

Somerville each have CSOs, effectively does not permit any CSO discharge to the receiving waters.¹

Historically, the Massachusetts Department of Environmental Protection (MassDEP) began issuing in 1998 Water Quality Standards Variances, which authorize limited CSO discharges from the MWRA, Cambridge and Somerville CSO outfalls in these water bodies. The most recent Variances, issued on August 30, 2024, have multiple requirements, including:

- development of Updated CSO Control Plans;
- consideration of climate change when evaluating control alternatives; and
- an extensive public outreach program during planning efforts.

As noted above, MWRA, Cambridge, and Somerville are each required to submit a Draft Updated CSO Control Plan for their respective outfalls (or a joint plan) to MassDEP and the U.S. Environmental Protection Agency (EPA) by December 31, 2025. Plans are required to include evaluation of CSO control alternatives *up to and including full elimination*. In addition to providing a recommended CSO Control Plan, the draft Plan will include an affordability analysis in accordance with EPA’s February 2023 Clean Water Act Financial Capability Assessment Guidance, as well as documentation necessary to support further issuance of Water Quality Standards Variances if full elimination is recommended (further Variances would be required until full elimination is achieved); or, if full elimination is not recommended, documentation to support reclassification of the receiving waters from Class B to Class B (CSO), permitting limited CSO discharges. At this time, it is unclear what level of CSO control would be considered elimination by MassDEP and EPA.

Alternatives Development and Level of CSO Control

MWRA, Cambridge, and Somerville, with input from Boston Water and Sewer Commission (BWSC), have been developing and evaluating alternatives for CSO control for the Alewife Brook/Upper Mystic River Basin and the Lower Charles River/Charles Basin. Four levels of CSO control for the future 2050 planning year are being evaluated: (i) significantly reducing CSO discharges in the waterbody from those predicted to occur in a 2050 Typical Year (“Breakpoint”); (ii) zero CSO discharges in a 2050 Typical Year (“2050 Typical Year”); (iii) zero CSO discharges in a 2050 5-year, 24-hour design storm (“2050 5-year”); and (iv) zero CSOs in a 2050 25-year, 24-hour design storm (“2050 25-year”).

For Breakpoint and 2050 Typical Year levels of control, alternatives included various combinations of projects (localized storage tanks, micro tunnels, sewer separation, etc.) to address CSO discharges at individual CSO outfalls or smaller groupings of CSO outfalls. For 2050 Typical Year level of control, alternatives also included regional tunnel solutions and full sewer separation of combined areas tributary to the variance water CSO outfalls.

Attachments A, B, and C summarize the various alternatives under consideration for the four levels of control for each of the three Variance water bodies. To provide a 2050 five-year or 2050 25-year level of control, large storage tanks (sometimes in combination with sewer separation) are being evaluated to control CSO discharges from the one remaining CSO outfall to the Upper

¹At the Alewife Brook/Upper Mystic River Basin, MWRA has one outfall, Cambridge has four outfalls, Somerville has one outfall and one outfall is shared by Somerville and MWRA. At the Lower Charles River/Charles Basin, MWRA has six outfalls and Cambridge has three outfalls.

Mystic River, and regional tunnels that would collect all the CSO discharges to the associated water body are being evaluated for the Alewife Brook and Charles River.² As detailed in the Attachments, the four levels of control bracket a large range of project type, cost, construction durations and impacts, with limited variation in annual water quality benefits.

Alternative Evaluation and Scoring Process

Staff from MWRA, Cambridge, and Somerville have been collaborating on a means of comparing/contrasting and evaluating the various alternatives for the three waterbodies at each individual level of control. A scoring rubric was developed to assign comparative values to the following criteria.

