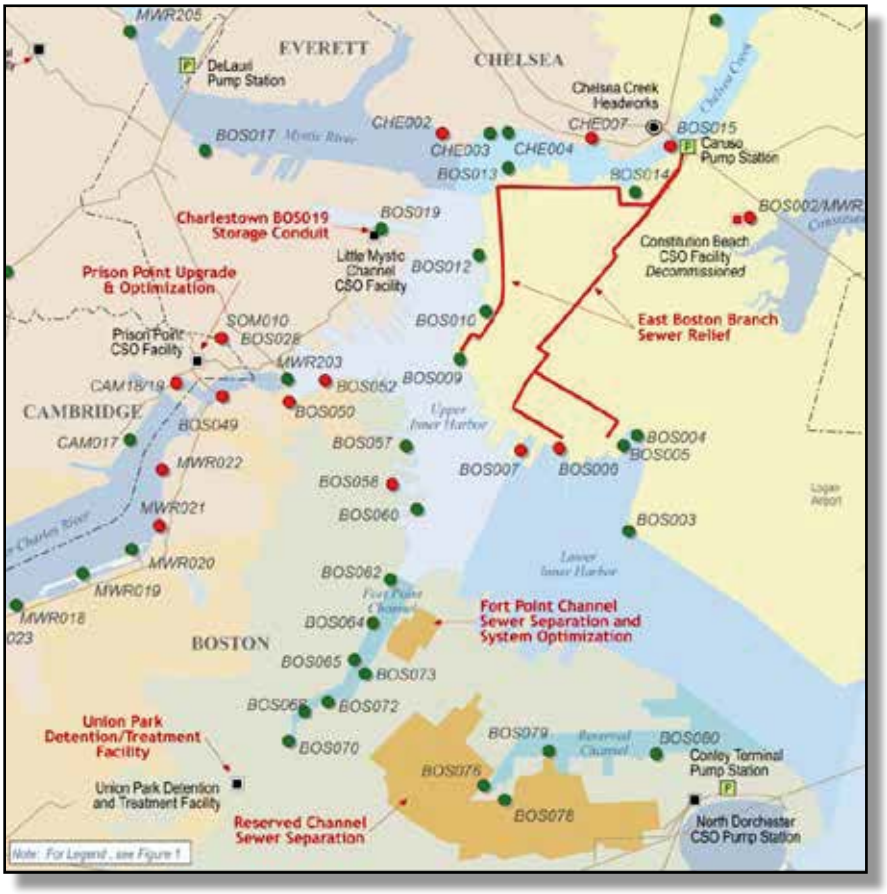


Figure 12: Boston Harbor and its Tributaries

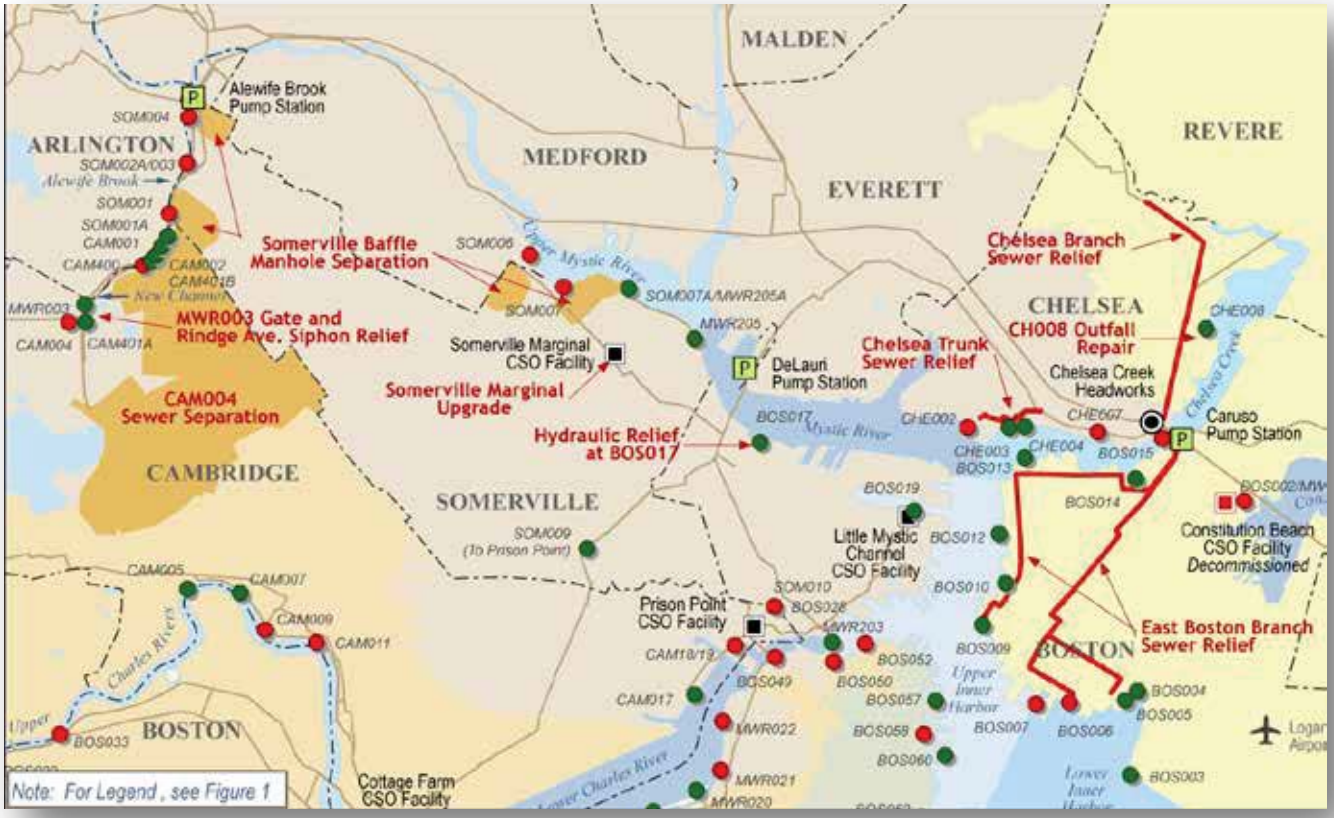
Boston Inner Harbor, Fort Point Channel and Reserved Channel



		CSO Outfalls	In a Typical Rainfall Year		
			Frequency of Most Active Outfall	Total Discharge Volume (million gallons)	Treated Discharge Volume (million gallons)
Boston Inner Harbor	1992	12	Up to 100	344.5	261.9 (76%)[(1)]
	2014	10	19[(1)]	292.8	283.8 (97%)[(1)]
	LTCP	10	17[(1)]	252.1	243.0 (96%)[(1)]
Fort Point Channel	1992	7	23	298.8	N/A
	2014	7	11[(2)]	43.5	35.9 (83%)[(2)]
	LTCP	7	17[(2)]	73.9	71.4 (97%)[(2)]
Reserved Channel (CSO projects were not complete until Dec 2015)	1992	4	65	89.1	N/A
	2014	4	7	1.8	N/A
	LTCP	4	3	1.5	N/A

[(1)] At Prison Point CSO Facility [(2)] At Union Park Detention/Treatment Facility (completed in 2007)

Alewife Brook, Mystic River Basin and Mystic/Chelsea Confluence*

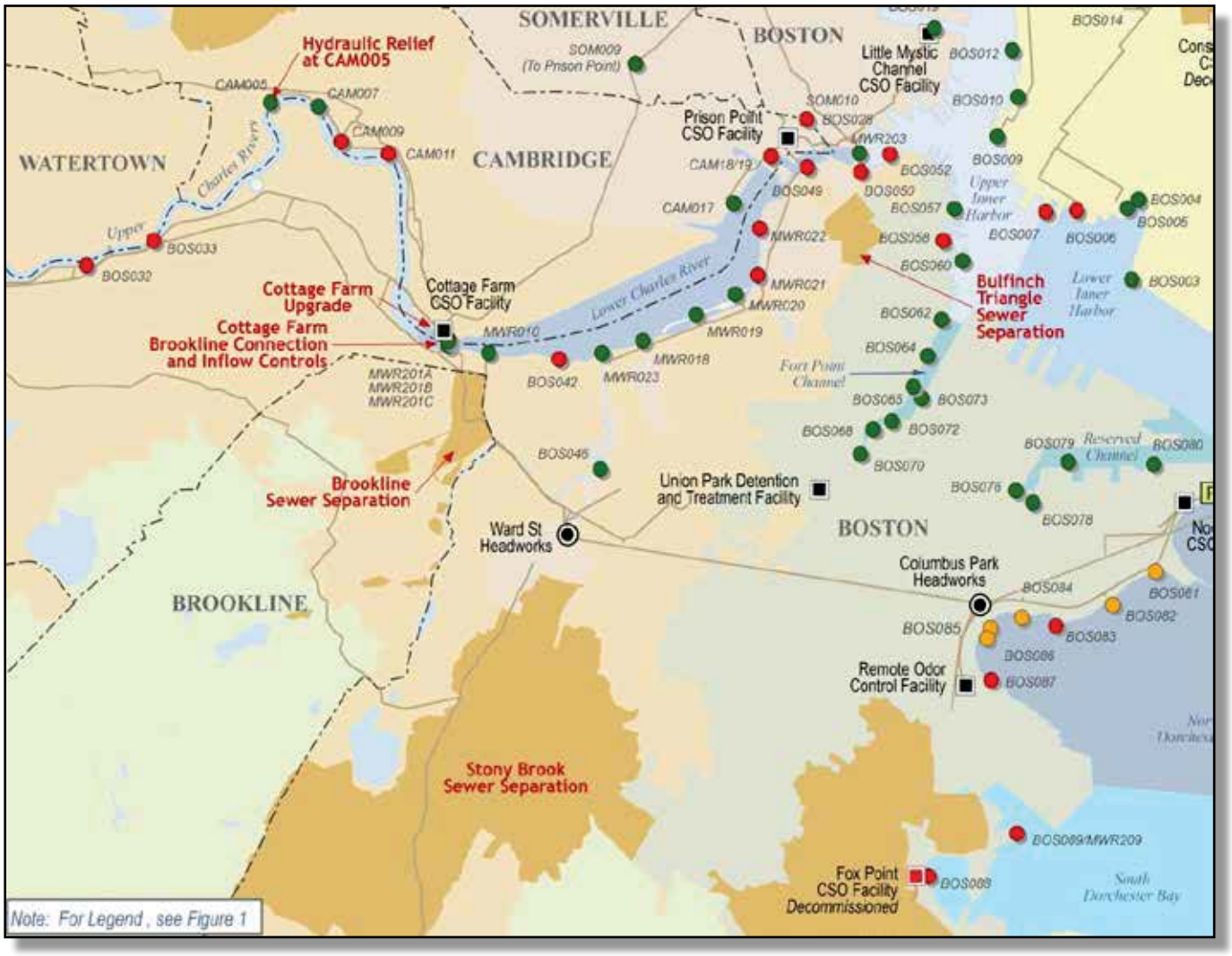


* Includes Lower Mystic River and Chelsea Creek.

		CSO Outfalls	In a Typical Rainfall Year		
			Frequency of Most Active Outfall	Total Discharge Volume (million gallons)	Treated Discharge Volume[1] (million gallons)
Alewife Brook/Upper Mystic River (CSO projects were not complete until Dec 2015)	1992	15	63	57.6	7.6 (13%)
	2014	8	10	15.7	1.8 (11%)
	LTCP	7	7	10.8	3.5 (32%)
Mystic/Chelsea Confluence	1992	9	76	186.0	120.4 (65%)
	2014	7	18[1]	60.2	59.5 (99%)
	LTCP	8[2]	39[1]	58.2	57.1(98%)

[1] At Somerville Marginal CSO treatment facility (Upper Mystic Outfall MWR205A; Lower Mystic Outfall MWR205)
[2] LTCP called for Outfall CHE002 to remain active. City of Chelsea permanently closed this outfall in December 2014.

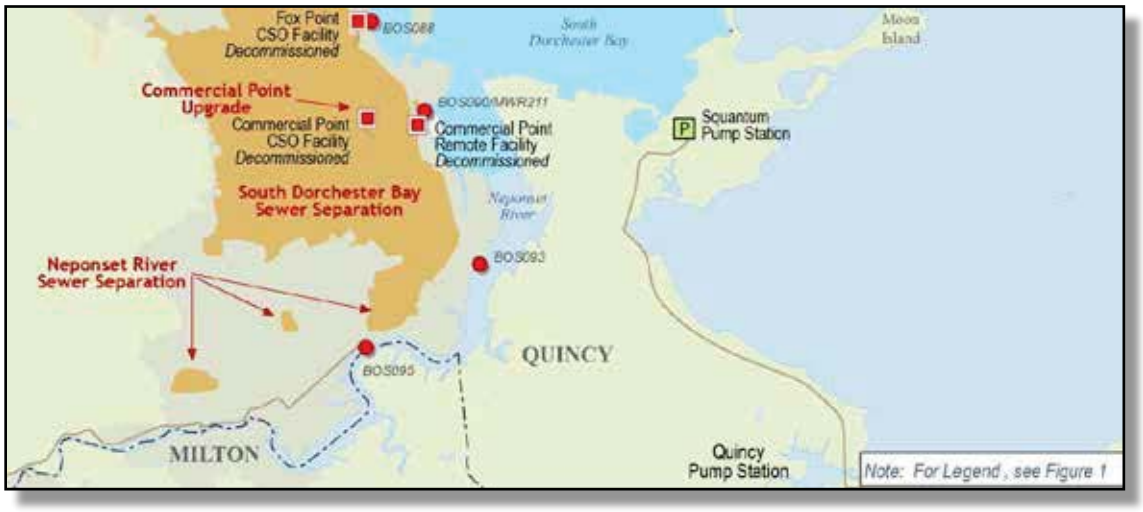
Charles River and Back Bay Fens



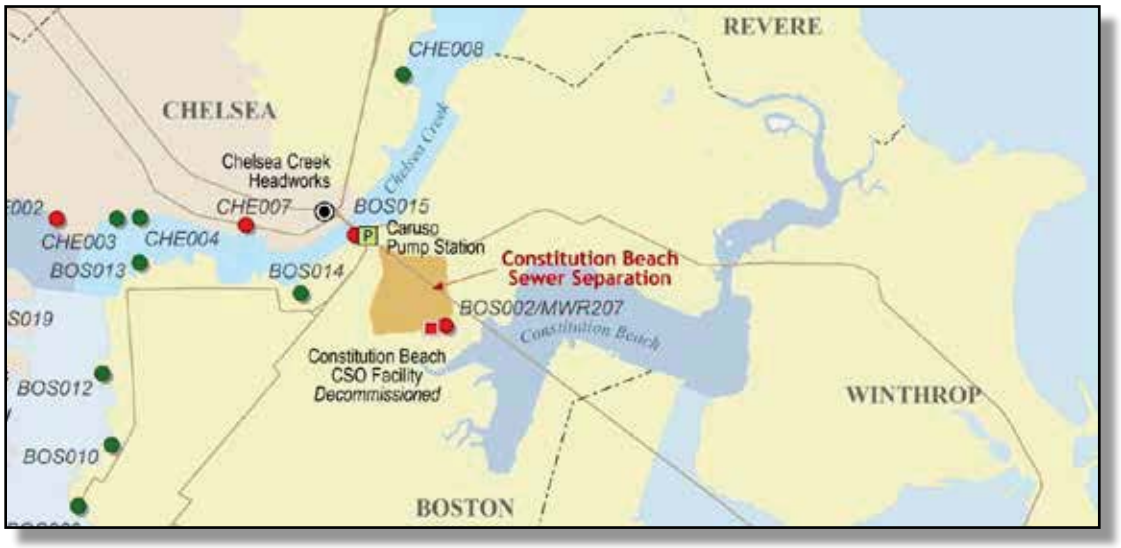
		CSO Outfalls	In a Typical Rainfall Year		
			Frequency of Most Active Outfall	Total Discharge Volume (million gallons)	Treated Discharge Volume[(1)] (million gallons)
Charles River Basin	1992	19	39	389.0	214.1 (55%)
	2014	10	5	19.7	16.7 (85%)
	LTCP	10	2	7.8	6.3 (81%)
Back Bay Fens	1992	1	2	5.3	N/A
	2014	1	1	1.6	N/A
	LTCP	1	2	5.4	N/A

