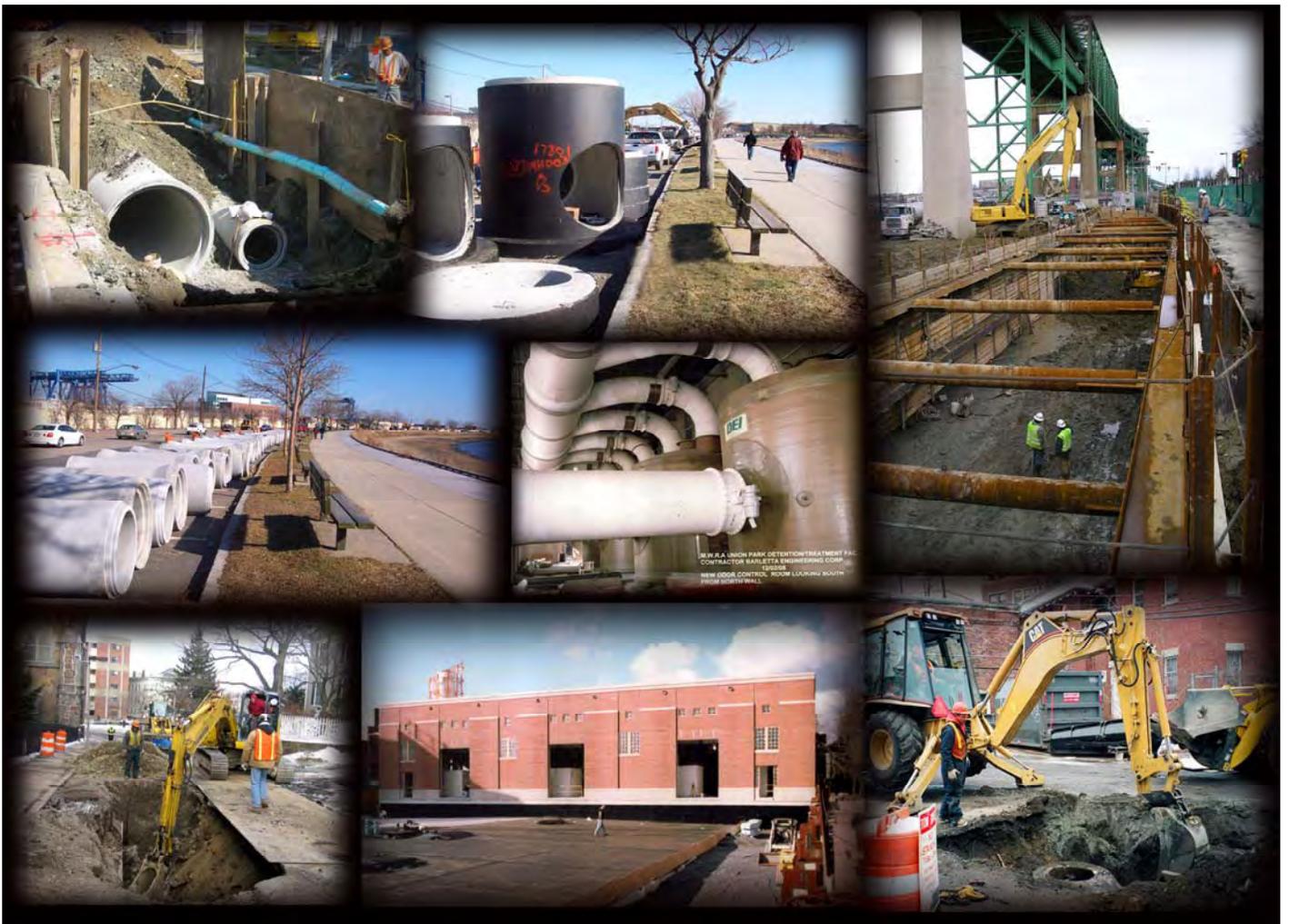


# Massachusetts Water Resources Authority



## Combined Sewer Overflow Control Plan



## Annual Progress Report 2005

March 2006



South Dorchester Bay Sewer Separation  
Roseland Street (Contract 8)  
72" drain & 30" sewer installation,  
while supporting an NSTAR  
electric duct bank, PVC pipe



Pleasure Bay  
Storm Drain Improvements  
looking toward Castle Island



Pleasure Bay Storm Drain Improvements  
looking toward Castle Island



Union Park  
Detention/Treatment Facility  
New Odor Control Room



Trench for BOS019 CSO  
Storage Conduit  
Looking toward  
Little Mystic Channel



South Dorchester Bay  
Sewer Separation  
Percival Street  
15-inch PVC  
drain installation



Union Park Detention/Treatment Facility  
Rear: new treatment building

Foreground: waterproofing slab above  
detention basins and effluent channel



South Dorchester Bay  
Sewer Separation  
off Columbus Ave  
@ Dimock Health Center  
Contract 3

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## **1. Introduction**

The Massachusetts Water Resources Authority (MWRA) files this CSO Annual Report for 2005 in accordance with the Federal District Court Order in the Boston Harbor Case. Annual and quarterly CSO reports are required by the Court and describe the progress of work to complete MWRA's long-term CSO control plan relative to milestones in the Court-ordered schedule. This annual report reviews planning, design and construction progress and accomplishments in 2005 and in the quarterly period from December 16, 2005 to March 15, 2006. Like previous annual reports, it also discusses issues that may affect MWRA's ability to complete the CSO projects on schedule.

MWRA's long-term CSO control plan was recommended in the Final CSO Facilities Plan and Environmental Impact Report (the "1997 Facilities Plan/EIR"), which MWRA filed with federal and state regulatory agencies in August 1997. Together with plan modifications MWRA recommended in subsequent Notices of Project Change and Supplemental Environmental Impact Reports, the plan now comprises 26<sup>1</sup> 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 state Water Quality Standards. The projects and their locations are shown in Figure 1.

The 1997 Facilities Plan/EIR received state and federal regulatory approvals in late 1997 and early 1998, respectively, allowing MWRA to move the recommended projects into design and construction. Several changes to the plan and schedule after 1997 also were approved by the Department of Environmental Protection (DEP) and the U.S. Environmental Protection Agency (EPA) and accepted by the Federal Court as changes to the Court's order and schedule of milestones. Ongoing negotiations among MWRA, DEP, EPA, and the Department of Justice (DOJ) are expected to result in additional changes to the plans or schedules for Alewife Brook, the Charles River and East Boston.

Figure 2 summarizes the scope, schedule and benefits of the current plan. Design and construction milestones for all of the projects are mandated by the Federal District Court in the Boston Harbor Case (CA No. 85-0489-MA) and are set forth in Schedule Six.

## **2. Progress and Key Accomplishments in 2005**

The Annual Report identifies progress and accomplishments in CSO planning, design and construction during 2005. The report focuses attention in two areas that characterize most of the work conducted in 2005: 1) a high level of design and construction activity on the projects for which final scopes and schedules are set in the Federal Court Order, and 2) MWRA negotiations with EPA, DEP and DOJ toward agreement on the scope and revised schedule for completion of MWRA's obligations for CSO control under the Order. In addition to the progress in 2005, the report also includes quarterly progress for the period December 16, 2005 through March 15, 2006.

### ***Project Implementation and Court Schedule Compliance***

2005 was a watershed year for implementing CSO control projects for which final scope and schedule are already set in the Court Order. Progress on CSO design and construction in 2005 exceeded any previous year. MWRA spent \$52 million in 2005 alone, the highest annual spending for CSO control to date. Of this amount,

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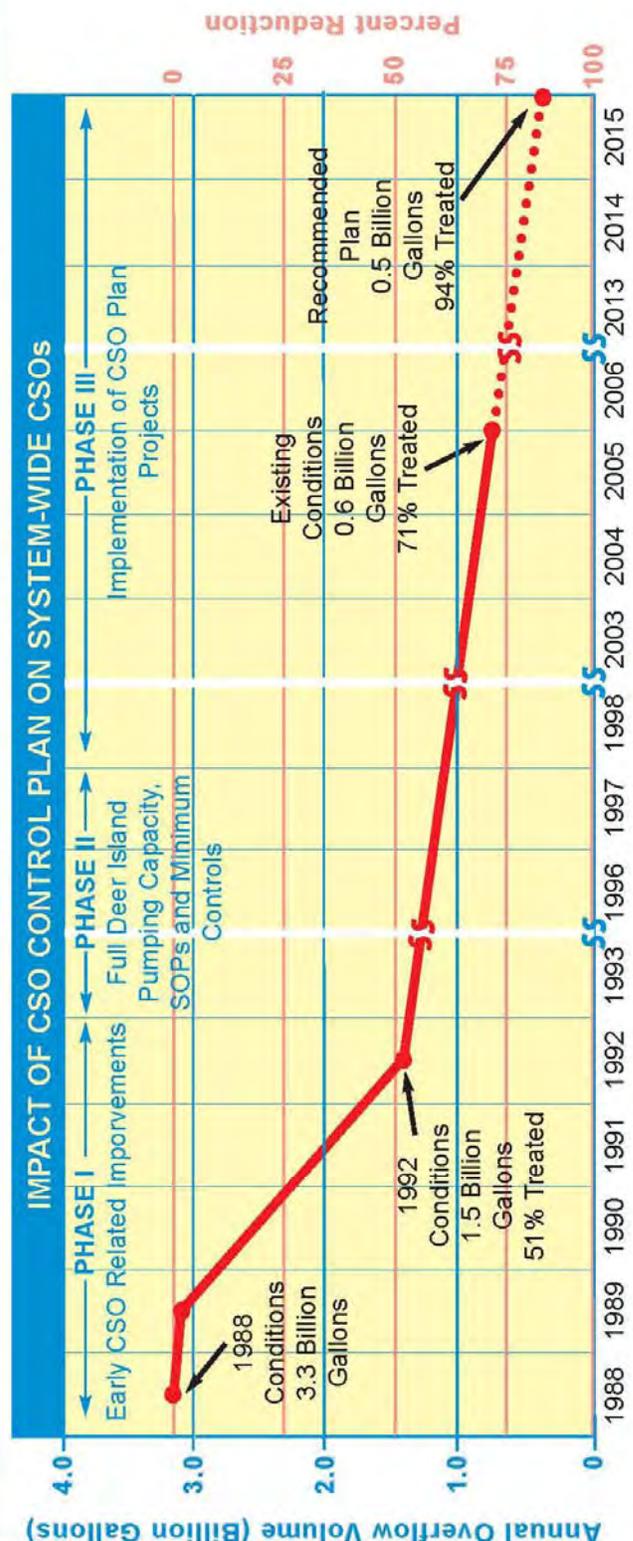
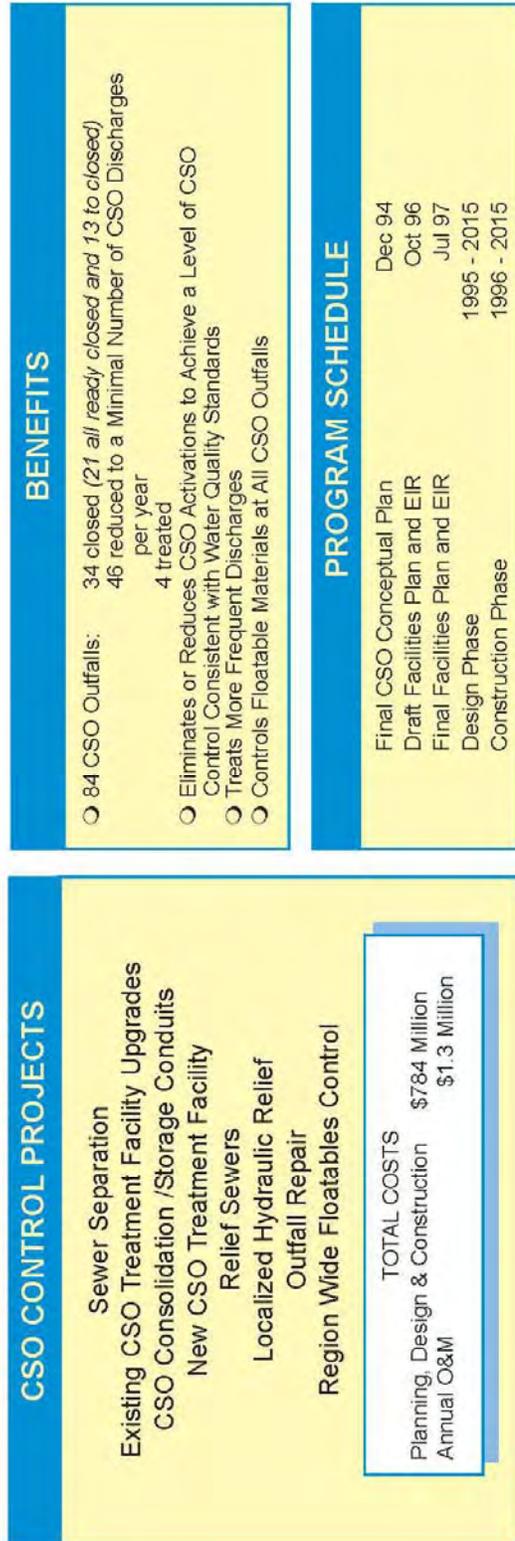
<sup>1</sup> The number of projects in the CSO plan has increased from 25 to 26, with the inclusion of the Pleasure Bay drainage improvements (part of North Dorchester Bay CSO control) into Schedule Six on June 30, 2005.

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FIGURE 1. MWRA RECOMMENDED CSO CONTROL PLAN AND STATUS OF IMPLEMENTATION

**FIGURE 2**  
**CSO Control**  
 Recommended Plan Benefits



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\$45 million was spent on construction of six projects: Union Park Detention/Treatment Facility, BOS019 Conduit, Pleasure Bay Drainage Improvements, and the South Dorchester Bay, Stony Brook and Fort Point Channel sewer separation projects.

- MWRA achieved 87% completion of the \$42 million construction contract for the Union Park Detention/Treatment Facility and expects to bring the new facility on line by the end of 2006. The underground, concrete detention basins and effluent channels and the new treatment building are complete. The contractor has installed coarse and fine screens, sluice gates, overflow weir gates, flushing gates, odor control vessels and fans, sample pumps, new boilers, air handling units, exhaust and supply fans and associated ductwork. The new electric service, including new transformer, switchgear, two motor control centers and a new emergency generator, is installed, tested and operational.
- MWRA commenced the \$10.5 million construction contract for the BOS019 CSO Storage Conduit in March 2005. By the end of the year, construction was about 25% complete and on-schedule to be substantially complete by March 2007, in compliance with Schedule Six. The contractor recently completed the deep, braced excavation next to the Tobin Bridge footings in Charlestown, and will soon commence installation of the 10-ft. by 17-ft. pre-cast concrete conduit sections.
- Construction activity by Boston Water and Sewer Commission (BWSC) on the South Dorchester Bay sewer separation project reached its highest level, with the installation of 22,135 feet (4.2 miles) of new storm drain in 2005. All of the major construction contracts are underway or completed. BWSC has installed more than 118,000 feet of new storm drain in Dorchester, 88% of the project work, and is ahead of the Court mandated progress requirement.
- Construction activity by BWSC on the Stony Brook sewer separation project continued at its highest level, with the installation of 12,000 linear feet (2.3 miles) of new storm drain in 2005. The last major construction contract is nearing completion. BWSC has installed more than 62,000 feet of new storm drain in Jamaica Plain, 87% of the project work, and is ahead of the Court mandated progress requirement. BWSC expects to complete the project by September 2006, in compliance with Schedule Six. It has begun to meter remaining overflows to the Stony Brook Conduit, which discharges to the Charles River, to verify that the goal of reducing average annual CSO flows by 99.7% from pre-project conditions is met.
- BWSC completed the initial construction project on the Fort Point Channel sewer separation project in July 2005 and commenced the remaining, larger construction contract in August. BWSC is on-schedule to complete construction of the project by the Schedule Six milestone of March 2007.
- In September 2005, MWRA commenced construction of the \$2.8 million Pleasure Bay Drainage Improvement project, marking the beginning of construction of MWRA's recommended plan for eliminating CSO discharges and minimizing stormwater discharges to the South Boston beaches. All of the new storm drainage is installed, and most of the existing stormwater outfalls to Pleasure Bay Beach have already been removed. The contractor expects to complete the project (paving and cleaning) by May, in advance of the 2006 swimming season.
- MWRA continued to make progress on final design of the North Dorchester Bay storage tunnel, receiving the 100% design submission in December. MWRA plans to advertise the estimated \$163 million tunnel contract in April 2006 and issue the notice to proceed in July.

- MWRA and BWSC executed an amendment to their CSO Memorandum of Understanding and Financial Assistance agreement adding the Morrissey Boulevard Storm Drain project, at an award amount of \$18,186,000. In June 2005, BWSC commenced design of the project in compliance with Schedule Six.