- Water Quality Impact: Improve/Reduce Phosphorus Loads
- Schedule: Minimize Timeline to CSO Reduction Benefits
- Impact on Public Uses during Construction
- Neighborhood Impacts during Construction
- Construction Complexity/Risk due to Depth of Excavations
- Overall Construction Complexity
- Operation & Maintenance/Safety Consideration
- Resiliency and Adaptability
- Opportunity to Upgrade Existing Infrastructure
- Flooding: Reduce Sewer/Stormwater Flooding Risk
- Community Co-benefits
- Permanent Impacts to Public Uses
- Impact to Non-Variance CSOs

Other considerations that are important in assessing the viability of a project include permitting uncertainties and land acquisition risks. For example, the ability to acquire Article 97 legislation to use public parklands cannot be determined at this time, but should be considered as a risk of being able to effectively advance a project. Further, examples of permitting uncertainties include compliance with existing NPDES MS4 requirements and Total Maximum Daily Loads (TMDLs) for phosphorus (i.e., increase in pollutant loads from stormwater discharges), compliance with Chapter 91 (i.e., permanent or temporary changes to existing shorelines or waterways), and construction permitting (i.e., transportation of equipment and construction materials or debris, and occupation of public right of ways, etc.). In many cases, project components of an alternative require physical space for permanent above grade assets. Where this involves acquiring private property, other parcels of land, or easements from others, land acquisition also introduces uncertainties.

Planning-level opinions of probable capital cost have been developed for each alternative for comparative purposes. For many CSO control alternatives, preliminary capital costs were based on general unit costs derived from similar projects. For large tunnels and alternatives requiring known unique features, preliminary capital costs were based on more project-specific features. Preliminary capital costs are current day estimates, without escalation to the mid-point of construction. The planning-level estimates include preliminary construction costs plus 25%

² Local storage to collect CSOs well within BWSC's system is also required to prevent CSO discharges to the Lower Charles Basin through outfall MWR023.

contingency and 37% for “soft costs” (e.g., design, construction administration, resident engineering, general permitting, etc.). The project team continues to refine these estimates. Costs to operate and maintain the new assets constructed as part of the alternatives are not included in the costs presented herein. Capital cost estimates at this alternatives level are included in Attachments A, B & C and are presented as a range until further cost estimating is completed. Planning level capital cost estimates for the alternatives included in Attachments A, B, and C, range from approximately \$0.4 to \$5.6 Billion.

Updated Water Quality Analysis

MWRA’s consultant, AECOM, has updated receiving water quality modeling utilized under the prior CSO Performance Assessment to reflect the impact of larger, more intense storms projected in the 2050 Typical Year rainfall. Results have been prepared using the more stringent Massachusetts Department of Public Health water quality standards for swimming beaches that look at single sample maximums as well as the recently-adopted MassDEP methodology, which averages samples over 30 days. Although the 2050 Typical Year rainfall results in additional CSO volumes to the three variance waters, the impact of CSO on the total duration of water quality exceedance when considering E. coli bacteria remains to be the equivalent of only approximately two days per year for the Charles River, four days per year for the Alewife Brook, and 15 days per year for the Upper Mystic River. However, the impact of other sources (stormwater, upstream boundary conditions) continues to be the primary cause of water quality standard exceedances during most of the 2050 planning year, with water quality exceedance when considering non-CSO sources predicted to be the equivalent of 226 days per year for the Charles River, 234 days per year for the Alewife Brook, and 201 days per year for the Upper Mystic River. When applying the recently-adopted MassDEP methodology for compliance with water quality standards (average samples over 30 days), CSO discharges are not shown to contribute to water quality standards exceedances as the impact of the CSO discharges are typically short duration.

Cost Allocation

MWRA, Cambridge and Somerville each own permitted CSO outfalls to the Variance waters. As such, each entity is responsible for preparing and implementing an Updated CSO Control Plan for their permitted CSO outfalls. Staff for the three entities have been working on developing a fair and equitable method of distributing the cost of implementing further CSO control work. Several meetings have been held to date, with further meetings in the coming weeks, to advance method(s) to allocate costs. Various means of allocating costs are being evaluated, including distributing cost by CSO ownership, project type and location, and share of CSO volume reduction. The aim is to have a proposed method on cost allocation for each recommended alternative that will be presented to the MWRA’s Board of Directors as well as the city councils of Cambridge and Somerville.

Stakeholder Engagement

MWRA, Cambridge and Somerville have met regularly with MassDEP and EPA, and have also met with the watershed associations, during the planning process. The most recent meeting was held with the watershed associations on September 4th to review and receive feedback on much of the information summarized in this staff summary. The major takeaways from the watershed associations included: (i) their belief that the acute impact of CSO discharges when they occur and their impact to public health are not being appropriately portrayed in the Water Quality Analysis performed; (ii) their dissatisfaction in the time it is taking to develop and implement further CSO

control plans; (iii) their desire to see more investment in green infrastructure; and (iv) their concern that the level of control that may be chosen will not meet their expectations for elimination.