[(1)] At Cottage Farm CSO treatment facility

Neponset River



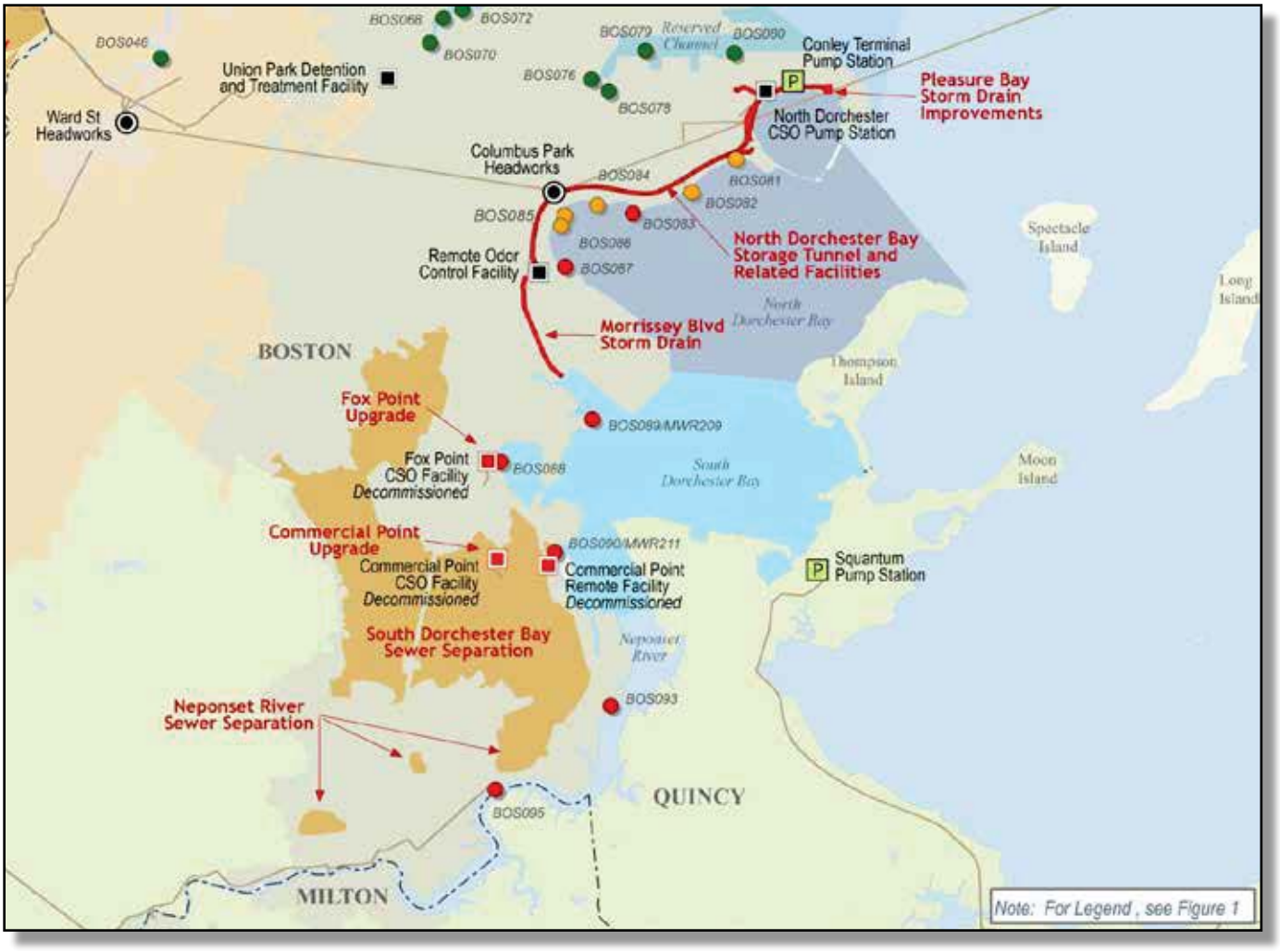
Constitution Beach



		CSO Outfalls	In a Typical Rainfall Year		
			Frequency of Most Active Outfall	**Total Discharge Volume** (million gallons)	**Treated Discharge Volume** (million gallons)
Neponset River	1992	2	72	6.98	N/A
	2014	0	Eliminated		
	LTCP	0	Eliminated		
Constitution Beach	1992	1	24	4.0	4.0 (100%)[(1)]
	2014	0	Eliminated		
	LTCP	0	Eliminated		

[(1)] At Constitution Beach CSO Facility (decommissioned in 2000)

Boston Harbor Beaches



		CSO Outfalls	In a Typical Rainfall Year		
			Frequency of Most Active Outfall	Total Discharge Volume (million gallons)	Treated Discharge Volume (million gallons)
North Dorchester Bay (South Boston Beaches)	1992	7	80	57.6	N/A
	2014	5	0	0	
	LTCP	5	0	0	
South Dorchester Bay	1992	3	87	186.0	186.0 (100%)[(1)]
	2014	Eliminated			
	LTCP				

[(1)] At Commercial Point and Fox Point CSO facilities (both decommissioned in 2007)

MWRA and the CSO communities eliminated CSO discharges at 34 of the 84 CSO outfalls and virtually eliminated, i.e., 25-year storm level of control, CSO discharges (along with a 5-year storm level of control of separate stormwater discharges) at the five remaining outfalls along the South Boston beaches. The 34 closed outfalls include five outfalls – two City of Cambridge outfalls, two BWSC outfalls and one City of Chelsea outfall - that the Long-Term Control Plan had assumed would remain active. The City of Cambridge closed Charles River Basin outfalls CAM009 and CAM011 in 2007 on an interim basis and maintains them in a closed condition while it continues to evaluate hydraulic conditions in the local sewer system before making a decision to keep them closed permanently. BWSC permanently closed East Boston/Inner Harbor outfalls BOS006 and BOS007 in 2004, and the City of Chelsea closed Outfall CHE002, which discharged to the Mystic River/Chelsea Creek Confluence, in 2014.

Brick and mortar bulkhead of high outlet overflow in CSO regulator at Outfall CHE002.

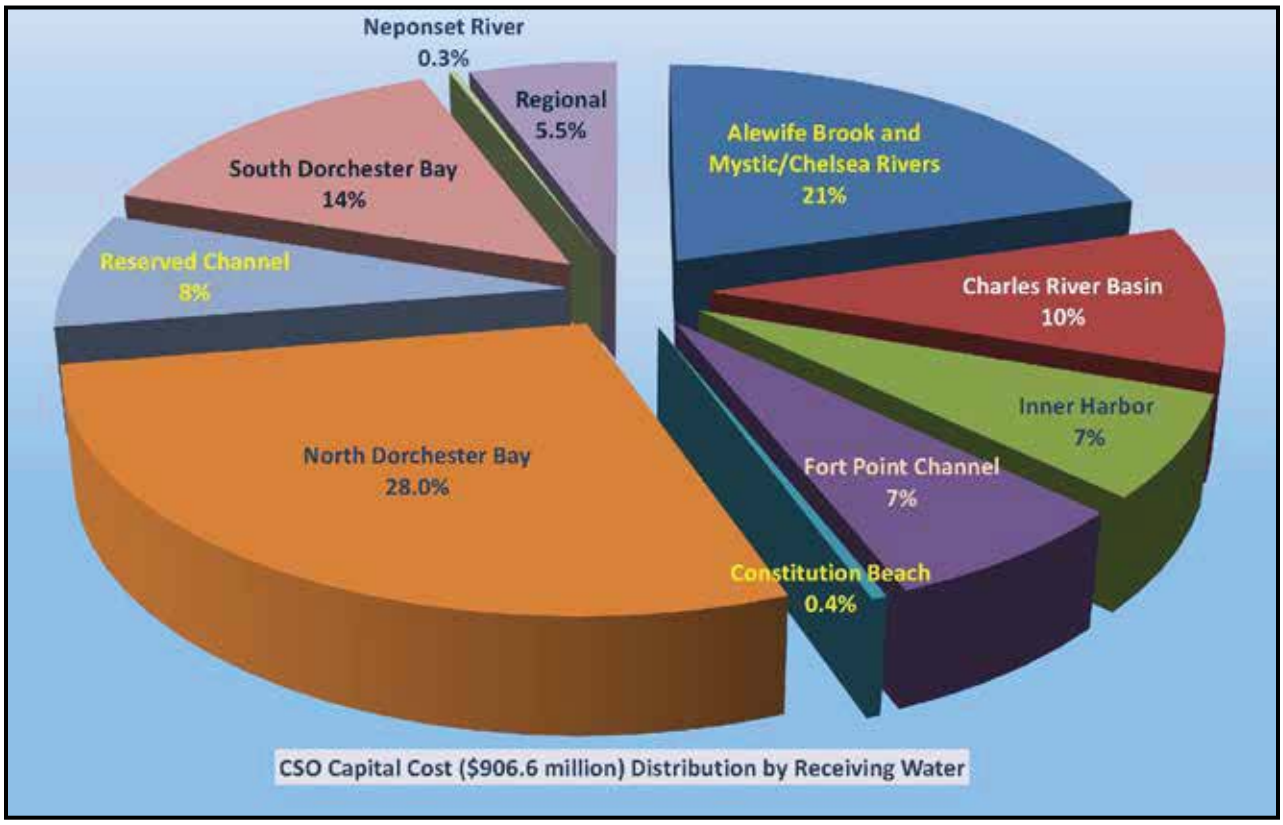
Former CSO Outfall CHE002 now discharges stormwater, only.

The Long-Term CSO Control Plan has eliminated CSO discharges to sensitive receiving waters (swimming and shell fishing), including the beaches of South Dorchester Bay and Neponset River (Savin Hill, Malibu and Tenean beaches) and Constitution Beach. For the South Boston beaches (North Dorchester Bay), MWRA's CSO storage tunnel provides a 25-year storm level of CSO control and a 5-year storm level of separate stormwater control.

MWRA's Proposed FY17 CIP includes $906.6 million for the CSO Control Program, including past planning, MWRA design and construction, financial assistance to communities to implement the CSO projects they will own and operate, and the required 3-year CSO performance assessment. The allocation of those dollars to accomplish the approved levels of CSO control for the various receiving waters is shown in Figure 13, on the following page.

MWRA has spent approximately $891.0 million (98%) of its CSO Program budget. The remaining $15.6 million in scheduled CSO spending is for the following remaining activities: extensive eligible surface restoration work by Cambridge with the CAM004 Sewer Separation project (anticipated spending of $9.6 million through June 2017); close-out of BWSC Reserved Channel contracts ($164,000 through 2016); removal of additional stormwater inflow by BWSC in Dorchester, following completion of the South Dorchester Bay sewer separation project and closing of related CSO outfalls in 2007 (anticipated spending of $3.6 million, with schedule under review); and a $2.0 million placeholder for the court mandated CSO performance assessment in 2018-2020.

Figure 13: CSO Cost by Receiving Water



1. Does not include the >$200 million investment in the Deer Island transport system by 1992, which greatly reduced CSO discharge system-wide and especially benefited the Charles River.
2. "Regional" includes area-wide planning and system optimization measures.
3. "Charles River Basin" includes the Back Bay Fens.

MWRA met the qualification requirements for federal stimulus funding for four CSO Program contracts: North Dorchester Bay pumping station and force main, North Dorchester Bay ventilation building, East Boston Branch Sewer Relief Contract 3, and Reserved Channel sewer separation Contract 2. The federal stimulus funding was provided to MWRA through the State Revolving Fund (SRF) program, which is administered by the Massachusetts Pollution Abatement Trust and DEP. With the stimulus funding, MWRA received $13.8 million in forgiveness of the principal on the SRF loans for these four construction contracts. Most of the other construction contracts in the Long-Term Control Plan were funded with low-interest loans under the DEP-managed SRF program.

Federal and State Regulatory Approvals

In 1998, the U.S. Environmental Protection Agency and the Massachusetts Department of Environmental Protection approved MWRA's 1997 recommended CSO control plan, which then included 25 CSO control projects, and DEP issued water quality standards determinations that effectively brought the plan into compliance with state Water Quality standards. DEP issued the classification B(cso) (for fresh waters) or SB(cso) (for marine waters) for most of the water segments affected by CSO. Class B(cso) and SB(cso) require attainment of the levels of CSO control in an approved facilities plan, in this case, MWRA's LTCP. DEP did not change the Class B designations for the Charles River and Alewife Brook/Upper Mystic River, which would prohibit CSO discharges in the absence of relief by way of a variance. DEP has instead issued a series of temporary variances to the Class B standards for CSO only, that allow MWRA and the CSO communities to continue to discharge CSO to these waters. Chapter 5 of this report describes next steps in the regulatory process.

Following the 1998 regulatory approvals, MWRA recommended several changes to the plan. MWRA revised its projects and schedules for Alewife Brook Sewer Separation (2001), East Boston Branch Sewer Relief (2003), North Dorchester Bay CSO Storage Tunnel (2004) and Reserved Channel Sewer Separation (2004) based on new information gained during the design phases of these projects. During this same period, MWRA filed variance-required reports that evaluated higher levels of CSO Control for the Charles River/Cottage Farm Facility (2004) and the Alewife Brook/Upper Mystic River (2003). The only additional CSO control recommended in these reports was inflow control and operational optimization at the Cottage Farm facility.

Key 2006 Agreement

In April 2006, the Court allowed a joint motion (MWRA, EPA, and Department of Justice) and issued an Order (July 2006) incorporating changes to the Long-Term Control Plan and schedule. This Order was the result of extensive negotiations and eventual agreement by the parties that resolved remaining outstanding issues associated with the Long Term Control Plan. The 2006 agreement resulted in: increased CSO control for the Charles River Basin; a revised recommended plan for CSO control for North Dorchester Bay (South Boston Beaches CSO Control); and a five-year period after achievement of the last construction milestone (December 2015) during which MWRA would have no additional construction responsibilities and would conduct a three-year post-construction assessment due in 2020. This was in keeping with MWRA's Advisory Board and Board of Directors' requirement that, in exchange for the additional Charles River CSO projects, MWRA would be allowed a five-year period (2015-2020) of no additional CSO obligations or related capital project spending. With this agreement and associated approvals and court orders, MWRA gained greater, necessary certainty in managing its capital program and rate increases over the 15-year period through 2020.

