

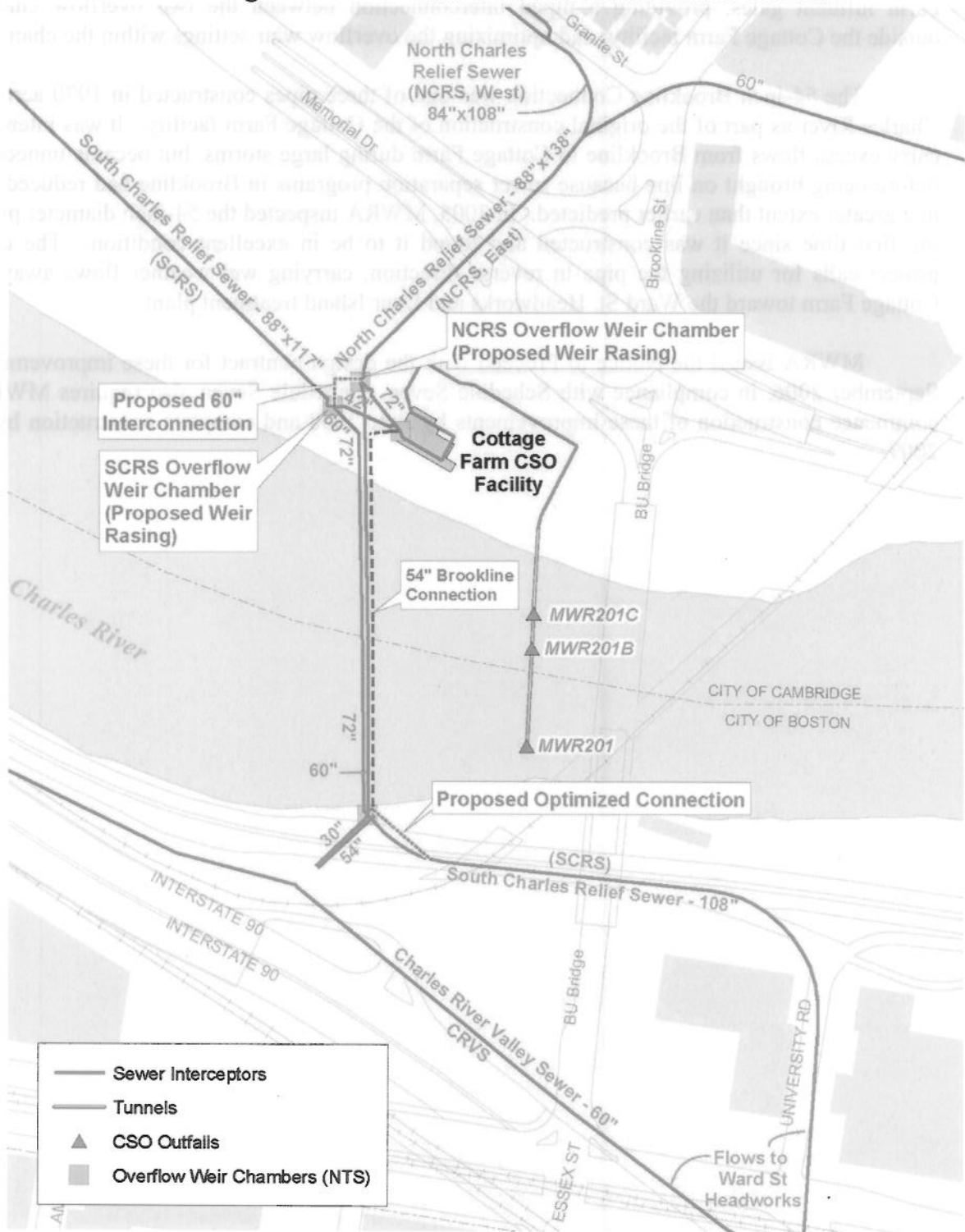
*June 13, 2007*

with the South Charles Relief Sewer (on the Boston side of the river); developing gate controls and a control system to optimize and potentially automate the operation of the existing Cottage Farm influent gates; providing a piped interconnection between the two overflow chambers outside the Cottage Farm facility; and optimizing the overflow weir settings within the chambers.

The 54-inch Brookline Connection was one of three pipes constructed in 1970 across the Charles River as part of the original construction of the Cottage Farm facility. It was intended to carry excess flows from Brookline to Cottage Farm during large storms, but became unnecessary before being brought on line because sewer separation programs in Brookline had reduced flows to a greater extent than earlier predicted. In 2005, MWRA inspected the 54-inch diameter pipe for the first time since it was constructed and found it to be in excellent condition. The current project calls for utilizing the pipe in reverse direction, carrying wet weather flows away from Cottage Farm toward the Ward St. Headworks and Deer Island treatment plant.

MWRA issued the Notice to Proceed with the design contract for these improvements in September 2006, in compliance with Schedule Seven. Schedule Seven also requires MWRA to commence construction of these improvements by June 2008 and complete construction by June 2009.