In addition, four recent public meetings, held virtually on Zoom, have nearly all exceeded 200 participants. These meetings are aimed at advancing an understanding of what CSO discharges are, why they occur, and what has been done already to reduce their frequency and volumes. Additional topics included reviewing potential tools to help reduce or eliminate CSO discharges, providing an overview of the planning process, and sharing potential control alternatives under consideration and the range of potential costs with an explanation of regulatory guidelines used to evaluate affordability. These public meetings have provided valuable public feedback along the way and have been a means of responding to over 450 questions during the two-to-three-hour meetings. The fifth meeting is scheduled for the evening of September 25, to present the array of control levels and alternatives under evaluation and the expected CSO control impacts to water quality and to review next steps before a Draft Plan is submitted by December 31, 2025. All of the public presentations have been recorded and may be found on the joint project website at: <https://voice.somervillema.gov/joint-cso-planning>.

Next Steps

To ensure that MWRA's Advisory Board is well informed on alternatives under consideration and the potential cost to MWRA and its ratepayers, staff will also make a presentation(s) to the Advisory Board during an upcoming meeting(s). After considering comments from this Board, the Advisory Board, those obtained from Somerville and Cambridge's respective city council meetings, as well as those received at the public meetings, MWRA, Cambridge and Somerville will complete the scoring of alternatives and alternative selection process. Staff plan to make a recommendation to this Board for each of the three variance waters at the October 22, 2025, Board of Directors' meeting.

MWRA, Cambridge, and Somerville are working toward submitting a single Draft Updated CSO Control Plan document to MassDEP and EPA in December 2025. The Draft Plan will include a review of regulatory drivers for CSO control and a summary of past and current CSO control efforts, documentation of the planning process including outreach and engagement efforts, a complete summary of all the tools and alternatives considered for further CSO control, with additional information on those that warranted further consideration, and documentation on scoring and other factors leading to a recommended Updated CSO Control Plan for each of the three variance waters. If the recommended Plan does not achieve what staff believe would be considered CSO elimination, the report will also provide data to support a future change in water quality standards to authorize limited CSO discharges.

The Draft Updated CSO Control Plan submittal will be followed by a public meeting and hearing on the Draft Plan within a five-month DEP/EPA and Public Review Period. Staff envision robust public involvement following submittal of the Draft Plan. Further adjustment to the Draft Plan will likely be made, prior to submitting the Final Updated CSO Control Plan in January 2027 for MEPA review. Staff will provide regular updates to the Board throughout this process, and will present the recommended final plan for each of the three variance waters at future Board of Directors' meetings.

BUDGET/FISCAL IMPACTS:

The FY26 CIP includes \$5,000,000 (as a placeholder) for future CSO Updated Control Plan Design. Once a plan is recommended to and approved by the BOD, additional projects will be added to the CIP.

ATTACHMENTS:

Attachment A: Alternatives for CSO Control to Alewife Brook

Attachment B: Alternatives for CSO Control to Upper Mystic River

Attachment C: Alternatives for CSO Control to Charles River



Alewife Brook – Breakpoint Typical Year Alternatives

Control Level	Alternative Name	Combined Sewer Overflow Outfalls						Estimated Duration ¹ (years)	Preliminary Estimated Cost ² (Millions)
		CAM001	CAM002	CAM401A	CAM401B	MWR003	SOM001A		
Limited CSOs in 2050 TY	AB - Hybrid 1	8 acres sewer separation 0 act/0 MG remaining	No action 0 act/0 MG remaining	Conveyance + Storage Tank 0.6 MG 0 act/0 MG remaining	Storage Tank 0.4 MG 0 act/0 MG remaining	Storage Tank 1 MG (200'x70'x15') 1 act/0.5 MG remaining	100 acres sewer separation with wetland in Davis Square 12 act/5.91 MG remaining	20	\$260-\$430
Limited CSOs in 2050 TY	AB - Hybrid 2	Same as above	Same as above	Same as above	Same as above	Same as above	Microtunnel 0.9 MG (2,300 LF, 8.5 ft. dia.) 3 act/3 MG remaining	10-20	\$130-\$220

Notes:

1. Estimated duration is the approximate time period for construction and timeline to full CSO reduction benefit for each alternative. Some alternatives include the potential for earlier partial benefits
2. Preliminary estimated cost is a planning level capital cost estimate that is not escalated to mid point of construction. Land acquisition and extensive permitting costs are not included.

