

UNITED STATES DISTRICT COURT
for the
DISTRICT OF MASSACHUSETTS

.....

UNITED STATES OF AMERICA,

Plaintiff,

v.

METROPOLITAN DISTRICT COMMISSION,
et al.,

Defendants.

.....

CONSERVATION LAW FOUNDATION OF
NEW ENGLAND, INC.,

Plaintiff,

v.

METROPOLITAN DISTRICT COMMISSION,

Defendants.

CIVIL ACTION
No. 85-0489-RGS

CIVIL ACTION
No. 83-1614-RGS

MWRA ANNUAL REPORT
FOR CALENDAR YEAR 2023

The Massachusetts Water Resources Authority (the “Authority” or “MWRA”) submits the following annual report for the period from January 1, 2023 through December 31, 2023, and supplementary compliance information in accordance with the Court’s order of December 23, 1985, and subsequent

orders of the Court including the Court's February 18, 2022, Schedule Seven Compliance Order Number 250. (ECF No. 1901).

I. Introduction

The *CSO Annual Report – January 1 to December 31, 2023: CSO Discharge Estimates and Rainfall Analyses*, April 30, 2024 (filed herewith as Exhibit A) (“Annual Report”) is the third in a series of such annual reports filed by the Authority since the Court approved an amendment to Schedule Seven in Compliance Order No. 250. (ECF No. 1901). The results achieved by implementation of the Authority's Combined Sewer Overflow (“CSO”) Long-Term Control Plan (“LTCP”) continue to be impressive. As a result of the Authority's and the CSO communities' significant efforts and expenditures in CSO control work, an estimated annual CSO discharge of 3.3 billion gallons to the harbor and rivers in the late 1980s has been reduced by 88% to 397 million gallons (“MG”) in the Typical Year as of the end of 2023. The well-documented continued success of the Authority's LTCP program and continued CSO reduction efforts in significantly reducing untreated CSO discharges in a Typical Year is further illustrated in the Annual Report.

Schedule Seven

Schedule Seven, as amended, requires the Authority to file an annual report by April 2024. The Annual Report has also been posted on MWRA's website. Below is a summary of both specific components of the Annual Report required by the Court's Schedule Seven Compliance Order No. 250 and

additional noteworthy updates since the Authority's last annual report in April 2023. As this is the last annual report under Compliance Order No. 250, the Authority will also provide a brief summary of the two prior annual reports.

II. Prior Annual Reports

A. Calendar Year 2021 Annual Report

The annual report for calendar year 2021 included the findings in the Authority's Notice of Filing Final Assessment Report and Interim Update as of December 30, 2021 ("Final Assessment Report"). As of the end of 2021, the LTCP goals for Typical Year activation and volume were met or materially met at 70 of the 86 CSO outfalls for which performance targets were defined.¹ With respect to the 16 remaining CSO outfalls that did not meet the LTCP goals for activation frequency and/or volume by the end of 2021 (the "16 Outfalls"),² the Authority reported that: (i) it had developed plans to enable six of these outfalls to meet LTCP goals after 2021;³ (ii) it had identified potentially feasible

¹See, *Final Assessment Report*, Exhibit A (ECF No. 1898). As explained in the Final Assessment Report, among the 70 CSO outfalls were six that were noted with an asterisk in Table 2-2 where, while the predicted activation and/or volume exceeded the LTCP goal, the performance had improved since 1992 to a level believed to achieve water quality goals. In each of the six cases, the difference between the Q4-2021 performance and the LTCP goal was relatively nominal, and the inability to precisely meet the activation and/or volume goals at these locations was not considered material and water quality was not impaired by the deviation from the LTCP goals. See *id.*, Final Assessment Report at Section 2.1.3; see also, Annual Report at Section 3.1, Table 3-1.

² The 16 Outfalls are: SOM001A; SOM007A/MWR205A; MWR205; BOS014; BOS017; CHE008; BOS009; BOS003; BOS062; BOS065; BOS070/DBC; CAM005; MWR018; MWR019; MWR020; and MWR201.

³ The six outfalls are: SOM007A/MWR205A; MWR205; BOS014; CHE008; BOS009; and BOS003. In the Final Assessment Report and annual report for calendar year 2021 the Authority noted that with respect to these outfalls it had developed plans to enable them to meet LTCP goals after 2021. This statement should have been more precise to indicate that the plans would

alternatives for four of these outfalls to possibly achieve CSO LTCP volume and activation goals;⁴ and (iii) six CSO outfalls remained particularly challenging at the end of 2021 (the “Six Challenging Outfalls”).⁵

B. Calendar Year 2022 Annual Report

In the annual report covering calendar year 2022, the Authority reported that as the end of 2022 two additional CSO outfalls – BOS014 and BOS003 – met their LTCP volume and discharge activation goals, reducing the number of outfalls not meeting the LTCP goals from 16 to 14 (the “14 Outfalls”). This resulted in a total of 72 of 86 outfalls meeting or materially meeting their LTCP goals. The Authority reported that for eight of the 14 Outfalls projects forecasted to enable these outfalls to meet LTCP goals were in design or construction and that those projects were expected to be complete by the end of 2024.⁶ Finally, the Authority reported that although investigations continued, the remaining Six Challenging Outfalls were not expected to meet their respective LTCP volume and/or activation goals by the final 2024

enable CSO outfalls SOM007A/MWR205A, MWR205 and CHE008 to *materially* meet their LTCP goals after 2021.

⁴ The four outfalls are: BOS017; BOS062; BOS065; BOS070/DBC.

⁵ The Six Challenging Outfalls are: SOM001A; MWR201; CAM005; and MWR018; MWR019; MWR020.

⁶ The eight outfalls are: SOM007A/MWR205A; MWR205; BOS017; CHE008; BOS009; BOS062; BOS065; and BOS070/BDC. In the annual report for calendar year 2022 the Authority noted that with respect to these outfalls improvements were in design or construction that were predicted to result in LTCP attainment. This statement should have been more precise to indicate that planned improvements would enable CSO outfalls SOM007A/MWR205A, MWR205, CHE008 and BOS070/DBC to *materially* meet their LTCP goals. As set forth herein, the LTCP goals for CHE008 were ultimately met.

Schedule Seven milestone.

III. Summary of Annual Report for Calendar Year 2023

A. Typical Year Performance of All Outfalls as Compared to 1992 System Conditions and the LTCP

The Annual Report includes a complete accounting of the 86 CSO outfalls active in the late 1980s. Annual Report at Table 3-1. For the now 45⁷ remaining active CSO outfalls, the Annual Report provides discharge estimates using MWRA's calibrated hydraulic model as updated with system changes and new information under Typical Year rainfall conditions. The hydraulic model configuration was set to represent the system conditions at the end of 2023. These results were compared against the 1992 system conditions, as well as the LTCP goals.

The Authority is pleased to report that as of the end of 2023, it continues to surpass the overall volume reduction goal of 404 MG from 1988 levels (estimated to be 3.3 billion gallons). As of the end of 2023, the total CSO discharge is now modeled to be 397 MG in a Typical Year,⁸ which continues to

⁷ The Final Assessment Report and prior annual reports referred to 46 remaining active CSO outfalls, when it should have referred to 45 remaining active CSO outfalls.

⁸ The Authority notes that the statement in the prior annual report that CSO discharge was modeled to be 396 MG in a Typical Year was incorrect, primarily due to inaccurate information entered during model enhancements in 2022. In particular, several stormwater areas within the Boston Water and Sewer Commission ("BWSC") system upstream of CSO outfalls MWR018, 019, and 020, and MWR203 (Prison Point CSO Treatment Facility) were entered into the model as flowing to the Stony Brook Conduit (which runs directly to the Charles River) rather than the Old Stony Brook Conduit. This resulted in small increases (<0.1MG total) at outfalls MWR018, 019, and 020 and a more significant increase (5.4MG) to the treated annual discharge at MWR203 (Prison Point CSO Treatment Facility). One additional correction was made in 2023 to adjust the size of the influent pipe to regulator RE046-100 within the BWSC system. This regulator is directly tributary to MWR023. While the adjustment better represents the physical system, it results in a modeled discharge increase at MWR023. Nonetheless, MWR023 is still meeting its LTCP goal of two activations and is just shy of its volume goal (0.19 MG vs. 0.13 MG),

remain well below the total LTCP goal of 404 MG. CSO remediation projects performed by MWRA and BWSC in 2023 resulted in a total untreated CSO discharge decrease of over 4 MG.

Significantly, 96% of CSO discharge is treated, now two percent above the LTCP overall goal of 94%. Although the LTCP volume and activation goals do not distinguish between treated and untreated CSO discharges, MWRA has worked to maximize the ratio of treated (*e.g.*, after neutralization of bacteria) versus untreated discharges to further reduce the pollutant loads to the receiving waters, whenever feasible.

As to specific outfalls, the Authority is also pleased to report that one additional CSO outfall - CHE008 - is now meeting its LTCP goals as of the end of 2023. The total is now 73 of 86 outfalls meeting or materially meeting their LTCP volume and activation goals.⁹ The additional compliant outfall reduces the number of outfalls not meeting the LTCP goals to 13 (the “13 Remaining Outfalls”).¹⁰ *See*, Annual Report at Section 3.1. For five of the 13 Remaining

which are remarkable improvements from the 1992 system conditions of 39 activations and 114.60 MG volume.

⁹ The materially meeting outfalls are noted with an asterisk in Table 3-1 of Section 3.1 in the Annual Report. They are outfalls BOS013, BOS057, BOS060, MWR203, CAM007, and MWR023. For these outfalls, the model predicted activation and volume for Q4-2023 System Conditions has decreased since 1992 levels to a level believed to achieve anticipated water quality improvements. The inability to precisely meet activation and/or volume goals at these locations is considered immaterial and water quality is not impaired by the deviation from the LTCP goals. As described below, additional work being performed by BWSC at BOS013 is expected to bring this outfall in line with its LTCP goals. In addition, with respect to MWR203, see discussion at footnote 15.

¹⁰ The 13 Remaining Outfalls are: SOM001A; SOM007A/MWR205A; MWR205; BOS017; BOS009; BOS062; BOS065; BOS070/DBC; CAM005; MWR018; MWR019; MWR020; and MWR201.

Outfalls (BOS017, BOS062, BOS065, BOS070/DBC, and BOS009), projects forecasted to enable these outfalls to meet or materially meet LTCP goals are under construction and are expected to be completed by the end of 2024.¹¹ *Id.*

Of the 13 Remaining Outfalls, two additional treated outfalls downstream of the Somerville Marginal CSO Treatment Facility (MWR205 and SOM007A/MWR205A) will be improved such that they are predicted to materially meet their LTCP goals. That construction project is expected to be advertised for bid in May 2024 and substantially completed by the end of 2025.

There are 36 outfalls (11 more than required under the Second Stipulation) that have been permanently closed, the same number reported in last year's annual report.¹² When coupled with the five outfalls along the South Boston Beaches that were effectively closed (*i.e.*, achieving a 25-year level of control in 2011), 41 outfalls have been closed since the CSO control program's onset.

During 2023, BWSC completed the first of five sewer separation projects within South Boston, resulting in a nearly 3 MG decrease in CSO discharged to the Fort Point Channel. Further sewer separation in South Boston is

¹¹ These improvements are predicted to result in four of these outfalls (BOS017, BOS009, BOS062, BOS065) meeting LTCP goals. For one outfall (BOS070/DBC), it is undetermined at this time whether it will meet or materially meet LTCP goals. Along with project work to provide BWSC system relief to reduce CSO discharges at BOS070/DBC, BWSC is performing sewer separation work in South Boston that is expected to also reduce CSO discharges at this location. Delays in sewer separation work, however, may result in this CSO not fully meeting (but materially meeting) the LTCP goals by the end of 2024. This outfall should meet its LTCP goal when the sewer separation work by BWSC is ultimately completed.

¹² *See*, Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control (March 15, 2006) (ECF No. 1636) (the "Second Stipulation").

anticipated over the next several years. In addition, BWSC's work continues in East Boston (with the third of five sewer separation projects underway). Final utility work is expected to be complete in the tributary area to CSO outfall BOS009 during summer of 2024, with such work expected to bring this last remaining East Boston CSO outfall in line with its LTCP goals before the end of the year.

As discussed in the Authority's previous report, the Six Challenging Outfalls (that the Court aptly labeled "incurable" - Compliance Order No. 251) will not meet their respective LTCP volume and/or activation goals by the final 2024 Schedule Seven milestone. However, for one of the Six Challenging Outfalls (CAM005), the Authority has identified potential improvements that are predicted to bring this outfall closer to LTCP attainment for activation frequency; this outfall already meets its LTCP volume goal. No other work is currently planned for the Six Challenging Outfalls.