Prior to the 2006 agreement, MWRA and EPA had differences over the appropriate level of CSO control and related additional investment for the Charles River. EPA's proposed position on the Charles River controls had put significant risk on the scope of MWRA's obligations for CSO control and cost to MWRA ratepayers, which MWRA determined did not resulting in significant environmental benefits. To reach agreement on its recommended changes and secure a higher level of certainty of its long-term CSO obligations, MWRA offered and EPA agreed with, new, additional capital construction projects (Bulfinch Triangle Sewer Separation, Brookline Sewer Separation, and Cottage Farm Brookline Connection and Inflow Control) that would increase the level of CSO control for the Charles River.

MWRA's CSO control plan for the South Boston Beaches also had hit roadblocks with local resident opposition to the siting and construction of a proposed large treatment and pump facility (400 million gallons per day) included in the originally approved plan. MWRA proposed enlarging the tunnel component of the project and replacing the large pump and treatment facility with a relocated smaller CSO pumping facility at Massport's Conley Terminal. In addition, DEP and EPA agreed upon the level of CSO control (25-year or "virtual elimination") provided by MWRA's recommended project for the South Boston Beaches.

Under the Order, MWRA has five years following construction of the last CSO project in 2015 to complete, by December 2020, post-construction monitoring and a performance assessment to verify that the approved long-term levels of CSO control are achieved. Also as part of the agreement, DEP agreed to continue to reissue, and EPA agreed to continue to approve, the Charles River and Alewife Brook/Upper Mystic River CSO variances through 2020 without additional CSO controls beyond the approved plan. The current variances end in October and September, 2016, respectively. MWRA recently met with DEP to begin the process of reissuing the variances for the period 2016-2019.

The United States and MWRA also agreed to withdraw the 1987 First CSO Stipulation and replace it with a Second Stipulation that requires MWRA to implement the CSO requirements on the Court's schedule and to meet the agreed upon levels of CSO, as to annual activation frequency and volume of discharge at each CSO outfall, which are appended to the Second Stipulation. In July 2006, the Court accepted the schedule revisions and incorporated a new schedule (Schedule Seven).

4. ENVIRONMENTAL WATER QUALITY

This chapter summarizes current water quality and water quality improvement in the various receiving waters that benefit from the Long-Term Control Plan.

Current Water Quality Conditions

CSO discharges have been vastly reduced, treated, or eliminated in all segments of the harbor with the completion of construction. Figure 14 and Figure 15, on pages 30 and 31, show the current levels of compliance with swimming standards (2010 through 2015 data) in these segments, including harbor embayments, tributaries and beaches. These figures also show the reduced CSO volume discharged to each segment. The elimination of CSO discharges from waters where compliance levels are still not near 100%, such as the Neponset River and Dorchester Bay, indicate that sources other than CSO are a cause of elevated bacteria. In areas such as the Inner Harbor and Lower Charles, where CSOs remain, the majority of CSO flow receives treatment, and CSO discharges comply with "fishable/swimmable" standards (i.e., have no impact) 98% of the time in a typical rainfall year.

The results of water quality sampling at harbor beaches show very good conditions, with the vast majority of samples meeting swimming standards. CSOs have been eliminated from all harbor beaches, and any remaining water quality violations are attributable to other sources. South Boston beaches meet standards 98% of the time.

Water Quality Improvement

The water quality of Boston Harbor and the Charles, Mystic and Neponset rivers has steadily improved as MWRA and the CSO communities completed the CSO projects and as communities along these waters have also implemented programs to control pollutant loadings from storm drains. Beach closings due to high bacteria are relatively infrequent, allowing for swimming on most summer days at all beaches.

The bar graph in Figure 15, on page 31, shows the marked reduction in samples failing to meet limits following start-up operation of the CSO storage tunnel in May 2011. The fraction of days failing to meet the bacteria limit at one or more South Boston beaches has dropped from an average of 18% in the five years prior to start-up of the storage tunnel to an average of 4% in the nearly five years that MWRA has operated the tunnel. The few remaining water quality violations and related beach closings are not CSO related (there has been no CSO discharge since the storage tunnel opened), and may be caused by environmental factors such as near-field overland stormwater runoff contaminated with pet waste or bird droppings.

During 2015, the storage tunnel captured approximately 130 million gallons of CSO and separate stormwater and prevented any CSO or stormwater discharge to the beaches in the approximately 97 rainfall events that occurred that year. From start-up on May 4, 2011, to March 15, 2016, the storage tunnel captured more than 900 million gallons of CSO and stormwater, and there has been no discharge of CSO to the beaches. Hurricane Irene in August 2011 and the December 9, 2014, storm resulted in two discharges of separate stormwater to the beaches and Savin Hill Cove and three additional storms have resulted in transfers of some separate stormwater to Savin Hill Cove, in accordance with the operating protocols for the tunnel.


Save the Harbor/Save the Bay

Figure 14

Current water quality in Boston Harbor & Tributary Rivers

Percent of samples meeting the *Enterococcus* swimming limit 104 counts/100mL
for all weather conditions, 2010-2015 and change in CSO volume, in million gallons, 1988-2015.

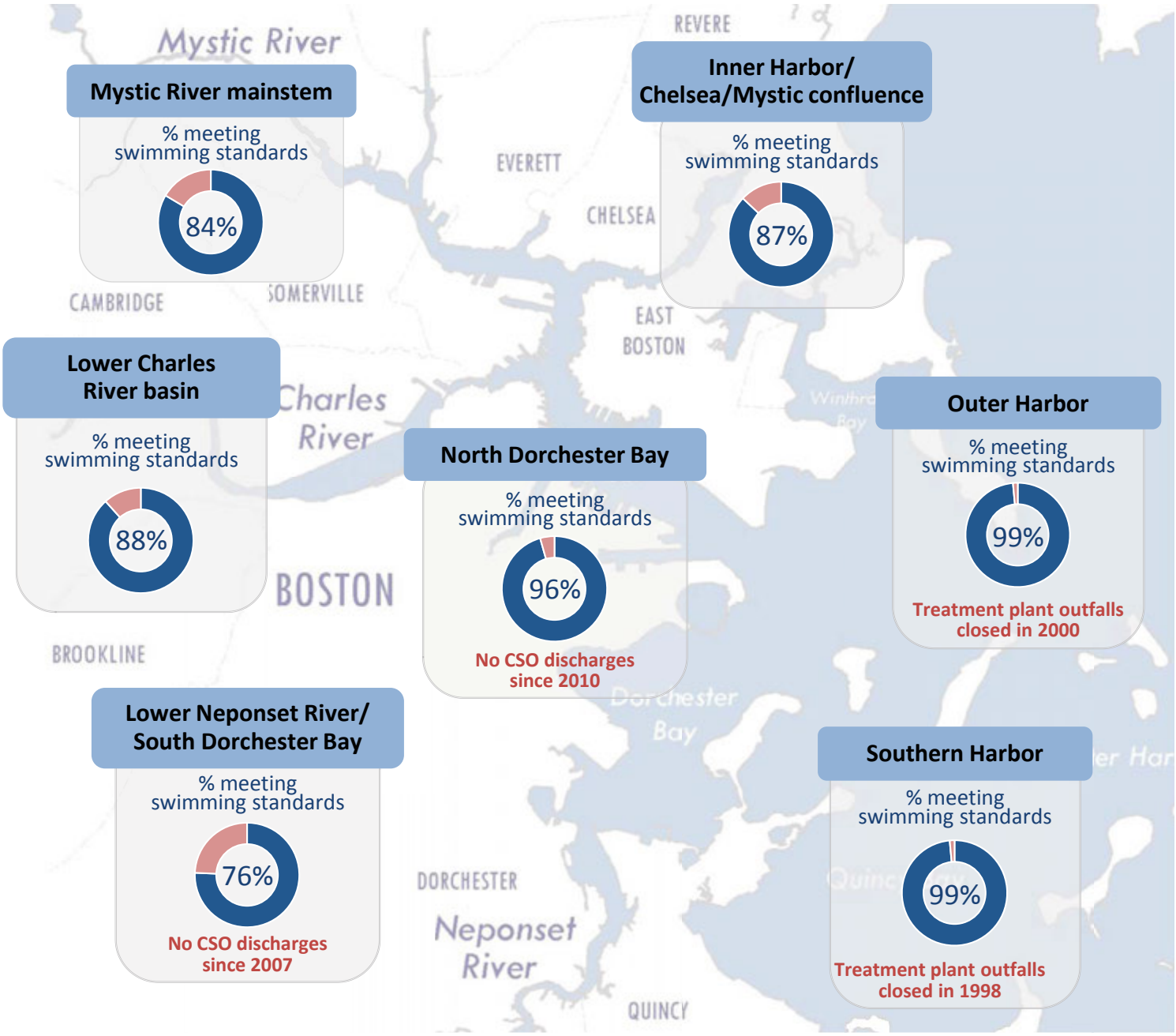
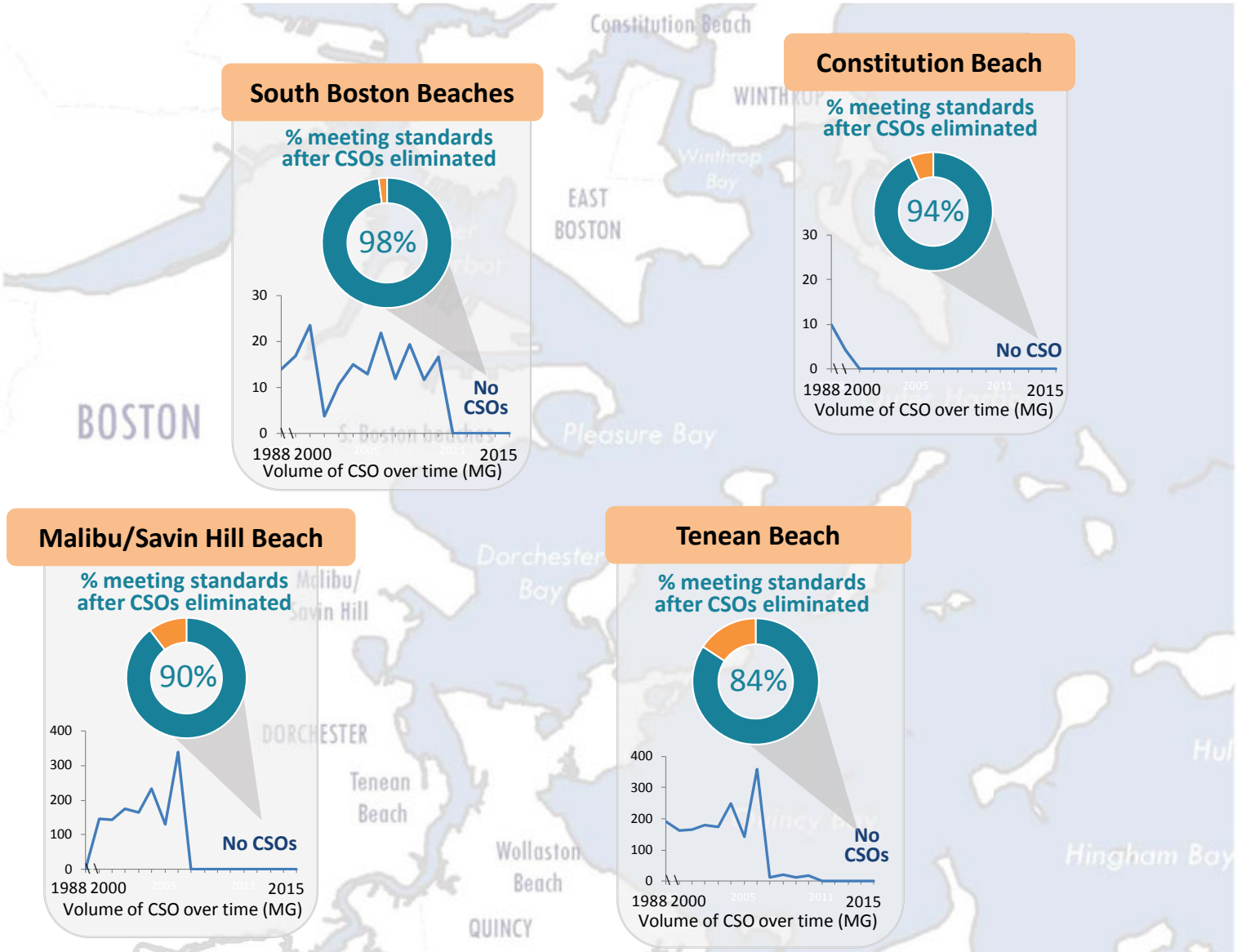
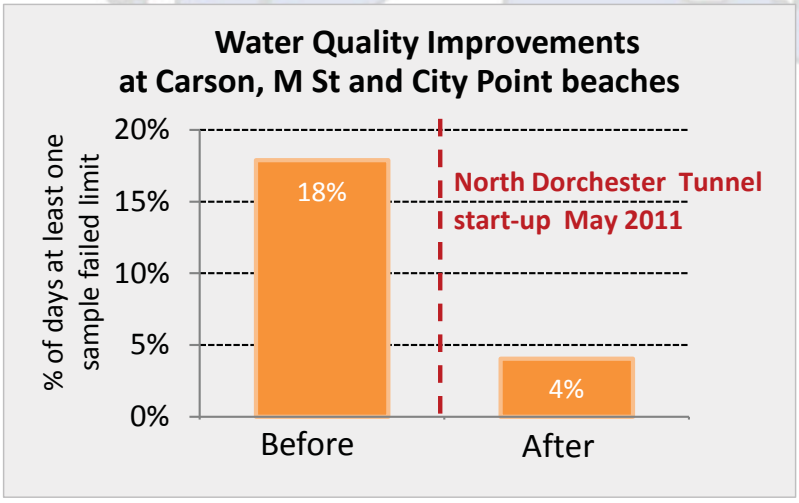


Figure 15

Current water quality at Boston Harbor beaches

Percent of samples meeting the *Enterococcus* swimming limit 104 counts/100mL
for all weather conditions, 2010-2015 and change in CSO volumes near each beach, 1988-2015.





Results from DCR swimming seasons for were used to calculate the fraction of bacteria samples that met the posting limit of 104 cfu/100 mL *Enteroccocus*. Bar graph includes results for Carson, M St and City Point beaches.

MWRA's major improvements to its collection and treatment systems and its completed CSO control projects have removed CSO as a major source of pollution to the Boston Harbor and its tributaries, and have the potential to enhance environmental conditions and promote safe public use. The benefits of these complementary pollution control programs are most evident in the Charles River. Tremendous water quality improvement has been observed and measured in the Charles River Basin, where average annual CSO discharge has been drastically cut from about 1.7 billion gallons in 1988 to 21 million gallons today, a greater than 98% reduction. Approximately 80% of this remaining overflow is treated at MWRA's Cottage Farm CSO facility.

These improvements are the result of major wastewater system projects, most notably the Deer Island Wastewater Treatment Plant and related conveyance and pumping systems, as well as the CSO control projects completed to date. MWRA and the CSO communities along the Charles River completed a set of improvements in the late 1980s that eliminated dry weather sewage overflows at CSO outfalls. They also completed a set of system optimization projects in the mid-1990s that maximized the wastewater system's hydraulic performance and lowered CSO discharges. MWRA and the communities have also completed six CSO control projects along the Charles River: Cottage Farm Facility Upgrade (2000), CAM005 Hydraulic Relief (2000), Independent Floatables Controls and Outfall Closings Project (2001), Stony Brook Sewer Separation (2006), Cottage Farm Brookline Connection and Inflow Controls (2009), Bulfinch Triangle Sewer Separation (2010) and Brookline Sewer Separation (2013).