### ***Long-term Regulatory Approval and a Final Court Order and Schedule***

In 2005, MWRA continued its discussions with EPA, DEP and DOJ to secure long-term regulatory approval on a comprehensive plan and implementation schedule for CSO control. MWRA's key goals for these discussions included:

- removing CSO program scope risks and cost exposure that have existed since 1997, particularly with respect to the CSO control plans for the Charles River and Alewife Brook,
- securing long-term approvals of MWRA's revised plans and proposed schedules for projects for which MWRA had conducted reassessments,
- bringing greater stability to MWRA's operations and financial planning, and
- moving forward with, and completing, CSO controls and associated water quality improvements with assurance of meeting regulatory and court obligations.

The Authority recently reached agreement with DEP, EPA, and DOJ on the appropriate level of CSO control and recommended plans for the Charles River, the Alewife Brook/Upper Mystic River, and East Boston, and on its overall long-term CSO control plan. A summary of the recommended plans for the Charles River, Alewife Brook/Upper Mystic River and East Boston are provided in *MWRA's August 2, 2005 Recommendations and Proposed Schedule for Long-Term CSO Control for the Charles River, Alewife Brook and East Boston.*<sup>2</sup> The Authority and the United States DOJ are filing a joint motion with the Court on March 15, 2006, seeking to modify the milestones in Schedule Six related to the recommended CSO control plans for Alewife Brook/Upper Mystic River and East Boston, and to add milestones related to the Charles River.

This comprehensive agreement will allow the Authority to continue to implement a CSO control plan that will remain at the forefront of CSO control nationally, dramatically improve water quality, and provide more certainty in managing its capital program and rate increases for a 15-year period. With this agreement, the estimated cost to complete the Authority's Long-Term CSO control plan is now \$855 million.

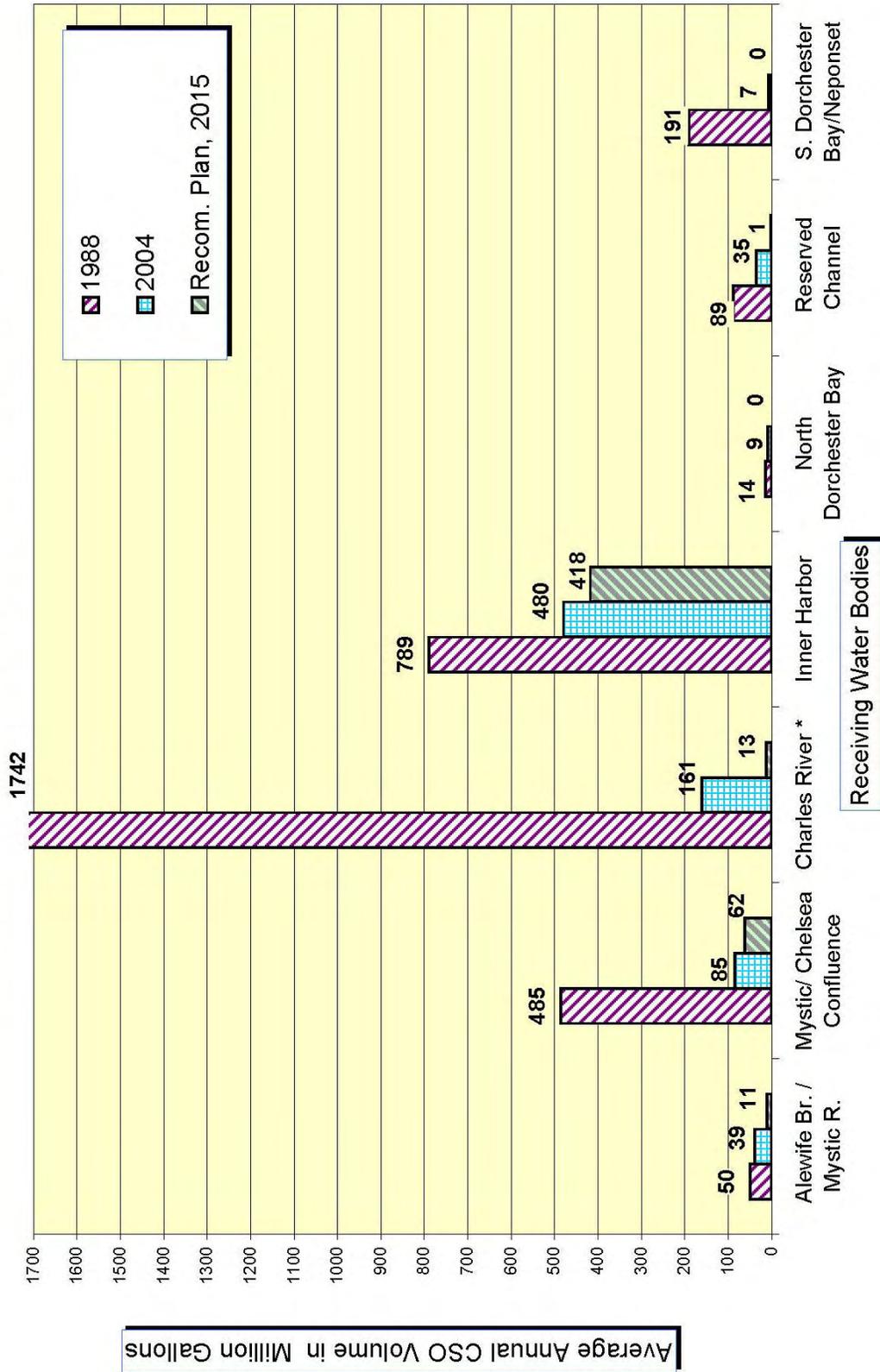
The final plan that MWRA has proposed incorporates into MWRA's 1997 plan several project changes that resulted from subsequent project and receiving water reassessments, including:

- The revised sewer separation plan for Alewife Brook, recommended in 2001.
- The Fort Point Channel sewer separation project, which MWRA recommended in 2003 to replace a tunnel storage plan for outfalls BOS072 and BOS073.
- The original plan for East Boston interceptor relief, confirmed by the project reassessment MWRA conducted in 2003.
- The revised recommended plan for the South Boston beaches recommended in 2004, including the storage tunnel and related facilities, the Pleasure Bay drainage improvements and the Morrissey Boulevard storm drain.
- The Reserved Channel sewer separation project, which MWRA recommended in 2004 to replace the earlier tunnel storage plan.

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<sup>2</sup> See Attachment "A" to the September 15, 2005 Compliance and Progress Report.

Figure 3. CSO Discharge Volumes are Diminishing



\*Includes discharges from outfall BOS046 to the Back Bay Fens

- Additional Charles River controls to further reduce treated discharges at the Cottage Farm CSO facility, including gate controls, interceptor system optimization measures and targeted sewer separation in Boston and Brookline.
- System optimization measures implemented by MWRA and BWSC in 2002 and 2003 to minimize CSO discharges to the Charles River at outfalls MWR018, MWR019, MWR020 and MWR010 and the Dorchester Brook Conduit (Fort Point Channel).

MWRA estimates that it will spend a total of \$855 million to implement the long-term plan, including planning, design and construction, on the revised schedule and with escalation to the mid-point of construction. The performance goals of this recommended plan are shown in Figure 3. Annual CSO discharge volume will be reduced from 3.3 billion gallons in 1988 to 0.5 billion gallons, and 94.5% of the remaining discharge volume will receive treatment at the CSO facilities located at Cottage Farm, Prison Point, Somerville Marginal and Union Park. The treatment facility at Constitution Beach was decommissioned in 2000, and the treatment facilities at Commercial Point and Fox Point will be decommissioned when the South Dorchester Bay sewer separation project is completed no later than November 2008.

### **3. Overall Progress and Benefits Achieved**

CSO spending in 2005 brought total MWRA capital expenditures on the CSO control plan to \$329 million, of the total \$756 million budget in the MWRA's Fiscal Year 2006 Capital Improvements Program (FY06 CIP). With the cooperation of its CSO communities, MWRA has completed 14 of the 26<sup>3</sup> CSO projects in the Court Order, and nine additional projects are now well into construction. CSO discharges to Constitution Beach and the Neponset River were eliminated several years ago with the completion of sewer separation projects in those areas.

Since 1987, when MWRA assumed responsibility for developing and implementing a regional CSO control plan in the Boston Harbor Case, improvements to MWRA's wastewater transport and treatment systems have produced huge reductions in CSO discharges with dramatic improvement in water quality in many areas (see Figure 3). The wastewater system improvements, which included the upgraded Deer Island Treatment Plant and associated pumping stations, as well as completed CSO projects, have reduced average annual volume of CSO discharge (in a typical rainfall year) from 3.3 billion gallons in 1988 to 0.8 billion gallons today, with 64% of the remaining overflow receiving treatment at MWRA's five CSO facilities.

CSO impacts to water quality have been greatly reduced. CSO discharges to South Boston beaches were cut almost in half with the improvements to pumping capacity at Deer Island from 1989 to 2000. For Boston Harbor, a decrease in wet-weather bacteria counts harbor-wide since the late 1980s (Figure 4) shows the cumulative effect of the Boston Harbor Project and CSO control projects.

#### ***Efforts to Track CSO Benefits***

In 2005, MWRA continued to perform hydraulic modeling and water quality sampling to measure improved sewer system performance, estimate remaining CSO discharges and their impacts, and track improvements in water quality conditions as CSO control projects are implemented. A considerable amount of hydraulic modeling and water quality sampling was conducted to comply with the requirements of MWRA's NPDES permit and the conditions of regulatory variances. The permit and variances require MWRA to estimate the

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<sup>3</sup> Including Pleasure Bay and Morrissey Boulevard storm drain projects, added to the Court Order in 2005.

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quantity of CSO discharge from active outfalls in every storm event occurring in the previous year.

<b>Completed Projects</b>		<b>CSO Project Implementation Status* – March 2006</b>	
<i>Hydraulic Relief at CAM005</i>			
<i>Hydraulic Relief at BOS017</i>			
<i>Chelsea Trunk Sewer Replacement</i>			
<i>Chelsea Branch Sewer Relief</i>			
<i>CHE008 Floatables Control and Outfall Repair</i>		<b>In Construction</b>	
<i>Cottage Farm CSO Facility Upgrade</i>	<i>Pleasure Bay Drainage Improvements (87% complete)</i>		
<i>Prison Point CSO Facility Upgrade</i>	<i>Union Park Treatment Facility (90% complete)</i>		
<i>Somerville Marginal CSO Facility Upgrade</i>	<i>Charlestown BOS019 Storage Conduit (33% complete)</i>		
<i>Commercial Point CSO Facility Upgrade</i>	<i>East Boston Branch Sewer Relief (10% complete by Contract 1)</i>		
<i>Fox Point CSO Facility Upgrade</i>	<i>South Dorchester Bay Sewer Separation (88% complete)</i>		
<i>MWRA Floatables/Outfall Closing Projects</i>	<i>Stony Brook Sewer Separation (87% complete)</i>		
<i>Neponset River Sewer Separation</i>	<i>Fort Point Channel Sewer Separation (10% complete)</i>	<b>In Design</b>	<b>In Design Procurement</b>
<i>Constitution Beach Sewer Separation</i>	<i>Cambridge/Alewife Brook Sewer Separation (25%)</i>	<i>North Dorchester Bay CSO Tunnel and Facilities</i>	<i>E. Boston Branch Sewer Relief (Contracts 2 and 3 only)</i>
<i>Somerville Baffle Manhole Separation</i>	<i>Regionwide Floatables Control (75% complete)</i>	<i>Morrissey Boulevard Storm Drain</i>	<i>Reserved Channel Sewer Separation</i>

\*The above figure does not include recently agreed upon Additional Charles River CSO control projects and Prison Point CSO Facility study.

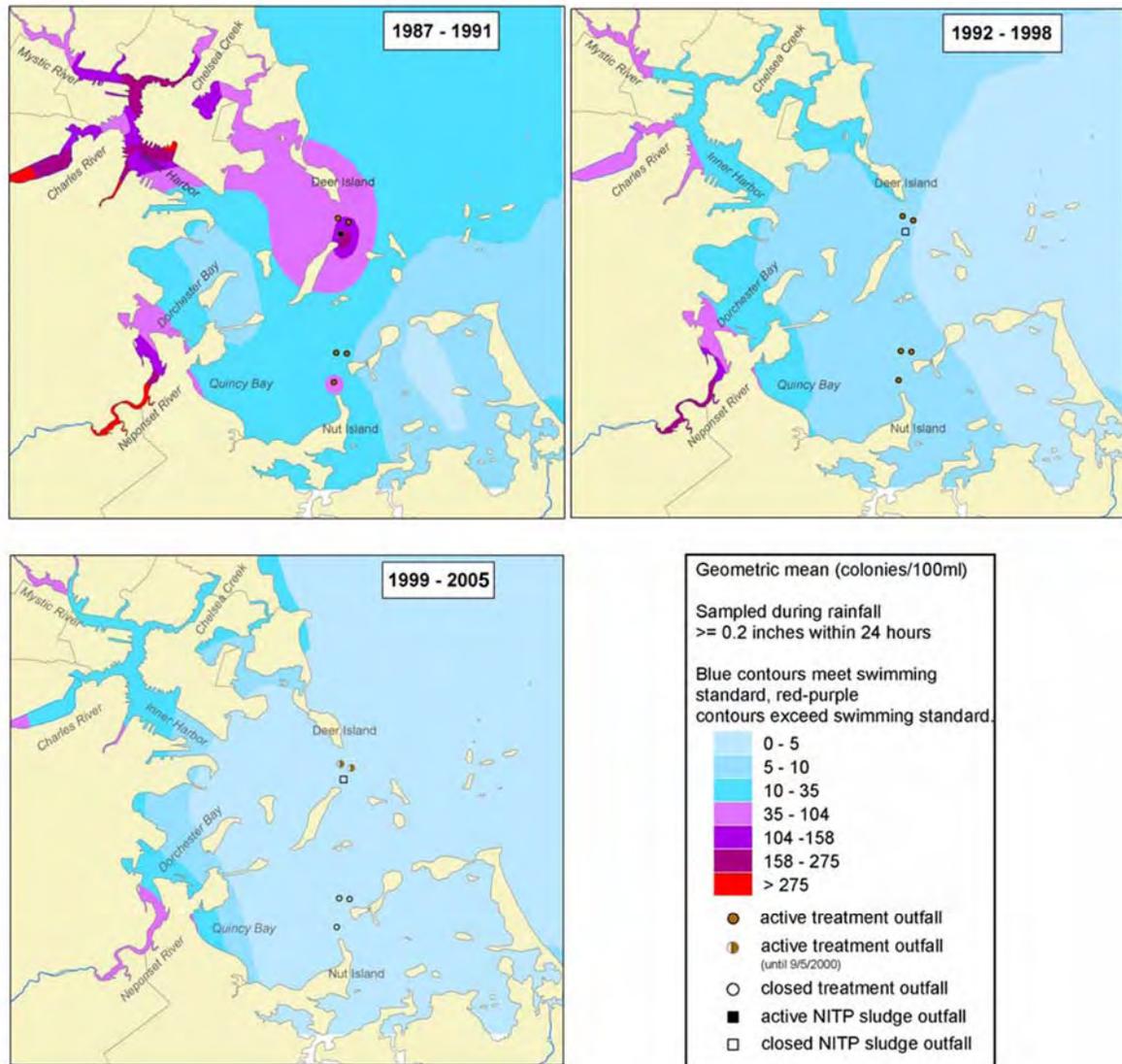
The efficacy of CSO controls is assessed by comparing discharges from year to year and relating them to what would be expected to occur in “typical year” rainfall conditions, which were the basis for the CSO control goals in the 1997 Facilities Plan/EIR. The modeling results over the last few years confirm that MWRA is on track toward achieving the predicted benefits of its CSO plan. MWRA has submitted reports to EPA and DEP presenting the modeling results for years 2001 through 2004, and plans to submit the report for 2005 in April 2006.

***Efforts to Safeguard Long-term Benefits***

Another important activity in MWRA’s CSO control program is the review of proposed projects involving changes to the MWRA or community sewer systems or land use development in the service area. Careful consideration must be given to the impacts of sewer system improvements and development projects to ensure that these projects will not compromise sewer system performance, the attainment of CSO control goals or the benefits of CSO control long into the future.

Through coordinated efforts with its CSO communities (Boston, Cambridge, Chelsea and Somerville) and with DEP, MWRA reviews large development plans (e.g. Environmental Notification Forms, Draft and Final Environmental Impact Reports) and worked with developers to ensure that project plans include mitigation of potential negative impacts to the sewer system. Development projects typically increase the amount of wastewater flow to the community and MWRA combined sewer systems, which could increase the burden on the systems during wet weather and exacerbate system flooding and overflows.

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**Figure 4 Changes in Boston Harbor Average *Enterococcus* Counts in Wet Weather**

Changes in wet weather bacterial water quality in Boston Harbor 1987 to 2003, monitoring data collected by MWRA's Central Lab and Environmental Quality monitoring program in Boston Harbor and tributary rivers, and from Metropolitan District Commission (now Department of Conservation and Recreation) beach monitoring. *Enterococcus* is the sewage indicator bacteria recommended by EPA for monitoring marine waters. Contours show the geometric means of *Enterococcus* data collected when more than 0.2 inches of rain had fallen in the previous 24 hours; blue areas meet the EPA standard and red-purple areas exceeded the standard.