Figure 3  
Cottage Farm Brookline Connection and Inflow Controls

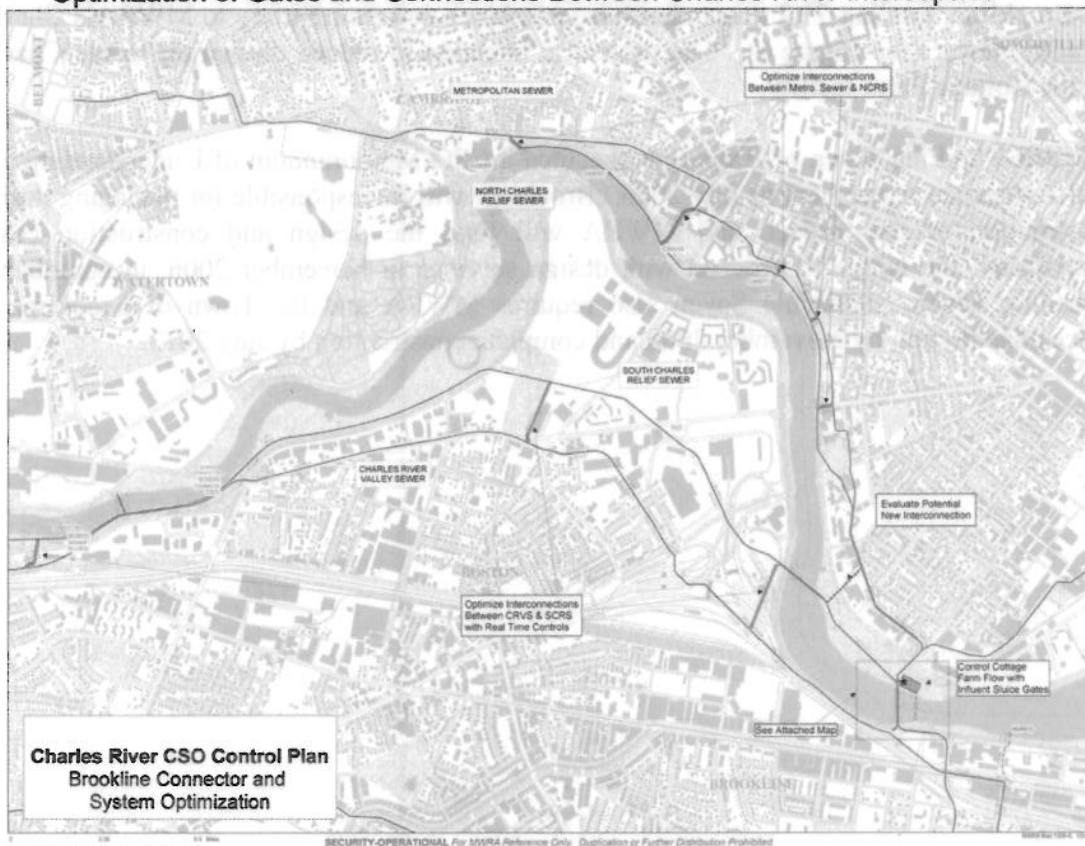


Charles River Valley/South Charles Relief Sewer Gates Controls and Additional Interceptor Connections

This set of improvements to reduce Charles River CSOs includes measures to optimize flows among the four interceptors that convey flow to the Ward St. Headworks and can overflow to the Cottage Farm facility. The measures include developing an operational strategy for optimizing the transfer and allocation of flows between the Charles River Valley Sewer and the South Charles Relief Sewer using existing gates located at three connections between these interceptors, (see Figure 4). MWRA will also evaluate the feasibility of improving hydraulic performance along the North Charles Metropolitan Sewer and the North Charles Relief Sewer with new connections or modified existing connections between these interceptors and by adjusting overflow regulators along the interceptors, if beneficial.

MWRA plans to commence the design of the gate controls and the evaluation of additional interceptor connections under one contract in January 2008, in compliance with Schedule Seven. Schedule Seven also requires MWRA to submit a report on the evaluation of additional connections by January 2009, commence construction of the interceptor gate controls by January 2010, and complete construction of the gate controls by January 2011.

**Figure 4  
Optimization of Gates and Connections Between Charles River Interceptors**



Bulfinch Triangle Sewer Separation

The goal of the \$4.4 million Bulfinch Triangle sewer separation project is to minimize CSO discharges to the Charles River by separating combined sewer systems in the area of Boston roughly bounded by North Station, Haymarket Station, North Washington St., and Cambridge St. and immediate environs (see Figure 5). Implementation of the recommended sewer separation plan will reduce the number of overflows to the Charles River, reduce overflows to the Prison Point CSO facility, and allow BWSC to close outfall BOS049.

MWRA and BWSC added this project to their CSO Memorandum of Understanding and Financial Assistance Agreement in October 2006. BWSC will be responsible for managing design and construction, and MWRA will fund the design and construction costs.