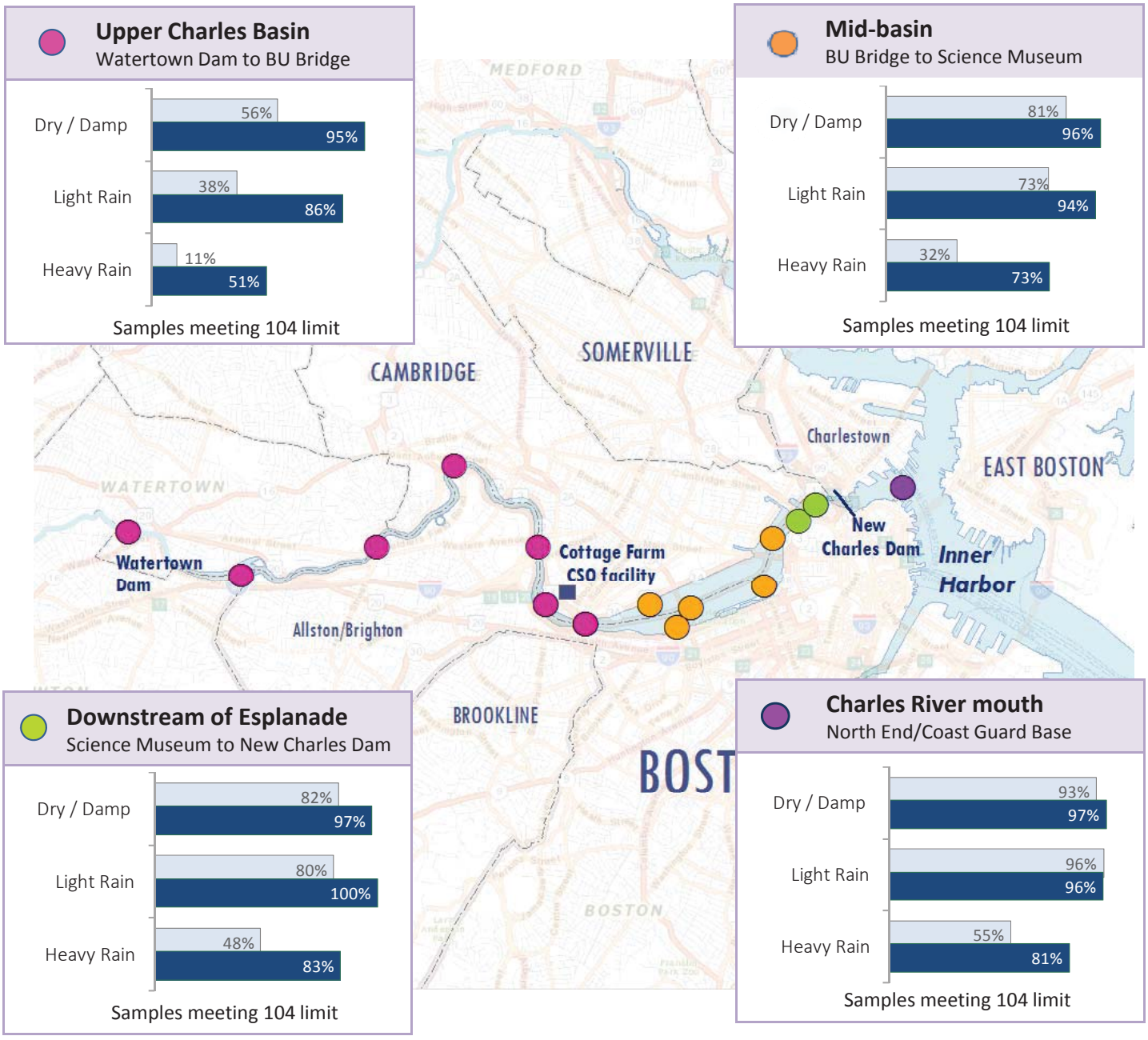
In the same period, communities along the Charles River have continued programs aimed at reducing pollution in separate stormwater discharges, including identifying and removing illicit sewer connections to storm drains. The CSO and stormwater related improvements have contributed to significant and steady water quality improvement in the Charles River Basin during dry and wet weather conditions, as shown in Figure 16, on the following page.

Figure 17, on page 34, shows the bacterial water quality in the Mystic River. The Lower Mystic and Mystic River mouth had the best water quality, meeting water quality limits most of the time, with the majority of bacteria samples meeting the *Enterococcus* swimming limit of 104 cfu/100mL in all weather conditions for 2008 through 2015, and more than 90% of samples meeting standards in dry weather. While conditions worsen in heavy rain events, these rainfall conditions are relatively infrequent.

Figure 16

Change in Lower Charles River Water Quality Over Time

Graphs show the percent of samples meeting the *Enterococcus* bacteria limit for swimming, 104 counts/100mL, by river reach and weather condition.

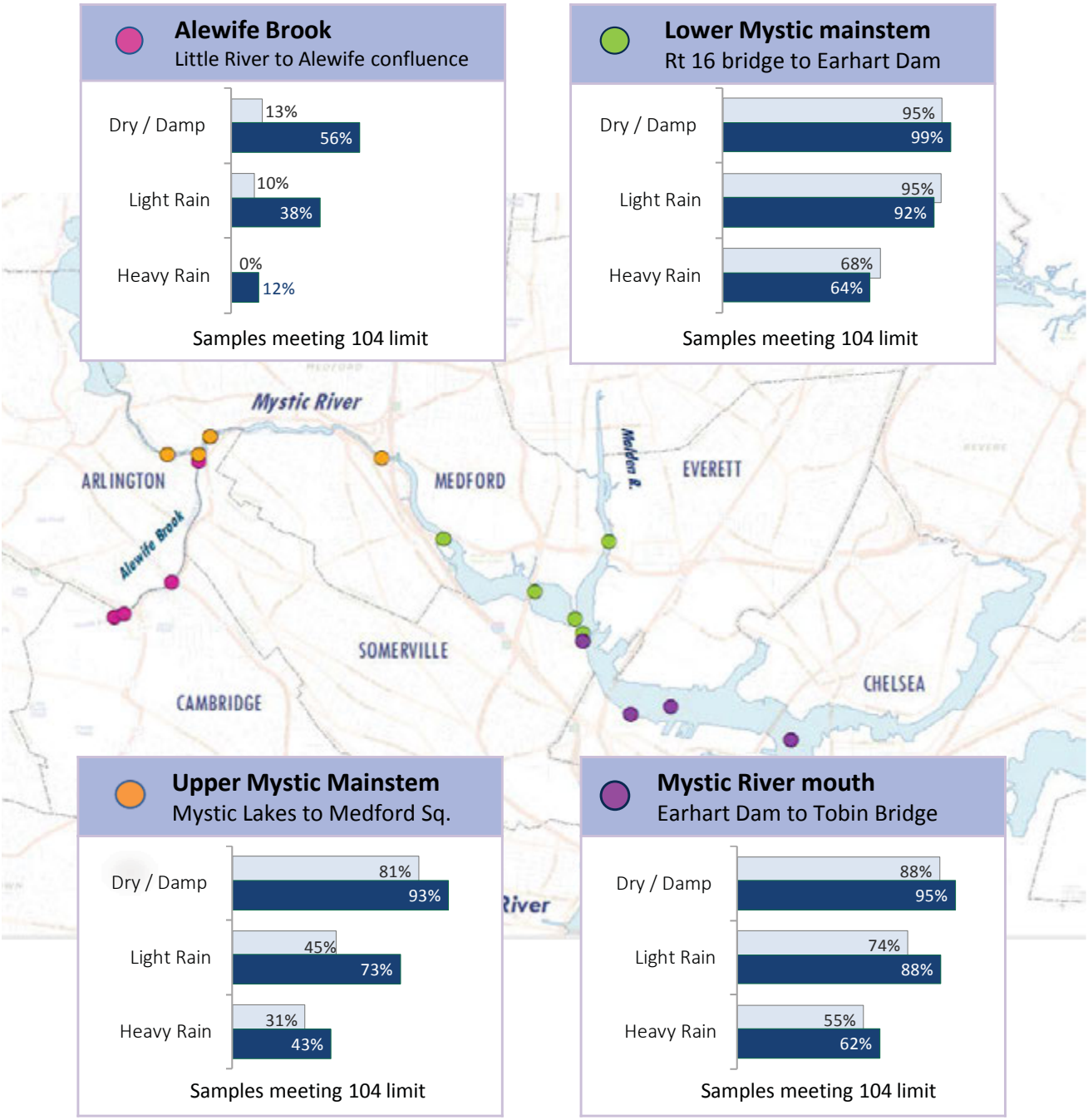


Dots are MWRA sampling locations. State swimming standards for *Enterococcus* single sample limit is 104 cfu/100 mL. Rainfall: Heavy Rain is at least 0.5 inches of rain in previous 48 hours; Light Rain is between 0.1 and 0.5 inches of rainfall in previous 48 hours. 2008 – 2015 period is considered current conditions, following substantial completion of infrastructure improvements. Data from intervening years (2000 – 2007) are excluded.

Figure 17

Change in Mystic River Water Quality Over Time

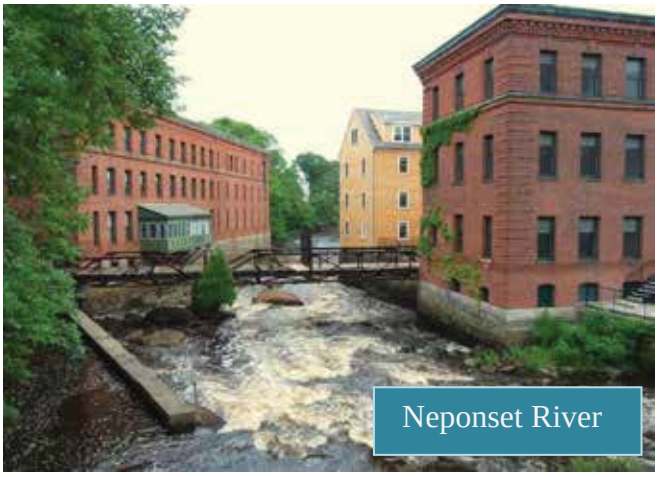
Graphs show the percent of samples meeting the *Enterococcus* bacteria limit for swimming, 104 counts/100mL, by river reach and weather condition.



Dots are MWRA sampling locations. State swimming standards for *Enterococcus* single sample limit is 104 cfu/100 mL. Rainfall: Heavy Rain is at least 0.5 inches of rain in previous 48 hours; Light Rain is between 0.1 and 0.5 inches of rainfall in previous 48 hours. 2008 – 2015 period is considered current conditions, following substantial completion of infrastructure improvements. Data from intervening years (2000 – 2007) are excluded.

Bacteria counts in Alewife Brook (prior to the completion of the major CSO work in 2015) frequently fail to meet swimming limits in both dry and wet weather, and water quality is particularly poor after heavy rain. However, Alewife Brook's influence on downstream water quality conditions in the Mystic main stem is limited, with bacterial conditions downstream showing little influence downstream of the Alewife Brook confluence with the river.

Figure 18, on the following page, shows substantial improvement in water quality over time in the Neponset River, though the magnitude of improvements varies by river segment, with upstream locations showing the most significant change, particularly at the Baker Dam. CSO discharges were eliminated in 2000 with completion of the Neponset River sewer separation project. Prior to the project, CSO flows were discharged at two BWSC outfalls in the lower Neponset, downstream of the Granite Ave. bridge. Water quality data show improvement downstream of these former CSOs, and further upstream at the Baker Dam, which shows improvement in dry as well as wet weather conditions. Bacteria levels generally meet swimming standards at the mouth of the Neponset River in all but heavy rainfall conditions, where there is considerable dilution with the water of South Dorchester Bay.



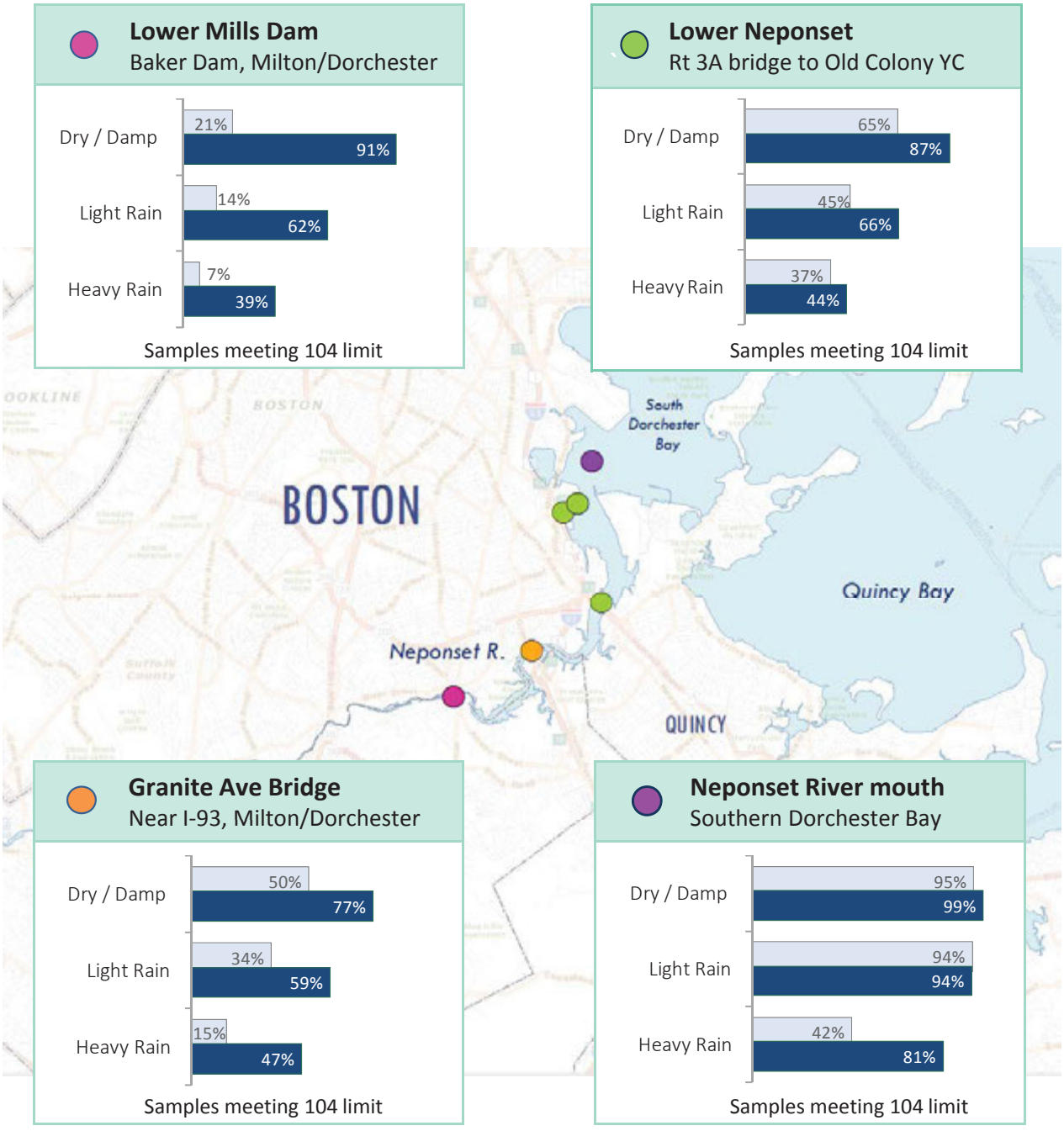
Improvement in the quality of Boston Inner Harbor waters is also seen in the changes to *Enterococcus* bacteria counts over the period 1989 to 2015, shown in Figure 19, on page 37. Water quality conditions improved with the significant increase in wastewater transport and treatment capacity (delivery to the Deer Island Treatment Plant) in the period prior to 1991. This increase in delivery capacity greatly reduced CSO discharges at most outfalls. Since then, wet-weather water quality continues to improve in Boston Harbor and its tributary rivers, but at a slower pace, due in part to diminishing returns on wastewater pollution investments and the dominance of other sources of pollution, including urban stormwater.