Finally, although not a requirement of the Court's Compliance Order No. 250 or the LTCP, the Annual Report includes calculations of the percent of combined sewage volume captured and treated during calendar year 2023, referred to as "percent capture."¹³ On a system-wide basis, 99.7% of combined sewage volume is being captured, the same as for 2022.¹⁴

¹³ Percent capture is the ratio of combined sewage captured that is treated at MWRA's Deer Island Wastewater Treatment Plant ("DITP"), and as calculated at various CSO facilities, to the total stormwater and sanitary sewage entering the combined sewer system during wet weather periods.

¹⁴ For 2023, the Authority has calculated that 93.4% of combined sewage volume in a Typical Year is being captured and treated at the DITP. This is a 0.1% decrease from 2022 calculations, attributed to the Prison Point input error described in footnote 8. When considering MWRA CSO

B. For the 16 Outfalls, Summary of Any Improvement Work Completed Since the Prior Report, and Update on MWRA's Investigative Work and Analysis

Meaningful progress continued in 2023. A project that resulted in an additional outfall (CHE008) meeting its LTCP goal was completed. Design work was completed and construction commenced for another project expected to improve CSO control at five outfalls (BOS017, BOS062, BOS065, and BOS070/DBC; plus BOS013) to a level meeting or materially meeting their LTCP goals. Another project is soon to be complete for an outfall (BOS009) predicted to meet its LTCP goal. Further progress was made for a project that is predicted to result in two CSO outfalls (MWR205 and SOM007A/MWR205A) materially meeting their respective LTCP goals. The Authority has identified potential weir adjustment work for one of the Six Challenging Outfalls (CAM005) that may help reduce activation frequencies at this outfall although not fully reaching the LTCP goal; that outfall otherwise meets its volume LTCP goal. Finally, the Authority has performed its alternatives analysis for the Six Challenging Outfalls (SOM001A, MWR201, MWR018, MWR019, MWR020 and CAM005).

CHE008. Construction to increase the capacity of the connection from the City of Chelsea's system to MWRA's interceptor was completed in June 2023. The as-built conditions were coded into the Authority's hydraulic model, which

treatment facilities that provide screening, some detention/settling (providing total suspended solids and Biological Oxygen Demand reductions), and bacteria disinfection, the percent capture for 2023 is 98.1%, an increase of 0.1% from 2022. When adding the Somerville Marginal CSO facility, which provides bacteria disinfection but does not provide any detention/settling, the 2023 calculation remains unchanged from 2022 calculations at 99.7% of combined sewage volume being captured.

shows no CSO outfall activations in the Typical Year, bringing this CSO outfall in compliance with the LTCP goals.

BOS017, BOS062, BOS065 and BOS070/DBC (plus BOS013).

MWRA, in coordination with BWSC, has made further progress on system modifications for CSO outfalls BOS017, BOS062, BOS065 and BOS070/DBC. As previously reported, MWRA entered into a memorandum of understanding and financial assistance agreement (“MOU/FAA”) with BWSC in November 2022, in an amount up to \$10 million, for the design and construction of modifications to BWSC’s collection system expected to improve performance for these four CSO outfalls. In December 2023, the MWRA Board of Directors approved an amendment to the MOU/FAA to add the improvement work for BOS013. Although BOS013 already materially met its LTCP goal, BWSC identified further improvements consistent with other work in East Boston that would further reduce overflows at this outfall. MWRA agreed to fund this work under the terms of the MOU/FAA.

BWSC competitively bid the construction project for the work for these five outfalls. In January 2024, a second amendment to the MOU/FAA with BWSC was approved by MWRA’s Board of Directors increasing the amount by \$1,881,274, to \$11,881,274, given the higher than estimated construction bid for the work. Work began at several of these sites in April 2024 and is expected to be substantially completed at all five CSO locations by the end of 2024. These improvements are predicted to result in CSO outfalls BOS017, BOS009, BOS062, and BOS065 meeting LTCP goals. For outfall BOS070/DBC, it is

undetermined at this time whether it will meet or materially meet LTCP goals. See, footnote 11.

BOS009. The BWSC's current sewer separation project in East Boston (Contract No. 3) is partially funded through an MOU/FAA with MWRA (up to \$2,181,667). As previously reported, work under this project resulted in BOS014 and BOS003 meeting its LTCP goals. Progress in sewer separation as part of Contract No. 3 did not advance as expected in 2023, as construction work was limited by the closure of the Callahan Tunnel in July and August 2023, preventing final interconnections to complete the work. BWSC, however, expects to complete this work by summer 2024, and such work is expected to result in CSO outfall BOS009 (the last underperforming East Boston outfall) meeting its LTCP goals. The Authority understands that BWSC intends to continue sewer separation work over the next several years, mainly within the area tributary to CSO outfall BOS003, which should further reduce East Boston CSO discharges.

SOM007A/MWR205A and MWR205 (Somerville Marginal Facility). Design of the supplemental connection and control gate upstream of the Somerville Marginal CSO facility, which is expected to significantly reduce CSO discharges from CSO outfalls SOM007A/MWR205A and MWR205 and further optimize system capacity, is now complete. Project construction was expected to be completed in 2024. However, the complicated design of a gate chamber within the on-ramp from Mystic Valley Parkway to Interstate 93 faced several obstacles. These included adding the rehabilitation of a 16-inch Somerville Sewer adjacent

to the proposed project excavation that was found in poor condition and likely not able to survive the project work, additional traffic management coordination, additional utility conflict resolution, inclusion of additional gate controls to permit future optimization, and the addition of a manual gate to safeguard against system failures.

Advertisement for construction bids is now expected in May 2024. Given the complexity and location of this work, including additional limitations on when the work can be performed, construction is expected to be completed by the end of 2025, which is predicted to allow these outfalls to materially meet their individual LTCP goals.¹⁵

With the completion of these projects, as well as further CSO communities' work to improve CSO control that will be incorporated into the hydraulic model over the next few years, the Authority anticipates further reductions below the total, system-wide CSO control goal.

The Six Challenging Outfalls - SOM001A, MWR201 (Cottage Farm Facility), CAM005 and MWR018, MWR019, MWR020. The Authority investigated alternatives regarding the Six Challenging Outfalls that will not meet their LTCP

¹⁵ Although substantial volume reductions are expected, which will allow SOM007A/MWR205A and MWR205 to materially meet their LTCP goals, due to the hydraulic interconnectivity of the collection system, this work is also predicted to affect the Prison Point CSO outfall (MWR203). Although MWR203 is currently forecast to materially meet its LTCP goals in December 2024, the completion of the supplemental connection in 2025 is expected to further increase MWR203 CSO volume. This increase is expected to be somewhat offset by Somerville's completion of sewer separation work and activation of a stormwater pump station in the Union Square area expected in 2026, but the amount of the offset is uncertain. MWRA will coordinate with Somerville to evaluate means to maximize these future offsets and will provide an update in the upcoming supplemental report.

goals by the December 2024 milestone. Preliminary costs have also been estimated to help assess the costs and benefits of these alternatives. The Annual Report provides a summary of the many alternatives evaluated, which will be further documented in the forthcoming Supplemental Report to the Performance Assessment in December 2024.

For CSO outfall SOM001A, MWRA developed multiple alternatives with three of the five alternatives predicted to meet CSO outfall SOM001A's LTCP goal without causing other CSO outfalls in the Alewife Brook to exceed their respective goals. Storage alternatives predicted to meet the CSO outfall SOM001A goal have a preliminary estimated cost ranging from \$32 to \$45 million. Although modifications to the regulator along with relocating 115 acres of stormwater out of the SOM001A system directly to Alewife Brook is predicted to meet LTCP goals, the additional stormwater flows to Alewife Brook would exacerbate brook flooding and was not evaluated further under this effort. See Annual Report at Section 3.3.1.

For CSO Outfall MWR201 (Cottage Farm CSO Treatment Facility), the Annual Report presents two alternatives that would further reduce CSO discharges by approximately 1.4 MG to meet the LTCP goals during the two activations predicted in a Typical Year. The first alternative is sewer separation of approximately 300 acres at a preliminary estimated cost of \$155M, which is predicted to result in a 1.73 MG CSO discharge reduction in a Typical Year. The second alternative is storage adjacent to the Cottage Farm CSO Treatment Facility at a preliminary estimated cost ranging from \$35 to \$45M that is

predicted to result in a 1.44 MG CSO discharge reduction in a Typical Year.

For CSO outfall CAM005, the Authority explored sewer separation, raising and lengthening the overflow weir, and implementing green infrastructure. The Authority will be retaining the services of a consultant to further evaluate and design modifications to the CAM005 regulator to lengthen the weir and increase the weir height. This work is predicted to reduce CSO discharge to five activations in a Typical Year versus the LTCP goal of three and further reduce CSO volumes, which are already below the LTCP goals. With an increased weir length and height as a starting point, the Annual Report summarizes the added benefit of sewer separation, and a few variations of green stormwater infrastructure implementation within the tributary area to CSO outfall CAM005. At a preliminary estimated cost ranging from \$2M to \$12M, each of the alternatives is predicted to reduce activations by at least two activations, to the LTCP goal of three activations. The Authority will continue to work with Cambridge to evaluate raising and lengthening the weir at CAM005 and move forward with such weir work should MWRA determine that it is constructable.

At CSO outfalls MWR018, 019, and 020, several extensive system improvement alternatives are summarized in the Annual Report, including upstream stormwater redirection and green stormwater infrastructure, which on their own or in combination, are not predicted to reduce CSO discharges at these locations to the LTCP goal of zero in a Typical Year. Alternatives including upstream sewer separation with a preliminary estimated cost of \$62M and

storage alternatives (with siting difficulties along the Charles River) with a preliminary estimated cost ranging from \$36 to \$45M, would meet the LTCP goal of eliminating the two remaining activations at these locations in a Typical Year.

The Court will recall that the Six Challenging Outfalls are among those that discharge to the Lower Charles River/Charles River Basin or the Alewife Brook/Upper Mystic River (collectively “Variance Waters”).¹⁶ These outfalls operate under regulatory variances to the Class B Water Quality Standard that permit a limited amount of CSO discharge. The most recent variances were effective on August 31, 2019, when MassDEP issued final determinations to adopt variances for an additional five-year term, to August 31, 2024 (“Variances”). Under the Variances, the Authority, Cambridge and Somerville are each required develop an updated CSO control plan to evaluate the feasibility and cost of higher levels of control for their respective outfalls. The Authority, Cambridge and Somerville have already begun preparing their respective updated CSO control plans, which again include the Six Challenging Outfalls. See Section IV.B below. It is noteworthy that the updated CSO control plans will be forward-looking to a new 2050 Typical Year that takes into consideration climate change, including larger, more intense rain events.

C. Analysis of Prior Year’s Rainfall in Comparison to the Typical Year

Section 2.2 and Appendix A of the Annual Report present the rainfall data

¹⁶ There are sixteen outfalls that discharge to the Variance Waters. They are CAM001, CAM002, MWR003, CAM401A, CAM401B, SOM001A, SOM007A/MWR205A, CAM005, CAM007, CAM017, MWR010, MWR018, MWR019, MWR020, MWR201 and MWR023.

measured during the period from January 1, 2023, through December 31, 2023. It also describes the analysis of the rainfall data used to characterize the return period of each storm event and compares measured rainfall for the 2023 period to the rainfall included in the Typical Year.

Based on the analysis performed, during 2023, the Metropolitan Boston area experienced significantly more volume of rain, higher intensity storm events, and about the same number of large storms in terms of depth greater than two inches compared to the Typical Year. The 2023 average rain depth of 55.35 inches across the collection system's gauges was 8.55 inches higher than the Typical Year total rainfall depth of 46.80 inches. The exceptional number, volume and intensity of events during the months of July and August 2023 resulted in the National Weather Service's classification of 2023 as the second wettest summer on record in the Boston region.

Rainfall intensity is a significant cause of CSO activations. In 2023, the number of storms with peak intensities greater than 0.40 inches per hour ranged from ten to fifteen, compared to nine for the Typical Year. The highest intensity rain event was measured at the Fresh Pond USGS Gauge, which measured a storm with a peak intensity of 1.97 inches per hour (determined to equate to a 20-year 1-hour storm). In total, Fresh Pond, closest to the Alewife Brook, measured seven storms with peak intensities greater than 0.75 inches per hour. The three other gauges closest to the CSO system had individual storms with peak intensities between 1.14 to 1.69 inches per hour, and each gauge measured three storms with peak intensity greater than 0.75 inches per hour. In

comparison, the Typical Year had one storm with a peak intensity of 1.08 inches per hour with the remaining eight storms having peak intensities between 0.42 and 0.75 inches per hour. The impact of higher rainfall (in terms of total rainfall, as well as peak intensity), is evident in both the comparison of the 2023 rainfall totals versus Typical Year figures and the comparison of the 2023 discharges versus modeled CSO discharge estimates for the Typical Year.

D. Summary of Measured Overflows from MWRA Treated and Untreated CSO Discharges

Measured activations and volumes for all 45 active CSO outfalls are provided in Table 2-3 of the Annual Report along with comparisons to modeled predictions. Further discussion on the measured overflows is provided in Section E, below.