- 1987-1991** shows data from before the Boston Harbor project and CSO plans began up through the last year that sludge was discharged (1991). In wet weather most of the Inner Harbor, the tributary rivers, and areas affected by discharges of sewage and sludge from the Deer Island Treatment Plant (DITP) and Nut Island Treatment Plant failed the standard, some with extremely high counts.
- 1992-1998** reflects impacts of CSO upgrades, the end of sludge discharges, full pumping at DITP, improved primary and beginning secondary treatment at DITP. Most of the harbor meets standards, except tributary rivers, Fort Point Channel, and along Wollaston Beach.
- 1999-2005** shows continued improvement due to closure of 22 CSO outfalls, upgrades of CSO facilities, ending of harbor treatment plant effluent discharges as the new outfall began operating, and local efforts to abate stormwater pollution.

Communities typically require development projects to remove on-site stormwater flows from the combined sewer system where possible, or to prevent any increase in stormwater flows that must continue to drain to a combined sewer. To offset the impacts of the additional sanitary flow that typically accompanies large-scale development, DEP, MWRA and the communities urge developers to remove, at an appropriate ratio (e.g. 2:1, 3:1 or 4:1), an amount of stormwater or infiltration (groundwater entering the pipes). The developer may accomplish this on the project site, by separating sewers and storm drains, the developer may perform work off-site to remove wet weather flows from a hydraulically related that were previously combined, or sewer system. The result in either case is no net increase in wet weather overflows, at a minimum, or a net reduction in wet weather flows and overflows.

#### **4. CSO Control Plan Cost and Spending**

##### ***Cost and Schedule Concerns***

With the approvals MWRA has secured from EPA and DEP on the updated long-term CSO control plan, and with the associated proposed changes to the court order, MWRA will have assurance that scope, schedule and cost exposure related to regulatory approval and compliance with water quality standards, especially for the Charles River variance, the Alewife/Upper Mystic River variance and recent project reassessments, has been removed for a 15-year period, to 2020. However, risk to cost and schedule continues to exist with respect to construction of the Alewife Brook CSO plan.

The Alewife Brook CSO Plan was revised by MWRA and Cambridge in 2001, based mostly on a Supplemental Preliminary Design Report (“SPDR”) that Cambridge had completed in 1998, along with a reassessment conducted by MWRA’s CSO planning consultant in 1999-2000. The revised plan received MEPA approval in 2003. Cambridge had already completed construction of portions of the plan. Since 2003, Cambridge has updated its SPDR to reflect additional plan changes that resulted from MEPA review and from new field information. Cambridge has also updated design and construction schedules and cost estimates. These updates were being done at the same time Cambridge was performing final design on key portions of the work, namely “Contract 12,” which involves the construction of a stormwater basin and new storm drain outfall in the Alewife Reservation to accommodate new stormwater flows that will be generated with the planned sewer separation.

In December 2004, MWRA received the updated preliminary design report from Cambridge. The total project cost of the Alewife sewer separation and Cambridge floatables control increased from \$74 million in the 2001 Notice of Project Change to \$93 million. While cost sharing between MWRA and Cambridge is still being negotiated, Cambridge has requested approximately \$20 million more in MWRA funding compared to the \$40.4 million in the FY06 CIP. MWRA staff continue to review the updated information and meet with Cambridge toward an understanding on the project plans, schedules, costs and cost sharing.

By the end of 2004, Cambridge nearly completed final design of Contract 12 (stormwater basin and outfall), and had planned to advertise the construction documents in July 2005. However, citizens’ appeals of the Wetlands Order of Conditions issued by the Cambridge Conservation Commission and the subsequent Superseding Order of Conditions issued by DEP have caused significant delay. The matter is scheduled to be resolved in administrative court proceedings in May and June, 2006. Without wetlands approval, the stormwater basin and outfall cannot be constructed, and without the basin and outfall, the rest of the Alewife plan is not feasible. Current project schedules proposed by MWRA and Cambridge assume a court decision favoring Cambridge and bringing final resolution by the summer of 2006. If this is not the case, all of the remaining elements of the Alewife Brook CSO plan will be further delayed.

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***MWRA's Capital Budget and Spending Projections for CSO Control***

The CSO program is the largest single capital spending commitment in MWRA's FY06 and Proposed FY07 Capital Improvement Programs. MWRA's FY06 and Proposed FY07 capital budgets include \$755.8 million and \$783.6 million, respectively, for the CSO Program, or approximately 22% of MWRA's total capital budget, including all water and wastewater projects.

MWRA has made difficult decisions to defer many non-CSO projects to meet its CSO control obligations under the Federal District Court Order and control the financial burdens on its ratepayers by limiting future increases in water and sewer rates. MWRA reduced its proposed spending on non-CSO projects during the next eight years by approximately \$570 million, by removing \$420 million for lower priority projects that had been included in the FY05 CIP and, by deferring \$150 million in high priority water and wastewater capital improvements.

**Recent CSO Capital Budget History**

	FY05 CIP	FY06 CIP	Proposed FY07 CIP
Program Planning and Support Activities*	\$ 50 M	\$ 52 M	\$ 52 M
MWRA-managed Design and Construction	443 M	416 M	422 M
Community-managed Design and Construction	208 M	288 M	310 M
<b>TOTAL CSO PROGRAM</b>	<b>\$ 701 M</b>	<b>\$ 756 M</b>	<b>\$ 784 M</b>

\* Includes the cost of land and easements for CSO projects.

In the Proposed FY07 CIP, the CSO Program accounts for approximately one-third of the \$1.6 billion proposed capital spending in FY06 and beyond. Annual spending on the CSO Program has increased over the last few years and will continue to increase as more projects move into construction. Annual spending is estimated to peak at \$111 million in FY09 and scheduled to end in FY16.

**CSO Program Spending**

	Thru FY05	FY06	FY07	FY08	FY 09	FY 10
MWRA-managed Design and Construction	\$116 M	\$ 29 M	\$42 M	\$72 M	\$96 M	\$53 M
Community-managed Design and Construction	150	27	22	16	13	14
Program Planning and Support Activities	39	4	2	2	2	1
<b>TOTAL CSO PROGRAM</b>	<b>\$ 305 M</b>	<b>\$60 M</b>	<b>\$ 66 M</b>	<b>\$90 M</b>	<b>\$111 M</b>	<b>\$68 M</b>

Note: From MWRA's Proposed FY 07 CIP. MWRA's fiscal year (FY) ends on June 30.

Table 1 presents historical and current cost estimates for the CSO projects. Total cost of the CSO plan (planning, design and construction) has risen from \$398 million when MWRA issued the Final CSO Conceptual Plan in 1994, to \$487 million when EPA and DEP approved the Final CSO Facilities Plan and Environmental Impact Report in 1997, to \$756 million in MWRA's Approved FY06 CIP and \$784 million in

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**Table 1. CSO Project Cost Estimates**

Project	Conceptual Plan (Dec 1994)	Fac. Plan/EIR (Aug 1997)	Current Budget (1)	Proposed Budget (2)	Status
North Dorchester Bay CSO Plan	\$ 122.7M	\$ 164.4M	\$ 228.0M	\$ 222.8M	In design
Pleasure Bay Drainage Improvements			3.6	2.8	In construction
Morrissey Boulevard Storm Drain			18.2	19.4	In design
Reserved Channel Sewer Separation			54.2	57.4	Design start 7/06
Hydraulic Relief at CAM005 Hydraulic Relief at BOS017	6.1	1.3	2.3	2.3	Complete
East Boston Branch Sewer Relief	38.4	30.8	68.0	72.9	Phased design and construction
Fort Pt. Channel Sewer Separation	5.2	11.9	5.6	7.9	In construction
BOS019 Storage Conduit	2.6	5.7	13.7	13.7	In construction
Chelsea Trunk Sewer Replacement Chelsea Branch Sewer Relief and CHE008 outfall repair	7.8	31.1	29.8	29.8	Complete
Union Park Detention Treatment Facility	16.9	36.3	45.5	47.6	In construction
Upgrades to Existing CSO Facilities and MWRA Floatables Control	13.3	14.6	22.4	22.4	Complete
S. Dorchester Bay Sewer Separation	94.0	69.2	115.4	115.8	In construction
Stony Brook Sewer Separation	24.4	45.0	44.6	44.6	In construction
Neponset River Sewer Separation	10.9	9.0	2.7	2.7	Complete
Constitution Beach Sewer Separation	8.9	5.6	3.8	3.8	Complete
Somerville Baffle Manhole Separation	0.7	0.4	0.4	0.4	Complete
Cambridge/Alewife Brook Sewer Separation	12.1	13.8	40.4	41.7	Phased design and construction underway
MWR003 Gate & Rindge Ave. Siphon			1.8	1.9	Design start 4/09
Cottage Farm CSO Controls <sup>(3)</sup>			0.8	6.0	Design start 9/06
Brookline Sewer Separation <sup>(3)</sup>				9.0	Design start 11/06
Bulfinch Triangle Sewer Separation <sup>(3)</sup>				4.0	Design start 11/06
Region-wide Floatables Control	1.6	1.6	3.6	3.7	Phased design and construction underway
BOS032 Interceptor Connection Relief	1.1				(4)
Dorchester Brook Conduit In-Line Storage	4.1				(4)
<b>Sub Total CSO PROJECTS</b>	<b>\$370.8M</b>	<b>\$440.7M</b>	<b>\$704.8M</b>	<b>\$732.6M</b>	
Planning and Land / Easements <sup>(5)</sup>	\$ 27.0	\$ 46.3	\$ 51.0	\$51.0	
<b>Total CSO PROGRAM</b>	<b>\$397.8M</b>	<b>\$487.0M</b>	<b>\$755.8M</b>	<b>\$783.6M</b>	

(1) From MWRA approved FY 06 Capital Improvement Program.

(2) From MWRA proposed FY 07 Capital Improvement Program.

(3) Proposed in recent agreement with DEP, EPA and DOJ for long-term CSO Control proposed to be added to Court Order.

(4) The 1994 Conceptual Plan included Dorchester Brook Conduit In-Line Storage and BOS032 Interceptor Connection Relief, both subsequently deleted.

(5) Not including Somerville Baffle Manhole Separation, which is included in the CIP budget line item for Planning and Land/Easements.

the Proposed FY07 CIP. Most of the increase from the FY06 CIP to the Proposed FY07 CIP represents a placeholder cost for additional Charles River CSO Controls, which include Cottage Farm inflow controls, Bulfinch Triangle Sewer Separation and Brookline Sewer Separation, at a combined estimated cost of \$19 million. These improvements were proposed by MWRA in the recent discussions with EPA, DEP and DOJ toward comprehensive agreement on the long-term CSO control plan and are included in the Joint Motion filed with the Court on March 15, 2006.

## **5. Project Implementation**

This section defines the scope and schedule of each of the projects recommended in the long-term CSO control plan and describes progress made in 2005, any significant project changes since 2004, and key issues that have affected or may affect MWRA's ability to implement the projects in compliance with Schedule Six.

### **5.1 MWRA Managed Projects**

#### **NORTH DORCHESTER BAY AND RESERVED CHANNEL**

##### ***Recommended Plan and Implementation Schedule***

In April 2004, the MWRA Board of Directors voted to approve a revised recommended plan for CSO control for North Dorchester Bay and the Reserved Channel, and MWRA filed the Supplemental Facilities Plan and Environmental Impact Report ("SFP/EIR") presenting the revised plan.

The recommended plan calls for a 25-year-storm level of CSO control (essentially elimination) and a 5-year-storm level of separate stormwater control for the North Dorchester Bay beaches; elimination of stormwater discharges to Pleasure Bay by redirecting them to the Reserved Channel; and a large reduction in CSO discharges to the Reserved Channel, in line with the B(cso) water quality standards designation for the Channel. Components of the recommended plan and MWRA's project schedule are described in the table below. The plan is shown in Figure 5.

The state Secretary of Environmental Affairs issued a certificate on July 16, 2004, stating that the SFP/EIR "adequately and properly complies with" Massachusetts Environmental Policy Act (MEPA) requirements and that "the project may now proceed to the final design and permitting stage." The certificate also indicated that additional information should be developed during the permitting process, especially information related to the Morrissey Boulevard drain project, and required that a monitoring program be developed for water and sediment quality in Savin Hill Cove/South Dorchester Bay to identify project-specific impacts or changes to these water bodies.

Once completed, the project is expected to virtually do away with beach closings resulting from sources associated with the North Dorchester Bay outfalls. These sources are CSO, separate stormwater and illegal sanitary connections to drainage pipes. The project will eliminate CSO discharges except in catastrophic storms (25-year storm or greater), compared to 21 discharges per year on average today.

With the participation of BWSC and the Department of Conservation and Recreation (DCR), the project includes components to minimize these agencies' separate stormwater discharges to the South Boston beaches. Overall, separate stormwater from BWSC and DCR drainage systems will be discharged only in storms greater than the 5-year design storm, compared to current discharges during every rainstorm (100 times per year on average). Stormwater now discharging to the beaches will be tied into the CSO tunnel, and stormwater tributary to Pleasure Bay will be relocated to the less sensitive Reserved Channel.

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BWSC stormwater discharges from the BOS087 area to Carson Beach will be minimized by redirecting stormwater from larger storms, via a new Morrissey Boulevard drainage conduit, to a non-swimming area of South Dorchester Bay (Savin Hill Cove). It is important to note that MWRA has no statutory or regulatory responsibility for managing separate stormwater and that this project does not set any precedent for MWRA to adopt such responsibilities.

COMPONENT	DESCRIPTION	PROJECT SCHEDULE		
		Commence Design	Commence Construction	Complete Construction
North Dorchester Bay Storage Tunnel	<ul style="list-style-type: none"> <li>10,832-ft. long, 17-ft. diameter soft-ground tunnel with mining shaft and equipment removal shaft</li> <li>Drop shafts, diversion structures and associated piping at CSO outfalls BOS081 to BOS086, including gates to control stormwater</li> </ul>	Sep 04	Jul 06	Dec 09
North Dorchester Bay Facilities	<ul style="list-style-type: none"> <li>15 mgd dewatering pump station at Conley Terminal and 24-inch force main</li> <li>Odor control facility at upstream end of tunnel, near State Police building</li> </ul>	Sep 06	Apr 09	May 11
Pleasure Bay Storm Drain Improvements	<ul style="list-style-type: none"> <li>Stormwater piping and appurtenances to relocate stormwater discharges from Pleasure Bay to the Reserved Channel</li> </ul>	Sep 04	Sep 05	May 06
Morrissey Boulevard Storm Drain	<ul style="list-style-type: none"> <li>2,900-foot long, 12x12 foot box conduit for stormwater conveyance to Savin Hill Cove/South Dorchester Bay</li> <li>Gated connection to CSO Storage tunnel</li> </ul>	Jun 05	Dec 06	Jun 09
Reserved Channel Sewer Separation	<ul style="list-style-type: none"> <li>Separation of combined sewer systems in areas tributary to CSO outfalls BOS076, BOS078, BOS079 and BOS080</li> </ul>	Jul 06	May 09	Dec 15

By tying much of the stormwater flows proposed to be diverted from outfall BOS087 at the North Dorchester Bay beaches to the new CSO storage tunnel, this plan minimizes the frequency and volume of new stormwater discharges to Savin Hill Cove, compared to an earlier BWSC/DCR Morrissey Boulevard drainage proposal. Under MWRA's plan, stormwater from the BOS087 outfall area will be captured in the tunnel up to the 1-year design storm, resulting in one diversion discharge per year to Savin Hill Cove, on average, rather than every time it rains, as in the previous proposal.

In addition, the project will minimize CSO discharges to the Reserved Channel, reducing them from about 37 per year currently to 3 per year, on average. The estimated capital cost of the recommended plan, not including land and easement acquisition costs, is \$302.4 million (in MWRA's Proposed FY07 CIP), in December 2006 dollars. Total cost to complete the projects for North Dorchester Bay and the Reserved Channel is estimated to be \$350 million, with inflation to the mid-point of construction and land easement costs.

Figure 5  
 North Dorchester Bay and Reserved Channel  
 Recommended CSO Control Plans



——— Tunnel     
 - - - - - Dewatering Force Main     
 - - - - - Storm Drain

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On June 30, 2005, the Federal District Court accepted an MWRA motion to add several milestones to Schedule Six for design and construction of the North Dorchester Bay tunnel and facilities, Pleasure Bay storm drain improvements, Morrissey Boulevard storm drain and Reserved Channel sewer separation. The new milestones are reflected in the project schedules shown in the table above. BWSC will manage implementation of the Morrissey Boulevard storm drain and Reserved Channel sewer separation projects under amendments to the CSO Memorandum of Understanding and Financial Assistance Agreement that also includes several other CSO projects in MWRA's long-term plan.