As shown in Figure 20, on page 38, wet weather water quality conditions in Boston Harbor and its tributary rivers improved after the significant increase in wastewater transport and treatment capacity in the early 1990's. Since then, wet weather conditions have continued to improve with implementation of the CSO projects. By 2008, MWRA and the CSO communities had completed many of the CSO control projects that further reduced or eliminated discharges at most CSO outfalls, including outfalls to the Charles River, Mystic River and Chelsea Creek. In the same period, community efforts to control urban stormwater pollution were underway, and these efforts have continued.

Figure 18

Change in Lower Neponset River Water Quality Over Time

Graphs show the percent of samples meeting the *Enterococcus* bacteria limit for swimming, 104 counts/100mL, by river reach and weather condition.

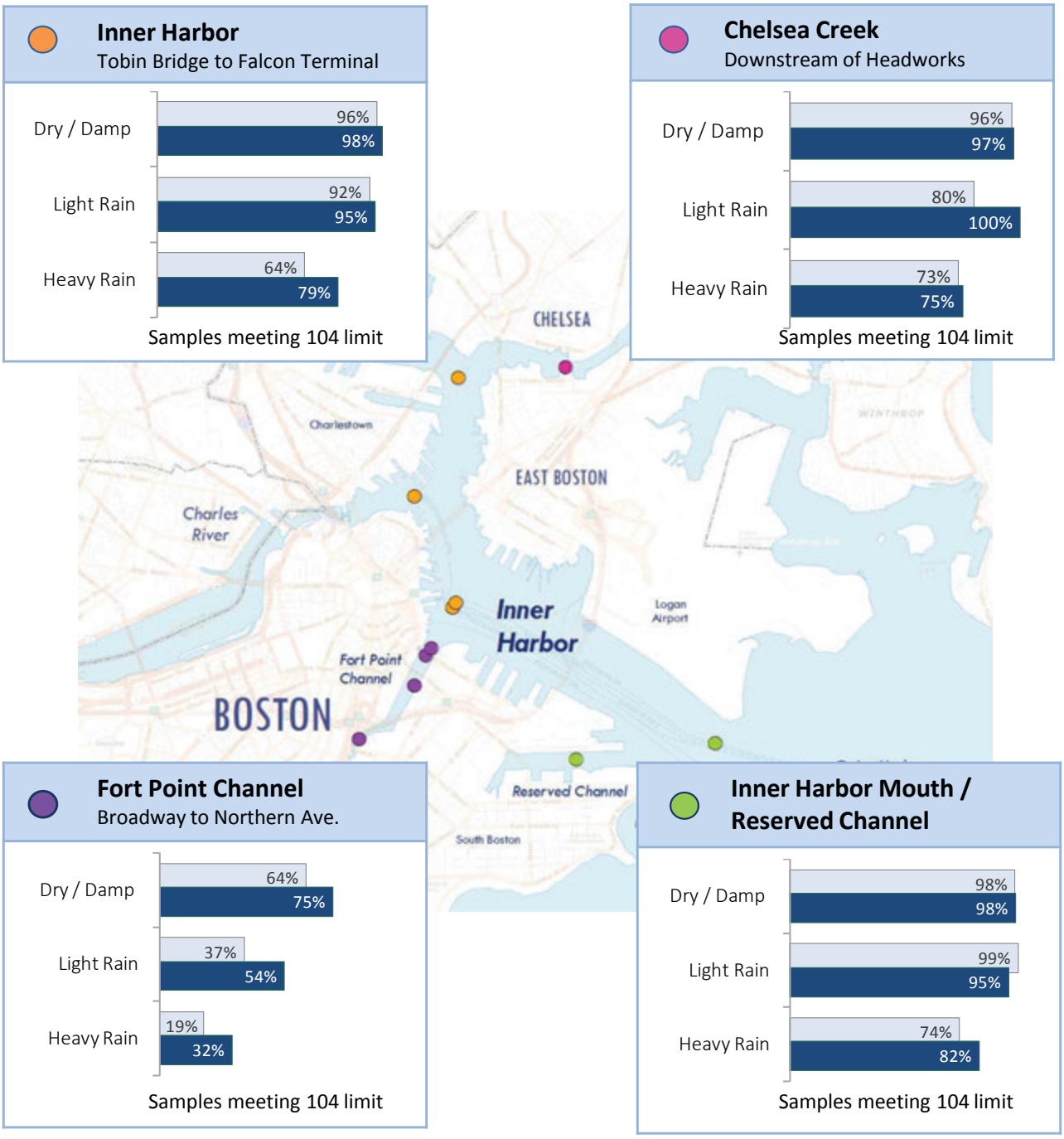


Dots are MWRA sampling locations. State swimming standards for *Enterococcus* single sample limit is 104 cfu/100 mL. Rainfall: Heavy Rain is at least 0.5 inches of rain in previous 48 hours; Light Rain is between 0.1 and 0.5 inches of rainfall in previous 48 hours. 2008 – 2014 period is considered current conditions, following substantial completion of infrastructure improvements. Data from intervening years (2000 – 2007) are excluded.

Figure 19

Change in Inner Harbor Water Quality Over Time

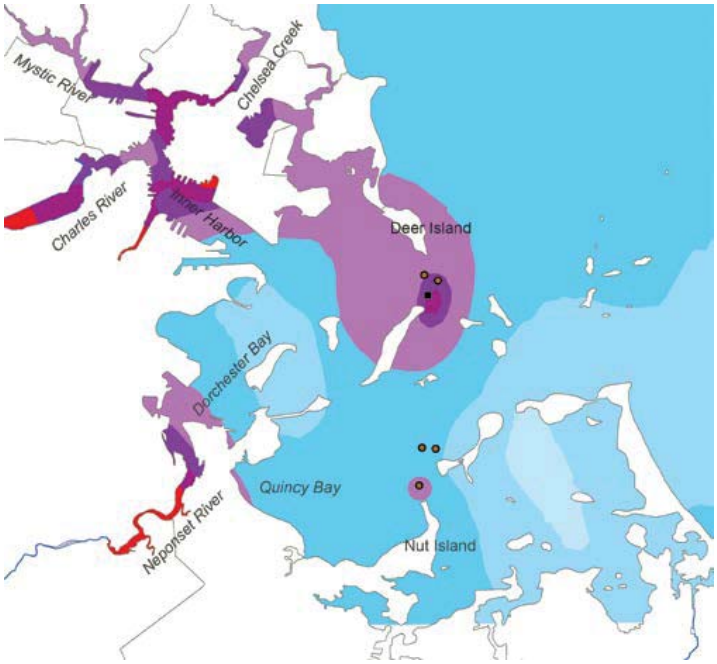
Graphs show the percent of samples meeting the *Enterococcus* bacteria limit for swimming, 104 counts/100mL, by water segment and weather condition.



Dots are MWRA sampling locations. State swimming standards for *Enterococcus* single sample limit is 104 cfu/100 mL. Rainfall: Heavy Rain is at least 0.5 inches of rain in previous 48 hours; Light Rain is between 0.1 and 0.5 inches of rainfall in previous 48 hours. 2008 – 2015 period is considered current conditions, following substantial completion of infrastructure improvements. Data from intervening years (2000 – 2007) are excluded.

Figure 20
Changes in Boston Harbor *Enterococcus* Bacteria in Wet Weather

Prior to Boston Harbor projects (1989-1991)



Most Boston Harbor projects complete (post-2007)

Geometric mean (colonies/100 mL)

Sampled during rainfall
>=0.2 inches within 24 hours

Blue contours meet swimming standard, red-purple contours exceed swimming standard

- 0 - 5
- 5 - 10
- 10 - 35
- 35 - 104
- 104 - 158
- 158 - 275
- > 275

- active treatment outfall
- closed treatment outfall
- active NITP sludge outfall
- closed NITP sludge outfall

Contours show the geometric means of *Enterococcus* bacteria samples collected when more than 0.2 inches of rain fell in the previous day. Blue areas meet the EPA geometric mean standard for *Enterococcus* (35 cfu/100 mL) and red-purple areas exceed the standard.

1989-1991

This period precedes major improvements to upgrade MWRA's Deer Island treatment plant, including the closure of harbor treatment plant outfalls, and CSO controls. The period includes the final year that wastewater sludge was released to Boston Harbor (1991).

Harbor areas affected by the discharge of sewage and sludge from the old Deer Island and Nut Island treatment plants, as well as tributary rivers affected by CSO failed to meet the water quality standard in wet weather.

Post-2007

Data from these years reflect the effects of CSO upgrades, the ending of sludge discharges, improved treatment capacity and start of second treatment at the Deer Island Treatment Plant. This period also follows the ending of treatment plant discharges to the Harbor with startup of the Massachusetts Bay outfall in 2000.

5. PROGRESS CONTINUES – COURT ORDER AND REGULATORY COMPLIANCE

Remaining Court Schedule Milestones

MWRA has addressed more than 180 milestones in the schedules issued by the Federal District Court since the First CSO Schedule in 1987. The current schedule, Schedule Seven, was issued in June 2006 and was last amended in July 2011. The CSO schedules included milestones for planning activities, regulatory compliance submissions and project design and construction. There are only two remaining milestones in Schedule Seven, both relating to a requirement that MWRA conduct a CSO post-construction monitoring program and performance assessment to verify attainment of the required long-term levels of control, "(including as to frequency of CSO activation and as to volume of discharge) specified in its approved Long-Term Control Plan."

Remaining Schedule Seven Milestones	
Jan 2018	*MWRA to commence three-year performance assessment of its Long-Term CSO Control Plan. The assessment shall include post-construction monitoring in accordance with EPA's Combined Sewer Overflow (CSO) Policy, 59 Fed. Reg. 18688 (Apr. 19, 1994).*
Dec 2020	*MWRA to submit results of its three-year performance assessment of its Long-Term CSO Control Plan to the EPA and DEP. MWRA to demonstrate that it has achieved compliance with the levels of control (including as to frequency of CSO activation and as to volume of discharge) specified in its Long-Term CSO Control Plan.*

MWRA's Final FY16 and Proposed FY17 Capital Improvement Program budgets for CSO control include a placeholder budget for the three-year assessment, pending detailed scoping. MWRA has begun to scope the post-construction monitoring program and performance assessment, and has commenced related discussions with EPA and DEP. MWRA has also commenced efforts to coordinate its post-construction monitoring program with BWSC, the cities of Cambridge, Chelsea and Somerville, and the Town of Brookline. MWRA intends to build on the information already received from these communities, including the as-built plans and stormwater inflow removal records for their completed sewer separation projects. Additional information from the communities may include flow meter data, system performance records and elements of available community sewer system models that may help in assessing system performance.

Annual Performance Tracking and CSO Discharge Reporting

MWRA has for more than a decade conducted annual CSO performance assessments and CSO discharge tracking. These have included the annual collection and review of facility operation records, meter data and other system performance indicators, updates to the MWRA collection system hydraulic model with new information about system conditions, and the estimation, using model predictions and facility records, of CSO activations and discharge volume at all active outfalls during the previous calendar year, as well as an updated simulation of CSO discharges from Typical Year rainfall. These updates and discharge estimates are performed to satisfy annual tracking and reporting requirements in the MWRA's and CSO communities' NPDES permits and in the CSO variances for the Charles River and Alewife Brook/Upper Mystic River. These annual updates and assessments have also allowed MWRA to measure and track system performance as it continued to implement the Long-Term Control Plan.

MWRA incorporates completed sewer system improvements, such as completed CSO projects, other significant system or operational changes and any other new information about system conditions into the model. Information from facility records is used to configure the facility operational assumptions in the model for each modeled storm event. Meter data and other system performance indicators are used to compare measured conditions to the model results for selected storms, allowing MWRA to verify the model's accuracy prior to modeling the actual storms in the previous calendar year.

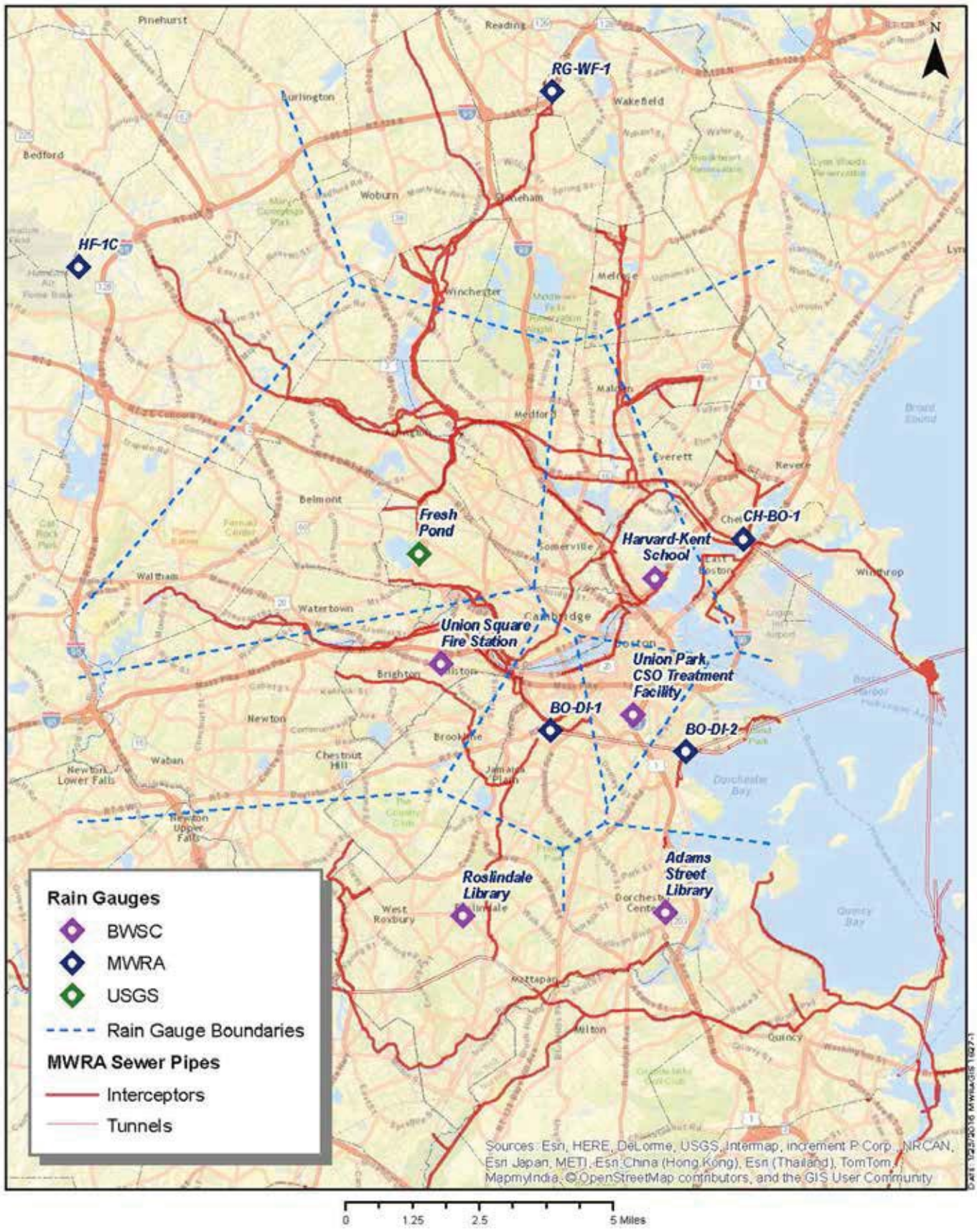
MWRA submitted the CSO discharge estimates for calendar year 2014 to EPA and DEP on April 30, 2015. Like the earlier reports, the 2014 discharge report included descriptions of system changes or new system information that had the potential for affecting CSO discharges. The 2014 report also included estimates of the number of activations and the discharge volume for each of the outfalls that were potentially active that year. MWRA has commenced the model updates for the calendar year 2015 discharge estimates and plans to model the 2015 storms and report the CSO discharge estimates by April 30, 2016.