E. Comparison of MWRA Meter and Model Data to Community Meter Data for Those Outfalls Where It Exists

For the entirety of 2023, MWRA and its CSO member communities (Boston, Cambridge, Somerville, and Chelsea) have used meters in their collection systems to determine when a CSO discharge is occurring and to calculate and estimate volume for each CSO discharge. The Annual Report compiles these activation frequency and measured CSO discharge volume estimates for all 45 active CSO outfalls in Table 2-3. The MWRA's hydraulic model was run using various rain gauges throughout the service area as inputs to the hydrodynamic portion of the model, which computes the rainfall runoff that is directed into the hydraulic model for routing, along with sanitary and infiltration flows through the complex combined sewer network. Table 2-3 of

the Annual Report compares the results for all metered and modeled CSO activation and volume estimates for the 45 active CSO outfalls.

For calendar year 2023, a total of 666.02MG of CSO volume was measured compared to 712.70 MG of CSO volume predicted using MWRA's hydraulic model. Notable differences for individual CSO overflows are addressed in Table 2-4. For example, with respect to CAM401A, Table 2-4 notes that the Authority is working with Cambridge to better understand and resolve observed differences at that CSO outfall. This includes the installation of flow meters and level sensors within the CSO outfall CAM401A system to evaluate possible explanations for meter and model deviations.¹⁷

Also, with respect to BOS003, MWRA and BWSC continue to evaluate if the capacity enhancements made at regulator RE003-12, the only remaining regulator to CSO outfall BOS003, are achieving the modeled benefits. Modeled combined flows entering the regulator were reasonably close to measured values, but there was uncertainty in the level within the downstream interceptor. A level sensor was recently installed in the MWRA's interceptor to determine if elevated levels in the MWRA interceptor are resulting in CSO frequency and volumes being greater than anticipated.

Although the overall model prediction is approximately 7% greater than the meter data, the metered CSO volume estimates and model predictions are comparable for storm events in 2023, demonstrating the model's ability to

¹⁷ Metering and recalibration may result in adjustments of the current prediction of LTCP goals being met at CAM401A.

quantify CSO discharges in a year with more than typical rainfall, including individual storm events with greater intensity than storms in the Typical Year.

IV. Additional Update of Events Since Prior Annual Report

A. Engagement and Work Under the Schedule Seven Compliance Order and Variances

In calendar year 2023, the Authority continued to keep an open dialogue with interested parties and stakeholders and continued required work under the Schedule Seven Compliance Order No. 250 and the Variances. This included the following:

- The sixth quarterly meeting with the EPA and MassDEP required by Schedule Seven Compliance Order No. 250 to review progress on the 16 Outfalls was held on June 22, 2023. A presentation titled “Preliminary Alternative Development towards December 2024 Supplemental Report / Progress Update” was given. This meeting and presentation served as a progress update on the 16 Outfalls that were reported not to meet the LTCP activation and/or volume goal in the December 2021 Final Assessment Report, including the Six Challenging Outfalls.¹⁸
- MWRA participated in a meeting on June 26, 2023, with the Charles River Watershed, Mystic River Watershed Association and Save the Alewife Brook (collectively “Watershed Groups”), to present MWRA’s, Cambridge’s and Somerville’s updated CSO control planning process.
- A biannual meeting with the Conservation Law Foundation (“CLF”) and the Watershed Groups was held on July 13, 2023. A presentation was given on MWRA’s progress toward meeting the LTCP goals including updates on certain projects, review of the alternatives for the Six Challenging Outfalls and questions and answers.
- The seventh quarterly meeting with MassDEP and EPA required by Schedule Seven Compliance Order No. 250 to review progress on the

¹⁸ The information provided for the Six Challenging Outfalls was conceptual and the costs were preliminary estimates of construction only and did not include design, operation and maintenance costs, etc.

10 outfalls not meeting LTCP goals as of December 2021 was held on September 28, 2023. The Authority provided further updates on the system improvements at MWR205, SOM007A/MWR205A, BOS003, BOS009, BOS014, CHE008, BOS017, BOS062, BOS065 and BOS070.

- MWRA, Cambridge, Somerville, and BWSC held a meeting with the Watershed Groups on October 24, 2023 to provide an in-depth preview of the updated CSO control plans tools and alternatives development process under the Variances. This highly technical presentation included the status of the updated CSO control plans, a preview of the presentation materials to be used at an upcoming Third Public meeting as well as a discussion about the CSO control tools, alternatives development process and the preliminary model results using the 2050 Typical Year.
- Public Meeting Number Three was held on November 15, 2023 to provide information on the updated CSO control plan to the public. The topics included an overview of the updated CSO control plans process and regional effort, a description of the available CSO control tools, information on goals and priorities, the schedule to develop and the process to select and evaluate CSO control alternatives, and next steps.
- The biannual meeting with CLF and the Watershed Groups was held on December 20, 2023. The focus of this meeting was MWRA's accomplishments, the ongoing design work to develop system improvements, status and updates on the ongoing and future construction projects and presentation of the completed construction projects in 2023.
- On January 31, 2024, MWRA submitted to the MassDEP and EPA the annual report for 2023, on the progress of CSO "Additional System Optimization" measures as required under the Variances.
- The eighth quarterly meeting with the MassDEP and EPA was held on February 8, 2024. An update was provided on the supplemental connection and control gate upstream of the Somerville CSO facility and the revision to the schedule. The meeting also provided an opportunity for discussion of the ongoing work under the MOU/FAA with BWSC for the improvements at BOS017, BOS062, BOS065, BOS070 and BOS013. Further discussion was held on coordination efforts between MWRA and Cambridge DPW to install temporary flow meters in the CSO outfall CAM401A system to investigate the flows at this location.

- A public press release as required under the Variances was issued on April 15, 2024, which included general information on CSOs, the location of outfalls in the Alewife Brook/Upper Mystic River and Charles River watersheds and potential health risks posed by exposure to receiving waters during CSO events.
- Cambridge, Somerville, and MWRA held and continue to hold bi-weekly meetings to coordinate on issues and joint efforts in developing updated CSO control plans (discussed further below) for CSO outfalls discharging to the Variance Waters as well as coordinate on efforts to meet existing LTCP goals. (Previous meetings with the communities in 2022 were held separately and on a monthly basis prior to May 2022.)
- Cambridge, Somerville, and MWRA held and continue to hold monthly meetings with EPA and MassDEP to update each on the progress and solicit feedback associated with the development of updated CSO control plans for the Variance Waters.
- MWRA held and continues to hold monthly coordination meetings with the City of Chelsea and BWSC to coordinate on CSO-related issues, including those supporting the efforts towards meeting existing LTCP goals.

B. Extension Requests for Variances

As set forth above, the CSO outfalls that discharge to the Variance Waters, including the Six Challenging Outfalls, are subject to certain requirements of the Variances that include, among other things, the development of updated CSO control plans. The Authority and the Cities of Cambridge and Somerville are each responsible for preparing an updated CSO control plan for their respective outfalls. There is significant collaboration between the Authority, Cambridge, and Somerville in the preparation of their updated CSO control plans.

During MassDEP's and EPA's review of the scope of work, the Authority,

Cambridge and Somerville were encouraged to perform certain additional items, including updating the Typical Year to reflect more recent rainfall data and the projected impact of climate change and engaging in additional public participation to allow for outreach to Environmental Justice populations and public input. These items were not included in the Variances, and the parties needed additional time to collaborate and fulfill the requests in connection with the updated CSO control plans.

As previously reported, on September 22, 2022, the Authority, Cambridge, and Somerville each submitted to MassDEP a schedule extension request for their respective draft and final updated CSO control plans. On March 8, 2024, MassDEP issued a Public Notice, Tentative Determinations to adopt new Variances for a period not to exceed five years (generally through August 29, 2029), and Technical Fact Sheets supporting the Tentative Determinations. MassDEP accepted comments on the Tentative Determinations through April 22, 2024.

The Authority submitted written comments, which were generally in support of the Tentative Determinations; however, the Authority also submitted some important comments and proposed refinements for purposes of clarity. MWRA's comments largely focused on the timing of certain deliverables, as well as on issues similar to those that arose in the context of the recent Draft NPDES Permit. *See* subsection C, below.

The Authority understands that MassDEP is currently in the process of reviewing public comments, and consistent with past practice will be developing

its responses to these comments concurrently with its anticipated Final Determinations for the Variances for submittal to EPA for final approval. The Authority awaits the MassDEP Final Determinations.

C. Draft National Pollutant Discharge Elimination System (“NPDES”) and Clean Water Act Permits For the MWRA Deer Island Treatment Plant and CSO Outfalls ¹⁹

The Authority currently holds an NPDES permit for the DITP outfall (as well as certain Authority-owned/operated CSO outfalls), which was jointly issued by EPA and MassDEP on May 20, 1999, and then subsequently modified on August 10, 2000. On or about May 31, 2023, EPA issued a public notice and request for comments on a revised draft NPDES Permit and corresponding Fact Sheet for the Authority’s DITP, CSO Treatment Facilities, and other CSO outfalls. Concurrently, MassDEP issued a draft Massachusetts Surface Waters Discharge Permit, which largely incorporates by reference the terms and conditions of the

¹⁹ As was previously done with the currently effective DITP NPDES permit, this section is to advise the Court of EPA and MassDEP permitting actions that overlap, and/or potentially conflict with or complicate compliance while work continues under the remedial order of this Court. See e.g., *MWRA Monthly Compliance Report for January 1998 and Progress report as of February 13, 1998*, at 11-13 (ECF No. 1405) (advising the Court of draft NPDES permit for DITP); *MWRA Monthly Compliance report for May 1999 and progress Report as of June 15, 1999*, at 8-14 (ECF No. 1463) (advising the Court of the Authority’s intentions to appeal the final NPDES permit); *MWRA Monthly Compliance report for June 1999 and progress report as of July 15, 1999*, at 8-10 (ECF No. 1466) (confirming the Authority’s appeal of the final NPDES permit); *MWRA Monthly Compliance report for July 1999 and progress report as of August 13, 1999*, at 7 (ECF No. 1468) (indicating EPA will not rule on appeal until it explores potential settlement); *MWRA Monthly Compliance report for August 1999 and progress report as of September 15, 1999*, at 5 (ECF No. 1470) (indicating settlement discussions); *MWRA Monthly compliance report for May 2000 and progress report as of June 15, 2000*, at 11-12 (ECF No. 1499) (announcing settlement agreement); and *MWRA Monthly compliance report for June 2000 and progress report as of July 17, 2000*, at 7 (ECF No. 1501) (announcing final NPDES permit and explaining that the Authority would not be able to comply with some NPDES permit requirements until the Court-ordered construction projects are completed).

EPA draft NPDES permit.²⁰ (While these are separate permitting actions, for simplicity, we refer to these actions collectively as the “2023 Draft Permit.”)²¹

The public comment period for the 2023 Draft Permit concluded on November 28, 2023. The Authority’s extensive comments dated November 28, 2023 (filed herewith as Exhibit B) (“Comments”) covered the full spectrum of the 2023 Draft Permit conditions, including commentary on: (i) effluent limitations and monitoring requirements; (ii) CSOs; (iii) unauthorized discharges; (iv) operation and maintenance of the treatment control facilities; (v) industrial users and pretreatment program; (vi) special conditions; (vii) reporting requirements; (viii) State 401 Certification conditions; and (ix) the content of various attachments. One area of focus of the Authority’s Comments, however, was the 2023 Draft Permit’s wet-weather-related and CSO provisions. Given this Court’s role and prior orders relating to the Authority’s wet-weather operations and CSOs, the Authority briefly summarizes below its comments on these topics and how they are addressed in the 2023 Draft Permit.

Court-Ordered Bypass Procedures. As the Court may recall, in July through September 2008, the Authority and EPA were able to amicably resolve a dispute that started years prior with allegations concerning bypass procedures at DITP. The heart of the dispute traced its roots to the terms of the Authority’s

²⁰ Although jointly administered by EPA and MassDEP in the past, as of June 20, 2020, the NPDES permit program is administered solely by EPA.

²¹ The Authority understands that EPA has made (and may continue to make) the 2023 Draft Permit and related materials available on its website at the following link: <https://www.epa.gov/npdes-permits/epas-permit-massachusetts-water-resources-authority-mwra-deer-island-treatment-plant>.

existing NPDES permit and the operation of DITP during wet weather events. EPA's concerns centered around NPDES permit violations for bypasses of secondary treatment and for failures to give EPA notices of such bypasses. The Authority viewed the same practices as permissible and appropriate "blending" events, where wastewater which had received only primary treatment and had been disinfected was then blended with flows that had received both primary and secondary treatment, provided that the final blended effluent met secondary NPDES permit limits. Importantly, neither water quality standards nor numerical NPDES permit limits were ever exceeded during these periods of blending. Ultimately, the Authority and EPA settled their differences in a negotiated Stipulation and Order that this Court approved in September 2008.²² This 2008 Stipulation and Order addressed the ambiguity in the existing NPDES permit for DITP by setting numeric parameters and a process by which blending of secondary and primary flows could occur.