BWSC issued the notice to proceed with design services in August 2006, in compliance with Schedule Seven. Schedule Seven also requires MWRA and BWSC to commence construction of Bulfinch Triangle sewer separation by November 2008 and complete construction by July 2013.

Brookline Sewer Separation

The \$9.0 million Brookline sewer separation project is intended to separate remaining areas of Brookline, totaling 71.2 acres, that have combined sewers tributary to MWRA's Charles River Valley Sewer (see Figure 6). The project is intended to reduce discharges to the Charles River at the Cottage Farm facility.

MWRA and the Town of Brookline executed a CSO Memorandum of Understanding and Financial Assistance Agreement in July 2006. Brookline will be responsible for managing design and construction of the project, and MWRA will fund the design and construction costs. Brookline issued the notice to proceed with design services in November 2006, in compliance with Schedule Seven. Schedule Seven also requires MWRA and the Town of Brookline to commence construction by November 2008 and complete construction by July 2013.

Figure 5

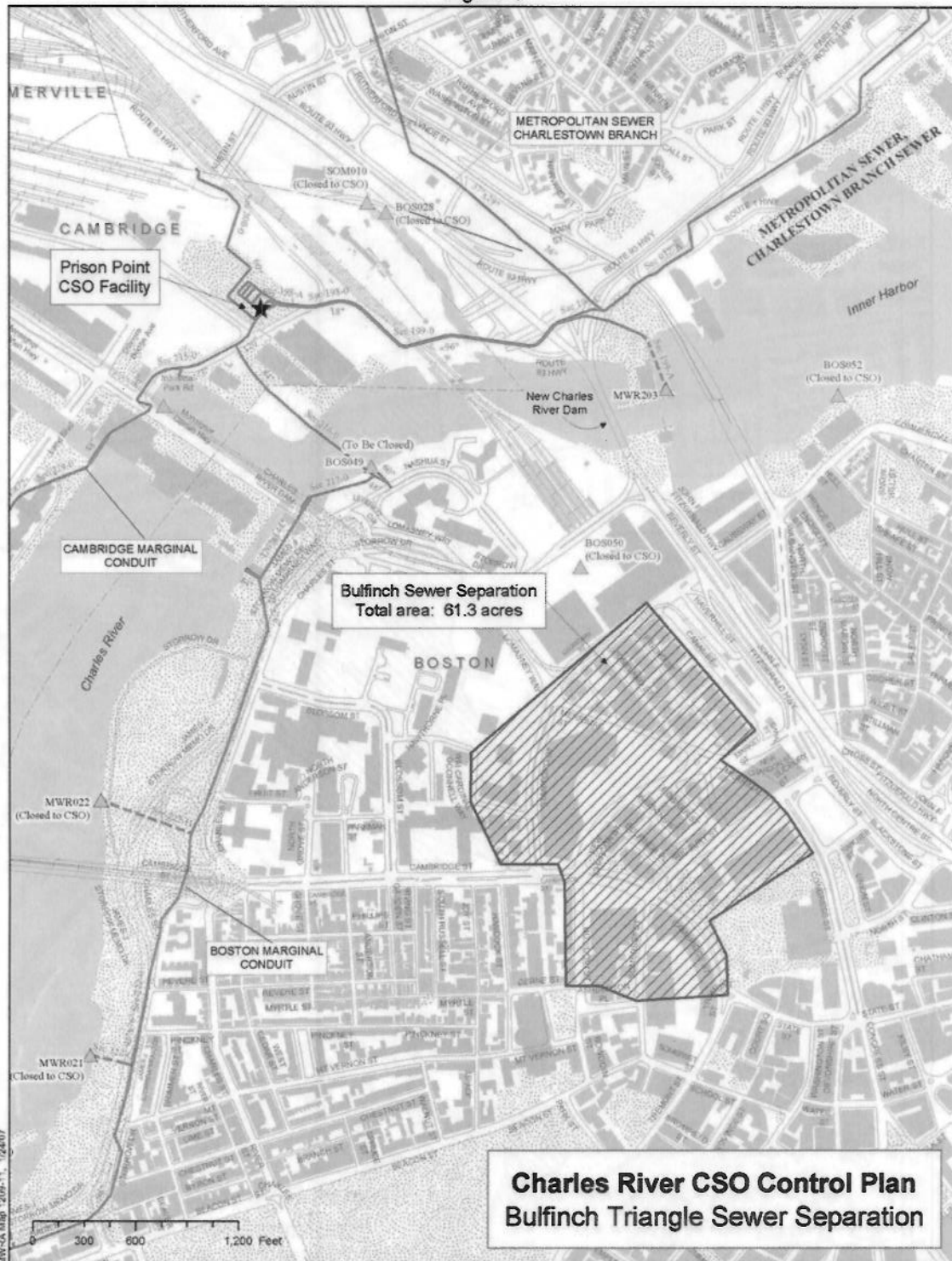
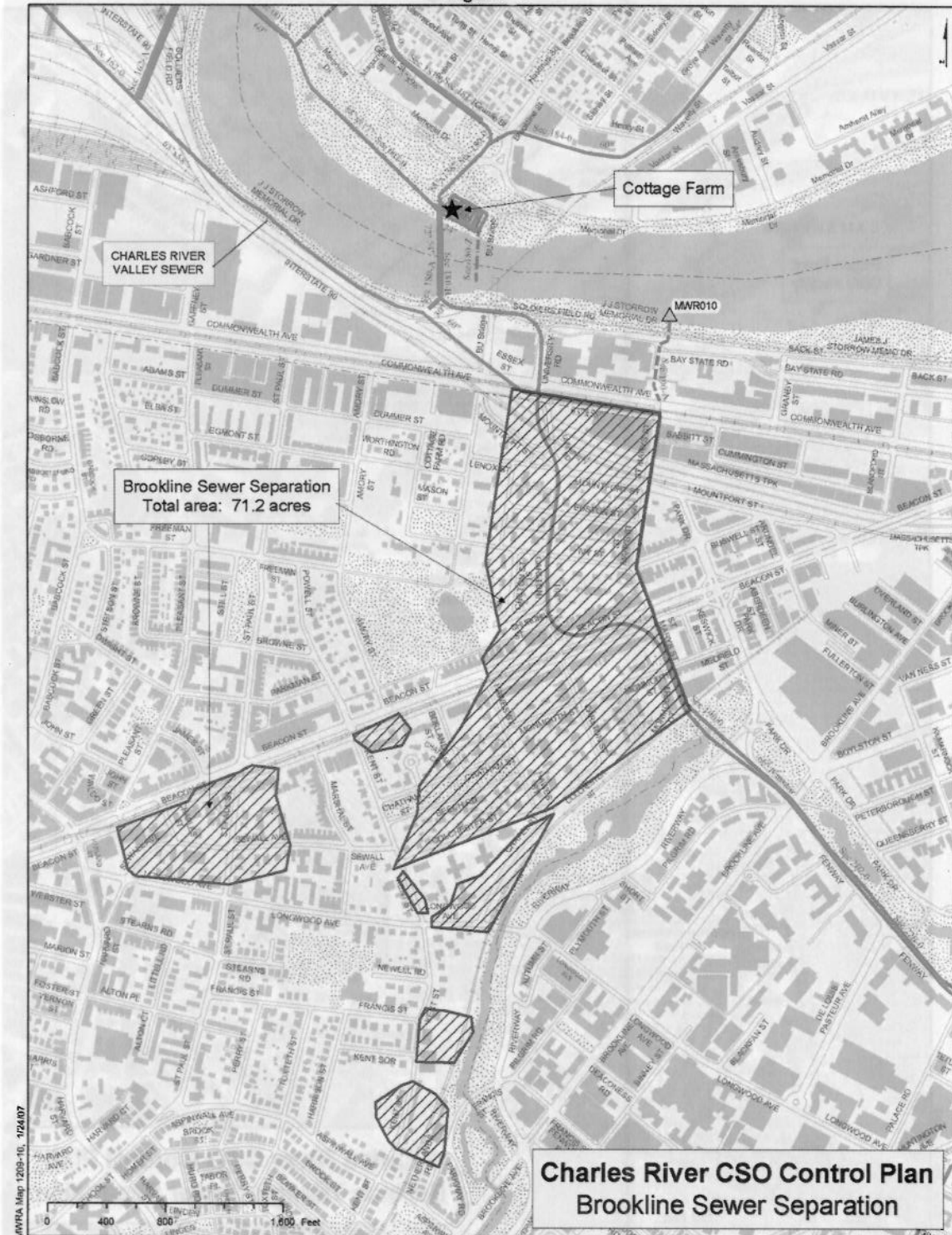