For 2014, MWRA modeled each of the 90-100 rainfall events that year, as recorded at MWRA, community and USGS rainfall gauges. Data from MWRA and community rainfall gauges are used to create geographical (polygon) rainfall area inputs to the model, as shown in Figure 21, on the following page. The discharge estimates reported to EPA and DEP are based on the model predictions, except at CSO treatment facilities, where MWRA uses measured flows in the facility records in lieu of the model predictions.

In addition to modeling all of the actual rainfall events for the previous calendar year, MWRA also models the "Typical Year" rainfall with end-of-year updated system conditions. This has allowed MWRA to compare the updated system performance against the levels of control in the Long-Term Control Plan and to track progress toward the CSO control goals, which are based on the Typical Year rainfall that was approved by EPA and DEP for CSO performance goals and measurement. To be able to understand and explain the estimated discharges for each calendar year, which can vary greatly from Typical Year predictions, MWRA performs a detailed review and comparison of the characteristics of the year's actual storms to the characteristics of the storms in the Typical Year.

For the 2015 CSO discharge report that MWRA will submit to EPA and DEP by April 30, 2016, updates to MWRA's collection system model from end-of-year 2014 conditions to end-of-year 2015 conditions will incorporate the as-built plans and operational protocols for the MWR003 project and the as-built plans and stormwater inflow removal estimates for the last of the BWSC Reserved Channel sewer separation contracts and for Cambridge's CAM004 sewer separation project. MWRA will also incorporate the plans and stormwater inflow removal estimates from any sewer separation work the communities completed outside the scope of the Long-Term Control Plan.

Figure 21: Rain Gauge Inputs to MWRA Hydraulic Model



Compliance with Water Quality Standards

When EPA and DEP issued, in 1998, their initial approvals of MWRA's 1997 recommended CSO plan, DEP also issued water quality standards determinations for the CSO affected water segments to bring the plan into compliance with state Water Quality Standards. MWRA's Long-Term Control Plan has eliminated CSO discharges to Class B and SB waters, where CSO discharges are prohibited primarily to protect beaches and shellfish beds. The LTCP also meets standards for waters that DEP designated Class B(cso) or SB(cso), where CSO discharges must meet Class B or SB standards at least 95% of the time and meet a higher level of compliance in accordance with the CSO discharge limits (activation frequency and volume at each outfall in a Typical Year) in an approved long-term control plan. Table 3 identifies the current water quality standards for Boston Harbor related waters addressed in the LTCP.

Table 3: State Water Quality Standards and Required Levels of CSO Control

Water Quality Standard Classification	Receiving Water Segment	Required Level of CSO Control
Class B	Neponset River	CSO prohibited/eliminated (25-year storm control for the South Boston beaches)
Class SB	North Dorchester Bay South Dorchester Bay Constitution Beach	
Class B(cso)	Back Bay Fens (Muddy River)	>95% compliance with Class B or SB Must meet level of control for CSO activation and frequency in approved Long-Term Control Plan
Class SB(cso)	Neponset River Estuary Upper and Lower Boston Inner Harbor Fort Point Channel Reserved Channel	
Class B (CSO Variance)	Alewife Brook and Upper Mystic River Charles River	Class B standards sustained w/temporary authorizations for CSO discharges as the LTCP is implemented and verified (1998-2020)

DEP did not change the Class B designations for the Charles River and the Alewife Brook/Upper Mystic River, at the time, but instead made the determination that it would issue temporary variances to Class B standards for CSO, only. DEP has since issued a series of 3-year CSO variances that allow MWRA and the CSO communities to continue to discharge CSO to these waters. In accordance with the agreement MWRA reached with EPA and DEP in 2006, DEP will continue to reissue, and EPA will continue to approve, the Charles River and Alewife Brook/Upper Mystic River CSO variances through 2020. The current variances end in October and September, 2016, respectively. MWRA recently met with DEP to begin the process, including public review, for reissuing the variances for the period 2016-2019. In part using the results of MWRA's CSO performance assessment due in December 2020, DEP expects to determine whether the levels of CSO control achieved by MWRA's Long-Term CSO Control Plan support B(cso) designations for the Charles River and the Alewife Brook/Upper Mystic River.

CSO Variances – Charles River and Alewife Brook/Upper Mystic River

On August 29, 2013, DEP issued Final Determinations to continue to extend the CSO-related variances to the water quality standards for Alewife Brook/Upper Mystic River and the Lower Charles River/Charles River Basin, subsequently approved by EPA in July of 2014. The variance extensions have three-year terms through September 1, 2016, and October 1, 2016, respectively. The variances apply only to the permitted CSO outfalls to these receiving waters and do not otherwise modify Class B water quality standards. In accordance with the variances, CSO discharges from permitted outfalls are not required to meet effluent limits based on the Class B criteria when flow in the collection system exceeds the system's conveyance capacity as a result of precipitation or snow melt. Through its continued implementation of the Nine Minimum Controls, MWRA maintains the conveyance capacity of its collection system and has improved the handling of wet weather flows through system optimization efforts, most recently through improvements to the operations of influent gates at Prison Point and Cottage Farm CSO treatment facilities implemented in the last few years. The variances require continued implementation of CSO long term control measures consistent with MWRA's Long-Term Control Plan and compliance with other requirements referenced herein.

Each variance extension, including the variances currently in effect (2013-2016), acknowledges that it would not be feasible to fully attain the Class B bacteria criteria and associated recreational uses for these receiving waters within that three-year period. The agreement reached by EPA, DEP and MWRA in March 2006 included an understanding that DEP would reissue, and that EPA would approve, a series of three-year variance extensions effective through 2020. This agreement was based in part on the determination that implementation of controls necessary for full attainment of the Class B bacteria criteria and associated use (i.e. elimination of CSO) would result in substantial and widespread economic and social impact. After 2020, with information MWRA is required to provide to verify the level of CSO control attained by MWRA's completed Long-Term Control Plan, MWRA expects that DEP will reassess the feasibility of attaining Class B uses and may make long-term water quality standards determinations for these receiving waters.

The variances include conditions that MWRA and the CSO communities have complied with for these waters, including implementation of the Long-Term Control Plan, continued implementation of operation and maintenance measures that can minimize CSO discharges and impacts, dissemination of public information on CSO discharges and potential public health impacts, 24-hour public notification of a treated CSO discharge to the Charles River from the Cottage Farm CSO Facility, continuation of MWRA's water quality monitoring program, and annual reporting of rainfall events and estimates of CSO activations and discharge volumes at each outfall.

In 2014, MWRA continued to respond to the CSO-related requirements and conditions in its NPDES Permit and in the CSO variances for the Alewife Brook/Upper Mystic River and the Lower Charles River Basin. Examples of MWRA's compliance responses to the permit and variance requirements include:

- By April 15th each year, in compliance with the Alewife Brook/Upper Mystic River variance, MWRA and the cities of Cambridge and Somerville issue a joint CSO press release that is also distributed to watershed advocacy groups, local health agents, and the owners of property in the Alewife Brook flood plain. The press release includes updated information describing CSOs, potential health risks of exposure to CSO discharges, locations of CSO discharges, and the status of MWRA's CSO abatement program for the Alewife Brook.

- In compliance with the Alewife Brook/Upper Mystic River CSO variance and the City of Cambridge NPDES permit, Cambridge publicly issues a notice of CSO discharge to the Alewife Brook within 24 hours of each discharge, as measured by a city meter at the most active outfall (CAM002).

- In compliance with the Lower Charles River Basin variance, MWRA issues notice of each CSO discharge at its Cottage Farm facility to local regulatory agencies, health agents, community rowing and boat houses within 24 hours of the start of discharge. While MWRA has reduced the average annual frequency of Cottage Farm facility discharges from approximately 22 times per year for 1997 sewer system conditions to 5 times per year in

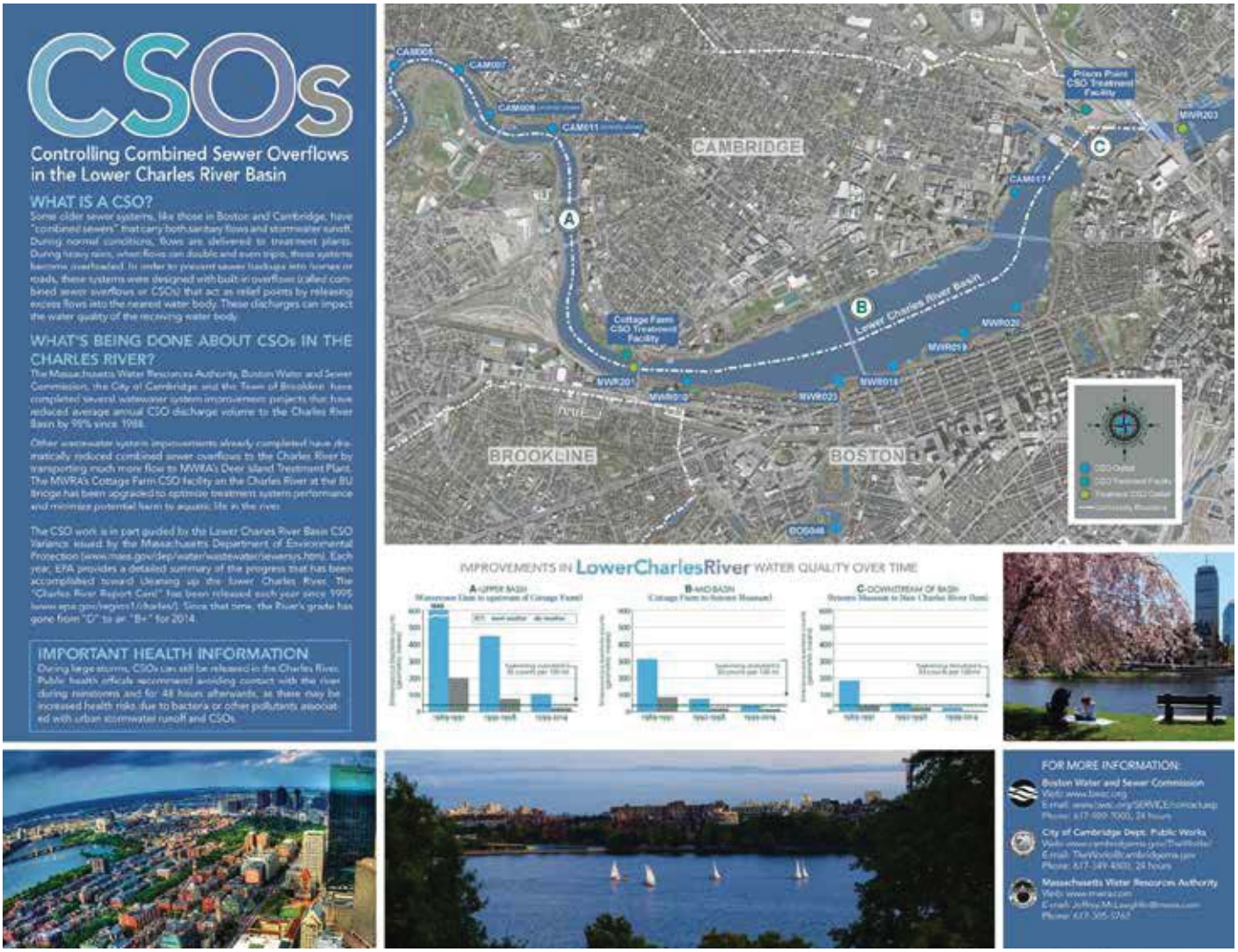
2014, Cottage Farm remains the most active CSO outfall on the Charles River and, therefore, an appropriate indicator of CSO discharges.

- For the Charles River, MWRA created a large-scale poster (Figure 22) that describes CSOs, potential health risks of exposure to CSO discharges, the locations of CSO discharges to the river, and the status of MWRA's CSO abatement program. The poster and an updated version were distributed to sailing and boat clubs, watershed advocacy groups and local health agents in 2010 and in early 2016.

- MWRA continued to conduct its harbor and river water quality sampling and testing program in all waters affected by CSO, collect water quality data throughout the year, and report the results to EPA and DEP.

- By April 30th each year, MWRA reports its estimates of CSO discharge at every active outfall for all storms in the previous calendar year (see "Annual Performance Tracking and CSO Discharge Reporting," on page 39).

Figure 22: Charles River CSO Poster



6. LONG-TERM CSO CONTROL PLAN PROJECTS

1. SOMERVILLE BAFFLE MANHOLE SEPARATION

Receiving Water:
Alewife Brook, Upper Mystic River

Completed:
1996

Capital Cost:
$400,000

Description:
City of Somerville separated common manholes connecting local sewer and storm drain systems. City of Somerville performed design and construction with MWRA financial assistance.

CSO Control

Water Quality Benefit:
Eliminated CSO discharges at three City of Somerville outfalls.

CSO Outfalls:
SOM001, SOM006, SOM007

Frequency of Discharge (typical year):
Before project: 2
With project: Eliminated

Annual Discharge Volume (typical year):
Before project: 0.04 million gallons
With project: Eliminated

CSO Reduction by Volume: 100%

2. CONSTITUTION BEACH SEWER SEPARATION

MWRA decommissioned its Constitution Beach CSO Facility after CSO flows were eliminated by BWSC sewer separation.

Receiving Water:
Boston Harbor/Constitution Beach

Completed:
2000

Capital Cost:
$3,731,000

Description:
BWSC installed 14,000 linear feet of storm drain to separate the combined sewer system, remove stormwater flows from area sewers, and eliminate CSO discharges to Constitution Beach, allowing MWRA to decommission the Constitution Beach CSO treatment facility.

CSO Control

Water Quality Benefit:
Eliminated CSO discharges to Constitution Beach to comply with Class SB water quality standards.