Pursuant to the 2008 Stipulation and Order, and for more than 15 years at this point, the Authority has been required to maintain a "secondary process limit" of at least 700 MGD for DITP.²³ The term "secondary process limit" generally refers to the setting in the process control system for DITP, which directs flows up to and including that flow rate through secondary treatment (*i.e.*, at this secondary process limit DITP operators can maintain process

²² See, Stipulation and Order (September 8, 2008)(ECF No. 1707).

²³ See *id.*, at ¶ 8 (ECF No. 1707).

stability and produce high-quality effluent compliant with secondary treatment standards and Effluent Limitations).²⁴ During wet weather events, flows in excess of this secondary process limit are diverted around the secondary process and then blended with the secondary treated flow before disinfection and discharge, while still meeting all permit limits. The Court Order requires that these diversions around secondary treatment be reported to EPA within specified timeframes (*i.e.*, within 24 hours and follow-up written description submitted within five days of the event).²⁵ Ultimately, operating in this fashion during wet weather reduces CSO discharges by maximizing flow to the DITP for treatment and therefore reduces CSO discharges upstream.

The 2008 Stipulation and Order, however, was not structured to live in perpetuity and recognized that a secondary process limit could be established in a NPDES permit and that MWRA's blending related obligations would ultimately "terminate when a new NPDES permit is issued to the MWRA by the EPA relating to the DITP and it becomes effective."²⁶ As the Authority explains in its Comments, Exhibit B at 6-8, the concern with the 2023 Draft Permit is that it does not mention the 2008 Stipulation and Order or a secondary process limit of 700 MGD, or suggest another figure in its place.

The Authority's Comments further detail the problem and offer a solution whereby the 2008 Stipulation and Order's requirements, and in

²⁴ See *id.*, at ¶ 8.c. (ECF No. 1707).

²⁵ See *id.*, at ¶ 9. (ECF No. 1707).

²⁶ See *id.*, at ¶¶ 8.a. & 19.b. (ECF No. 1707).

particular the 700 MGD secondary process limit, could be incorporated into the terms of any final NPDES permit. *See*, Comments, Exhibit B at 8. The Authority is hopeful that the final permit will provide the regulatory certainty that 2008 Stipulation and Order has provided for fifteen years.

Second Stipulation CSO Discharge Activations and Volumes as Effluent Limitations. The 2023 Draft Permit incorporates the outfall-by-outfall CSO discharge volumes and activations figures from the Second Stipulation as permit effluent limitations. The Authority's Comments details the basis for its objections to this approach and offers alternative approaches. Exhibit B, pp. 17-31. Among the concerns of the Authority is the risk of permit noncompliance given that there are certain outfalls that will not meet the LTCP goals by the 2024 final milestone and that any determinations regarding those outfalls will not be made until after the Authority's submission of its Supplemental Report in December. The Authority appreciates that the 2023 Draft Permit recognizes the role of this Court process (*see, e.g.*, acknowledgement on page 22 of the Draft Permit that the activation volumes and frequencies may be "amended by the court").²⁷ The Authority remains hopeful that the final permit will not create a risk of noncompliance given the enormous efforts of the Authority, in partnership with the CSO communities, to minimize CSOs under this Court's careful oversight.

²⁷ *See also*, details on pages 107-109 of the Fact Sheet, reciting the history of the "Federal Court-ordered Obligations" applying to CSOs.

V. Conclusion

The Authority is extremely proud of its accomplishments to date, including the meaningful progress made in 2023: an additional outfall meeting its LTCP goal; eight outfalls predicted to meet or materially meet their LTCP goals this year or next; and other work in the planning stages that, if constructable, is expected to further improve performance at another outfall. The Authority did not hesitate to do (and fund) more when there were solutions based on hydraulics, engineering, and science that were economically feasible and commensurate with the predicted water quality improvements. The Authority was reminded again this year of the inherent variability of the hydraulic model due to its size and complexity. That there remain the Six Challenging Outfalls does not overshadow the significant achievements of Authority's LTCP.

The Authority continues to work tirelessly on its many obligations and requirements including with respect to the LTCP, Schedule Seven Compliance Order No. 250 and Variances, and is preparing for a new NPDES permit, state Surface Water Discharge Permit and Variances. Finally, the Authority would be remiss if it did not thank its CSO community partners, the regulatory agencies and the Watershed Advocacy Groups for their efforts, assistance and diligent work. The Authority looks forward to continued collaboration and submitting its Supplemental Report to the Performance Assessment in December 2024.

Respectfully submitted,

MASSACHUSETTS WATER RESOURCES
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CERTIFICATE OF SERVICE

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

registered participants (excluding Christopher Little of Pierce Atwood, who has retired from the practice of law, Lawrence Liebesman and Joseph McGovern, who no longer work at the U.S. Department of Justice, and Edward J. DeAngelo, who no longer works at the Attorney General's Office) on April 30, 2024.

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Dated: April 30, 2024

Exhibit A



CSO Annual Report – January 1 to December 31, 2023: CSO Discharge Estimates and Rainfall Analyses

April 30, 2024

Prepared for the:
Massachusetts Water Resources Authority

Table of Contents

1. Introduction.....1

2. Summary of 2023 Model Results and Comparison to Meter Data2

2.1 Hydraulic Model Updates 3

2.2 Rainfall Analyses 3

2.3 Meter Estimates of CSO Discharges to Variance Waters for 2023 5

2.4 Meter and Modeled Estimates of 2023 System Wide CSO Discharges 6

3. Updated System Performance Assessment and Comparison with LTCP
Levels of Control 12

3.1 Performance Assessment 12

3.1.1 Percent Capture of Combined Sewage 16

3.2 Outfalls Forecast to Attain LTCP Activation and Volume Goals by December 2024 17

3.3 Outfalls Currently Not Forecast to Attain LTCP Activation and/or Volume Goal 18

3.4 Summary 27

Appendix A Rainfall Processing and Analyses January 1, 2023 – December
31, 2023 A-1

A.1 Rainfall AnalysesA-1

A.1.1 Rainfall Data Collection and ProcessingA-1

A.1.2 Monitored Storms and Comparison with Typical YearA-5

Figures

Figure 3-1. Schematic of Alewife Sub-System..... 19

Figure 3-2 Schematic of the Charles River/Cottage Farm Sub-System 21

Figure 3-3. Schematic of Charles River/Prison Point Sub-System..... 25

Tables

Table 2-1. Model Changes to reflect Q4-2023 System Conditions 3

Table 2-2. 2023 MWRA Metered CSO Discharges to Variance Waters 6

Table 2-3. Summary of 2023 Modeled and Metered CSO Discharges..... 7

Table 2-4. Notable Differences Between Metered and Modeled CSO Discharges, January 1, 2023 to
December 31, 2023..... 11

Table 3-1. Typical Year Performance: Baseline 1992, Q4-2023 Conditions and LTCP Goals..... 13

Table 3-2. Percent Capture of Combined Sewage for the Typical Year for Q4-2023 System Conditions
Compared to Q4-2022 System Conditions 17

Table 3-3. Outfalls Forecast to Attain LTCP Goals by 2024 18

Table 3-4. SOM001A Q1-2023 Conditions and LTCP Goal 19

Table 3-5. SOM001A Summary of Alternatives Evaluated to Attain LTCP Goals 20

Table 3-6. Cottage Farm Q1-2023 Conditions and LTCP Goal 21

Table 3-7. Cottage Farm Summary of Alternatives Evaluated to Attain LTCP Goals 22

Table 3-8. CAM005 Q1-2023 Conditions and LTCP Goal..... 23

Table 3-9. CAM005 Summary of Alternatives Evaluated to Attain LTCP Goals..... 24

Table 3-10. MWR018/019/020 Q1-2023 Conditions and LTCP Goal 25

Table 3-11. MWR018/019/020 Summary of Alternatives Evaluated to Attain LTCP Goals..... 26

1. Introduction

On December 30, 2021, the Massachusetts Water Resources Authority (MWRA) submitted the Final Combined Sewer Overflow *Post Construction Monitoring Program and Performance Assessment Report* (“December 2021 CSO Report”) to the U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) documenting the results of the four-year study to measure the performance of its Long Term Control Plan (LTCP). Until the Schedule was amended in February 2022, this was the final court scheduled milestone in Boston Harbor Litigation (*United States v. Metro. Distr. Comm’n., et al*, No. 85-0489 RGS). From 1987 through 2015, MWRA addressed 182 CSO-related court schedule milestones, including completing the construction of the 35 wastewater system projects that comprised the LTCP by December 2015. MWRA’s obligations for CSO control under the Court Order are defined in the March 15, 2006, *Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control*, as amended on April 30, 2008 (the “Second Stipulation”).

This report is the third of three Annual Reports as required by the Court’s compliance order extending until December 2024 the time to complete, among other things, identified projects and additional evaluation of alternatives to further reduce CSOs at the sixteen outfalls that did not meet the LTCP goals by December 31, 2021. As part of this extension, MWRA is required to provide estimates of combined sewer overflow (CSO) discharges in its service area during calendar year 2023. For more information about MWRA’s federal court obligations for CSO control, including the LTCP levels of control, see Section 1.3.5 in [Semiannual CSO Discharge Report No. 2, May 3, 2019](#).

Pursuant to the Court’s Schedule Seven, as amended, MWRA reports herewith its estimates using hydraulic modeling of calendar year 2023 CSO activation frequency and total discharge volume from each of the CSO outfalls addressed in MWRA’s approved LTCP. In addition, MWRA also provides estimates of CSO activation frequency and volume at each of the outfalls calculated using meter data. MWRA has also provided this information to its member communities with CSOs, including Boston Water and Sewer Commission (BWSC) and the cities of Cambridge, Chelsea, and Somerville.

For the MWRA outfalls in the variance waters (Charles River, Alewife Brook, and Upper Mystic River), the activations, volumes, and durations are provided in accordance with the reporting requirements in the Variances for the Alewife Brook/Upper Mystic River and the Lower Charles River/Charles Basin, issued by MassDEP in 2019 pursuant to the Massachusetts Surface Water Quality Standards at 314 CMR 4.00. The Variances authorize limited CSO discharges to the Alewife Brook/Upper Mystic River and the Lower Charles River/Charles Basin in conjunction with National Pollution Discharge Elimination System (NPDES) permits MA0103284, MA0101982 and MA0101974 issued to MWRA, the City of Cambridge and the City of Somerville, respectively.

This report is organized into the following chapters:

Chapter 1: Introduction

Chapter 2: Summary of 2023 Meter¹ Data and Comparison to Model Results. Presents the following:

- a summary of the model changes incorporated into the 2023 system conditions model
- a summary analysis of the 2023 rainfall in comparison to the Typical Year²
- a table with the metered CSO activation frequency, duration, and volume for each of the MWRA outfalls tributary to the variance waters for 2023 to meet the reporting requirement as described in section D.4.b.iv of the 2019 Alewife Brook/Upper Mystic River Variance and as described in section D.3.b.iv of the 2019 Lower Charles River/Charles Basin Variance
- the estimated CSO activations and discharge volume during calendar year 2023 using the MWRA collection system model, configured to represent system conditions in 2023
- the estimated CSO activations and discharge volumes calculated from monitoring data from MWRA and the CSO community meters

Chapter 3: Updated System Performance Assessment and Comparison with LTCP Levels of Control. Presents the following:

- a comparison of the CSO activations and discharge volumes for the Typical Year for Q4-2023 (end of 2023) system conditions to the activation frequency and volume goals established for each outfall under the Second Stipulation. Also presented are previously-modeled Typical Year CSO activations and volumes for 1992 system conditions.
- a table with the percent capture of combined sewage for the Typical Year for Q4-2022 and Q4-2023 system conditions.
- a summary of the status of further evaluations of outfalls that did not meet the LTCP goals for activation frequency and/or volume as of the end of 2023.

Appendix A: Rainfall Data Collection and Analyses January 1, 2023 to December 31, 2023.

Provides a summary of the rainfall data collected for 2023, characterizes the return period for each storm, and provides a comparison to the Typical Year rainfall.

2. Summary of 2023 Model Results and Comparison to Meter Data

MWRA developed estimated CSO activation frequency and discharge volume at each CSO outfall during calendar year 2023 using the MWRA's Integrated Catchment Model (ICM) of the collection system. The model simulated each of the rainfall events in 2023 with system conditions existing at the time of each storm. In support of these simulations, MWRA updated the model to account for new information and known changes to the system, including system improvements that were completed during the year, new meter data, and results of field inspections. Each system change was incorporated into the 2023 Typical Year simulation, which represents end-of-year conditions. The model updates for 2023 are summarized in section 2.1, and the rainfall analysis is summarized in section 2.2. Section 2.3 presents the meter estimates of MWRA CSO discharges to the variance waters for 2023 and Section 2.4 presents the comparison of meter and modeled estimates of all CSO discharges for the period of January 1, 2023 to December 31, 2023.