Legend:

TY = Typical Year

act = number of activations annually in 2050 TY

MG = total discharge volume in million gallons

GSI = Green Stormwater Infrastructure



Alewife Brook 2050 Typical Year (TY) Alternatives

Control Level	Alternative Name	Combined Sewer Overflow Outfalls						Estimated Duration ¹ (years)	Preliminary Estimated Cost ² (Millions)
		CAM001	CAM002	CAM401A	CAM401B	MWR003	SOM001A		
0 CSOs 2050 TY	AB - Integrated Alternative	No action	No action	Storage Tank 2.1 MG	Storage Tank 0.4 MG	Storage Tank 0.5 MG (160' x 50' x 15' sidewater depth)	264 acres sewer separation inline storage with throttles	31	\$710 - \$1,180
0 CSOs 2050 TY	AB - Hybrid Alternative 1	8 acres sewer separation	No action	Conveyance + Storage Tank 1.5 MG	Included w/ SOM001A project	Storage Tank 1.4 MG (225' x 85' x 15' sidewater depth)	100 acres sewer separation with wetland in Davis Square) Microtunnel 1.3 MG (2,900 LF, 9 ft dia.) to store CAM401B and SOM001A	20	\$350 - \$580
0 CSOs 2050 TY	AB - Hybrid Alternative 2	Same as above	No action	Same as above	Included w/ SOM001A project	Storage Tank 1.5 MG (230' x 90' x 15' sidewater depth)	Microtunnel 2.3 MG (5,400 ft. and 9 ft. dia.) to store CAM401B and SOM001A	15	\$200 - \$340
0 CSOs 2050 TY	AB - Tunnel Alternative	Tunnel 4.9 MG (7,600 LF, 11 ft. dia.) with dewatering pump station (aboveground), odor control Conduit (4,500 ft., 6 ft. dia.) to convey CAM401A overflow to drop shaft at MWR003						15 - 20	\$440 - \$740
0 CSOs 2050 TY	AB - Tunnel Alternative + GSI	Same as Tunnel Alternative + GSI						20	\$460 - \$770
0 CSOs 2050 TY (minimum)	Sewer Separation	560 acres (SOM) + 438 acres (CAM) + Treatment + Flow Attenuation						>50	\$1,140 - \$1,900



Alewife Brook 2050 5-Year and 25-Year Alternatives

Control Level	Alternative Name	Combined Sewer Overflow Outfalls						Estimated Duration ¹ (years)	Preliminary Estimated Cost ² (Millions)
		CAM001	CAM002	CAM401A	CAM401B	MWR003	SOM001A		
0 CSOs in 5-Yr	AB - 5YR Storage Tunnel	Tunnel 20.6 MG (7,600 LF, 22 ft dia.) with dewatering pump station (aboveground), odor control						12-15	\$740 - \$1,230
	AB - 5YR Storage Tunnel + GSI	Tunnel 20.3 MG (7,600 LF, 22 ft dia.) with dewatering pump station (aboveground), odor control						12-15	\$760 - \$1,270
0 CSOs in 25-Yr	AB - 25YR Storage Tunnel	Tunnel 41.6 MG (7,600 LF, 32 ft dia.) with dewatering pump station (aboveground), odor control						12-15	\$1,220 - \$2,040
	AB - 25YR Storage Tunnel + GSI	Tunnel 41.0 MG (7,600 LF, 32 ft dia.) with dewatering pump station (aboveground), odor control						12-15	\$1,250 - \$2,080