CSO Outfalls:
MWR207(BOS002)

Frequency of Discharge (typical year):
Before project: 16 (treated)
With project: Eliminated

Annual Discharge Volume (typical year):
Before project: 1.35 million gallons
With project: Eliminated

CSO Reduction by Volume: 100%

Long-Term CSO Control Plan Projects (continued)

3. HYDRAULIC RELIEF AT OUTFALL CAM005

Receiving Water:
Charles River Basin

Completed:
2000

Capital Cost:
$1,100,000

Description:
MWRA relieved the 40-foot long, 24-inch diameter dry weather connection between the CAM005 regulator and MWRA's North Charles Metropolitan Sewer with a 54-inch additional connection, on Mt. Auburn Street, Cambridge.

CSO Control

Water Quality Benefit:
Minimized CSO discharges to meet B(cso) water quality standards (>95% compliance with Class B).

CSO Outfalls:
CAM005

Frequency of Discharge (typical year):
Before project: 11
With project: 3

Annual Discharge Volume (typical year):
Before project: 3.8 million gallons
With project: 0.84 million gallons

CSO Reduction by Volume: 78%

4. HYDRAULIC RELIEF AT OUTFALL B0S017

Receiving Water:
BOS017: Mystic River/Chelsea Creek Confluence

Completed:
2000

Capital Cost:
$1,195,000

Description:
MWRA installed 190 feet of 36-inch diameter pipe in Sullivan Square, Charlestown, to divert two local (BWSC) combined sewers to a direct connection with MWRA's Cambridge Branch Sewer. In addition, eliminated a 10-foot long restriction between the Charlestown and Cambridge Branch Sewers.

CSO Control

Water Quality Benefit:
Minimized CSO discharges to meet SB(cso) water quality standards (>95% compliance with Class SB).

CSO Outfalls:
BOS017

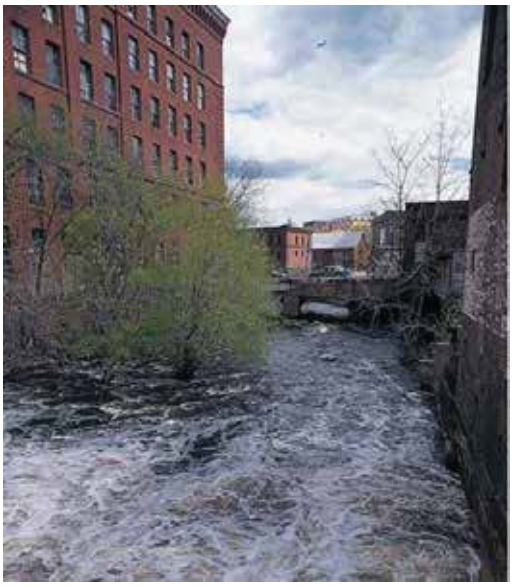
Frequency of Discharge (typical year):
Before project: 18
With project: 1

Annual Discharge Volume (typical year):
Before project: 2.5 million gallons
With project: 0.02 million gallons

CSO Reduction by Volume: 99%

Long-Term CSO Control Plan Projects (continued)

5. NEPONSET RIVER SEWER SEPARATION



Receiving Water:
Neponset River

Completed:
2000

Capital Cost:
$2,549,000

Description:
BWSC installed 8,000 linear feet of storm drain to separate the combined sewer system, remove stormwater flows from area sewers, and close CSO regulators, eliminating CSO discharges at the two remaining CSO outfalls to the Neponset River.

CSO Control

Water Quality Benefit:
Eliminated CSO discharges to Neponset River to comply with Class B water quality standards and protect South Dorchester Bay beaches (Tenean Beach).

CSO Outfalls:
BOS093, BOS095

Frequency of Discharge (typical year):
Before project: 17
With project: Eliminated

Annual Discharge Volume (typical year):
Before project: 5.8 million gallons
With project: Eliminated

CSO Reduction by Volume: 100%

6. CHELSEA TRUNK SEWER REPLACEMENT
7. CHELSEA BRANCH SEWER RELIEF
8. CHE008 OUTFALL REPAIRS

Receiving Water:
Mystic River/Chelsea Creek Confluence
Chelsea Creek

Completed:
2000-2001

Capital Cost:
$29,779,000

Description:
MWRA replaced 18-inch diameter city-owned trunk sewer with 30-inch pipe, relieved MWRA's Chelsea Branch and Revere Extension Sewers with 48-inch to 66-inch diameter pipe, and rehabilitated Outfall CHE008. Installed underflow baffles for floatables control at all outfalls.

CSO Control

Water Quality Benefit:
Minimized CSO discharges to meet Class SB(cso) water quality standards (>95% compliance with Class SB).

CSO Outfalls:
CHE002, CHE003, CHE004, CHE008

Frequency of Discharge (typical year):
Before project: 8
With project: 4

Annual Discharge Volume (typical year):
Before project: 9.0 million gallons
With project: 0.6 million gallons

CSO Reduction by Volume: 93%

Long-Term CSO Control Plan Projects (continued)

9. UPGRADE COTTAGE FARM CSO FACILITY
10. UPGRADE PRISON POINT CSO FACILITY
11. UPGRADE SOMERVILLE MARGINAL CSO FACILITY
12. UPGRADE FOX POINT CSO FACILITY
13. UPGRADE COMMERCIAL POINT CSO FACILITY

Receiving Water:
Charles River Basin
Upper Inner Harbor
Upper Mystic River
Mystic River/Chelsea Creek Confluence
South Dorchester Bay

Completed:
2001

Capital Cost:
$22,385,000

Description:
MWRA upgraded chlorine disinfection systems, added dechlorination systems, process control and safety improvements.

CSO Control

Water Quality Benefit:
Upgrade treatment to meet water quality standards criteria, including residual chlorine limits.

CSO Outfalls:
MWR201 (Cottage Farm Facility)
MWR203 (Prison Point Facility)
MWR205, MWR205A(SOM007A) (Somerville Marginal Facility)
MWR209(BOS088/BOS089) (Fox Point Facility)
MWR211(BOS090) (Commercial Point Facility)

These projects improved treatment performance, with no effect on discharge frequency or volume.

14. PLEASURE BAY STORM DRAIN IMPROVEMENTS

Receiving Water:
North Dorchester Bay

Completed:
2006

Capital Cost:
$3,195,000

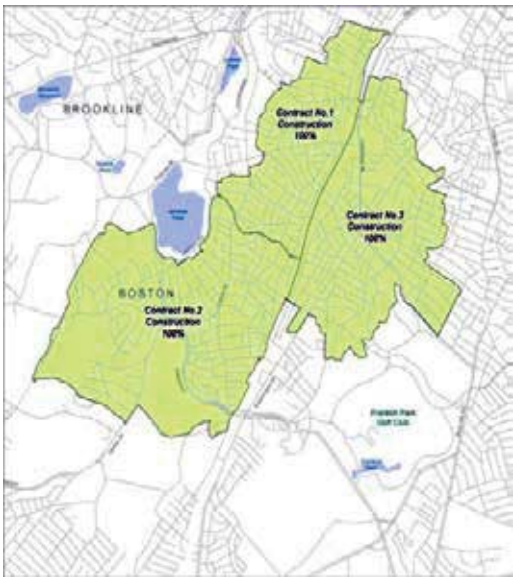
Description (cont):
MWRA constructed a new storm drain system to relocate stormwater discharge from Pleasure Bay to the Reserved Channel.

CSO Control

Water Quality Benefit:
Eliminated storm water discharges to Pleasure Bay Beach.

Long-Term CSO Control Plan Projects (continued)

15. STONY BROOK SEWER SEPARATION



Receiving Water:
Charles River Basin

Completed:
2006

Capital Cost:
$44,246,000

Description:
BWSC installed a total of 107,175 linear feet of storm drain and sanitary sewer to remove stormwater from local sewers serving a 609-acre area in Jamaica Plain, Mission Hill and Roxbury, and disconnected an already-separated storm drain system serving an adjacent 548-acre area from the sewer system.

CSO Control

Water Quality Benefit:
Minimizes CSO discharges to meet B(cso) water quality standards (>95% compliance with Class B).

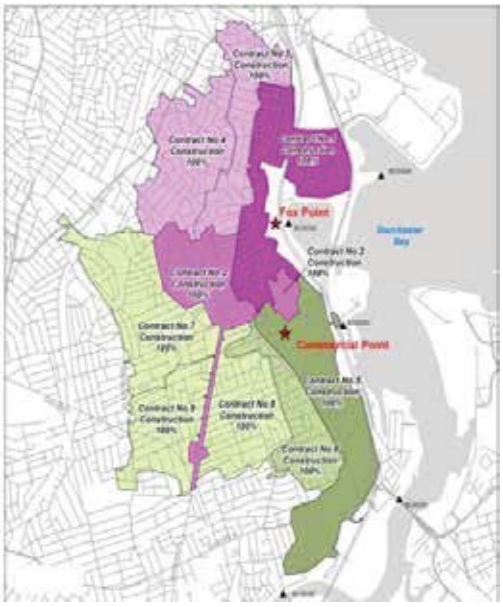
CSO Outfalls:
MWR023 (Stony Brook Conduit)

Frequency of Discharge (typical year):
Before project: 22
With project: 2

Annual Discharge Volume (typical year):
Before project: 44.5 million gallons
With project: 0.13 million gallons

CSO Reduction by Volume: 99.7%

16. SOUTH DORCHESTER BAY SEWER SEPARATION



Receiving Water:
South Dorchester Bay

Completed:
2007

Capital Cost:
$118,800,000

Description:
BWSC installed a total of 150,000 linear feet of storm drain and sanitary sewer to remove stormwater from local sewers serving a 1,750-acre area in Dorchester. Closed all CSO regulators, allowing MWRA to decommission its Fox Point and Commercial Point CSO facilities.

CSO Control

Water Quality Benefit:
Eliminated CSO discharges to Savin Hill, Malibu and Tenean beaches, in compliance with Class SB water quality standards.

CSO Outfalls:
MWR209 (BOS088/BOS089)
MWR211 (BOS090)

Frequency of Discharge (typical year):
Before project: 20 (treated)
With project: Eliminated

Annual Discharge Volume (typical year):
Before project: 30 million gallons
With project: Eliminated

CSO Reduction by Volume: 100%

Long-Term CSO Control Plan Projects (continued)

17. FORT POINT CHANNEL SEWER SEPARATION

Receiving Water:
Fort Point Channel

Completed:
2007

Capital Cost:
$11,917,000

Description:
BWSC installed 4,260 feet of storm drain and 4,300 feet of sanitary sewer to remove stormwater from local sewers serving 55 acres in the Fort Point Channel area. Raised overflow weirs at outfalls BOS072 and BOS073. Replaced tide gates and installed underflow baffles for floatables control at both outfalls.

CSO Control

Water Quality Benefit:
Minimizes CSO discharges to meet Class SB(cso) water quality standards (>95% compliance with Class SB).

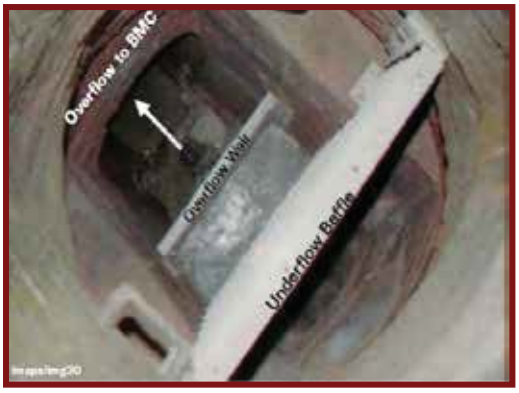
CSO Outfalls:
BOS072, BOS073

Frequency of Discharge (typical year):
Before project: 9
With project: 0

Annual Discharge Volume (typical year):
Before project: 3.0 million gallons
With project: 0.0

CSO Reduction by Volume: 100%

18. REGIONWIDE FLOATABLES CONTROL
19. MWRA FLOATABLES CONTROL AND OUTFALL CLOSING PROJECTS



Receiving Water:
Region-wide

Completed:
2007

Capital Cost:
$1,216,000

Description:
MWRA and the CSO communities installed underflow baffles for floatables control and closed several regulators and outfalls.

CSO Control

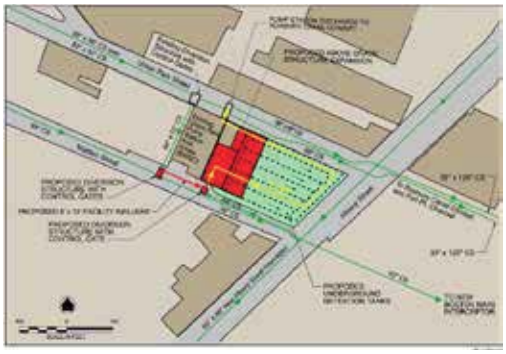
Water Quality Benefit:
Complies with EPA Policy Nine Minimum Controls requirement to control solid and floatable material. Eliminated CSO discharges at certain outfalls.

CSO Outfalls:
Various outfalls system-wide.

CSO Control:
The floatables controls do not affect CSO discharge frequency or volume.

Long-Term CSO Control Plan Projects (continued)

20. UNION PARK DETENTION/TREATMENT FACILITY



Receiving Water:
Fort Point Channel

Completed:
2007

Capital Cost:
$49,583,000

Description:
MWRA added a CSO treatment facility to the existing BWSC Union Park Pumping Station, including fine screens, chlorine disinfection, dechlorination, and two million gallons of detention storage.

CSO Control

Water Quality Benefit:
Provides treatment of Union Park pumping station discharges to Fort Point Channel to meet Class SB water quality criteria, including residual chlorine limits, and lowers discharge frequency and volume with on-site detention basins.

CSO Outfall:
BOS 070

Frequency of Discharge (typical year):
Before project: 25 (untreated)
With project: 17 (treated)

Annual Discharge Volume (typical year):
Before project: 132.0 million gallons
With project: 71.4 million gallons/year

CSO Reduction by Volume: 46%

21. BOS019 CSO STORAGE CONDUIT

Receiving Water:
Upper Inner Harbor (Little Mystic Channel)

Completed:
2007

Capital Cost:
$14,288,000

Description:
MWRA installed twin-barrel 10'x17' box conduit to provide 670,000 gallons of off-line storage, between Chelsea St. and the Mystic Tobin Bridge, Charlestown. Included above-ground dewatering pump station.

CSO Control

Water Quality Benefit:
Minimizes CSO discharges to meet Class SB(cso) water quality standards (>95% compliance with Class SB).

CSO Outfall:
BOS019

Frequency of Discharge (typical year):
Before project: 13
With project: 2

Annual Discharge Volume (typical year):
Before project: 4.4 million gallons
With project: 0.6 million gallons

CSO Reduction by Volume: 86%

Long-Term CSO Control Plan Projects (continued)

22. PRISON POINT CSO FACILITY OPTIMIZATION

Receiving Water:
Upper Inner Harbor

Completed:
2008

Capital Cost:
$50,000

Description:
MWRA minimized treated CSO discharges to the Inner Harbor by optimizing the operation of existing facility gates and pumps to maximize in-system storage and convey more flow to Deer Island.

CSO Control

Water Quality Benefit:
Reduces treated CSO discharges to Upper Inner Harbor.

CSO Outfall:
MWR203 (Prison Point Facility)

Frequency of Discharge (typical year):
Before project: 25 (treated)
With project: 19 (treated)

Annual Discharge Volume (typical year):
Before project: 370.2 million gallons
With project: 283.8 million gallons

CSO Reduction by Volume: 23%

23. COTTAGE FARM BROOKLINE CONNECTION AND INFLOW CONTROLS

Receiving Water:
Charles River Basin

Completed:
2009

Capital Cost:
$3,000,000

Description:
MWRA optimized the combined conveyance capacity of the two MWRA sewers that carry flows across the Charles River by interconnecting overflow chambers outside the Cottage Farm CSO facility, and MWRA supplemented this conveyance capacity by bringing into service a parallel, previously unutilized 54-inch diameter sewer (the "Brookline Connection").