¹ Metered data are estimates of outfall discharge calculated using data from sensors, taking into account physical configurations and constraints.

² Typical Year Rainfall or Typical Year: The performance objectives of MWRA's approved Long-Term CSO Control Plan include annual frequency and volume of CSO discharge at each outfall based on "Typical Year" rainfall from 40 years of rainfall records at Logan Airport, 1949-1987 plus 1992. The Typical Year was a specifically constructed rainfall series that was based primarily on a single year (1992) that was close to the 40-year average in total rainfall and distribution of rainfall events of different sizes. The rainfall series was adjusted by adding and subtracting certain storms to make the series closer to the actual averages in annual precipitation, number of storms within different ranges of depth and storm intensities. The development of the Typical Year is described in MWRA's System Master Plan Baseline Assessment, June 15, 1994. The Typical Year consists of 93 storms with a total precipitation of 46.8 inches.

2.1 Hydraulic Model Updates

Updates to MWRA's hydraulic model are necessary to refine CSO discharge estimates as improvements are made to the MWRA and community sewer systems or to adjust model parameters or configurations based on updated system information; to compare model predictions against meter data; and to update Typical Year CSO performance for comparison with the LTCP activation and volume goals. The MWRA's Q4-2023 model was updated with the changes listed in Table 2-1 below. The table provides the **Location** of the part of the model that was modified. The **Summary of Change** provides information on what was changed in the model. **Supporting Information** provides additional context on the justification/source of information about the modification that was made to the model. The Q4-2023 system conditions model was used to predict CSO discharges during the storms that occurred in the period of January 1, 2023, through December 31, 2023, and to assess the Typical Year CSO performance for current system conditions.

Table 2-1. Model Changes to reflect Q4-2023 System Conditions

Location	Summary of Change	Supporting Information
CSO Facilities	Updated the Real Time Control (RTC) to include the storm-by-storm operation of the facilities based on facility operation data provided by MWRA.	The updated RTC was added for the January 1 – December 31, 2023 period based on data provided by MWRA
Outfall BOS046, Boston Gate House #1	The model RTC was updated to reflect the actual gate conditions at Gate House #1 during the January 1, 2023 – December 31, 2023 period (the Typical Year version of the model will open the gates in accordance with BWSC's current SOP's).	BWSC opens the gates in Gate House #1 for individual storms based on operator discretion and if the storm is predicted to exceed 80% of a 2-year recurrence interval depth.
Regulator RE046-100	Regulator configuration updates	Updated the regulator RE046-100 influent pipe diameter (increased pipe diameter from 12-inches to 18-inches based on field observations).
Outfall CHE008	CHE008 Dry Weather Flow (DWF) Connection Modification Completed June 30, 2023	MWRA provided field measurements and sketches documenting the new dry weather flow configuration at regulator RE-081. Work was completed on June 30, 2023.
Prison Point Tributary Area	Stormwater Subcatchments	MWRA updated stormwater subcatchment delineations in the Back Bay based on GIS mapping. The updated delineations relocated stormwater from the Stony Brook Conduit to the Old Stony Brook Conduit.
Outfall BOS070	South Boston Sewer Separation Contract 1 Completed August 2023	BWSC completed Contract 1 of the 5-contract South Boston Sewer Separation project in August 2023.

2.2 Rainfall Analyses

Rainfall is a driving factor in the analysis of CSOs, as the occurrence of overflows within the MWRA sewer system is dependent on rainfall intensity and/or depth. The rainfall for the period of January 1, 2023, through December 31, 2023, was analyzed to help support the understanding of the modeled performance for 2023 conditions with respect to the measured activations and volumes at each outfall for the 2023 period, and with respect to the LTCP targets for performance for the Typical Year. As described in the *CSO Annual Report: Discharge Estimates and Rainfall Analyses report for Calendar Year 2021*³, the MWRA's rainfall recurrence interval calculation methodology was updated from *Technical Paper 40* (TP-40)⁴ to *Atlas-14*⁵.

³ CSO Annual Report April 29, 2022: CSO Discharge Estimates and Rainfall Analyses for Calendar Year 2021

<https://www.mwra.com/cso/pcmpa-reports/042922-annualcso.pdf>

⁴ TP 40: https://reduceflooding.com/wp-content/uploads/2018/09/TechnicalPaper_No40.pdf

⁵ Atlas 14 Volume 10 report : https://www.weather.gov/media/owp/oh/hdsc/docs/Atlas14_Volume10.pdf

Values for Atlas 14 for Boston were extracted from NOAA's data server⁶ on April 12, 2022. The Atlas 14 partial duration curves were used to assign the recurrence intervals. The smallest storm the partial duration curves address is the 1-year storm, so the partial duration intensity-duration-frequency (IDF) curves for the 3-month and 6-month frequencies were extrapolated. The storm recurrence intervals identified in the text and sections below and in Appendix A are based on the 2019 edition of Atlas 14 referenced above.

Appendix A includes the following tables that were prepared in support of this analysis:

- Table A-4. Summary of Storm Events at Ward Street Headworks Rain Gauge (BO-DI-1) for January 1, 2023, to December 31, 2023
- Table A-5. Frequency of Events within Selected Ranges of Total Rainfall for January 1, 2023, through December 31, 2023
- Table A-6. Comparison of Storms Between January 1, 2023, and December 31, 2023, and Typical Year with Greater Than 2 Inches of Total Rainfall
- Table A-7. Comparison of Storms Between January 1, 2023, and December 31, 2023, and the Typical Year with Peak Intensities Greater than 0.40 inches/hour

The findings from those tables are summarized below.

In 2023, Metropolitan Boston experienced a substantially greater volume of rain, more higher-intensity storm events, and about the same number of storms with depth greater than 2 inches compared to the Typical Year. The average depth across the collection system's rain gauges in 2023 of 55.35 inches was 8.55 inches greater than the Typical Year total rainfall depth of 46.80 inches. The exceptional number of high intensity events during the two months of July and August 2023 resulted in 2023 being classified by the National Weather Service as the second wettest summer on record in the Boston region. The impact of higher rainfall (in terms of total rainfall, as well as peak intensity) is evident in the 2023 vs. Typical Year rainfall comparisons in the rainfall summary tables, and in comparing the modeled CSO discharge estimates for 2023 versus the Typical Year. For example, in 2023, the Prison Point modeled discharge volume was 385.49 MG, compared to the Typical Year predicted Prison Point discharge of 250.39 MG, a 135.10 MG difference. Also in 2023 the total modeled CSO discharge was 713 MG compared to the Typical Year predicted total CSO discharge of 397 MG.

In terms of comparing the 2023 rainfall to the Typical Year, the following observations are noted:

- 2023 averaged 93 storm events with an average annual rainfall depth of 55.35 inches across the rain gauges assessed, compared to 93 storm events with an average annual rainfall depth of 46.80 inches for the Typical Year (Table A-5).
- In general, the breakdown of numbers of storms by rainfall depth categories for 2023 skewed towards the larger storms compared to the Typical Year. The 2023 period had eight more storms with depths greater than 0.5 inches and eight fewer storms with depths lower than 0.5 inches. (Table A-5).
- In terms of larger storms, for the four gauges shown in Table A-6 the number of storms with greater than 2 inches of total rainfall in 2023 ranged from four to eight, with 6 storm events recorded to have a depth greater than 2 inches at Ward St (BO-DI-1), 4 storms for Columbus Park (BO-DI-2) and Chelsea Creek (CH-BO-1) respectively, and 8 storms at USGS Fresh Pond. The average of those four gauges came to 6 storms with depth greater than 2 inches, which matched the count from the Typical Year. The largest storm in 2023 among those four gauges had a depth of 3.44 inches, compared to the largest storm in the Typical Year, which has a depth of 3.89 inches (Table A-6). Within the Typical Year, the storms with greater than 2 inches of rainfall were separated from each other by a period of at least one month. In 2023, two

⁶ NOAA's Data server for MA: https://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=ma

December storms recorded at the Ward Street and USGS Fresh Pond rain gauges with greater than 2 inches of rainfall were separated by only one week (Table A-6).

- For the four gauges shown in Table A-7, the number of storms with peak intensities greater than 0.40 inches per hour ranged from ten to fifteen, compared to nine for the Typical Year. The two months of July and August are noted to include eight to ten of these intense storm events. The Typical Year had one storm with a peak intensity of 1.08 inches per hour with the remaining eight storms having peak intensities between 0.42 and 0.75 inches per hour. In 2023, the Fresh Pond gauge measured a storm with a peak intensity of 1.97 inches per hour (determined to equate to a 20-year 1-hour event) and measured a total of seven storms with peak intensities greater than 0.75 inches per hour. The other three gauges represented in Table A-7 had individual storms with peak intensities between 1.14 to 1.69 inches per hour and each measured three storms with peak intensity greater than 0.75 inches per hour. (Table A-7).

Appendix A presents the rainfall data measured during the period of January 1, 2023, through December 31, 2023. It also describes the analysis of the rainfall data used to characterize the return period of each storm event and a comparison of measured rainfall for the 2023 period to the rainfall included in the Typical Year. Further detail regarding the rainfall data collection and processing can be found in Chapter 9 of the [December 2021 CSO Report](#).

2.3 Meter Estimates of CSO Discharges to Variance Waters for 2023

Under the CSO Variances for the Alewife/Upper Mystic River and the Lower Charles River/Charles Basin and 314 CMR 16.00: Notification Requirements to Promote Public Awareness of Sewage Pollution, MWRA, Cambridge, and Somerville must provide public notification of CSO activations within two hours and estimate volumes within five business days. In addition, the variances require MWRA, Cambridge and Somerville to report the annual CSO volumes and overflow durations no later than April 30th of each year. MWRA and the CSO communities have been collecting meter data used to report the CSO discharges at each of the outfalls tributary to the variance waters as part of the CSO Notification Program.

Table 2-2 below presents the estimated activation frequency, duration, and volume of CSO to the variance waters for MWRA-owned outfalls based on meter data. These data were collected by MWRA, supplemented by BWSC monitoring of regulators tributary to both outfalls MWR023 and BOS046. Refer to the Cambridge and Somerville annual reports for additional discussion regarding community metering data.

Table 2-2. 2023 MWRA Metered CSO Discharges to Variance Waters

Outfall/Waterbody	MWRA Metered ⁽¹⁾ CSO Discharge Estimates ⁽²⁾		
	Activation Frequency	Volume (MG)	Duration (hr)
Alewife Brook			
MWR003	2	1.3	2.2
Upper Mystic			
SOM007A/MWR205A	15	43.56	29.91
Lower Charles			
MWR010	0	0	0
MWR018	3	0.56	2.93
MWR019	2	0.19	1.09
MWR020	2	0.13	0.91
MWR201 (Cottage Farm) (treated)	8	61.83	19.28
MWR023	6	1.13	4.99

- (1) Metered data are estimates of outfall discharge calculated using data from sensors, taking into account physical configurations and constraints.
- (2) This table of metered CSO activation frequency, duration, and volume for each of the MWRA outfalls tributary to the variance waters for 2023 is provided to meet the reporting requirement as described in section D.4.b.iv of the 2019 Alewife Brook Variance and as described in section D.3.b.iv of the 2019 Charles River Variance.

2.4 Meter and Modeled Estimates of 2023 System Wide CSO Discharges

The Q4-2023 system conditions model was used to simulate the storm events from January 1, 2023, to December 31, 2023. MWRA and the CSO communities have been collecting meter data at each of the outfalls listed in the LTCP as part of the CSO Notification Program. These meter data were used to tabulate the CSO activation frequency and volume for January 1, 2023, to December 31, 2023 period.

The estimates of CSO activations and volumes based on meter data for non-MWRA-owned outfalls were made available from BWSC, Cambridge, Chelsea and Somerville. Each of the communities utilizes a professional metering firm for the installation and maintenance of flow metering equipment and the assessment of CSO activations, volumes and durations based on the meter data. MWRA has worked closely with BWSC to review the CSO activation frequency and volume reported through the CSO Notification System in order to compare how the metered activations and discharge volumes are tabulated to the methodology used in the model. The BWSC meter data presented below has been adjusted to account for a 12-hour minimum interevent time and a minimum activation volume threshold of 0.01 MG to be consistent with model output. Table 2-3 presents the adjusted CSO activation frequency and volume for BWSC outfalls and a brief description of the changes from the originally reported values. MWRA has not reviewed the meter configurations or the methodologies for computing the CSO activations and volumes for BWSC, Cambridge, Chelsea, or Somerville. Calculating CSO discharges from meter data for the purpose of developing volume estimates, whether by MWRA or by the communities, is inherently difficult and can be inaccurate given complex hydraulics, difficulty in proper calibration given normal dry conditions, etc.