Upper Mystic River - Breakpoint Typical Year Alternatives

Control Level			Estimated Duration ¹ (years)	Preliminary Estimated Cost ² (Millions)
	Alternative Name	Combined Sewer Overflow Outfalls SOM007A / MWR205A		
Limited CSOs in 2050 TY	MR - Hybrid 1	95 acres of sewer separation Storage Tank 2.7 MG (205' x 60' x 40') 2 act/6.77 MG remaining (treated discharge)	5-10	\$150 - \$250
Limited CSOs in 2050 TY	MR - Hybrid 2	Storage Tank 5 MG (205' x 100' x 40') 2 act/8.23 MG remaining (treated discharge)	5	\$70 - \$110

Notes:

1. Estimated duration is the approximate time period for construction and timeline to full CSO reduction benefit for each alternative. Some alternatives include the potential for earlier partial benefits.
2. Preliminary estimated cost is a planning level capital cost estimate that is not escalated to mid point of construction. Land acquisition and extensive permitting costs are not included.

Legend:

TY = Typical Year

act = number of activations annually in 2050 TY

MG = total discharge volume in million gallons

GSI = Green Stormwater Infrastructure



Upper Mystic River 2050 Typical Year (TY) Alternatives

Control Level			Estimated Duration ¹ (years)	Preliminary Estimated Cost ² (Millions)
	Alternative Name	Combined Sewer Overflow Outfalls SOM007A / MWR205A		
0 CSOs 2050 TY	MR - Integrated Alternative	366 acres of sewer separation Storage Tank 4.0 MG (205' x 82' x 40')	20	\$400 - \$670
0 CSOs 2050 TY	MR - Hybrid Alternative	95 acres of sewer separation Storage Tank 7.4 MG (205' x 120' x 50')	5 - 7	\$190 - \$310
0 CSOs 2050 TY	MR - Storage Alternative	Storage Tank 10.5 MG (205' x 165' x 50')	5 - 7	\$120 - \$190
0 CSOs 2050 TY	MR - Storage Alternative + GSI	Storage Tank 9.4 MG (205' x 150 x 50') + GSI	5 - 7	\$120 - \$200



Upper Mystic River 2050 5-Year and 25-Year Alternatives

Control Level			Estimated Duration ¹ (years)	Preliminary Estimated Cost ² (Millions)
	Alternative Name	Combined Sewer Overflow Outfalls SOM007A / MWR205A		
0 CSOs in 5-Yr	MR - 5YR Storage Tank	Storage Tank 10.5 MG Storage Tank (205' x 165' x 50') (will control the 2050TY and 5 Yr mid tide volume)	5-10	\$110 - \$190
	MR - 5YR Storage Tank + GSI	Storage Tank 9.4 MG (205' x 150' x 50') + GSI	5-7	\$120 - \$200
	MR - 5YR Hybrid	95 acres of sewer separation Storage Tank 7.4 MG (205' x 120' x 50') (will control the 2050TY and 5 yr mid tide volume)	5-7	\$200 - \$330
0 CSOs in 25-Yr	MR - 25YR Storage Tank	Storage Tank 16.7 MG (205' x 260' x 50') (mid tide)	5-10	\$150 - \$250
	MR - 25YR Storage Tank + GSI	Storage Tank 15 MG (205' x 235' x 50') (mid tide) + GSI	5-10	\$150 - \$260
	MR - 25YR Hybrid	95 acres of sewer separation Storage Tank 14.2 MG (205' x 225' x 50') (mid tide)	5-10	\$240 - \$400



Charles River - Breakpoint Typical Year Alternatives

Control Level	Alternative Name	Combined Sewer Overflow Outfalls						Estimated Duration ¹ (years)	Preliminary Estimated Cost ² (Millions)
		CAM005	CAM017	MWR018-020	MWR023	MWR010	MWR201		
Limited CSOs in 2050 TY	CR – Hybrid Alternative 1	2.5 MG SW storage tank 0 act/0 MG remaining	80 acres separation 0 act/0 MG remaining	188 acres of partial sewer separation 2 act/0.88 – 0.94 MG remaining	0.06 MG Storage Box Conduits 2 act/0.11 MG remaining	No Action 0 act/0 MG remaining	No Action 4 act/26.81 MG remaining (treated discharge)	25	\$220 - \$360
Limited CSOs in 2050 TY	CR – Hybrid Alternative 2	Same as above	Same as above	Microtunnel 1.19 MG (3,600 LF, 8 ft dia.) 2 act/1.10 – 2.18 MG remaining	Same as above	Same as above	Same as above	10	\$180 - \$300

Notes:

- Estimated duration is the approximate time period for construction and timeline to full CSO reduction benefit for each alternative. Some alternatives include the potential for earlier partial benefits
- Preliminary estimated cost is a planning level capital cost estimate that is not escalated to mid point of construction. Land acquisition and extensive permitting costs are not included.