***Progress on North Dorchester Bay Storage Tunnel and Related Facilities***

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Construction	August 2006	July 2006
Complete Construction	May 2011	May 2011

With substantial design progress made in 2004 and 2005, MWRA's accelerated design schedule targets advertising the North Dorchester Bay CSO storage tunnel contract in April 2006 and issuing a notice to proceed with the contract in July 2006. In October 2005, the MWRA Board of Directors voted to award the construction management services contract for the tunnel and related facilities. In December, the design consultant team completed the 100% design plans and contract specifications.

In the course of the design efforts in 2005, the focus has been on coordinating with landowners and other agencies from which land rights or other approvals are required and working through the technical details of this complex construction project with multiple teams of expert reviewers. There have been many design workshops with MWRA Operations staff, and peer review provided by the MWRA's Technical Review and Advisory Team of tunneling experts, as well as constructability reviews by Construction Management team. At the 90% design stage, MWRA made a series of presentations and held coordination meetings with engineers and staff of the City of Boston Public Works, Public Improvement Commission, Boston Transportation Department, Conservation Commission, Boston Parks and Recreation, Massport, Boston Water and Sewer Commission (BWSC), the State Police, and DCR. Meetings were held with potentially affected private utilities and landowners such as NSTAR, the Bayside Expo and the Boston Teacher's Union. MWRA is currently engaged in executing a Memorandum of Understanding with the Boston Fire Department for backup tunnel rescue services. An additional critical requirement to awarding the tunnel contract by July 2006 is the filing and approval of the necessary Article 97 legislation.

As a result of these coordination meetings and peer reviews, several features have been added to the project that affect cost. These include restoration work in Moakley Park, in areas disturbed by construction, including an irrigation system and sod for two soccer fields near the proposed BOS086 outfall surface pipelines and some restoration to softball fields near the proposed BOS085 outfall surface pipelines. MWRA has also required that the tunnel contractor perform much of the park restoration work early in the contract, to reduce impacts during the recreation season. Details of tree replacements, construction snowplowing, and Day Boulevard improvements near the BOS081 surface work have been coordinated with DCR. To avoid having the electric demands of the tunnel mining operations impact the NSTAR power grid, arrangements for isolation transformers and installation of redundant power lines have been made. Coordination efforts with BWSC have resulted in extended sections of cured-in-place pipe improvements to existing, older BWSC brick outfalls as part of efforts to protect them from any tunnel mining impacts. Despite these project additions, MWRA has been able to control costs from escalating significantly.

In 2005, MWRA also completed the preliminary design study the CSO facilities contract, which includes the dewatering pump station, force main and separate upstream odor control facility. In addition to the

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enhancements described in the 2004 CSO Annual Report, additional alternatives analyses were performed for the force main that will connect the dewatering pump station at Conley Terminal to the local interceptor system. This alternatives analysis resulted in an improved alignment both hydraulically and with regard to its impacts to the local neighborhood.

MWRA must obtain permission to construct on Conley Terminal, the primary tunnel construction staging area and eventual permanent site of the CSO Pump Station facility. MWRA is nearing completion of coordinating with Massport to effect these permissions through short-term occupancy permits and long-term easement agreements.

The Secretary of Environmental Affairs Certificate (July 2004) on the SFP/EIR required MWRA to prepare a Section 61 Finding, in accordance with M.G.L. c.30, s.61, to identify the environmental impacts and mitigation measures for components of the project requiring a state permit, action or approval. The Secretary specifically directed that the Section 61 Finding address certain key issues raised in public comments on the diversion of some separate stormwater from North Dorchester Bay to Savin Hill Cove in South Dorchester Bay.

MWRA, BWSC and DCR jointly filed the Section 61 finding in July 2005. The document presented the respective responsibilities of MWRA, BWSC and DCR for design, construction and operations and maintenance of the facilities and structures recommended in the plans for North Dorchester Bay and the Reserved Channel, and generally described how issues raised by the Secretary would be addressed as the projects are implemented. For example, regarding a monitoring program for Savin Hill Cove/South Dorchester Bay, MWRA will continue monitoring water quality in that area as part of its Boston Harbor monitoring program, and BWSC will develop and implement, in consultation with MWRA, DCR and other agencies, a monitoring program to assess the impacts of its new stormwater outfall.

As part of the design work, MWRA carefully developed work plans and schedules for obtaining all permits and approvals necessary to construct the North Dorchester Bay tunnel and facilities and the Pleasure Bay stormwater improvements. Similar work plans and schedules will be developed by BWSC for the Morrissey Boulevard and Reserved Channel projects. For North Dorchester Bay, environmental permits are required from the Boston Conservation Commission (Wetlands Order of Conditions), the Department of Environmental Protection (Waterways Chapter 91 License), and the Army Corps of Engineers. Construction access permits are required from BWSC for work affecting its facilities, from DCR for work within land under its control, which includes most of the work, from the Boston Parks and Recreation Department for work in Moakley Park and from the Boston Improvements Commission for work in city streets. MWRA is also working with elected officials to coordinate the filing of Article 97 legislation for construction in parklands, which involves most of the planned work.

Most of the work on this project in the first quarter of 2006 has involved review of the 100% design submission by MWRA and certain outside parties, response to comments, and preparation of the final bid documents. MWRA has also continued work to secure all permits and land/easement approvals, including Article 97 legislation.

***Progress on Pleasure Bay Storm Drain Improvements***

	<u>Court Milestone</u>	<u>Project Schedule</u>
Complete Construction	May 2006	May 2006



MWRA issued the notice to proceed with the Pleasure Bay Storm Drain Improvement construction contract on September 8, 2005. The contractor elected to perform a soil pre-characterization program utilizing test pits, to allow “load and go” disposal of any contaminated soils during construction. Although this slowed the start of pipeline installation, it made the work more efficient once installation of the new storm drains began. The contractor has made substantial progress and is currently ahead of schedule. All of the new storm drains and new catch basins along Day Boulevard have been installed.

The southern leg of the new storm drain system, near Kelly’s Landing and the City Point parking lot, is in place, is connected to the existing BOS081 outfall (to North Dorchester Bay) and is operational. The old storm drain outfalls that served this area have been removed from Pleasure Bay beach and chronic ponding of runoff in this section of Day Boulevard has been eliminated. The northern leg of the new storm drain system, along Day Boulevard from Castle Island to Marine Park has been installed. Work on the most downstream reaches of this system, along Shore Drive to a connection with outfall BOS080 near the main gate to Conley Terminal is completed. The construction contract is 87% complete, and MWRA expects to complete all work by May 2006, in compliance with Schedule Six.



***Progress on Reserved Channel Sewer Separation and Morrissey Boulevard Storm Drain***

See later sections of this report for information on the progress of these projects.

**HYDRAULIC RELIEF PROJECTS AT CAM005 AND BOS017**

MWRA completed construction of these two projects in 2000. A single construction contract combined two localized hydraulic relief projects, one in Cambridge to minimize CSO discharges at outfall CAM005, which discharges to the Charles River Basin, and the other in Charlestown to minimize CSO discharges at outfall BOS017, which discharges to the Lower Mystic River. In Cambridge, the 24-inch, 40-foot long dry weather connection between the CAM005 regulator and MWRA’s North Charles Metropolitan Sewer, adjacent to Mt.

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Auburn Hospital, was relieved with a new 54-inch connection. In Charlestown, 190 feet of 36-inch pipe was installed in Sullivan Square to divert two BWSC combined sewers to a more direct connection with MWRA's Cambridge Branch Sewer, thereby relieving the original dry weather connection from the BOS017 regulator. In addition, a 10-foot long restriction between the Charlestown and Cambridge Branch Sewers, adjacent to Sullivan Square, was removed, with the intent of lowering hydraulic grade lines in the Charlestown Branch Sewer during wet weather and possibly relieving CSO overflow conditions upstream, at outfall BOS019.

**EAST BOSTON BRANCH SEWER RELIEF**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	March 2000	March 2000
Commence Construction	March 2003	March 2003
Complete Construction	September 2005*	To be determined

\* In negotiation.

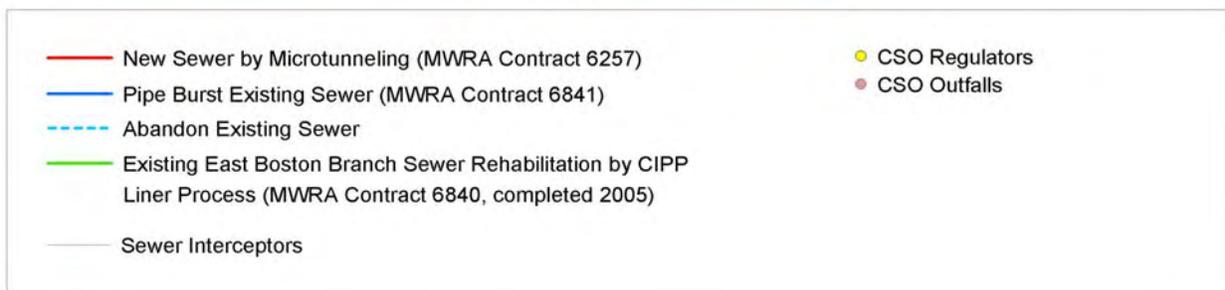
This project calls for relief of the MWRA interceptor system serving most of East Boston, to minimize CSO discharges to Boston Harbor and Chelsea Creek through outfalls BOS003-014. The current plan, originally recommended in the 1997 Facilities Plan/EIR, consists of replacing, relieving or rehabilitating approximately 4.5 miles of existing interceptor sewers using a combination of construction methods including microtunneling, pipe bursting, open cut and pipe relining. MWRA issued a Notice to Proceed for design services in March 2000, in compliance with Schedule Six. Design plans call for three construction contracts to complete the project. MWRA has completed one of the construction contracts, but suspended design work on the other two, when it determined that the original plan would cost twice as much as estimated in the 1997 Facilities Plan/EIR and would not fully attain the recommended level of CSO control. The reassessment, conducted in 2003 and 2004, involved reevaluating the cost effectiveness of the plan against alternatives that might provide higher benefit and cost less.

MWRA completed its reassessment work in early 2004. One conclusion of the reassessment was that CSO overflows in East Boston are slightly less than originally estimated. The number of CSO discharges at the most active outfall dropped from the previously estimated 37 per year in the 1997 Plan to 31 per year. The total annual volume of CSO discharge from all 10 outfalls in East Boston dropped from 45 million gallons to 41 million gallons.

The reevaluation also considered the potential for improving the performance of the facilities and pipelines that carry East Boston flows to the Deer Island Treatment Plant. These facilities include the Caruso Pump Station in East Boston, the Winthrop Terminal facility and the Chelsea Creek Headworks. This review did not find new opportunities for improving the performance of these facilities beyond the benefits of currently planned work. Although planned improvements to the Winthrop Terminal facility will increase transport capacity and allow Caruso Pump Station to pump at a slightly greater rate, this increase in capacity has little effect on flows and overflows in East Boston, where ability to convey wet weather flows is currently limited not by the pump station but by the conveyance capacities of the East Boston pipes delivering flow to the station.

In addition, the reassessment compared the cost and benefit of a total of 20 CSO control alternatives involving hydraulic relief, sewer separation and flow diversion. Other CSO control technologies, such as storage or treatment, that were evaluated and rejected in the 1997 Plan were not deemed cost-effective, primarily because the outfalls are dispersed throughout East Boston.

**Figure 6**  
 East Boston Branch Sewer Relief  
 Hydraulic Relief Plan



map1102-1

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The results confirmed that the current interceptor relief project (Figure 6), at a total estimated capital cost of \$73 million (in December 2005 dollars), more than twice the cost estimate in the 1997 Facilities Plan/EIR, would reduce CSO discharges from 31 to 6 in a typical year and reduce annual discharge volume from 41 million gallons to 8.6 million gallons, compared to the 1997 plan goals of 5 activations and 4.0 million gallons. It is important to note that while the current hydraulic relief plan does not meet the 1997 goals, which were the basis for regulatory approvals of the plan and for new CSO discharge limits in the BWSC and MWRA NPDES permits, the current plan's performance is consistent with the predicted performance in the 1994 CSO Conceptual Plan and System Master Plan, which was the original basis for the milestones in Schedule Six.

Based on the results of the reassessment, MWRA believes that the current interceptor relief plan, even at the updated, higher cost estimate of \$73 million, is cost-effective and will significantly reduce CSO discharges at all of the East Boston outfalls in keeping with the intent and benefits of the 1997 plan. Ongoing work by BWSC and others to separate sewers in East Boston will further reduce CSO discharges.

MWRA commenced the first construction contract in March 2003 in accordance with Schedule Six and completed the contract in June 2004. This work involved rehabilitating portions of the existing East Boston Branch Sewer with cured-in-place pipe lining to extend the useful life of the sewer and improve its hydraulic capacity.

The second construction contract involves installation of a new sewer interceptor along Border, Condor, East Eagle and Chelsea Streets and along Marginal, Orleans and Bremen Streets primarily using microtunneling methods, and the third contract replaces and upgrades interceptors in upstream areas using "pipe bursting" methods, whereby a new, larger pipe is installed in the same place as the smaller existing pipe by pushing through and breaking up the old pipe. Excavation is limited to setup locations from where the new pipe is driven and locations where connections must be made. Design work on these contracts will resume once MWRA reaches agreement with EPA and DEP on a final plan for CSO control in East Boston.

MWRA has commenced procurement of a new design contract for the project. MWRA expects to resume design in June 2006.

**BOS019 CSO STORAGE CONDUIT**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	January 2003	July 2002
Commence Construction	March 2005	March 2005
Complete Construction	March 2007	March 2007

The 1997 Facilities Plan/EIR recommended constructing a 380-foot long, 12'x12' box conduit adjacent to the Tobin Bridge and Chelsea Street in Charlestown to store most of the CSO flows that discharge at outfall BOS019. The stored flows will be pumped back to the Deer Island transport system after each storm passes and system capacity becomes available. An above ground building will be constructed to house the dewatering equipment, as well as the activated carbon odor control systems which will treat the air that is displaced when the conduit fills with combined sewage. During larger storms that cause overflows that exceed the storage volume of each conduit, system relief will continue to be provided through the existing outfall. For this reason, underflow baffles were recommended to be installed within the existing and proposed regulator as part of this project to provide floatables control.

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MWRA commenced the design contract for the BOS019 storage conduit in July 2002, in advance of the milestone in Schedule Six. As an initial design effort, MWRA completed a reassessment of the BOS019 storage conduit project in June 2003. The reassessment verified that a storage conduit larger than the one recommended in 1997 would be needed to reduce overflows at BOS019, but that the project remained cost-effective to meet the CSO control goals of two overflows per year and a total annual discharge volume of 0.4 million gallons. With the cost-effectiveness of the plan confirmed, MWRA commenced preliminary design work.



In the course of design, several significant changes were made to the project from what was assumed in the 1997 Facilities Plan/EIR. MWRA reexamined system hydraulic conditions using flow meter data it collected in the fall of 2003. With the new data, MWRA concluded that a storage volume of

670,000 gallons would be necessary to meet the 1997 CSO control goals, a significant increase in size, as well as cost, over the 410,000 gallon storage conduit recommended in the 1997 plan. At the same time, to protect the Mystic River Bridge foundations during construction, the storage conduit was shortened in length by making it a double-barreled conduit, and moved further away from the bridge. MWRA added an automatic flushing-gate system for cleaning the two storage barrels after storms. The revised plans call for twin 10-foot wide by 17-foot high barrels, 280 feet long each.



Before Construction



December 2005

MWRA issued the notice to proceed with the construction contract for the BOS019 CSO storage conduit in March 2005, in compliance with Schedule Six. In November 2005, the contractor completed installing all of the steel soldier piles for support of excavation and also completed 50% of the lagging system and soil excavation. Overall, the project was nearly 25% complete by the end of 2005.

In the first quarter of 2006, the contractor completed excavating soil from the conduit trench, installing the excavation support system, and constructing the pulling slab for installation of the precast conduit sections. The contractor has also completed construction of the influent gate structure. By mid-March, the contractor had achieved 33% completion.

Production of the precast conduit sections began in mid-January, and the contractor will soon begin installing the sections into the trench. The contractor plans to have all sections in place by July 2006. The project is on schedule for completion by March 2007, in compliance with Schedule Six.