Figure 6



Actual and Anticipated CSO Reductions in the Charles River Basin

MWRA, with the cooperation of BWSC, Cambridge and Brookline, has made significant investments since the late 1980's to improve the wastewater collection and transport systems and complete the implementation of the CSO control projects recommended in the 1997 FEIR. These investments have dramatically reduced CSO discharges to the Charles River (a 96% reduction in average annual volume since 1988) and have allowed many CSO outfalls to be permanently closed. With new information collected since the Variance was first issued in 1998, MWRA has improved upon the long-term plan and predicted CSO control benefits by recommending additional long-term controls that primarily involve optimization of sewer system performance and reduction of stormwater inflow. MWRA predicts that these improvements will reduce the current (2006) level of CSO discharge by 89%, for an overall reduction in average annual CSO volume to the Charles River Basin of 99.5% since MWRA began its CSO control efforts in the late 1980's.

The CSO abatement resulting from MWRA's LTCP is summarized in the following table:

Annual CSO Discharge Frequency and Volume to the Charles River (for typical year rainfall)						
Outfall	Baseline Conditions (1988)		Current Conditions <sup>(2)</sup>		Plan Implementation <sup>(3)</sup>	
	Activations	Volume (MG)	Activations	Volume (MG)	Activations	Volume (MG)
BOS032	4	3.17	N/A	Eliminated	N/A	Eliminated
BOS033	7	0.26	N/A	Eliminated	N/A	Eliminated
CAM005	6	9.17	4	1.60	3	0.84
CAM007	1	0.81	3	0.79	1	0.03
CAM009	19	0.19	2	0.06	2	0.01
CAM011	1	0.07	0	0.00	0	0.0
BOS028	4	0.02	N/A	Eliminated	N/A	Eliminated
BOS042	0	0.00	N/A	Eliminated	N/A	Eliminated
BOS049	1	0.01	0	0.00	N/A	Eliminated
CAM017	6	4.72	2	1.07	1	0.45
MWR010	16	0.08	0	0.00	0	0.0
MWR018	2	3.18	0	0.00	0	0.0
MWR019	2	1.32	0	0.00	0	0.0
MWR020	2	0.64	0	0.00	0	0.0
MWR021	2	0.5	N/A	Eliminated	N/A	Eliminated
MWR022	2	0.43	N/A	Eliminated	N/A	Eliminated
MWR201 <sup>(3)</sup>	18+	1,547	11	61.95	2	6.3
MWR023	39	115	7	0.45	2	0.13
SOM010	18	3.38	N/A	Eliminated	N/A	Eliminated
<b>Total</b>		<b>1,690 MG</b>		<b>68.00 MG</b>		<b>7.76 MG</b>

<sup>(1)</sup> Includes major improvements to Deer Island transport and treatment system and implementation of system optimization measures (SOPs) recommended by MWRA in 1993 and 1994.

<sup>(2)</sup> From MWRA modeling of 2006 system conditions.

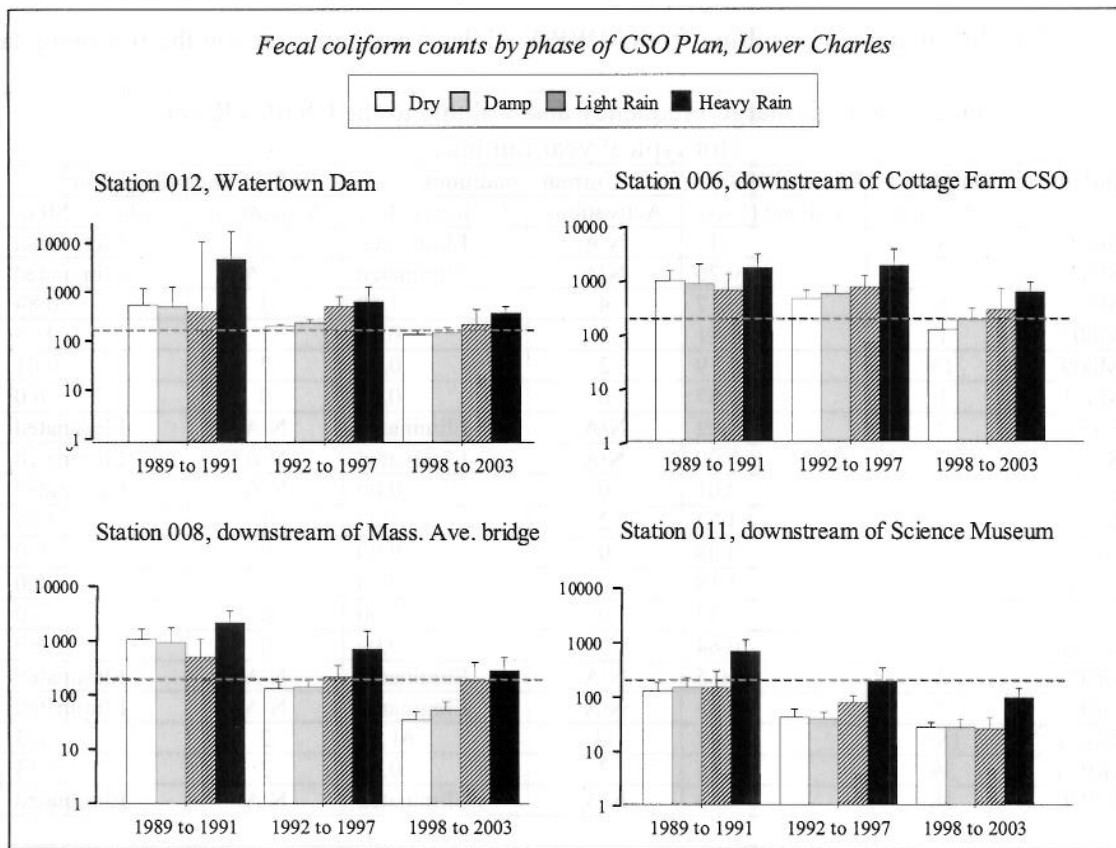
<sup>(3)</sup> Construction of the long-term CSO control plan for Boston Harbor and its tributaries is scheduled to be complete by December 2015, which will be followed by a period of post construction monitoring in accordance with Schedule Seven of the Boston Harbor Case.