CSO Control

Water Quality Benefit:
Minimizes treated CSO discharges from the Cottage Farm CSO Facility to the Lower Charles River Basin.

CSO Outfall:
MWR201 (Cottage Farm Facility)

Frequency of discharges (typical year):
Before project: 7 (treated)
With project: 7 (treated)

Annual Discharge Volume (typical year):
Before project: 44.5 million gallons
With project: 24.0 million gallons

CSO Reduction by Volume: 46%

Long-Term CSO Control Plan Projects (continued)

24. MORRISSEY BOULEVARD STORM DRAIN

Receiving Water:
North Dorchester Bay

Completed:
2009

Capital Cost:
$32,339,000

Description:
BWSC installed 2,800 linear feet of 12-foot by 12-foot and 8-foot by 8-foot box conduit for stormwater conveyance, with gated connection to North Dorchester Bay CSO Storage Tunnel at upstream end, new outfall to Savin Hill Cove, and pollution prevention measures.

CSO Control

Water Quality Benefit:
Maximizes the level of stormwater control provided by the CSO Storage Tunnel along the South Boston beaches by redirecting stormwater to Savin Hill Cove in large storms.

25. EAST BOSTON BRANCH SEWER RELIEF

Receiving Water:
Boston Harbor and Chelsea Creek

Completed:
2010

Capital Cost:
$85,637,000

Description:
MWRA upgraded its 115-year-old interceptor system serving most of East Boston, using a combination of construction methods: micro-tunneling, pipe-bursting, open-cut excavation and pipe relining.

CSO Control

Water Quality Benefit:
Minimizes CSO discharges to meet Class SB(cso) water quality standards (>95% compliance with Class SB).

CSO Outfalls:
BOS003, BOS004, BOS005, BOS009, BOS010, BOS012, BOS013, BOS014 (BOS006 and BOS007 closed by BWSC)

Frequency of discharges (typical year):
Before project: 31
With project: 6

Annual Discharge Volume (typical year):
Before project: 41.0 million gallons
With project: 8.6 million gallons

CSO Reduction by Volume: 79%

Long-Term CSO Control Plan Projects (continued)

26. BULFINCH TRIANGLE SEWER SEPARATION

Receiving Water:
Boston Inner Harbor and Charles River Basin

Completed:
2010

Capital Cost:
$9,054,000

Description:
BWSC installed a total of 5,290 feet of storm drain and sanitary sewer to remove stormwater from local sewers in a 14-acre area of Bulfinch Triangle/North Station, allowing already-separated storm drains serving an additional 47-acre area of Government Center to be removed from the sewer system, as well. Closed Outfall BOS049 to CSO discharges.

CSO Control

Water Quality Benefit:
Eliminated CSO discharges at Outfall BOS049 to Lower Charles River Basin. Contribute to treated CSO reduction at the Prison Point CSO Facility.

CSO Outfalls:
BOS049

Frequency of discharges (typical year):
Before project: Larger storms only
With project: Eliminated

Annual Discharge Volume (typical year):
Before project: Larger storms only
With project: Eliminated

CSO Reduction by Volume: N/A

27. INTERCEPTOR CONNECTION RELIEF AND FLOATABLES CONTROL AT CAM002 AND CAM401B AND FLOATABLES CONTROL AT CAM001

CAM 002A & B inlet structure-baffle is visible in front of CAM 002A outlet with a steel plate (temporary condition) bolted on the left hand wall on the CAM 002B outlet.

Receiving Water:
Alewife Brook

Completed:
2010

Capital Cost:
$2,904,569

Description:
City of Cambridge upgraded the hydraulic capacities of its connections to MWRA interceptors and installed underflow baffles for floatables control.

CSO Control

Water Quality Benefit:
Together with other Alewife Brook CSO projects, minimizes CSO discharges and their impacts to meet Class B "fishable/ swimmable" criteria >95% of the time.

CSO Outfalls:
CAM002, CAM401B, CAM001

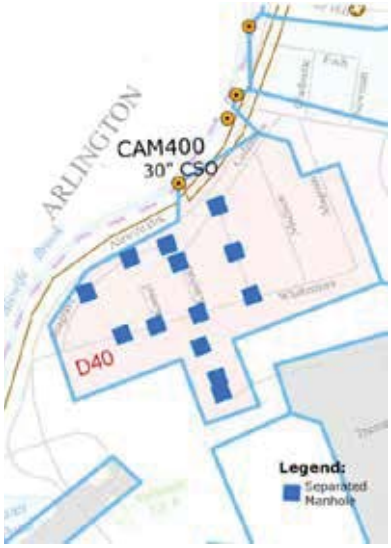
Frequency of Discharge (typical year)
Before projects: 25
After projects: 7

Annual Discharge Volume (typical year)
Before projects: 12.1 million gallon
After projects: 3.2 million gallons

CSO Reduction by Volume: 74%

Long-Term CSO Control Plan Projects (continued)

28. CAM400 COMMON MANHOLE SEPARATION



Receiving Water:
Alewife Brook

Completed:
March 2011

Capital Cost:
$4,776,000

Description:
City of Cambridge replaced common storm drain and sewer manholes with separate manholes and associated piping in the local, mostly residential streets bounded by Alewife Brook Parkway, Massachusetts Avenue, Magoun Street and Whittemore Avenue, as well as a portion of the WR Grace property off Whittemore Avenue. Closed Outfall CAM400 to CSO discharges.

CSO Control

Water Quality Benefit:
Together with other Alewife Brook CSO projects, minimizes CSO discharges and their impacts to meet Class B "fishable/ swimmable" criteria >95% of the time. Eliminated CSO discharges to Alewife Brook at Outfall CAM400.

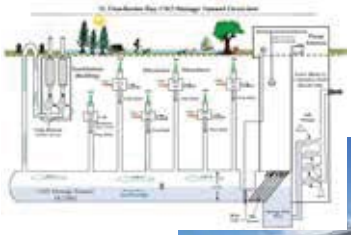
CSO Outfalls:
CAM400

Frequency of Discharge (typical year)
Before project: 10
After project: Eliminated

Annual Discharge Volume (typical year)
Before projects: 0.8 million gallon
After projects: Eliminated

CSO Reduction by Volume: 100%

29. NORTH DORCHESTER BAY STORAGE TUNNEL & RELATED FACILITIES



Receiving Water:
North Dorchester Bay

Capital Cost:
$228,405,000
(including Massport land agreement; not including the cost of Morrissey Boulevard storm drain (Project 24))

Completed: May 2011

Description:
MWRA constructed a 10,832-ft., 17-ft. diameter soft-ground tunnel, drop shafts and CSO and stormwater diversion structures along outfalls BOS081-BOS087; 15-mgd tunnel dewatering pump station at Massport's Conley Terminal; 24-inch force main; and below-ground tunnel ventilation and odor control facility at the upstream end of the tunnel. Eliminated outfalls BOS083 and BOS087.

CSO Control

Water Quality Benefit:
Eliminated CSO and separate stormwater discharges up to the 25-year storm and 5-year storm, respectively.

CSO Outfalls:
BOS081 BOS083 BOS085 BOS087
BOS082 BOS084 BOS086

Frequency of Discharge (typical year)
CSO: Before project: 17
After project: 0
Stormwater: Before project: 93
After project: 0

Annual Discharge Volume (typical year)
CSO:
Before project: 8.6 million gallons
After project: 0
Stormwater:
Before project: 144 million gallons
After project: 0

CSO Reduction by Volume: 100%
Stormwater Reduction by Volume: 100%

Long-Term CSO Control Plan Projects (continued)

30. Brookline Sewer Separation

Receiving Water:
Charles River Basin

Capital Cost:
$24,715,000

Completed: April 2013

Description:
Town of Brookline installed 9,448 linear feet of new storm drain and 5,840 linear feet of new sewer to separate the combined sewer systems serving a 72-acre area of the town to remove stormwater from the sewer system and reduce CSO discharges to the Charles River Basin.

MWRA rehabilitated its CSO outfall MWR010 in part to accommodate the stormwater flows.

CSO Control

Water Quality Benefit:
Supports the attainment of long term CSO control level at the Cottage Farm CSO facility. Reduces CSO discharges at Outfall MWR010, which activates in extreme storms, only.

CSO Outfalls:
MWR010
MWR201 (Cottage Farm Facility)

Frequency of Discharge (typical year):
Cottage Farm Facility (treated)
Before project: 7
With project: 5

Annual Discharge Volume (typical year):
Cottage Farm Facility (treated)
Before project: 27.2 million gallons
With project: 18.7 million gallons

CSO Reduction by Volume: 31%

31. CAM004 Stormwater Outfall and Wetland Basin


Rendering of Stormwater Wetland at Alewife Brook, Cambridge

Receiving Water:
Alewife Brook

Capital Cost:
$13,825,000

Completed: April 2013

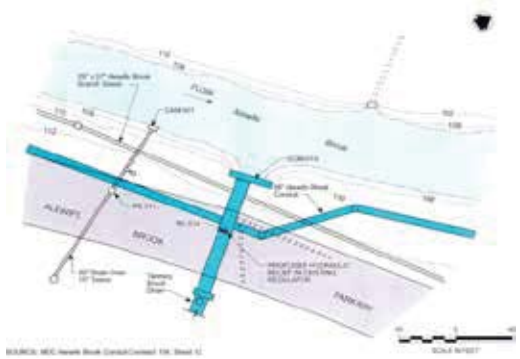
Description:
Cambridge constructed a new 4-foot by 8-foot box culvert storm drain to convey the separated stormwater to a new 3.4 acre wetland in the Alewife Brook Reservation. The wetland will provide 10.3 acre-feet of detention storage of stormwater flows and the attenuation of stormwater flow rate to the Little River and Alewife Brook.

CSO Control

Water Quality Benefit:
Supports the CSO benefits of CAM004 Sewer Separation by mitigating the potential impacts of the separated stormwater on the high water levels and water quality of the Little River and Alewife Brook.

Long-Term CSO Control Plan Projects (continued)

32. SOM01A Interceptor Connection Relief/Floatables Controls



Receiving Water:
Alewife Brook

Capital Cost:
$0.8 M

Completed: December 2013

Description:
MWRA upgraded the size of the local sewer connection between City of Somerville's Tannery Brook Conduit and MWRA's interceptor system and installed an underflow baffle to control the discharge of floatable materials.

CSO Control

Water Quality Benefit:
Together with other Alewife Brook CSO projects, minimizes CSO discharges and their impacts to meet Class B "fishable/ swimmable" criteria >95% of the time.

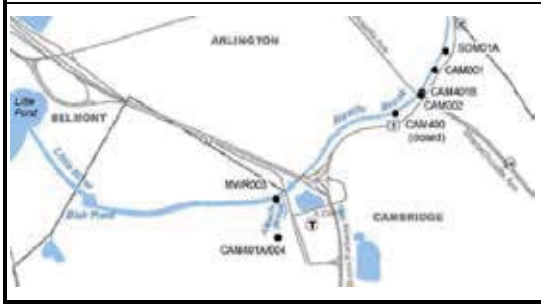
CSO Outfalls:
SOM01A

Frequency of Discharge (typical year):
Before projects: 10
With projects: Eliminated

Annual Discharge Volume (typical year):
Before projects: 9.9 million gallons
With projects: 1.3 million gallons

CSO Reduction by Volume: 87%

33. Control Gate and Floatables Control at Outfall MWR003 and MWRA Rindge Ave. Siphon Relief



Receiving Water:
Alewife Brook

Capital Cost:
$3,763,000

Completed:
October 2015

Description:
MWRA replaced the original static overflow weir with an automated weir gate; replaced the 30-inch diameter Rindge Avenue Sewer overflow siphon with a 48-inch diameter siphon; and installed an underflow baffle for floatables control. The project improves the balance of flows in MWRA's twin interceptors and provides greater system relief in large storms, in part to compensate for the closing of Outfall CAM004.

CSO Control

Water Quality Benefit:
Together with other Alewife Brook CSO projects, minimizes CSO discharges and their impacts to meet Class B "fishable/ swimmable" criteria >95% of the time.

CSO Outfalls:
MWR003 and CAM004

Frequency of Discharge (typical year)
MWR003 before projects: 1
MWR003 with projects: 5
CAM004 before projects: 63
CAM004 with projects: Eliminated

Annual Discharge Volume (typical year)

Outfall MWR003
Before projects: 0.1 million gallons
With projects: 1.0 million gallons

Outfall CAM004
Before projects: 24.1 million gallons
With projects: Eliminated

Long-Term CSO Control Plan Projects (continued)

34. Reserved Channel Sewer Separation

Receiving Water:
Reserved Channel

Capital Cost:
$70,559,000

Completed:
December 2015

Description:
BWSC installed 81,200 linear feet of new sewer and storm drain to separate the combined sewer systems serving a 365-acre area of South Boston tributary to four CSO outfalls along the Reserved Channel.

CSO Control

Water Quality Benefit:
Minimizes CSO discharges to meet Class SB(cso) water quality standards (>95% compliance with Class SB).

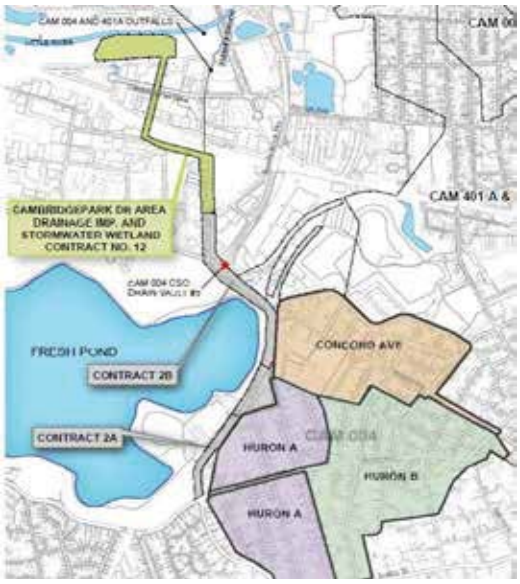
CSO Outfalls:
BOS076, BOS078, BOS079, BOS080

Frequency of Discharge (typical year)
Before project: 37
With project: 3

Annual Discharge Volume (typical year)
Before project: 28 million gallons
With project: 1.5 million gallons

CSO Reduction by Volume: 95%

35. CAM004 Sewer Separation



Receiving Water:
Alewife Brook

Capital Cost:
$100,000,000 (Cambridge and MWRA)
$54,000,000 (MWRA share)

Completed:
December 2015

Description:
Cambridge installed 55,300 linear feet of new or rehabilitated sewer and storm drain to separate the combined sewers serving a 211-acre area of Cambridge east of Fresh Pond Parkway. With the project, the City of Cambridge permanently closed Outfall CAM004.

CSO Control

Water Quality Benefit:
Together with other Alewife Brook CSO projects, minimizes CSO discharges and their impacts to meet Class B "fishable/ swimmable" criteria >95% of the time.

CSO Outfall:
CAM004

Frequency of Discharge (typical year)
Before project: 10
With project: 0

Annual Discharge Volume (typical year)
Before project 4.6 million gallons
With project: 0.0 million gallons

CSO Reduction by Volume: 100%

The End