Summary of 2023 Modeled and Metered CSO Discharges

Table 2-3 presents the comparison of metered estimates and modeled CSO discharges from January 1, 2023, to December 31, 2023. As indicated in Table 2-3, the model was able to replicate the storm responses for the majority of storm events in the 2023 period. However, it was not possible to match all of the modeled and metered activations for every meter and storm event. These differences may be attributed to various conditions or combination of conditions, including rainfall data quality and rainfall spatial variation, unknown transient conditions in the collection system, and the reliability of overflow metering data (see Section 4.2 of Semiannual Report No. 5 *Model Calibration and Factors Affecting Model Results*). Table 2-4 provides a list of the locations with notable differences between metered and modeled CSO discharges for the January 1, 2023 to December 31, 2023 period.

Table 2-3. Summary of 2023 Modeled and Metered CSO Discharges

Outfall	January 1, 2023 – Dec 31, 2023				
	Meter ^{(1) (2)}		Model		Meter Data Notes ⁽⁷⁾
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	
Alewife Brook					
CAM001	0	0.00	4	0.19	Meter data provided by Cambridge.
CAM002	0	0.00	1	0.23	Meter data provided by Cambridge.
MWR003	2	1.3	9	5.32	Meter data provided by MWRA. Refer to Table 2-4 below for discussion regarding meter vs model differences.
CAM401A	20	20.51	10	3.85	Meter data provided by Cambridge. Per the City of Cambridge, due to inconsistencies in flow monitoring data, CSO statistics for CAM401A are based on both metered and model simulated data. Refer to Table 2-4 below for discussion regarding meter vs model differences.
CAM401B	7	1.00	10	2.77	Meter data provided by Cambridge
SOM001A	12	7.02	11	14.17	Meter data provided by Somerville. Refer to Table 2-4 below for discussion regarding meter vs model differences.
TOTAL	20	29.83	11	26.53	
Upper Mystic River					
SOM007A/MWR205A ⁽³⁾	15	43.56	14	40.02	Meter data provided by MWRA.
Mystic/Chelsea Confluence					
MWR205 (Somerville Marginal Facility)	32	130.58	31	134.63	Meter data provided by MWRA.
BOS013	6	0.37	7	0.46	Meter data provided by BWSC. CSO Notification Program Reported: <ul style="list-style-type: none"> 8 activations and 0.39 MG Adjusted meter data to be consistent with modeled reporting of activation and volume ⁽⁶⁾ : <ul style="list-style-type: none"> Removed 2 activations with less than 0.01 MG
BOS014	1	0.04	3	0.58	Meter data provided by BWSC. CSO Notification Program Reported: <ul style="list-style-type: none"> 4 activations and 0.04 MG Adjusted meter data to be consistent with modeled reporting of activation and volume ⁽⁶⁾ : <ul style="list-style-type: none"> Removed 3 activations with less than 0.01 MG
BOS017	4	0.60	7	0.89	Meter data provided by BWSC.
CHE003	0	0.00	0	0.00	Meter data provided by Chelsea.
CHE004	2	0.06	3	0.47	Meter data provided by Chelsea.
CHE008	4	0.94	2	0.70	Meter data provided by Chelsea.
TOTAL	32	132.59	31	137.73	
Upper Inner Harbor					
BOS009	13	0.85	11	1.13	Meter data provided by BWSC. CSO Notification Program Reported: <ul style="list-style-type: none"> 23 activations and 0.87 MG

Table 2-3. Summary of 2023 Modeled and Metered CSO Discharges, Continued

Outfall	January 1, 2023 – Dec 31, 2023				
	Meter ^{(1) (2)}		Model		Meter Data Notes ⁽⁷⁾
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	
					Adjusted meter data to be consistent with modeled reporting of activation and volume ⁽⁸⁾ : <ul style="list-style-type: none"> Removed 8 activations with less than 0.01 MG Removed 2 activations with less than 12-hour interevent time
BOS010	2	0.03	3	0.45	Meter data provided by BWSC. CSO Notification Program Reported: <ul style="list-style-type: none"> 3 activations and 0.04 MG Adjusted meter data to be consistent with modeled reporting of activation and volume ⁽⁸⁾ : <ul style="list-style-type: none"> Removed 1 activation with less than 0.01 MG
BOS012	1	0.03	2	0.04	Meter data provided by BWSC. CSO Notification Program Reported: <ul style="list-style-type: none"> 2 activations and 0.04 MG Adjusted meter data to be consistent with modeled reporting of activation and volume ⁽⁸⁾ : <ul style="list-style-type: none"> Removed 1 activation with less than 0.01 MG
BOS019	4	1.16	3	0.64	Meter data provided by BWSC. CSO Notification Program Reported: <ul style="list-style-type: none"> 5 activations and 1.16 MG Adjusted meter data to be consistent with modeled reporting of activation and volume ⁽⁸⁾ : <ul style="list-style-type: none"> Removed 1 activation with less than 12-hour interevent time
BOS057	2	6.40	4	2.96	Meter data provided by BWSC.
BOS060	3	1.05	3	2.56	Meter data provided by BWSC.
MWR203 (Prison Point)	16	354.28	18	385.49	Meter data provided by MWRA.
TOTAL	16	363.80	18	393.27	
Lower Inner Harbor					
BOS003	20	6.77	5	3.17	Meter data provided by BWSC. Refer to Table 2-4 below for discussion regarding meter vs model differences.
BOS004	1	0.05	4	0.46	Meter data provided by BWSC.
BOS005	Closed	Closed	Closed	Closed	
TOTAL	20	6.82	5	3.63	
Fort Point Channel					
BOS062	10	2.99	4	3.83	Meter data provided by BWSC.
BOS064	3	0.20	4	0.49	Meter data provided by BWSC. CSO Notification Program Reported: <ul style="list-style-type: none"> 6 activations and 0.21 MG Adjusted meter data to be consistent with modeled reporting of activation and volume ⁽⁸⁾ : <ul style="list-style-type: none"> Removed 2 activations with less than 0.01 MG

Table 2-3. Summary of 2023 Modeled and Metered CSO Discharges, Continued

Outfall	January 1, 2023 – Dec 31, 2023				
	Meter ^{(1) (2)}		Model		Meter Data Notes ⁽⁷⁾
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	
					<ul style="list-style-type: none"> Removed 1 activation with less than a 12-hour interevent time
BOS065	3	0.06	3	1.98	Meter data provided by BWSC. CSO Notification Program Reported: <ul style="list-style-type: none"> 4 activations and 0.07 MG Adjusted meter data to be consistent with modeled reporting of activation and volume ⁽⁶⁾ : <ul style="list-style-type: none"> Removed 1 activation with less than 12-hour interevent time
BOS068	1	0.38	0	0.00	Meter data provided by BWSC.
BOS070/DBC	10	11.62	5	13.38	Meter data provided by BWSC. CSO Notification Program Reported: <ul style="list-style-type: none"> 18 activations and 82.57 MG Adjusted meter data to be consistent with modeled reporting of activation and volume ⁽⁶⁾ : <ul style="list-style-type: none"> Internal regulators and the Union Park Pump Station removed from the BOS070/DBC calculation
MWR215 (Union Park)	11	42.23	11	50.76	Meter data provided by MWRA.
BOS070/RCC	1	0.85	4	1.33	Meter data provided by BWSC.
BOS073	1	0.12	0	0.00	Meter data provided by BWSC.
TOTAL	11	58.45	11	71.77	
Reserved Channel					
BOS076	2	0.32	3	1.84	Meter data provided by BWSC.
BOS078	4	0.42	1	0.08	Meter data provided by BWSC.
BOS079	1	0.03	0	0.00	Meter data provided by BWSC.
BOS080	1	0.10	2	0.12	Meter data provided by BWSC. CSO Notification Program Reported: <ul style="list-style-type: none"> 2 activations and 0.11 MG Adjusted meter data to be consistent with modeled reporting of activation and volume ⁽⁶⁾ : <ul style="list-style-type: none"> Removed 1 activation with less than 0.01 MG (0.009 MG)
TOTAL	4	0.87	3	2.04	
Upper Charles					
CAM005	9	0.87	12	4.10	Meter data provided by Cambridge.
CAM007	2	1.25	7	8.57	Meter data provided by Cambridge.
TOTAL	9	2.12	12	12.67	
Lower Charles					
CAM017	4	5.36	2	0.87	Per the City of Cambridge, due to non-operation of CAM017 meters in the period 8/3/23-9/11/23, model simulation data was used for that period.
MWR010	0	0.00	0	0.00	Meter data provided by MWRA.
MWR018	3	0.56	3	2.33	Meter data provided by MWRA.

Table 2-3. Summary of 2023 Modeled and Metered CSO Discharges, Continued

Outfall	January 1, 2023 – Dec 31, 2023				Meter Data Notes ⁽⁷⁾
	Meter ^{(1) (2)}		Model		
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	
MWR019	2	0.19	3	1.47	Meter data provided by MWRA.
MWR020	2	0.13	3	4.15	Meter data provided by MWRA.
MWR201 (Cottage Farm)	8	61.83	7	50.92	Meter data provided by MWRA. Refer to Table 2-4 below for discussion regarding meter vs model differences.
MWR023 ⁽⁴⁾	6	1.13	3	0.63	Meter data provided by MWRA.
TOTAL	8	69.20	7	60.37	
Back Bay Fens					
BOS046 (BGH#1) ⁽⁴⁾	2	2.34	1	0.44	Volume was computed from MWRA data on 046 regulators and activation frequency from BWSC.
BOS046 (BGH#2) ⁽⁵⁾⁽⁶⁾	2	N/A ⁽⁶⁾	1	4.25	Activation frequency provided by BWSC.
TOTAL	2		1	4.69	
TOTAL UNTREATED		77.10		90.90	
TOTAL TREATED		588.92		621.80	
GRAND TOTAL		666.02		712.70	

- (1) Metered data are estimates of outfall discharge calculated using data from sensors, taking into account physical configurations and constraints.
- (2) Meter volume reported is calculated from MWRA, Cambridge, Somerville, Chelsea, and BWSC community meters.
- (3) Outfall SOM007A/MWR205A is a side-outlet relief off of outfall MWR205, downstream of the Somerville Marginal Facility. This outfall can activate and discharge treated flow during storm events when high tides restrict the discharge from outfall MWR205. The SOM007A/MWR205A volume includes a fraction of the flow treated at Somerville Marginal facility plus separate stormwater that enters the Somerville Marginal Conduit (outfall) downstream of the facility. The volume presented for outfall SOM007A/MWR205A is therefore not included in the "Total Treated" volume at the bottom of the table because the treated CSO fraction of the volume at SOM007A/MWR205A is counted in the volume presented for MWR205.
- (4) BOS046 (BGH#1 [Boston Gatehouse #1]) is primarily a stormwater discharge but may discharge CSO if the upstream regulators overflow. The upstream regulators are monitored by BWSC. The gatehouse is normally closed but may be opened for flood mitigation. Flow can discharge at BGH#1 if the gate is opened or if water overtops the closed gate. Based on model tracer studies, when a discharge occurs during model simulations at BOS046 and one or more of the upstream regulators in the Stony Brook system are predicted to activate, it was estimated that 25% of the CSO from the upstream regulators discharges at the MWR023 outfall (Charles River) and 75% discharges through BGH#1 at BOS046 (Back Bay Fens).
- (5) BOS046 (BGH#2 [Boston Gatehouse #2]) includes a permanently-closed gate which may also be overtopped in larger storm events; this gate was added to the model after the Q1-2021 system conditions model run per new field information.
- (6) N/A = Not available: Depth measurement only at this location.
- (7) Indicates the source of the meter data.
- (8) MWRA has worked closely with BWSC to review the CSO activation frequency and volume reported through the CSO Notification System in order to compare how the metered activations and discharge volumes are tabulated to the methodology used in the model. The BWSC meter data presented has been adjusted to account for a 12-hour minimum interevent time and a minimum activation volume threshold of 0.01 MG to be consistent with model output.