<sup>(4)</sup> MWR201 is the effluent discharge for the Cottage Farm CSO Facility. Flows are screened, disinfected and dechlorinated prior to discharge.

Results of MWRA's Water Quality Monitoring in the Charles River

MWRA has been monitoring water quality in the Charles River since 1989. Studies include measurements of sewage indicator bacteria, nutrients, and viral pathogens. MWRA has submitted reports annually during the timeframe of the variance. The reports (e.g. Coughlin K. 2006. Summary of CSO Receiving Water Quality Monitoring in Upper Mystic River/Alewife Brook and Charles River, 2005. Boston: Massachusetts Water Resources Authority. Report 2006-07. 38 p.) are available at: <http://www.mwra.state.ma.us/harbor/enquad/trlist.html>.

There have been noticeable improvements in the level of fecal coliform bacteria in the Charles River since MWRA began implementation of the long-term CSO control plan. Average bacteria counts during heavy rain, when the river is affected by contaminated stormwater and CSO, have decreased substantially. There have also been noticeable decreases during dry weather and light rain, when illicit connections and contaminated storm water have the largest effects, because the CSOs typically only discharge in heavy rain (Figure 7).



**Figure 7:** Average fecal coliform counts in different weather conditions and during phases of MWRA's CSO control plan at four locations in the lower Charles River. Dotted line indicates 200 fecal coliform/100 ml, the swimming standard. (Note log scale.)



### III. DEP Determinations and Next Steps

#### Charles River CSO Plan and Related Water Quality Improvement

Water quality in the Lower Charles River Basin has improved tremendously over the last decade, in part due to significant reductions in CSO discharges at the Cottage Farm facility and several other outfalls. Greatly improved pumping capacity at the Deer Island Wastewater Treatment Plant, improved sewer system operation and maintenance, and the implementation of projects under the long-term CSO control plan have contributed to the CSO reductions. The completed CSO work includes Stony Brook sewer separation; hydraulic relief at outfall CAM005; upgrade of the Cottage Farm facility; the closing of several outfalls by MWRA and BWSC; and floatables control. In addition, MWRA, with the cooperation of BWSC and the Town of Brookline, is now moving forward with additional projects that are intended to further reduce CSO discharges by optimizing the existing sewer system and reducing stormwater inflows. In addition, the City of Cambridge continues to implement its long-term plans for separation of its combined sewer systems in the Charles River watershed.

DEP noted in its comments on MWRA's Cottage Farm Facility Assessment Report (2004) that construction of CSO storage facilities at Cottage Farm was not a cost-effective measure for CSO control, and that MWRA should rather "*commit resources toward cost-effective projects which will further eliminate stormwater from the combined sewer system, and which will be consistent with community efforts in managing broader wet weather impacts. This approach will be important to optimizing use of the Cottage Farm CSO Treatment Facility and improving water quality in the lower Charles River Basin.*" DEP has concluded that the revised plan for the Charles River and specifically the system optimization and sewer separation projects added to the plan in 2006 are consistent with this approach and maximize CSO benefits.

#### Other Priorities to Ensure Continued Progress

Further water quality improvements in the Charles River watershed will rely largely on endeavors to address illegal discharges to storm drains, storm water Best Management Practices and other storm water impacts as they contribute to wet weather issues affecting the Charles River and its tributaries. DEP recognizes that progress is continuing to be made in these areas. Through the Charles River Basin CSO variance, the public, regulatory agencies and permittees have gained the benefit of information provided by the efforts of USGS, the Charles River Watershed Association, MWRA, BWSC, the City of Cambridge, and others to make sound decisions for continued, significant improvement in the water quality of the Charles River Basin.

DEP also acknowledges the importance of proper operation, maintenance, and rehabilitation of both the MWRA and community sewer and storm water systems to assure optimized conditions for conveying wastewater flows through the system for treatment and discharge at Deer Island and improving storm water quality. Sewer system repairs and cleaning have resulted in improved conveyance capacities in a number of locations and have also contributed to mitigating CSO discharges by addressing localized system flow constraints.

MWRA Long-Term CSO Control Plan

The \$73.3 million recommended plan to control CSO discharges to the Charles River is part of MWRA's region-wide LTCP that addresses 84 CSO outfalls discharging to Boston Harbor and its tributaries. MWRA's capital budget for the LTCP has risen from \$487 million in 1997, when MWRA issued the FEIR which was the basis for DEP's determination to issue the original CSO variance for the Charles River on October 1, 1998, to \$804 million in MWRA's current Capital Improvement Program. Much of the additional cost is due to enhancements to the plan that increase the level of CSO control or overcome site-specific hurdles to maintain the recommended levels of control. Following issuance of the FEIR, site specific issues led MWRA to conduct reassessments of several of the recommended projects in order to ensure that CSO goals would be met. MWRA also conducted investigations to improve upon the level of CSO control for the Charles River.