## **CHELSEA RELIEF SEWERS**

### ***Chelsea Trunk Sewer Replacement***

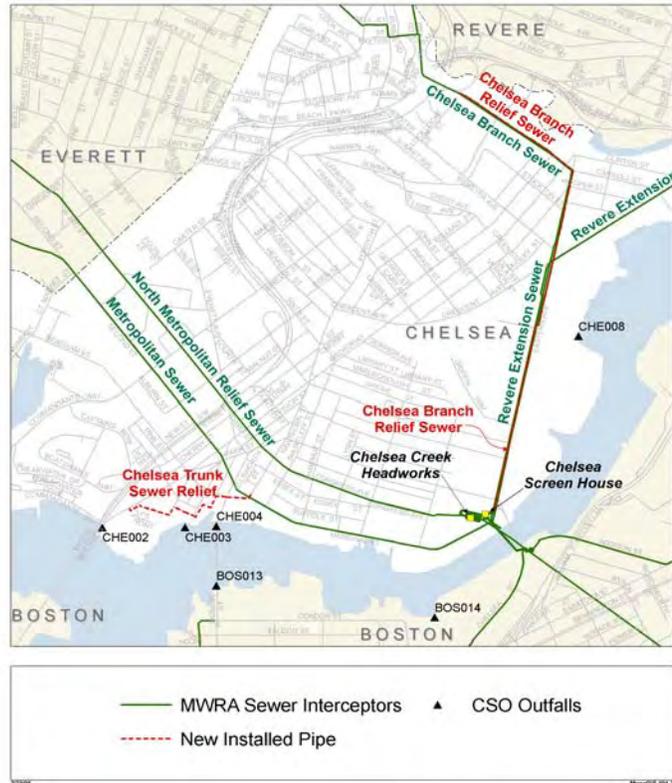
MWRA completed this project in 2000, on schedule. The 1997 Facilities Plan/EIR recommended replacing a trunk sewer in Chelsea with larger pipe, to minimize CSO discharges to the Inner Harbor at outfalls CHE002, CHE003 and CHE004. The existing Chelsea Trunk Sewer, which varied in diameter from 8 to 15 inches, was replaced with 2,300 feet of 30-inch diameter pipe. MWRA also replaced or rehabilitated sections of the CHE002 and CHE003 outfalls. MWRA managed the construction, but the City of Chelsea retains ownership and responsibility for operation and maintenance of the relieved sewer and outfalls.

### ***Chelsea Branch Sewer Relief***

MWRA completed this project in 2001, on schedule. The 1997 Facilities Plan/EIR recommended relieving MWRA's Chelsea Branch Sewer to minimize CSO discharges to Chelsea Creek at outfall CHE008 and reduce surcharging in the upstream transport system. The construction contract also included repairs to the existing CSO outfall at CHE008. MWRA installed 4,200 feet of 42-inch pipe and 3,500 feet of 66-inch pipe along Cabot Street and Eastern Avenue, to replace or relieve MWRA's Chelsea Branch Sewer and Revere Extension Sewer, which lie parallel along Eastern Avenue. The new pipes were constructed primarily using microtunneling methods.

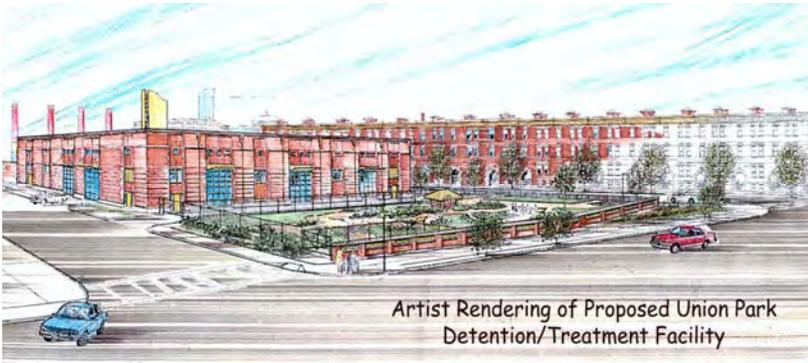
### ***CHE008 Floatables Control and Outfall Repairs***

This project was completed in 2001, on schedule. Outfall repairs at CHE008 included relining approximately 540 feet of the existing 42-inch outfall pipe, replacing 35 feet of the pipe at its downstream end, replacing the headwall and laying new riprap shore protection. An underflow baffle was installed at the sole regulator structure associated with this outfall, to provide floatables control.



**UNION PARK DETENTION/TREATMENT FACILITY**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	December 1999	December 1999
Commence Construction	March 2003	March 2003
Complete Construction	September 2005	December 2006



The Union Park Detention/Treatment Facility is intended to improve water quality in the Fort Point Channel by providing treatment to CSO flows that are discharged through BWSC's Union Park Pump Station. The existing pumping station, constructed in 1976, provides flood control for the South End neighborhood of Boston. Flows will pass through the new treatment facility before entering the existing pumping station wet well.

The new facility will include coarse screens, fine screens, chlorination with sodium hypochlorite, dechlorination with sodium bisulfite and odor control equipment. A new building will be constructed adjacent to the existing pumping station to house the new treatment equipment. New underground detention basins, which will have a combined storage capacity of 2.2 million gallons, are intended to reduce the average annual number of pumping station discharges to the Fort Point Channel (from 25 to 17 per year) and to detain flows that exceed the storage capacity in larger storms, to allow a level of solids removal.

Construction commenced in the spring of 2003. By the end of 2005, work on the construction project was 87% complete. The contractor had completed construction of the underground concrete detention basins and effluent channels, including waterproofing of the roofs, and the backfilling operation to place soils over the tank and return the site to grade had commenced. The new CSO building, including structural steel, masonry block and brick façade, membrane roof, and roll up doors was also complete, with the exception of personnel doors and windows. The contractor installed the following new process equipment: coarse and four fine screens, sluice gates, overflow weir gates, flushing gates, odor control vessels and fans, and sample pumps with automatic backwash strainers. New boilers were installed along with air handling units, exhaust and



New screening room, two coarse screens (rear) and four fine screens

supply fans and associated ductwork.

The building trades made significant progress, and continue to work in both the new CSO building and the existing pump station to complete process piping, plumbing, fire protection, HVAC duct work, odor control ductwork and conduit and wiring for electrical and instrumentation. The new electric service, including new transformer, switchgear, two motor control centers and new emergency generator were installed, tested and operational. Transfer of critical equipment from the existing electric service onto the new electric service is complete. A delay associated with bringing a new NSTAR electric service to the site location resulted in a delay of approximately three months to the project.

Work within the existing Union Park Pump Station also continued in 2005, with major structural modifications to reconfigure the building layout to accommodate integration with the new CSO facility. As part of BWSC improvements to the existing pump station, the existing electric pump 1 was replaced with new electric pumps 5 and 6 which are now installed, tested and operational. This achievement allowed the contractor to commence demolition of the existing pump 1 to make room for a new turbine driven pump 1. Unfortunately, there were several design changes associated with the structural modifications in constructing the new rooms to house the pumps and motors. Ultimately, two time extensions were granted which when combined resulted in over three months delay to the project.

Site utility work is substantially completed. In particular, an existing sewer manhole on Albany Street has been rebuilt to accommodate the installation of a sluice gate to isolate the new Boston Main Interceptor from the Union Park Pump Station. The new influent conduit and chamber is installed, waterproofed and backfilled to grade. A new water service to the existing pump station was installed to provide a dedicated fire protection service line to both the pump station and new CSO facility. The new gas service connection is installed. Modifications to existing utility lines to incorporate the new facility are completed including drain lines, sewer lines and secondary electrical duct banks are installed and operational. A new combined sewer force main was installed for the detention basin dewatering line.



Backfilling operations on the roof slab over the effluent channel

In the first quarter of 2006, the contractor completed the backfilling operation over the detention tanks and returned the area to grade. Windows have been installed in the new CSO building. The contractor also tested the new influent flow path and activated a portion of the new CSO facility, not including treatment components. The contractor has successfully started up the new CSO facility influent flow path. The new influent conduit and chamber, new sluice gates 1 and 2 and coarse screens 1 and 2 are now operational, with flow into the wetwell through the emergency overflow weir gates. This accomplishment allowed the contractor to commence demolition of the existing screening area to begin construction of Structural Modifications Phase 2 which involves the new hydraulics' room and new chemical feed rooms. Demolition and removal of all existing screening equipment is completed. The new pump 1 concrete pedestal has been

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installed, pump 1 including suction piping and discharge piping and a 48-inch magnetic meter are now installed as part of BWSC Pump Improvements. In the new detention basins, dewatering pumps 1 through 6 are installed including the discharge force main and mag meter. All major equipment is installed in the new CSO facility. The trades continue work in both the new CSO building and the existing pump station including: process piping, plumbing, HVAC, fire protection, electrical and instrumentation.

This phase of the project is considered interim startup. The testing, acceptance and startup of a portion of the new CSO facility has allowed the contractor access to demolish portions of the existing pumping station and construct the remainder of the project. This phase of the work is considered Structural Modifications Phase 2, with an estimated duration of six months, and consists of construction of the new chemical feed facilities, hydraulic control room and instrumentation systems. Once this work is completed, systems will be checked out, tested and started up, an estimated duration of four additional months.

The MWRA has granted the contractor time extensions to September 23, 2006, due to a number of differing site conditions and design changes. MWRA anticipates that the project will reach substantial completion by end of 2006. The extended period of construction beyond the September 2005 court milestone for completion of construction is due largely to unforeseen additional hazardous materials excavation and management and the critical nature of rehabilitating an existing flood control facility while maintaining facility operation and carefully phasing in new components of the work, including storm event testing, prior to demolishing existing facility components.

**UPGRADES TO EXISTING CSO FACILITIES**

MWRA upgraded five of its six CSO facilities (Commercial Point, Cottage Farm, Fox Point, Prison Point and Somerville Marginal) to improve treatment performance and meet new residual chlorine discharge limits. The upgraded facilities were all fully operational by early 2003. A sixth facility, at Constitution Beach in East Boston, was decommissioned by MWRA in 2000, following completion of sewer separation work in that area (see later discussion, under “Constitution Beach Sewer Separation”). The facility upgrades generally included replacement of the existing chlorine disinfection systems with improved systems, construction of dechlorination systems, and other process control and safety improvements.



**5.2 Community Managed Project**

**SOUTH DORCHESTER BAY SEWER SEPARATION**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	June 1996	June 1996
Commence Construction	April 1999	April 1999
Complete Construction	November 2008	November 2008

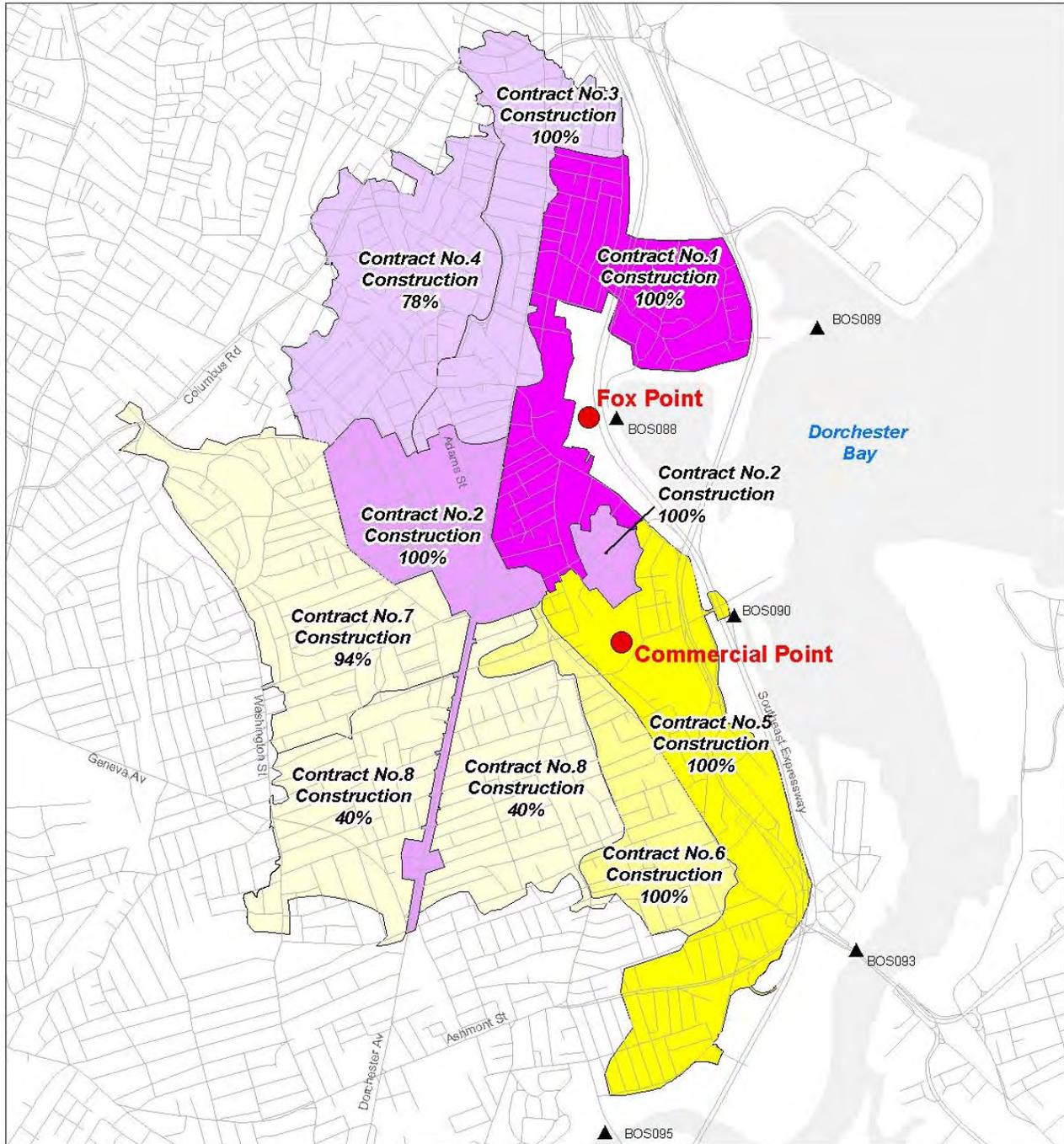
This project is intended to eliminate CSO discharges to South Dorchester Bay by separating combined sewer systems in Dorchester. The separation work primarily involves the construction of new storm drains and appurtenant structures, relocation of storm runoff connections from the existing combined sewer to the new storm drains, and rehabilitation of the existing combined sewers for use as sanitary sewers. The plan calls for approximately 136,000 linear feet of new storm drains. BWSC is implementing the project with MWRA funds.



Figure 7 and Table 2 show the project's design and construction progress. Schedule Six requires a construction progress rate of 10% per year from the commencement of construction in April 1999. As of December 2005, construction was 87% complete, measured as linear feet of installed storm drain, compared to the court required level of 70% for the same period. BWSC installed 22,135 linear feet of new storm drain in 2005 alone, 16% of the total to be installed. BWSC plans to complete the installation of new storm drainage in 2006. This project comprises eight major sewer separation construction contracts. Five have been completed, and three are ongoing. All of the ongoing contracts were awarded by BWSC in 2004.

Disconnection of downspouts from the combined sewer systems is necessary to remove enough stormwater from the sewers to meet CSO control goals, in this case elimination. The initial downspout disconnection contract for Dorchester, which also included downspout disconnection work in other CSO project areas, such as Jamaica Plain (Stony Brook project), Neponset and East Boston (Constitution Beach), was completed in 2004. The second downspout disconnection contract for the Dorchester area was awarded in late 2004 and continued through 2005. Also, BWSC has completed two of the three project-related street paving contracts. The third and final paving contract commenced in October.