Table 2-4. Notable Differences Between Metered and Modeled CSO Discharges, January 1, 2023 to December 31, 2023

Location	Meter	Model	Comment
CAM401A	20 discharges 20.51 MG	10 discharges 3.85 MG	<ul style="list-style-type: none"> MWRA and the city of Cambridge are working together to further understand and resolve observed differences. Flow meters and level sensors have been installed in the CAM401A system to evaluate possible explanations which include meter configuration/reliability, modeled hydrology and hydraulic accuracy, and returning sediment deposition in the downstream system.
MWR003	2 discharges 1.3 MG	9 discharges 5.32 MG	<ul style="list-style-type: none"> Based on level data at RE031 and RE032, the model slightly overpredicted the HGL in the Alewife Brook Branch Sewer (ABBS) and Alewife Brook Conduit (ABC) during the 2023 period. The conservative HGL in the model results in higher activation frequency and volume at MWR003. However, 5 of the modeled activations were less than 0.2 MG. Additionally, the model predicted that the gate would have lowered during the August 8th, 2023 storm event yet the meter indicated that the gate did not drop. During this storm event, USGS Fresh Pond rain gauge recorded a 20-year return interval for the 1-hour duration, well exceeding a Typical Year sized storm event. Based on the rain gauge information available, this storm event possessed high spatial variation. As noted in Section 2.2 above, the USGS Fresh Pond gauge also had a total of seven storms with peak intensity greater than 0.75 inches per hour, while the Columbus Park, Ward Street and Chelsea Creek gauges only had three, indicating spatial variation in some of the other larger storms as well.
BOS003	20 discharges 6.67 MG	5 discharges 3.17 MG	<ul style="list-style-type: none"> The model tends to under-predict the overflow frequency and volume at BOS003. MWRA continues to work with BWSC to check that the model is accurately representing constructed field conditions. A level sensor is being added to a manhole near this location to provide additional information.
SOM001A	12 discharges 7.02 MG	11 discharges 14.17 MG	<ul style="list-style-type: none"> In general, the model tends to slightly overpredict the overflow volume at SOM001A on a storm-by-storm basis compared to the metered volume. However, for the 7/29/23 and 8/8/23 storm events, the model over predicted the meter by 3.15 MG and 1.34 MG respectively. Each of these storm events produced higher 1-hour and 24-hour intensities than are seen in the Typical Year and possessed high spatial variation (see also the discussion of rainfall variability for MWR003 above).
MWR018	3 discharges 0.56 MG	3 discharges 2.33 MG	<ul style="list-style-type: none"> Historically, the water level in the BMC was overpredicted by the model during large storm events. Model versus meter comparisons from recent years have demonstrated that the model does a much better job of predicting the level in the BMC and CSO volumes at MWR018, MWR019 and MWR020 during less-extreme storm events.
MWR019	2 discharges 0.19 MG	3 discharges 1.47 MG	
MWR020	2 discharges 0.13 MG	3 discharges 4.15 MG	
MWR201 (Cottage Farm)	8 discharges 61.83 MG	7 discharges 50.92 MG	<ul style="list-style-type: none"> In general, the model tends to slightly overpredict the overflow volume at MWR201 on a storm-by-storm basis compared to the metered volume. However, for the 3/14/23 and 12/17/23 storm events, the model underpredicted the meter by 9.06 MG and 5.86 MG respectively. During the 3/14/23 storm event, the model predicted that the MWR201 influent gates opened and closed twice while the plant operations data reported that the gates were open for longer and did not close for a portion of the storm, resulting in a higher discharge volume. The 12/17/23 storm event had a total depth greater than two inches and a peak intensity greater than 0.4 in/hr at multiple rain gauges tributary to MWR201. However, spatial variation and the potential for frozen ground conditions in December could be driving the meter and model differences for this storm event.
MWR023	6 discharges 1.13 MG	3 discharges 0.63 MG	<ul style="list-style-type: none"> Meter data provided by MWRA indicates that two activations had durations less than 15 minutes and discharge volumes less than 0.01 MG.

3. Updated System Performance Assessment and Comparison with LTCP Levels of Control

3.1 Performance Assessment

This section summarizes the system performance under Typical Year rainfall based on the Q4-2023 system conditions model, representing conditions as of the end of 2023. As set forth in further detail below, with the completion of the Post Construction Monitoring Program and Performance Assessment and additional work completed at certain outfalls MWRA has demonstrated that 73 of the 86 outfalls listed in Exhibit B of the Second Stipulation have achieved or materially achieved LTCP goals as of the end of 2023, which is one more than reported at the end of 2022. MWRA continues to focus on the 13 (formerly 16) outfalls not yet forecasted to meet LTCP goals. Of the remaining 13 outfalls, seven have projects to meet or materially meet the LTCP goals that are in design or construction and are expected to be completed by the end of 2024 with the exception of two outfalls downstream of the Somerville Marginal CSO Facility where the project is estimated to be completed in 2025 due to construction constraints, given the new chamber installation in a heavily traveled roadway. The six outfalls that remain are particularly challenging and no clear alternatives commensurate to the minimal receiving water quality benefits have been identified.

Hydraulic modeling has historically served as the basis for evaluating performance of the MWRA's CSO system. Table 3-1 presents a full accounting of the status and Typical Year overflow activity as of Q4-2023 System Conditions for all discharge locations addressed by MWRA's CSO planning efforts and projects since MWRA assumed responsibility for system-wide CSO control in the mid-1980s. Table 3-1 also presents previously-modeled CSO discharge levels for 1992 System Conditions for the Typical Year, and the LTCP goals for Typical Year levels of control as defined in the Second Stipulation. In Table 3-1, Q4-2023 System Conditions activations or volumes that are greater than (i.e. do not achieve) the LTCP goals are shaded in grey, and each CSO outfall is color-coded based on status of attainment with the LTCP goals, as follows:

- Dark blue indicates outfalls meet or materially meets the LTCP goals under the Q4-2023 System Conditions.
- Light blue indicates outfalls that have projects in design or construction forecast to meet or materially meet the LTCP goals after December 2023.
- No color indicates outfalls that are particularly challenging with no clear plan yet established to achieve the LTCP goals.

Table 3-1. Typical Year Performance: Baseline 1992, Q4-2023 Conditions and LTCP Goals

Outfall currently achieves LTCP activation and volume goals.	Outfall is forecast to achieve LTCP goals after Dec 2023
Outfall investigations continue for forecast of LTCP attainment potential.	Model prediction is greater than LTCP value.

OUTFALL	1992 SYSTEM CONDITIONS ⁽¹⁾		Q4-2023 SYSTEM CONDITIONS		LONG TERM CONTROL PLAN ⁽²⁾	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
ALEWIFE BROOK						
CAM001	5	0.15	1	0.02	5	0.19
CAM002	11	2.73	0	0.00	4	0.69
MWR003	6	0.67	3	0.61	5	0.98
CAM004	20	8.19	Closed	N/A	Closed	N/A
CAM400	13	0.93	Closed	N/A	Closed	N/A
CAM401A	18	2.12	5	0.66	5	1.61
CAM401B			4	0.50	7	2.15
SOM001A	10	11.93	8	4.47	3	1.67
SOM001	0	0.00	Closed	N/A	Closed	N/A
SOM002	0	0.00	Closed	N/A	N/I ⁽³⁾	N/I ⁽³⁾
SOM002A	0	0.00	Closed	N/A	Closed	N/A
SOM003	0	0.00	Closed	N/A	Closed	N/A
SOM004	5	0.09	Closed	N/A	Closed	N/A
TOTAL		26.81		6.26		7.29
UPPER MYSTIC RIVER						
SOM007A/MWR205A ^{(7) (8)}	9	7.61	5	4.50	3	3.48
SOM006	0	0.00	Closed	N/A	N/I ⁽³⁾	N/I ⁽³⁾
SOM007	3	0.06	Closed	N/A	Closed	N/A
TOTAL		7.67		4.50		3.48
MYSTIC/CHELSEA CONFLUENCE						
MWR205 ⁽⁷⁾ (Somerville-Marginal CSO Facility)	33	120.37	30	100.41	39	60.58
BOS013*	36	4.40	8	0.27	4	0.54
BOS014	20	4.91	0	0.00	0	0.00
BOS015	76	2.76	Closed	N/A	Closed	N/A
BOS017 ⁽⁷⁾	49	7.16	6	0.34	1	0.02
CHE002	49	2.51	Closed	N/A	4	0.22
CHE003	39	3.39	0	0.00	3	0.04
CHE004	44	18.11	2	0.08	3	0.32
CHE008	35	22.35	0	0.00	0	0.00
TOTAL		185.96		101.10		61.72
UPPER INNER HARBOR						
BOS009 ⁽⁷⁾	34	3.60	10	0.73	5	0.59
BOS010	48	11.83	1	0.06	4	0.72
BOS012	41	7.90	0	0.00	5	0.72
BOS019	107	4.48	1	0.07	2	0.58
BOS050	No Data		Closed	N/A	Closed	N/A
BOS052	0	0.00	Closed	N/A	Closed	N/A
BOS057*	33	14.71	2	0.58	1	0.43
BOS058	17	0.29	Closed	N/A	Closed	N/A
BOS060*	64	2.90	2	0.38	0	0.00
MWR203 (Prison Point Facility)*	28	261.85	17	250.39	17	243.00
TOTAL		307.56		252.21		246.04

Table 3-1. Typical Year Performance: Baseline 1992, Q4-2023 Conditions and LTCP Goals, Continued

OUTFALL	1992 SYSTEM CONDITIONS ⁽¹⁾		Q4-2023 SYSTEM CONDITIONS		LONG TERM CONTROL PLAN ⁽²⁾	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
LOWER INNER HARBOR						
BOS003	28	18.09	4	1.15	4	2.87
BOS004	34	3.43	4	0.29	5	1.84
BOS005	4	10.23	Closed	Closed	1	0.01
BOS006	17	1.21	Closed	N/A	4	0.24
BOS007	34	3.93	Closed	N/A	6	1.05
TOTAL		36.89		1.44		6.01
CONSTITUTION BEACH						
MWR207	24	4.00	Closed	N/A	Closed	N/A
TOTAL		4.00		N/A		N/A
FORT POINT CHANNEL						
BOS062 ⁽⁷⁾	8	4.15	5	1.23	1	0.01
BOS064	14	0.99	0	0.00	0	0.00
BOS065 ⁽⁷⁾	11	3.08	1	0.41	1	0.06
BOS068	4	0.62	0	0.00	0	0.00
BOS070/DBC ⁽⁷⁾	4	281.62	6	2.59	3	2.19
MWR215 (Union Park Facility)			9	21.65	17	71.37
BOS070/RCC			0	0.00	2	0.26
BOS072	21	3.62	Closed	N/A	0	0.00
BOS073	23	4.73	0	0.00	0	0.00
TOTAL		298.81		25.88		73.89
RESERVED CHANNEL						
BOS076	65	65.94	1	0.09	3	0.91
BOS078	41	14.84	0	0.00	3	0.28
BOS079	18	2.10	0	0.00	1	0.04
BOS080	33	6.21	0	0.00	3	0.25
TOTAL		89.09		0.09		1.48
NORTHERN DORCHESTER BAY						
BOS081	13	0.32	0 / 25 year ⁽⁹⁾	N/A	0 / 25 year ⁽⁹⁾	N/A
BOS082	28	3.75	0 / 25 year ⁽⁹⁾	N/A	0 / 25 year ⁽⁹⁾	N/A
BOS083	14	1.05	Closed	N/A	0 / 25 year ⁽⁹⁾	N/A
BOS084	15	3.22	0 / 25 year ⁽⁹⁾	N/A	0 / 25 year ⁽⁹⁾	N/A
BOS085	12	1.31	0 / 25 year ⁽⁹⁾	N/A	0 / 25 year ⁽⁹⁾	N/A
BOS086	80	3.31	0 / 25 year ⁽⁹⁾	N/A	0 / 25 year ⁽⁹⁾	N/A
BOS087	9	1.27	Closed	N/A	0 / 25 year ⁽⁹⁾	N/A
TOTAL		14.23		0.00		0.00
SOUTHERN DORCHESTER BAY						
BOS088	0	0.00	Closed	N/A	Closed	N/A
BOS089 (Fox Pt.)	31	87.11	Closed	N/A	Closed	N/A
BOS090 (Commercial Pt.)	19	10.16	Closed	N/A	Closed	N/A
TOTAL		97.27		0.00		0.00
UPPER CHARLES						
BOS032	4	3.17	Closed	N/A	Closed	N/A
BOS033	7	0.26	Closed	N/A	Closed	N/A
CAM005	6	41.56	8	0.75	3	0.84
CAM007*	1	0.81	2	0.48	1	0.03
CAM009 ⁽⁴⁾	19	0.19	Closed	N/A	2	0.01
CAM011 ⁽⁴⁾	1	0.07	Closed	N/A	0	0.00
TOTAL		46.06		1.23		0.88

Table 3-1. Typical Year Performance: Baseline 1992, Q4-2023 Conditions and LTCP Goals, Continued

OUTFALL	1992 SYSTEM CONDITIONS ⁽¹⁾		Q4-2023 SYSTEM CONDITIONS		LONG TERM CONTROL PLAN ⁽²⁾	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
LOWER CHARLES						
BOS028	4	0.02	Closed	N/A	Closed	N/A
BOS042	0	0.00	Closed	N/A	Closed	N/A
BOS049	1	0.01	Closed	N/A	Closed	N/A
CAM017	6	4.72	0	0.00	1	0.45
MWR010	16	0.08	0	0.00	0	0.00
MWR018	2	3.18	2	0.44	0	0.00
MWR019	2	1.32	2	0.17	0	0.00
MWR020	2	0.64	2	0.09	0	0.00
MWR021	2	0.50	Closed	N/A	Closed	N/A
MWR022	2	0.43	Closed	N/A	Closed	N/A
MWR201 (Cottage Farm Facility)	18	214.10	2	7.73	2	6.30
MWR023 ⁽⁵⁾	39	114.60	2	0.19	2	0.13
SOM010	18	3.38	Closed	N/A	Closed	N/A
TOTAL		342.98		8.62		6.88
NEPONSET RIVER						
BOS093	72	1.61	Closed	N/A	Closed	N/A
BOS095	11	5.37	Closed	N/A	Closed	N/A
TOTAL		6.98		0.00		0.00
BACK BAY FENS						
BOS046 – Boston GH1 ⁽⁵⁾	2	5.25	2	0.22	2	5.38
BOS046 – Boston GH2 ⁽⁶⁾			0	0.00		
TOTAL		5.25		0.22		5.38
Total Treated		698		380		381
Total Untreated		759		17		23
GRAND TOTAL		1457		397		404

Notes:

* Model predicted activation and volume for Q4-2023 System Conditions has decreased since 1992 levels to a level believed to achieve anticipated water quality improvements. The inability to precisely meet activation and/or volume goals at these locations is considered immaterial.