Legend:

TY = Typical Year
 # act = number of activations annually in 2050 TY
 # MG = total discharge volume in million gallons
 GSI = Green Stormwater Infrastructure



Charles River 2050 Typical Year (TY) Alternatives

Control Level	Alternative Name	Combined Sewer Overflow Outfalls						Estimated Duration ¹ (years)	Preliminary Estimated Cost ² (Millions)
		CAM005	CAM017	MWR018-020	MWR023	MWR010	MWR201		
0 CSOs in 2050 TY	CR – Integrated Alternative	Stormwater Storage Tank with Underflow Restrictions 2.5 MG	CSO Storage Tank 0.6 MG	MWR018-020 included in MWR201	Storage Box Conduits 0.08 MG at RE046-381 0.16 MG at RE046-100	No Action	Tunnel 17.2 MG (11,700 LF, 17' dia.) to store MWR201 and MWR018-020	15	\$770 – \$1,280
0 CSOs in 2050 TY	CR – Hybrid Alternative 1	Same as above	80-acre sewer separation	Same as above	Same as above	Same as above	Same as above	15	\$810 – \$1,350
0 CSOs in 2050 TY	CR – Hybrid Alternative 2	Same as above	Same as above	204 acres partial sewer separation Microtunnel 1.73 MG (3,800 LF, 9 ft dia.)	Same as above	Same as above	Storage Tank 10.2 MG (305' x 150' x 40' sidewater depth)	25	\$440 - \$740
0 CSOs in 2050 TY	CR – Hybrid Alternative 3	Same as above	Same as above	366 acres partial sewer separation	Same as above	Same as above	Storage Tank 10.1 MG (300' x 150' x 40' sidewater depth)	30	\$400 - \$670
0 CSOs in 2050 TY	CR – Tunnel	Tunnel 17.8 MG (23,700 LF, 12' dia.) with dewatering pump station and odor control MWR023 Storage Box Conduits (same as other alternatives)						15-20	\$1,000 – \$1,660
0 CSOs in 2050 TY	CR – Tunnel + GSI	Tunnel 17.1 MG (23,700 LF, 12' dia.) with dewatering pump station and odor control MWR023 storage (same as other alternatives) + 74 impervious acres GSI						15-20	\$1,060 – \$1,760
0 CSOs in 2050 TY (minimum)	CR – Sewer Separation	481 acres (BOS) + 1231 acres (CAM) + 1101 acres (SOM) for SS + treatment 695 acres (BOS) + 930 acres (CAM) for conveyance + treatment						>50	\$2,280 – \$3,800



Charles River 2050 5-Year and 25-Year Alternatives

Control Level	Alternative Name	Combined Sewer Overflow Outfalls						Estimated Duration ¹ (years)	Preliminary Estimated Cost ² (Millions)
		CAM005	CAM017	MWR018-020	MWR023	MWR010	MWR201		
0 CSOs in 5-Yr	CR – 5YR	Tunnel 71.9 MG (23,700 LF, 24’ dia.) with dewatering pump station and odor control MWR023 Storage						15-20	\$1,330 – \$2,220
	CR – 5YR + GSI	Tunnel 71.4 MG (23,700 LF, 24’ dia.) with dewatering pump station and odor control MWR023 Storage						15-20	\$1,390 – \$2,320
0 CSOs in 25-Yr	CR – 25YR	Tunnel 132 MG (23,700 LF, 32’ dia.) with dewatering pump station and odor control MWR023 Storage						15-20	\$1,860 – \$3,100
	CR – 25YR + GSI	Tunnel 131.43 MG (23,700 LF, 32’ dia.) with dewatering pump station and odor control MWR023 Storage						15-20	\$1,920 – \$3,200