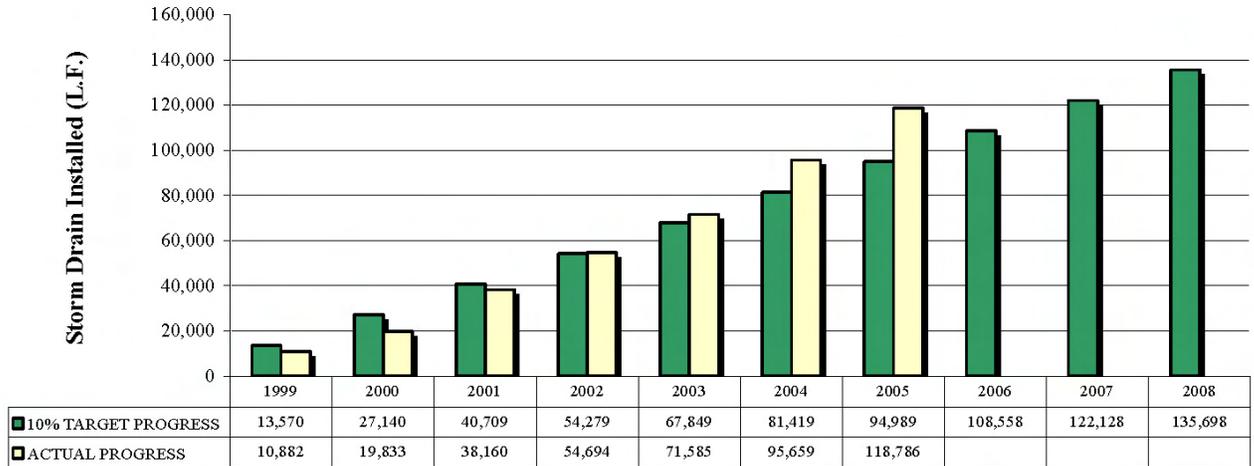
**FIGURE 7**  
**South Dorchester Bay Sewer Separation**



Contract 1 - Sewer separation complete	Contract 5 - Sewer separation complete
Contract 2 - Sewer separation complete	Contract 6 - Sewer separation complete
Contract 3 - Sewer separation complete	Contract 7 - Sewer separation 94% complete
Contract 4 - Sewer separation 78% complete	Contract 8 - Sewer separation 40% complete

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**ANNUAL PROGRESS OF MWRA/BWSC DRAIN INSTALLED IN  
 DORCHESTER 088/089 AND 090 AREAS**



**Table 2 South Dorchester Bay Sewer Separation Progress**

Construction Contract	Total Linear Ft. Storm Drain	NTP	Percent Complete											
			Thru 2001		Thru 2002		Thru 2003		Thru 2004		Thru 2005		1st Q 2006	
			Design	Const.	Design	Const.	Design	Const.	Design	Const.	Design	Const.	Design	Const.
1	15,770	Apr-99	100	98	100	100	100	100	100	100	100	100	100	100
2	15,666	Sep-00	100	36	100	91	100	100	100	100	100	100	100	100
3	19,005	Dec-02	90	0	100	0	100	42	100	95	100	100	100	100
4	20,060	Apr-04	20	0	75	0	100	0	100	30	100	78	100	79
5A	865	May-00	100	100	100	100	100	100	100	100	100	100	100	100
5	7,936	Apr-99	100	100	100	100	100	100	100	100	100	100	100	100
6	16,669	Aug-01	100	10	100	68	100	100	100	100	100	100	100	100
7	20,810	Dec-02	20	0	100	8	100	32	100	68	100	94	100	97
8	19,020	Sep-04	20	0	20	0	100	0	100	3	100	40	100	45
<b>TOTAL</b>	<b>135,801</b>		<b>81%</b>	<b>26%</b>	<b>87%</b>	<b>37%</b>	<b>100%</b>	<b>53%</b>	<b>100%</b>	<b>70%</b>	<b>100%</b>	<b>87%</b>	<b>100%</b>	<b>88%</b>

**Related Contracts**

9	-	2006-2007	10	0	15	0	15	0	15	0	100	0	0	0
10	-	Nov-02	50	0	50	0	100	0	100	100	100	100	100	100
Paving 1	-	Jun-99	100	50	100	75	100	90	100	100	100	100	100	100
Paving 2	-	Feb-03	50	0	75	0	100	0	100	22	100	78	100	78
Paving 3	-	Oct-05	50	0	75	0	75	0	100	0	100	0	100	0
Downspout Removal	-	Mar-03	50	0	75	0	100	0	100	0	100	25	100	25

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BWSC plans to award a total of 16 construction contracts (sewer separation, downspout removal and paving) to complete the South Dorchester Bay sewer separation project. Once these contracts are complete and the CSO regulators are closed, MWRA plans to decommission the Commercial Point and Fox Point CSO treatment facilities.

**STONY BROOK SEWER SEPARATION**

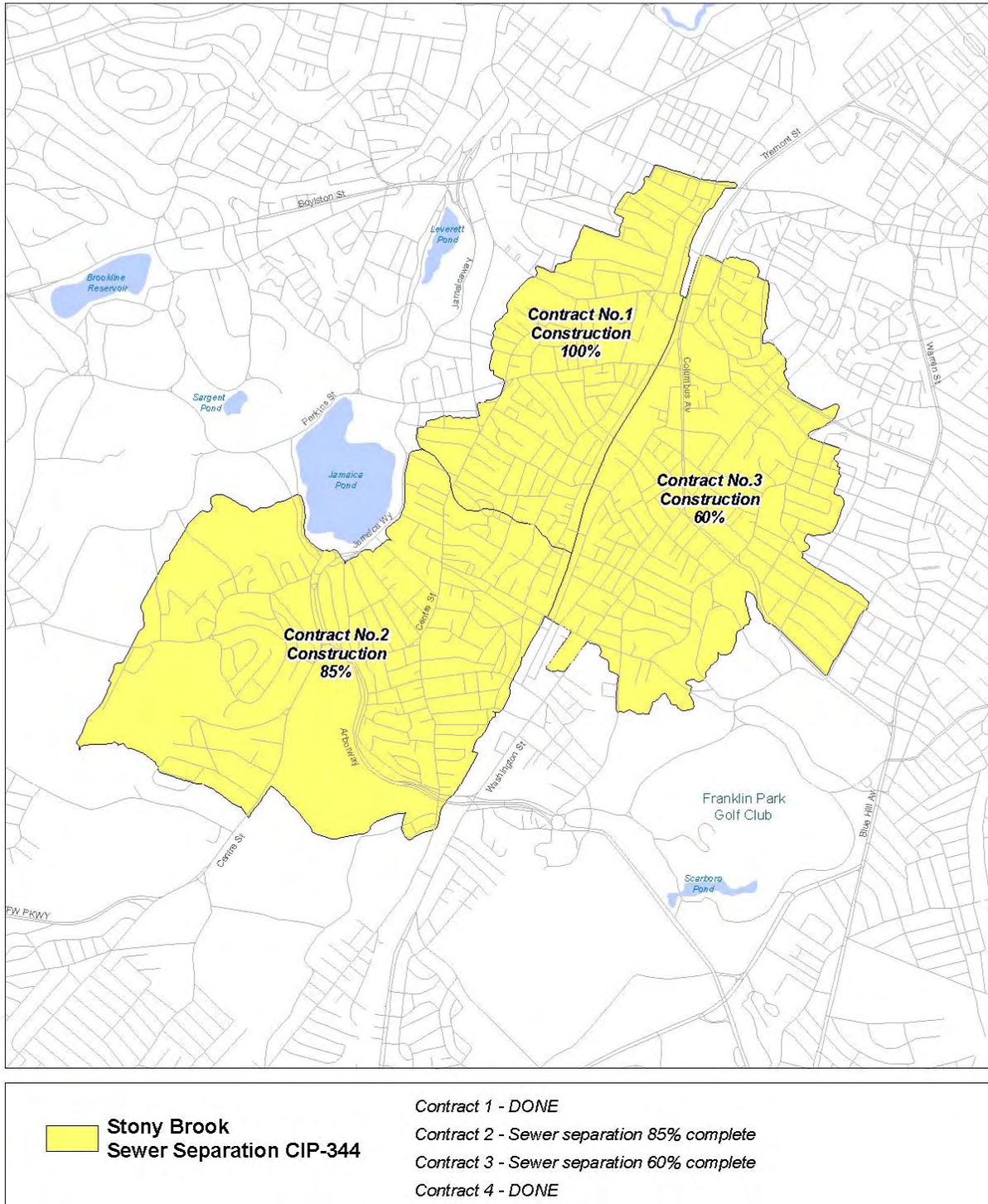
	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	July 1998	July 1998
Commence Construction	July 2000	July 2000
Complete Construction	September 2006	September 2006

This project is intended to minimize CSO discharges to the Stony Brook Conduit and the Back Bay Fens, both of which drain to the Charles River, by separating combined sewers in parts of Roxbury and Jamaica Plain. The separation work involves the installation of approximately 73,300 linear feet of new storm drain. BWSC is implementing the project with MWRA funds.

Figure 8 and Table 3 show the project's design and construction progress. Schedule Six requires a construction progress rate of 15% per year from the commencement of construction in July 2000. As of December 2005, construction was 85% complete, measured as linear feet of installed storm drain, compared to the court required level of 82.5% for the same period. BWSC installed approximately 12,000 linear feet of storm drain in 2005 alone, 16% of the total length to be installed. BWSC plans to complete the installation of new storm drainage in 2006, on schedule. All four major construction contracts have been awarded, and two of them, Contracts 1 and 4, are complete. Contract 2, which BWSC commenced in December 2002, is approximately 85% complete. Contract 3, the last major contract, which BWSC commenced in March 2004, is approximately 60% complete.

In 2005, BWSC also commenced the second of two paving contracts. In addition, BWSC made progress with other contracts to separate downspouts from the sewer system. It completed the downspout disconnection contract in February 2005. BWSC plans a total of seven construction contracts (sewer separation, paving and downspout disconnection) to complete the Stony Brook sewer separation project by the court milestone of September 2006.

**FIGURE 8**  
**Stony Brook Sewer Separation**

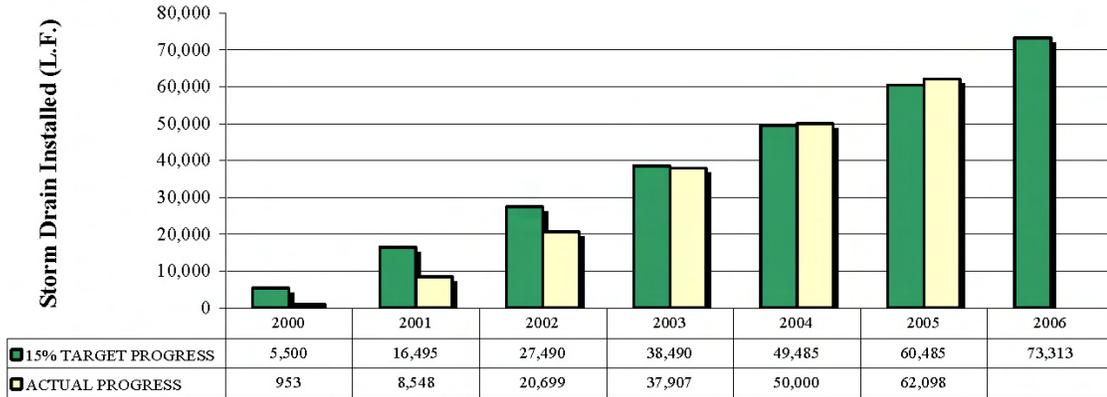


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**ANNUAL PROGRESS OF MWRA/BWSC DRAIN INSTALLED  
 IN STONY BROOK CSO AREAS**



**Table 3 Stony Brook Sewer Separation Progress**

Construction Contract	Total Linear Ft. Storm Drain	NTP	Percent Complete												
			Thru 2001		Thru 2002		Thru 2003		Thru 2004		Thru 2005		1st Q 2006		
			Design	Const.	Design	Const.	Design	Const.	Design	Const.	Design	Const.	Design	Const.	
1	27,230	Apr-01	100	8	100	66	100	99	100	100	100	100	100	100	100
2	26,810	Dec-02	90	0	100	0	100	35	100	60	100	85	100	85	85
3	17,985	Mar-04	90	0	90	0	100	0	100	30	100	60	100	70	70
4	1,288	Jul-00	100	100	100	100	100	100	100	100	100	100	100	100	100
<b>TOTAL</b>	<b>73,313</b>		<b>95%</b>	<b>12%</b>	<b>98%</b>	<b>29%</b>	<b>100%</b>	<b>51%</b>	<b>100%</b>	<b>68%</b>	<b>100%</b>	<b>85%</b>	<b>100%</b>	<b>87%</b>	<b>87%</b>

**Related Contracts**

Downspout Removal	-	Jul-02	50	0	75	0	100	0	100	38	100	84	100	85	85
Paving 1	-	Jul-02	50	0	75	0	100	0	100	25	100	100	100	100	100
Paving 2	-	Jun-04	-	-	-	-	90	0	100	0	100	0	100	0	0
Post Construction Monitoring	-	Jun-04	-	-	-	-	-	-	-	-	-	-	-	-	-

**FORT POINT CHANNEL BOS072-073 SEWER SEPARATION**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	July 2002	July 2002
Commence Construction	March 2005	March 2005
Complete Construction	March 2007	March 2007

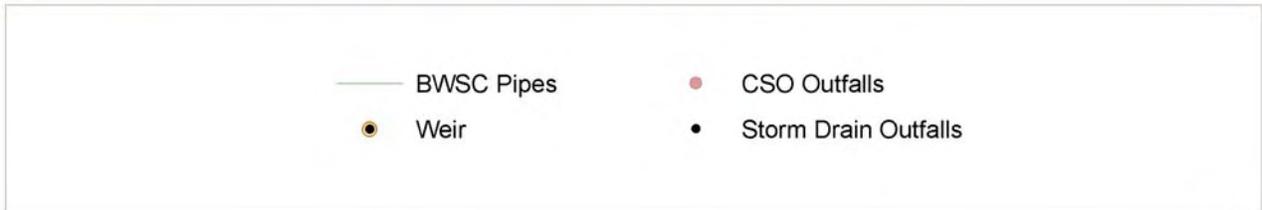
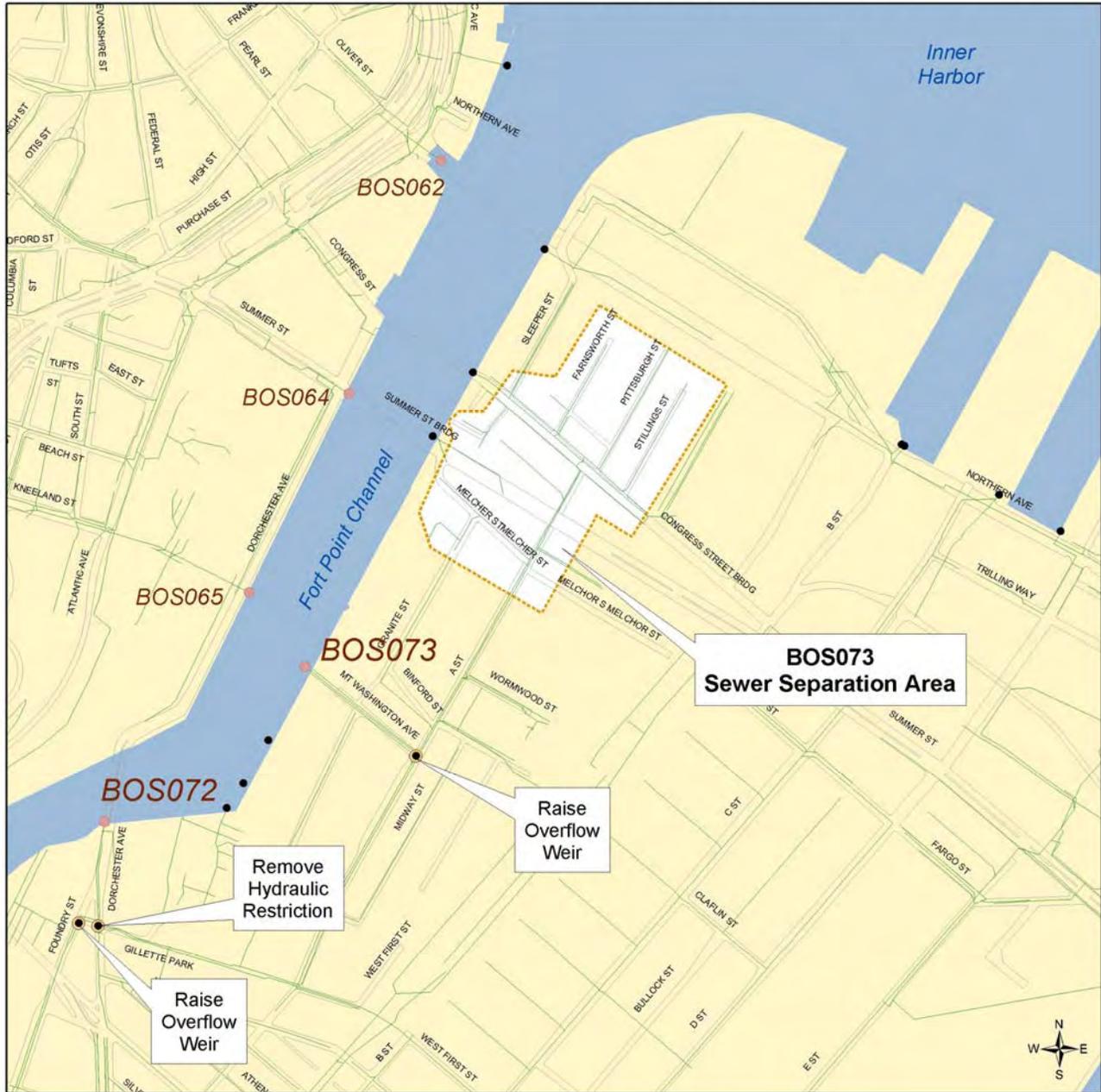
This project is intended to eliminate CSO discharges in a typical year at outfalls BOS072 and BOS073. The separation work primarily involves the construction of new storm drains and appurtenant structures, relocation of storm runoff connections from the existing combined sewer to the new storm drains, and rehabilitation of the existing combined sewers for use as sanitary sewers. The plan calls for approximately 5,150 linear feet of new storm drains. (Figure 9). BWSC is implementing the project with MWRA funds

BWSC commenced construction of a portion of the sewer separation work in March 2005, in compliance with the milestone in Schedule Six. In September 2005, BWSC commenced a second contract involving the bulk of the project work. This contract is approximately 10% complete. Construction is scheduled to be completed by March 2007, in compliance with Schedule Six.

The work to install the new storm drains in the narrow, busy commercial streets adjacent to Fort Point Channel is more difficult and more costly than originally expected, due in part to the need for extensive and difficult utility relocation and related traffic management. For these reasons, the estimated cost of this project has risen from \$4.8 million when it was incorporated into Schedule Six in 2004 to \$8 million today.