In August 2005, MWRA recommended a revised LTCP that included \$20 million of additional projects and associated higher level of control for the Charles River Basin. In March 2006, MWRA reached agreement with EPA, DEP and the U.S. Department of Justice DOJ on the plan and a new schedule. The agreement was filed with the Court as part of a joint motion to amend the court schedule.

In April 2006, the Court allowed the joint motion and issued an Order with a new schedule. Under the Order, MWRA has until the year 2020 to complete the remaining CSO work and subsequent monitoring to verify that the long-term CSO control goals are achieved. In addition, the United States and MWRA agreed to withdraw the February 27, 1987 Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflows and replace it with a Second Stipulation that requires MWRA to implement the CSO requirements set forth in the court schedule and to meet the levels of control described in MWRA's LTCP. In July 2006, the Court accepted revisions to Schedule Six incorporating a new Schedule Seven. The revisions include modified or additional milestones for projects in the Alewife Brook, Charles River and East Boston CSO plans.

Substantial and Widespread Social and Economic Impact

DEP has emphasized cost-effectiveness for CSO long-term control plans, to ensure that financial resources for pollution abatement actually provide improvements in water quality. The principles of cost-effectiveness and water quality benefits have been a major factor used by MWRA in the development of its present \$803 million CSO abatement plan. MWRA will spend more than \$400 million on CSO projects over the next eight years (2007-2015), which is 29% of all planned capital spending and 53% of wastewater capital spending in the same period. MWRA sewer rates are among the highest in the nation and are projected to increase significantly over the next eight years.

Implementation of the revised recommended plan will reduce the untreated CSO discharges to the Charles River to three or fewer per year on average, and will reduce the number of treated CSOs discharged at Cottage Farm to two activations per year. In accordance with DEP's CSO Guidance, cost-effectiveness, protection of sensitive uses, and the financial capability of CSO permittees are all important factors in making determinations on the appropriate level of CSO control.

MWRA submitted data related to DEP's finding of "substantial and widespread economic and social impact," the basis for its issuance of a Variance in 1997 (See 314 CMR 4.03(4)(f)). DEP documented for the current Variance ending October 1, 2007, its review of a report by Robert N. Stavins, Assessment of the Economic Impact of Additional Combined Sewer Overflow Controls on Households and Communities in the Massachusetts Water Resources Service Area, dated March 17, 2004. DEP also reviewed the Affordability Analysis Worksheets included in Appendix H of the Cottage Farm Report dated January 2004, which are based on EPA's Interim Economic Guidance for Water Quality Standards.

DEP's conclusions from its review of the documents submitted by MWRA and determination in support of the current Variance ending October 1, 2007 have not changed. Continued extension of the Variance is warranted on the basis of substantial and widespread economic and social impact. When it issued the current variance in 2004, DEP indicated that it would evaluate the information required by the variance to determine whether there are additional cost-effective CSO controls. DEP has reviewed the new information regarding revisions to the Charles River CSO plan, as well as other revisions and cost changes in MWRA's LTCP and has determined that additional controls beyond those recommended by MWRA would not be affordable.

#### **IV. CSO Variance Extension**

As part of the agreement on the LTCP reached in March 2006 among EPA, DEP, DOJ and MWRA, MWRA requested that the Variance for the Lower Charles River Basin be reissued through 2020 when MWRA must complete the region-wide LTCP and subsequent monitoring to verify that the long-term CSO control goals are achieved. MWRA bases this request on the significance of the CSO control and related water quality improvement it has achieved to date, the expectation for additional CSO control and water quality improvement with the projects it added to the Charles River plan as part of the 2006 decision, and the desire to provide a level of financial certainty and stability for its ratepayers.

##### Determination to Extend Variance

DEP makes the following determinations:

- The revisions MWRA has made to its long-term CSO control plan for the Charles River, by adding projects to optimize sewer system performance and remove stormwater inflow through sewer separation, are responsive to the conditions and intent of the Variance and will maximize CSO control benefits.
- All of the CSO discharges in the Lower Charles River Basin cannot be feasibly eliminated. MWRA has completed numerous analyses since the late 1980s evaluating alternatives for eliminating CSOs from the collection system tributary to the Deer Island Wastewater Treatment Plant. Among these are the 1997 FEIR, the 2004 Cottage Farm Facility Assessment Report, and the additional alternatives analyses and recommendations MWRA submitted to EPA and DEP in late 2005 and early 2006 that lead to the 2006 agreement. MWRA's revised LTCP incorporates all cost-effective and feasible CSO abatement projects for this watershed. At this point in time, it does

not appear technically feasible to eliminate all CSO outfalls to this watershed given the engineering and infrastructure constraints in the MWRA interceptor system, headworks, conveyance tunnels, the Deer Island wastewater treatment plant, and the ocean outfall.