FIGURE 9  
 Sewer Separation and System Optimization for BOS072-073



map1102-7

**NEPONSET RIVER SEWER SEPARATION**

This project involved sewer separation in the Neponset section of Dorchester, to eliminate CSO discharges to the Neponset River at outfalls BOS093 and BOS095. The separation work included construction of approximately 10,000 feet of new storm drain. BWSC performed the work with MWRA funding.

BWSC completed storm drain construction and closed the last remaining CSO outfall to the Neponset River in June 2000. It continues to perform downspout disconnection and other work to remove additional stormwater inflow from the sewer system, in order to minimize the risk of surcharging and flooding. In 2004, BWSC completed a substantial contract to remove inflow sources from sewer systems in the Neponset area. This work further reduced the amount of stormwater in the sewer system by removing non-residential, private drainage connections, such as connections from private parking lots.

**CONSTITUTION BEACH SEWER SEPARATION**

This project involved sewer separation in a section of East Boston to eliminate CSO discharges at the Constitution Beach CSO facility (outfall BOS002/MWR207). The separation work included construction of approximately 14,000 feet of new storm drain. BWSC performed the work with MWRA funding.

BWSC completed storm drain construction and closed the last remaining CSO regulator in September 2000, and MWRA decommissioned the Constitution Beach CSO Facility soon after. MWRA has transferred the site to the control of the Division of Capital Asset Management.

**RESERVED CHANNEL SEWER SEPARATION**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	July 2006	July 2006
Commence Construction	May 2009	May 2009
Complete Construction	December 2015	December 2015

To minimize CSO discharges to Reserved Channel by separating combined sewer systems in a portion of South Boston. Implementation of the recommended sewer separation plan will reduce the number of overflows to Reserved Channel from as many as 37 to 3 in a typical year, (see Figure 5, page 15).

In April 2001, MWRA filed a Notice of Project Change with MEPA, recommending a reassessment of the overall CSO control approach for North Dorchester Bay and Reserved Channel. The Secretary’s Certificate, issued in June, approved the reassessment as scoped by MWRA. MWRA began the reassessment in September 2001, which included updating planning assumptions and water quality information and evaluating a full range of CSO control goals and technologies. The reassessment completed in April 2004, when MWRA filed the Supplemental Facilities Plan and Environmental Impact Report for North Dorchester Bay and the Reserved Channel, recommended a new plan which included sewer separation in the area tributary to Reserved Channel. Design is scheduled to begin in July 2006, with construction starting and ending in May 2009 and December 2015 respectively.

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MWRA and BWSC plan to add this project to their CSO MOU and Financial Assistance Agreement, by which BWSC will be responsible for managing design and construction of the project and ensuring that CSO control goals and other project objectives are met. MWRA will fund most of the design and construction costs, pursuant to the eligibility terms of the agreement. BWSC plans to commence design by July 2006, in compliance with Schedule Six. The design work and construction contracts for the Reserved Channel sewer separation project will likely follow an approach similar to the South Dorchester Bay and Stony Brook sewer separation projects, with multiple construction contracts sequenced over several years. A preliminary design report early in the design phase will define the work in much more detail and lay out construction contracts and contract schedules.

**MORRISSEY BOULEVARD STORM DRAIN**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	June 2005	June 2005
Commence Construction	December 2006	December 2006
Complete Construction	June 2009	June 2009

A component of the North Dorchester Bay CSO control plan, the Morrissey Boulevard storm drain project is intended to direct some of the North Dorchester Bay stormwater away from MWRA's recommended CSO storage tunnel in storms greater than the 1-year design storm. Redirecting these stormwater flows to Savin Hill Cove and South Dorchester Bay in large storms reserves capacity in the MWRA tunnel to attain a 5-year level of stormwater control along the South Boston beaches, in addition to CSO elimination. BWSC commenced design of the Morrissey Boulevard storm drain in June, in compliance with Schedule Six. The work is being managed by BWSC with MWRA funding (see Figure 5 at page 15).

MWRA and BWSC added the Morrissey Boulevard storm drain project to their CSO MOU and Financial Assistance Agreement in May 2005, and BWSC commenced design work in June, in compliance with Schedule Six. Recently, BWSC submitted to MWRA the results of a design review and 75% design plans and specifications. Activities to obtain necessary permits, construction access and easements will begin soon. BWSC plans to complete design work and commence construction by the end of 2006.

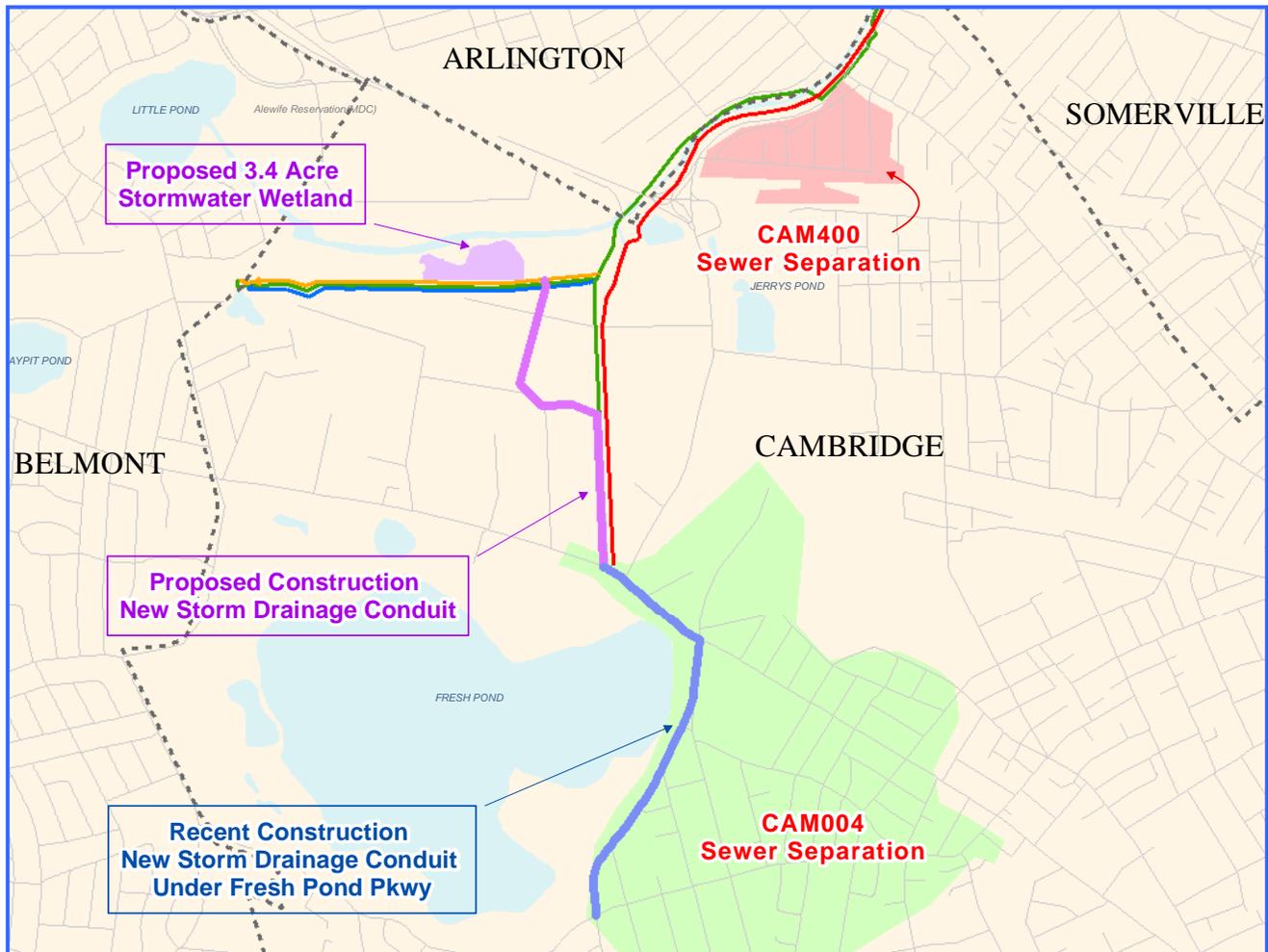
**CAMBRIDGE/ALEWIFE BROOK SEWER SEPARATION**

	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	January 1997	January 1997
Commence Construction	July 1998	July 1998
Complete Construction	January 2000*	To be determined

\* In negotiation.

***Background on the Revised Plan for Alewife Brook Sewer Separation***

This project is intended to minimize CSO flows to Alewife Brook, primarily by separating combined sewer systems in parts of Cambridge. Most of the design and construction work is being done by the City of Cambridge with MWRA funding under a Memorandum of Understanding and Financial Assistance Agreement. Cambridge began construction of the sewer separation plan in July 1998, in accordance with the recommended plan in the 1997 Facilities Plan/EIR and in compliance with Schedule Six. Cambridge has since completed all four of the construction contracts it awarded. The work already completed has significantly reduced CSO discharges to Alewife Brook. Hydraulic model simulations show that CSO discharges have been reduced from 63 times per year on average with 50 million gallons annual volume to 25 times per year on average with 33 million gallons annual volume.



However, in 2000, MWRA and Cambridge suspended further design work and construction contract awards related to the 1997 plan, based on new information showing that conditions in the Cambridge combined sewer system were markedly different from conditions assumed in 1997. They determined that considerably more work, as well as changes in the scope of work, would be necessary to meet the 1997 CSO control goals for Alewife Brook. In April 2001, MWRA and Cambridge submitted a Notice of Project Change for public review recommending an expanded, and much more costly, sewer separation plan to meet those goals. The Secretary's Certificate on the Notice of Project Change, issued in June 2001, required MWRA and Cambridge to prepare a document responding to all public comments, including comments related to the feasibility of obtaining necessary federal and state permits and other approvals to build the project. In May 2003, MWRA and the City of Cambridge submitted a response to MEPA, addressing all public comments. The Response to Comments was two years in the making and involved extensive interactions with regulatory agencies, community officials in Arlington, Belmont and Cambridge, DCR and the public.

The Response to Comments also presented a final project plan that incorporated adjustments made during the public review process to address the various concerns that had been raised. In particular, significant adjustments were made to Cambridge's proposed stormwater system and wetland basin to ensure that the stormwater flows generated by the sewer separation work will have no adverse effect on Alewife Brook flood elevations and that the wetland basin will contribute to the ecological and recreational goals in DCR's Master Plan for the Alewife Reservation. Submission of the Response to Comments document effectively marked completion of the MEPA review process for this project, allowing MWRA and Cambridge to move the project into design and construction.

### ***Updated Plans and Cost Concerns***

Since 2003, Cambridge has been updating its preliminary design plans to reflect the additional plan changes that resulted from MEPA review, public comments and new field information. Cambridge has also been updating design and construction schedules and cost estimates. While updating the plans, Cambridge has also pursued final design on key portions of the work, namely Contract 12, which involves construction of the wetland basin and new storm drain outfall in the Alewife Reservation.

In December 2004, MWRA received the Draft Second Supplemental Preliminary Design Report ("SSPDR") from Cambridge, which provided an update on the work plans, design and construction contract requirements, schedules and costs for the Cambridge, Alewife Brook Sewer Separation project. The SSPDR showed that the total project cost for the Alewife sewer separation plan and for Cambridge floatables control is now estimated by Cambridge to be \$94 million, compared to the estimate of \$74 million in the 2001 Notice of Project Change, though the general scope of work and level of CSO control have not changed. Table 7 below shows a comparison of cost breakdowns, by contract, between the 2001 Notice of Project Change and 2004 SSPDR. The cost increases are primarily due to detailed design changes and construction requirements (using costs from completed construction contracts), additional hazardous materials management requirements, Cambridge's selection of floatables control technologies, and inflation.

The Authority is greatly concerned that cost estimates have risen significantly. The \$74 million estimate, developed with the 2001 Notice of Project Change, was itself a huge cost increase from the original 1997 CSO plan estimate of \$13.8 million (the \$13.8 million plan is what the Authority originally agreed to in the Court schedule). The latest additional, large increase in estimated cost will compel the Authority to reevaluate again the cost effectiveness of the plan.

MWRA is continuing to meet with the Cambridge Department of Public Works to fully understand the updated information and resolve outstanding issues. From this review, MWRA expects to make a series of recommendations to its Board of Directors, regarding the reasonableness of Cambridge's updated plans and

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cost estimates, the appropriateness of moving forward with the Alewife Brook plan at a higher cost, the amount of the cost that is eligible for MWRA funding, and appropriate amendments to the agreements with Cambridge. The Authority and Cambridge are negotiating an agreement on total project cost or cost sharing.

**Table 4 Breakdown of Alewife Plan Costs**

Area/Outfall	Construction Contract	Construction and Engineering Cost Estimate	
		2001 NPC	2004 SSPDR
CAM002,004	Contracts 1 through 3	\$26,128,000	\$26,843,000
CAM004	Contract 12	\$20,826,000	\$21,676,000
	Contract 8A	\$21,890,000	\$10,818,000
	Contract 8B		\$12,563,000
	Contract 9		\$9,841,000
CAM400	Contract 13	\$1,217,000	\$3,247,000
CAM007,009,011	Contract 5 (Floatables Control)	\$2,509,000	\$4,255,000
CAM017			\$3,441,000
CAM001,004	Contract 4		
CAM002,401B	(Floatables Control)		
MWR003	Gate/siphon/floatables control	\$1,451,000	\$1,371,000*
<b>Total</b>		<b>\$74,021,000</b>	<b>\$94,055,000</b>

It should be noted that the current cost estimate is expressed in November 2004 dollars. If these costs are inflated to the currently estimated mid-point of construction, the total cost of the recommended plan is on the order of \$102 million.

\* MWRA cost estimate (FY05 CIP).

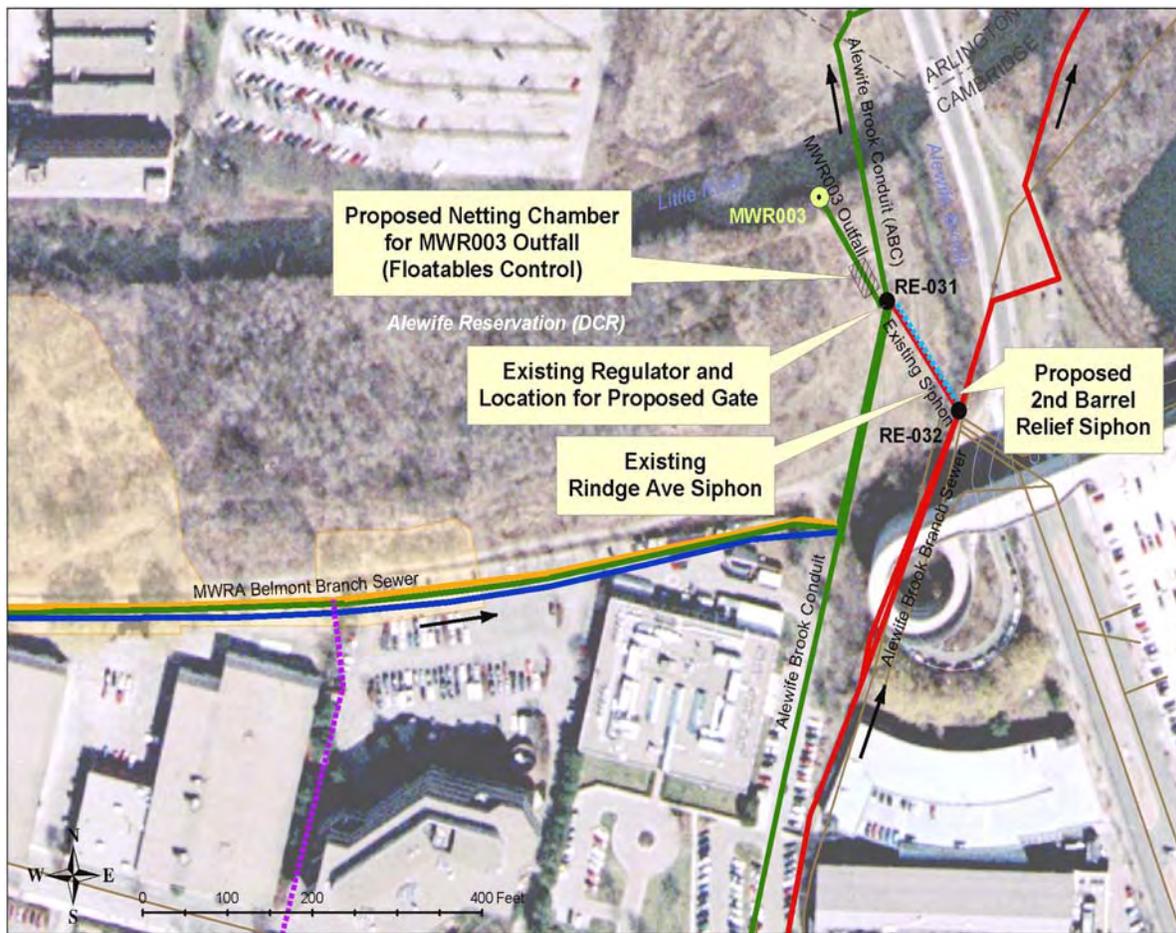
- Contracts 1, 2A, and 2B sewer separation in the CAM004 area.
- Contract 3 sewer separation in the CAM002 area.
- Contracts 4 and 5 floatables control along Alewife Brook and Charles River.
- Contracts 8A, 8B and 9 sewer separation in the CAM004 area.
- Contract 12 outfall for separated CAM004 area.
- Contract 13 common manhole separation in CAM400 area.
- Note: Contracts 6, 7 and 11 are no longer part of the plan.