- It remains unclear whether the Class B water quality standards for the Basin can ultimately be achieved or the extent (percent of time) the standards can be met. Analyses completed by the MWRA and others indicate that substantial stormwater pollutant loadings remain in the Charles River watershed. Actions are underway in this watershed to remediate stormwater discharges, including aggressive measures to identify and remove illegal sewer connections. However, it remains unclear at this time whether stormwater discharges to the Basin can meet the Class B water quality standard through the implementation of these controls. Therefore, additional time is needed before DEP can make a definitive determination as to the efficacy of the CSO and stormwater controls now planned or underway in bringing these discharges into compliance with the Class B standards.
- Proceeding at this time with controls beyond those presently included in the revised LTCP would result in substantial and widespread social and economic impact as specified in 314 CMR 4.03(4). The cost of MWRA's CSO control program is substantial, at present included in MWRA's capital budget at \$804 million and estimated by MWRA to ultimately cost \$864 million to complete the plan on schedule, including escalation to the mid-point of construction and contingency. MWRA's detailed financial impact assessment considered the effect of expected sewer rate increases, and, appropriately, median household income as adjusted by the relatively high cost of housing in the Boston area. The MWRA adequately demonstrated that proceeding at this time with CSO controls necessary for full attainment of Class B water quality standards in the Lower Charles River Basin would result in substantial and widespread economic and social impact.

DEP concludes that extension to the CSO Variance for the Lower Charles River Basin is appropriate at this time. DEP has also determined that it will reissue the variance in the future for three-year periods through 2020, when the CSO control plan and benefits will be completed and verified. Issuing of the CSO Variance Extension in the Charles watershed is consistent with EPA Guidance: *Coordinating CSO Long-Term Planning with Water Quality Standard Reviews (July 31, 2001)*, which asserts that longer term variances and renewal of variances are warranted given the extended duration necessary for implementation of LTCPs.

A determination on the highest feasible level of CSO control and associated water quality standard should be deferred until the LTCP is implemented and the associated benefits are verified in 2020, in compliance with Schedule Seven. During this same period, community programs to control illicit discharges, remove infiltration and inflow from sewer systems, and separate combined sewer systems are expected to continue and will result in additional water quality improvement for the Lower Charles River Basin.



Future Actions

- (1) The Variance for CSO discharges to the Lower Charles River Basin will be extended by a period not to exceed 3 years (October 1, 2010).
- (2) MWRA, the City of Cambridge, and the Boston Water & Sewer Commission shall implement all elements of the LTCP as defined in the Second CSO Stipulation and in accordance with Schedule Seven.
- (3) MWRA, the City of Cambridge, and the Boston Water & Sewer Commission shall continue to implement the Nine Minimum Controls and report on CSO activations and volumes.
- (4) MWRA shall continue to implement its receiving water monitoring in the Lower Charles River watershed and submit an annual summary report on or before July 1 of each year.



**FACT SHEET  
Attachment D**

**TENTATIVE DETERMINATION TO EXTEND VARIANCE  
FOR COMBINED SEWER OVERFLOW DISCHARGES  
TO  
ALEWIFE BROOK/UPPER MYSTIC RIVER BASIN**

**FACT SHEET**

This document is intended to provide a summary of the activities that have taken place since the Mass. Department of Environmental Protection's ("DEP") issuance of the CSO Variance for the Alewife Brook/Upper Mystic River Basin, and to provide a frame of reference for DEP's decision to extend the Variance for a period not to exceed three years, to September 1, 2010.

**I. Background on CSO Control and Variances**

*Original CSO Variance and Conditions*

A three-year Variance for CSO discharges to the Alewife Brook/Upper Mystic River Basin was issued by DEP on March 5, 1999. The Variance is a short-term modification of the Water Quality Standards issued by DEP subject to approval by the U.S. Environmental Protection Agency ("EPA"). The Variance allows limited CSO discharges from the outfalls along the Alewife Brook/Upper Mystic River permitted to the Massachusetts Water Resource Authority ("MWRA") and the cities of Cambridge and Somerville, subject to specific conditions. Other standards and criteria of the receiving waters' Class B designation are unaffected and remain in force.

The CSO Variance was issued in 1999 to allow time for DEP to obtain the information necessary to determine the appropriate long-term water quality standard and level of CSO control for the Basin, while ensuring that recommended CSO controls approved by DEP would be implemented. The Variance required the implementation of the cost-effective CSO control actions included in MWRA's Final CSO Facilities Plan and Environmental Impact Report, July 31, 1997 (the "FEIR") and also required other actions necessary to properly assess pollutant loads in the Basin and minimize the impact of CSO discharges.

The March 5, 1999 Alewife Brook/Upper Mystic River Basin Variance included specific conditions on activities of the MWRA and the cities of Cambridge and Somerville. These included requirements to implement the CSO control plan in the 1997 FEIR in the Alewife Brook/Upper Mystic River Basin; monitor and estimate CSO activations and volumes; prepare and submit a report on the CSO abatement benefit of infiltration and inflow (I/I) reduction programs; implement and report on water quality sampling programs in the Alewife Brook/Upper River Mystic Basin, including in-stream and stormwater sampling; and submit a Reassessment Report summarizing information gathered during the Variance process and reassessing the costs and benefits of additional CSO controls in the Alewife Brook/Upper Mystic River Basin, up to and including elimination of CSOs.