Cambridge's progress on Contract 12, involving the new storm drain outfall and stormwater wetland necessary to support future sewer separation in the CAM004 area and the closing of the CAM004 regulator, has been slowed and is further delayed by the ongoing appeal of DEP's wetlands approval for Contract 12. Cambridge received a Superseding Order of Conditions for Contract 12 from DEP on March 31, 2005. However, an appeal was filed by a group of citizens on April 13, 2005, seeking further consideration of an alternative location for the wetland basin. DEP held a hearing on this appeal on July 27, 2005. On November 18, 2005, a prehearing conference was held on the citizens' appeal of the Superseding Order of Conditions which DEP had issued in March. An adjudicatory hearing is scheduled for June 2006. MWRA is not aware of a defined timeline for a decision on the appeal and expects the wetlands approval could be held up for several more months. This additional time has been factored into MWRA's most recent project schedule and into the recent discussions with EPA and DEP about proposed new milestones. There is the continued possibility, however, of further appeals and other legal action that could compromise Cambridge's ability to construct the contract, placing all other components of the Alewife CSO plan at risk.

***MWRA Improvements at Outfall MWR003 and Rindge Avenue Siphon***

While a majority of the revised Alewife Brook CSO control plan is being implemented by the City of Cambridge with MWRA financial assistance, a portion of the plan dealing directly with MWRA sewers and an MWRA CSO outfall will be designed and constructed by MWRA. This work involves installing an automated hydraulic relief gate and associated controls at the overflow weir associated with outfall MWR003; installing floatables control for this outfall, consisting of an in-line netting structure; and relieving a 30-inch MWRA siphon that interconnects the two MWRA interceptors (the Alewife Brook Sewer and the Alewife Brook Conduit) that parallel Alewife Brook and convey wastewater from parts of Belmont, Arlington, Cambridge and Somerville.

MWRA has prepared a draft scope of services for design and engineering services during construction for these components of the Alewife Brook plan. However, the design work is not scheduled to commence until 2009, because this work is dependent upon Cambridge moving forward with its Contract 12.



**5.3 Region-wide Floatables Control and Outfall Closing Projects**

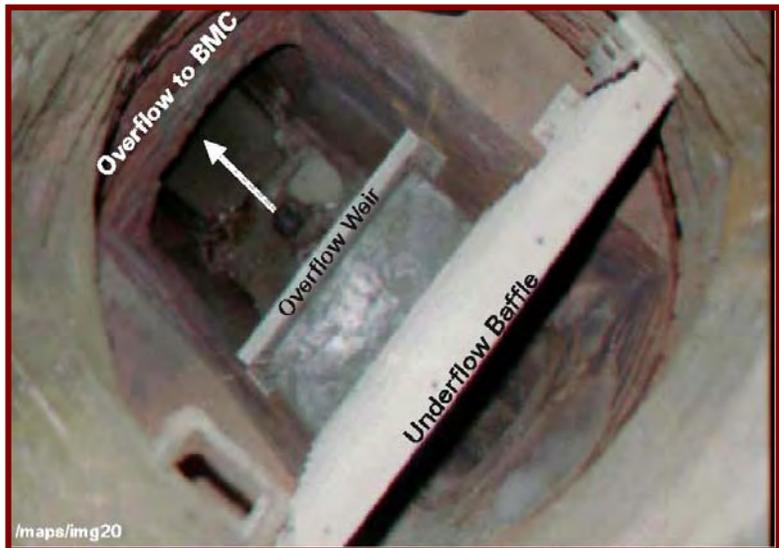
	<u>Court Milestone</u>	<u>Project Schedule</u>
Commence Design	September 1996	September 1996
Commence Construction	March 1999	March 1999
Commence Construction	May 2001	See text below for MWRA, BWSC and Cambridge schedules

The 1997 Facilities Plan/EIR called for the control of floatable materials in all remaining CSO discharges, in accordance with EPA’s National CSO Policy. Floatables controls will be installed at most of the remaining active CSO outfalls as part of the larger CSO control projects described above. For instance, the Chelsea Trunk Sewer Relief project included the installation of underflow baffles for floatables control at outfalls CHE002, CHE003 and CHE004.

The Region-wide Floatables Control and Outfall Closing Projects described in the following sections involve floatables controls and regulator or outfall closings that are independent of the larger projects. MWRA, BWSC, Cambridge and Somerville are responsible for implementing these controls in their respective systems. MWRA met the March 1999 milestone for commencement of construction with work at outfalls MWR018-022. Schedule Six required the completion of all related construction work by May 2001.

***MWRA Floatables Control at Outfalls MWR018–020 and Outfall Closings at MWR021-022***

CSO outfalls MWR018, 019, 020, 021 and 022 conveyed overflows from MWRA's Boston Marginal Conduit to the Lower Charles River Basin in very large storms. The project called for closing outfalls 021 and 022 and providing floatables control at the remaining locations. The plan for floatables control involved the installation of underflow baffles at eleven CSO regulator structures upstream of outfalls 018-020.



MWRA completed the installation of underflow baffles in four of the eleven BWSC regulators (MC-12, MC-15, MC-19 and MC-25) in late 1999. In March 2000, MWRA closed outfalls MWR021 and MWR022 to CSO discharges.

During preliminary design of floatables control at the seven remaining CSO regulators, which were located in the Old Stony Brook Conduit System, it was determined that the installation of underflow baffles at these regulators would be difficult and potentially prohibitive due to extensive construction requirements, construction impacts and cost.

Based on new information describing the construction difficulties and showing that outfalls MWR018, 019 and 020 only rarely activate, MWRA was not required to install floatables control for these outfalls. Instead,

DEP required MWRA to take certain actions to keep activations low and to confirm that activation frequencies at these outfalls were consistent with predictions. On an annual basis, MWRA reviews meter data to confirm the predicted performance, and has consistently seen that activation frequencies at these outfalls are rare, as predicted.

### ***CSO Control at Outfall MWR010***

In April and May 2001, MWRA submitted reports to EPA and DEP on studies it conducted to reassess CSO discharges at outfall MWR010. The scope of the reassessment included updating the hydraulic model of the combined sewer systems affecting this outfall, evaluating the feasibility of closing the outfall to CSO discharges, and recommending measures to minimize discharges if the outfall could not be closed.

Results of the reassessment showed that the outfall did not discharge CSO in a typical rainfall year. Furthermore, CSO discharges could be reduced to the level of not occurring up to a 5-year storm by bringing back into service a blocked connection between the Town of Brookline and MWRA systems. The reports also concluded that MWR010 should not be permanently closed, since closure of the outfall was predicted to result in upstream flooding during extreme storms.

On October 29, 2002, DEP issued its approval, subject to MWRA and Brookline maintaining the dry weather connection in an operable condition. In addition, DEP requested that MWRA evaluate further system optimization measures to minimize CSO discharges at MWR010 and at the hydraulically connected Cottage Farm CSO facility and implement Best Management Practices in the tributary area to minimize wet weather pollutant loadings. The results of initial system optimization evaluations were reported in the *Cottage Farm CSO Facility Assessment Report* in January 2004, which also described ongoing work by the Town of Brookline to separate sewers, which will enhance CSO control at MWR010 and at Cottage Farm. MWRA tracks the performance of the reactivated Brookline connection by reviewing upstream velocity and depth data collected by a permanent flow meter.

### ***BWSC Floatables Control***

Floatables control included in this project involved the installation of underflow baffles in ten existing CSO regulator structures associated with outfalls along Boston Inner Harbor and Fort Point Channel. BWSC designed and constructed the project, and MWRA funded costs. BWSC completed the last of the ten installations in 2002.

### ***Cambridge Floatables Control***

This work involves providing floatables control at eight outfalls located along Alewife Brook and the Charles River in Cambridge. Since Cambridge will be responsible for the operation and maintenance of its floatables control devices, MWRA has agreed to allow Cambridge to install devices of its choice, provided they meet the level of floatables control that would be achieved by MWRA's recommended plan. At four locations along Alewife Brook (CAM400 is no longer included, as this outfall will instead be closed), the floatables controls are being designed and installed in conjunction with the Cambridge/Alewife Brook sewer separation project. These controls were included in the various regulatory filings on the Alewife sewer separation project and Alewife Brook/Upper Mystic River Variance. As previously reported, Cambridge has completed floatables control at one of these locations, CAM401A, and plans to complete construction at the other Alewife locations by 2008. Design work is on hold pending resolution of the Contract 12 wetlands appeal.

Controls at four locations along the Charles River are separately being designed and installed by Cambridge.

Cambridge's final design work is ongoing, and Cambridge plans to complete construction in 2007.

### ***Somerville Floatables Control***

The final CSO plan called for the control of floatable materials in the CSO discharges at outfall SOM001A (Tannery Brook outfall) by installing an in-line net. This work, like much of the work under Cambridge Floatables Control, is associated with the Cambridge/Alewife Brook sewer separation project. The revised Alewife project in part calls for enlarging the local system connection to the MWRA interceptor at SOM001A, in addition to providing floatables control. MWRA and the City of Cambridge are now developing plans and schedules for design and construction of floatables control at this outfall. In the meantime, the City of Somerville continues to maintain a boom as an interim floatables control measure at this outfall.

However, the plan for floatables control at SOM001A is dependent on the recommendations that will come from studies of the Tannery Brook that Somerville is conducting in compliance with conditions in the Alewife Brook/Upper Mystic River Variance extension issued by DEP in September 2004. Any further work to implement a long term plan for floatables control should consider the results of that study. An interim report was completed in December 2005. Somerville is now conducting further, more detailed, studies toward recommending a long-term plan.

## **6. Planned CSO Program Activities in 2006**

Schedule Six in the Federal Court Order in the Boston Harbor Case includes seven CSO control milestones in 2006. In addition, MWRA continues work required to complete the Union Park Detention/Treatment Facility pursuant to a September 2005 milestone. These milestones are presented in Table 5.

### ***Fort Point Channel***

MWRA expects construction of the Union Park Detention/Treatment Facility to be substantially complete by December 2006, at which time the new pumping systems and treatment plant will be placed into operation, improving water quality in Fort Point Channel.

BWSC will continue its efforts to complete construction of the sewer separation and system optimization work related to outfalls BOS072 and BOS073 toward substantial completion by March 2007.

### ***Charles River Basin***

BWSC plans to complete construction of the Stony Brook Sewer Separation project and to conduct flow monitoring to confirm that the project's performance objectives have been met. The project is intended to reduce CSO discharge to the Stony Brook Conduit to two activations and 0.13 million gallons annual volume in a typical year.

Cambridge plans to commence construction in 2006 to provide floatables controls at its CSO outfalls along the Charles River.

Pursuant to the conditions with the Charles River CSO variance extension, MWRA plans to commence work to implement of the system optimization measures recommended in the Cottage Farm CSO Facility Assessment Report to reduce treated CSO discharges at Cottage Farm and will track efforts by Brookline and

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Cambridge to separate combined sewer systems and further reduce CSOs to the basin. MWRA will also track I/I control efforts in community systems that affect Charles River CSO discharges and will continue its long-term water quality monitoring program in the Basin.

**Table 5**

<b>Date</b>	<b>Milestone</b>	<b>Project Schedule</b>
Sep 2005	<i>MWRA to complete construction of detention and treatment facility at Union Park Pump Station.</i>	Construction is 87% complete. MWRA expects to extend construction contract to December 31, 2006, to cover additional work and work delays, and plans to bring the new facilities on-line at that time.
Mar 2006	<i>MWRA to submit annual report on CSO control progress.</i>	MWRA submitted this Annual Report for 2005 on March 15, 2006.
May 2006	<i>MWRA, in cooperation with BWSC, to complete construction of Pleasure Bay storm drain improvements.</i>	MWRA's construction of the Pleasure Bay storm drain improvements is underway and on schedule for completion by May 2006, at which time storm drain discharges to Pleasure Bay beach will be eliminated.
July 2006	<i>MWRA, in cooperation with BWSC, to commence design of Reserved Channel Sewer Separation.</i>	BWSC and MWRA plan to amend their CSO MOU and Financial Assistance Agreement this spring to add the Reserved Channel sewer separation project, and BWSC plans to commence design by July 2006.
Aug 2006	<i>MWRA to commence construction of North Dorchester Bay storage tunnel and related facilities.</i>	MWRA plans to commence the first of two contracts to construct the North Dorchester Bay tunnel and related facilities in July 2006.
Sep 2006	<i>MWRA to complete construction of hydraulic relief for BOS 017.</i>	MWRA completed the hydraulic relief project at outfall BOS017 (Mystic River, Charlestown) in 2000. MWRA has verified that the CSO control goals at this outfall were achieved.
Sep 2006	<i>MWRA, in cooperation with BWSC, to complete construction of Stony Brook sewer separation.</i>	BWSC plans to complete the Stony Brook sewer separation project by September 2006.
Dec 2006	<i>MWRA, in cooperation with BWSC, to commence construction of Morrissey Boulevard storm drain.</i>	BWSC currently is in detailed design of the project.

\*The above Table does not include recently agreed upon Additional Charles River CSO control projects and Prison Point CSO Facility study.

***South Dorchester Bay***

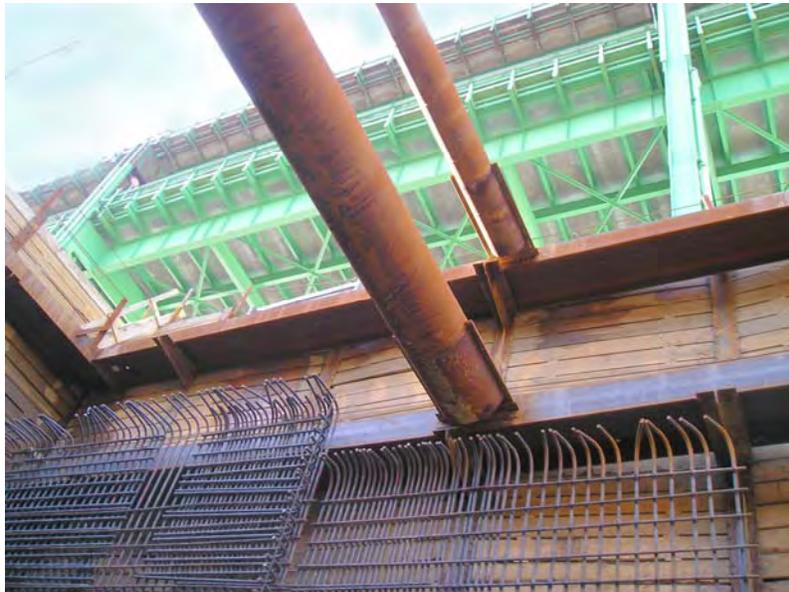
BWSC will continue its efforts to complete construction of the South Dorchester Bay sewer separation project and eliminate CSO discharges to South Dorchester Bay by November 2008, in compliance with Schedule Six. All of the planned, major construction contracts are completed or underway, and BWSC expects to complete all contracts by the end of 2006. Efforts are underway to monitor flows to determine whether the hydraulic performance of the system necessary to allow the closing of the remaining CSO regulators has been achieved.

***Alewife Brook/Upper Mystic River***

In 2006, Cambridge plans to complete final design of the wetland basin and stormwater outfall (Contract 12) that will allow Cambridge to pursue separation of the combined sewer systems tributary to outfall CAM004 and the closing of this outfall to CSO discharges. Cambridge's schedule calls for commencing the construction contract for the basin and the stormwater outfall and commencing the design of other components of the Alewife Brook plan in 2007, if it is able to obtain the necessary regulatory and land approvals.

***Annual CSO Discharge Reporting***

In compliance with its NPDES permit, MWRA is performing hydraulic modeling work to estimate CSO discharges during storms that occurred in calendar year 2005 and plans to submit those estimates to EPA and DEP in April 2006. MWRA will share the results with its CSO communities to verify the estimates and coordinate the submissions to EPA and DEP, because the communities have similar reporting requirements in their NPDES permits. MWRA uses the annual CSO discharge estimates to verify progress in controlling CSO discharges towards realizing the goals of the long-term CSO control plan and meeting related NPDES permit limits that are the basis for compliance with water quality standards.



View from bottom of BOS019 storage conduit trench; Mystic River Bridge above

***The End***