- (1) 1992 System Conditions include completion of Deer Island Fast-Track Improvements, upgrades to headworks, and new Caruso and DeLauri pumping stations. Estimated 1988 Grand Total Typical Year CSO volume (prior to these improvements) was 3,300 million gallons.
- (2) From Exhibit B to Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflows, as amended by the Federal District Court on May 7, 2008 (the "Second CSO Stipulation").
- (3) N/I: Outfall is not included in Exhibit B to the Second CSO Stipulation.
- (4) Tentatively closed pending additional hydraulic evaluation by City of Cambridge.
- (5) BOS046 (Gatehouse 1) is primarily a stormwater discharge but may contain CSO if the upstream regulators overflow. The upstream regulators are monitored directly. Gatehouse 1 is normally closed but may be opened for flood mitigation. Flow can discharge at the Gatehouse if either the gate is opened or if water overtops the gate. Based on model tracer studies, when a discharge occurs it is estimated that 25% of the CSO from the upstream regulators discharges at outfall MWR023 (Charles River) and 75% discharges at outfall BOS046 (Back Bay Fens).
- (6) BOS046 (Gatehouse 2) includes a permanently-closed gate which may also be overtopped in extreme wet weather; this gate was added to the model after the Q1-2021 system conditions model run per new field information. Boston GH2 was not included in the 1992 Conditions model, and was not predicted to activate in the Typical Year for the Q42023 Conditions model.
- (7) See Table 3-3 below for outfalls with ongoing project forecast to attain LTCP goals.
- (8) The SOM007A/MWR205A volume includes a fraction of the flow treated at Somerville Marginal facility plus separate stormwater that enters the Somerville Marginal Conduit (outfall) downstream of the facility. The volume presented for SOM007A/MWR205A is therefore not included in the "Total Treated" volume at the bottom of the table because the treated CSO fraction of the volume at SOM007A/MWR205A is counted in the volume presented for MWR205.
- (9) The outfalls do not discharge in a 25-year storm as defined at the time the LTCP was approved.

As indicated in Table 3-1, of the 45 outfalls that remain active (i.e. are not physically closed or associated with the North Dorchester Bay CSO Storage Tunnel), 32 outfalls meet or materially meet the LTCP goals as of Q4-2023 conditions⁷. As of the 2021 annual report, 16 outfalls were not predicted to meet LTCP goals. In 2022, projects were completed to allow the predicted discharge at BOS014 and BOS003 to meet LTCP goals. As of the end of 2023, a project has been completed at CHE008 resulting in predicted discharges meeting LTCP goals for that outfall. Of the remaining 13 outfalls, seven have projects predicted to meet or materially meet the LTCP goals that are in design or construction and are expected to be completed by the end of 2024 with the exception of the Somerville Marginal CSO Facility project which is estimated to be completed in 2025. MWRA has investigated alternatives to further reduce CSOs at the six outfalls that remain closer towards their individual LTCP goals. Additional detail is provided below in Section 3.3. However, as detailed in Section 3.3, with the exception of CAM005, further projects are not recommended to meet the LTCP goals, given the marginal improvements in water quality resulting from further CSO reductions and the expected development of a new CSO control plan, as required under the CSO variance for the Charles River, Alewife Brook and Upper Mystic River. **The total treated and untreated CSO volume of 397 MG is below the LTCP goal of 404 MG and, as noted, above a number of projects are underway that will further reduce the total volume by the end of 2024, with continued reductions into the near future.**

3.1.1 Percent Capture of Combined Sewage

Table 3-2 presents the computed percent capture of combined sewage for the Typical Year for Q4-2023 system conditions, and also presents for comparison the percent capture for the Q4-2022 system conditions that had previously been presented in the 2022 CSO Annual Report. The percent capture was computed by dividing the tributary wet weather volume conveyed to Deer Island and the MWRA's CSO treatment facilities by the total tributary wet weather volume. The total tributary wet weather volume, in turn, was defined as the volume of runoff collected into the combined sewer system, plus sanitary/base flow from the combined sewer areas that occurred for the duration of rain events. Wet weather volume from areas where complete sewer separation has been implemented (such as Dorchester, Constitution Beach, and the former CAM004 area) was not counted, nor was wet weather flow from separate systems outside of the CSO communities of Boston, Cambridge, Somerville and Chelsea. Wet weather volume from partially-separated areas (i.e. areas where active CSOs remain) was counted.

The differences between the Q4-2022 and Q4-2023 percent capture values can be attributed to the model updates summarized above in Table 2-1. The changes included the stormwater subcatchment updates tributary to Prison Point, which slightly increased the treated discharge volume; the South Boston Sewer Separation project, which reduced the wet weather volume captured at Deer Island; and the dry weather flow connection modifications at CHE008, which allowed more flow at CHE008 to enter the interceptor system, reducing the number and volume of CSOs at that location. In Table 3-2 the percent capture for Q4-2022 and Q4-2023 is presented in terms of the wet weather volume tributary to Deer Island, the wet weather volume tributary to Deer Island, Cottage Farm, Prison Point and Union Park, and the wet weather volume at Deer Island, Cottage Farm, Prison Point, Union Park and Somerville Marginal. Table 3-2 shows that the percent capture at Deer Island for the Q4-2023 conditions is 93.4% which is down slightly from 93.5% (Q4-2022) due to the slight increase in discharge at Prison Point. The percent capture at Deer Island, Cottage Farm, Prison Point, and Union Park increased from 98.0% to 98.1% due to the slight increase in treated discharge at Prison Point, and the percent capture at Deer Island, Cottage Farm, Prison Point, Union Park, and Somerville Marginal remained at 99.7%.

⁷ Outfall BOS005 was closed as part of the East Boston Contract 2 Sewer Separation Work on September 6, 2022 but had been meeting the LTCP goal prior to closure.

Table 3-2. Percent Capture of Combined Sewage for the Typical Year for Q4-2023 System Conditions Compared to Q4-2022 System Conditions

	Typical Year Q4-2022	Typical Year Q4-2023	Notes
(A) Total Tributary Wet Weather Volume ⁽¹⁾ (MG)	6,073	6,057	Reduction due to South Boston sewer separation (SBSS)
(B) Total volume discharged at untreated CSOs or at CSO Facilities (MG)	396	397	Slight increase at Prison Point attributed to changes in stormwater subcatchments in the Back Bay
(C) = (A - B) Total Wet Weather Volume Captured at Deer Island (MG)	5,677	5,660	Reduction due to SBSS
(D) = (C)/(A) Percent Capture at Deer Island	93.5%	93.4%	Slight increase in treated discharge (Prison Point)
(E) Total volume discharged at untreated CSOs or at Somerville Marginal Screening/Disinfection Facility (MG)	122	117	Decrease in untreated discharge because of SBSS and CHE008
(F) = (A - E) Total Wet Weather Volume Captured at Deer Island, Cottage Farm, Prison Point and Union Park (MG)	5,951	5,940	Reduction due to SBSS
(G) = (F)/(A) Percent Capture at Deer Island, Cottage Farm, Prison Point and Union Park	98.0%	98.1%	Slight increase in treated discharge (Prison Point)
(H) Total volume discharged at untreated CSOs (MG)	21	17	Reduction due to SBSS and CHE008
(I) = (A - H) Total Wet Weather Volume Captured at Deer Island, Cottage Farm, Prison Point, Union Park and Somerville Marginal (MG)	6,052	6040	Reduction due to SBSS
(J) = (I)/(A) Percent Capture at Deer Island, Cottage Farm, Prison Point, Union Park and Somerville Marginal	99.7%	99.7%	

Notes:

1. Wet weather volume defined as volume of runoff collected into the combined sewer system, plus sanitary/base flow that occurs for the duration of rain events. Includes wet weather volume from combined or partially-combined areas in Boston, Cambridge, Chelsea and Somerville.

3.2 Outfalls Forecast to Attain LTCP Activation and Volume Goals by December 2024

Table 3-3 presents 10 outfalls that did not meet the LTCP goals as of December 2021 but are forecast to meet the LTCP goals by December 2024. Six of these outfalls were originally presented in Table 2-3 of the December 2021 CSO Report. Table 3-3 has been updated to include outfalls BOS062, BOS065, BOS017 and BOS070/DBC, which are now forecast to meet LTCP goals by December 2024. Table 3-3 (below) presents the same information from Table 2-3 of the *December 2021 CSO Report* with updated information. For each outfall, Table 3-3 presents a description and updated status of the system improvement(s) intended to result in attainment of the LTCP goals by 2024, as well as the entity implementing the work and the tentative schedule for completion. As noted above, the construction projects at the regulators tributary to outfalls CHE008, BOS003 and BOS014 are now complete, and these locations are predicted to meet LTCP goals as of the end of 2023.

Table 3-3. Outfalls With Ongoing Projects Forecast to Attain LTCP Goals

OUTFALL	LOCATION	SYSTEM IMPROVEMENT(S)*	TO BE IMPLEMENTED BY	TENTATIVE SCHEDULED COMPLETION
MWR205	Somerville Marginal CSO Facility	Construct new connection chamber with control gate connecting the facility influent conduit to the interceptor. Project bid advertisement expected in May 2024. Project constraints given location of work resulting in extended construction duration. Substantial completion anticipated in December 2025. ⁽¹⁾	MWRA	2025
SOM007A/ MWR205A				
BOS003	East Boston	East Boston Sewer Separation Phase 3 to be completed Summer of 2024. Work has been completed to reduce CSO at BOS003 & BOS014. Work to resume this spring that will bring BOS009 in line with LTCP goals. Further CSO reductions expected beyond LTCP with an additional five sewer separation phases is expected with complete sewer separation of East Boston by 2030.	BWSC	Completed 2023
BOS 009				2024
BOS014				Completed 2023
CHE008	Chelsea Creek	Replace/upgrade interceptor connection. Construction has been completed and was brought online June 30, 2024.	MWRA	Completed 2023
BOS017	Mystic/Chelsea Confluence	Modify existing upstream siphon structure. Final design is complete. The construction contract was awarded in December 2023 and the contractor mobilized on April 1, 2024. Construction is estimated to be completed in 2024.	BWSC	2024
BOS062	Fort Point Channel	Modify existing regulator structure. Final design is complete. The construction contract was awarded in December 2023 and the contractor mobilized on April 1, 2024. Construction is estimated to be completed in 2024.	BWSC	2024
BOS065				
BOS070				
		Construct a new relief pipe parallel to the BMI. Final design is complete. The construction contract was awarded in December 2023 and the contractor mobilized on April 1, 2024. Construction is estimated to be completed in 2024.	BWSC	2024

(1) A small CSO reduction was achieved at SOM007A/MWR205A by replacement of the tidegate on MWR205 in May 2023

3.3 Outfalls Currently Not Forecast to Attain LTCP Activation and/or Volume Goal

Six locations remain where Typical Year CSO activation and/or volume exceed the LTCP goals and no additional system improvement has yet been recommended. MWRA has continued to track CSO performance at these locations and assess the causes of higher overflow activity. In Table 2-4 of the December 2021 CSO Report, MWRA identified candidate projects or system adjustments that may further mitigate CSO discharges to bring activations and volumes to, or closer to, the LTCP goals. In Chapter 4 of that report, additional information was provided regarding the alternatives being evaluated for these outfalls. The following section of this report presents updates for the remaining six outfalls that present significant challenges. The modeled Typical Year overflow frequency and volume presented below represent the Q1-2023 version of MWRA's model, which was the version used to conduct the evaluations summarized below.

3.3.1 SOM001A

Outfall SOM001A is located on the Alewife Brook Conduit in the Alewife Brook System. This outfall is not

meeting the LTCP goals for activation frequency or volume as shown in Table 3-4. A schematic of the Alewife Brook system including outfall SOM001A is presented in Figure 3-1.

Table 3-4. SOM001A Q1-2023 Conditions and LTCP Goal

OUTFALL	TYPICAL YEAR			
	Q1-2023 SYSTEM CONDITIONS MODEL		LONG TERM CONTROL PLAN	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
ALEWIFE BROOK				
SOM001A	8	4.47	3	1.67

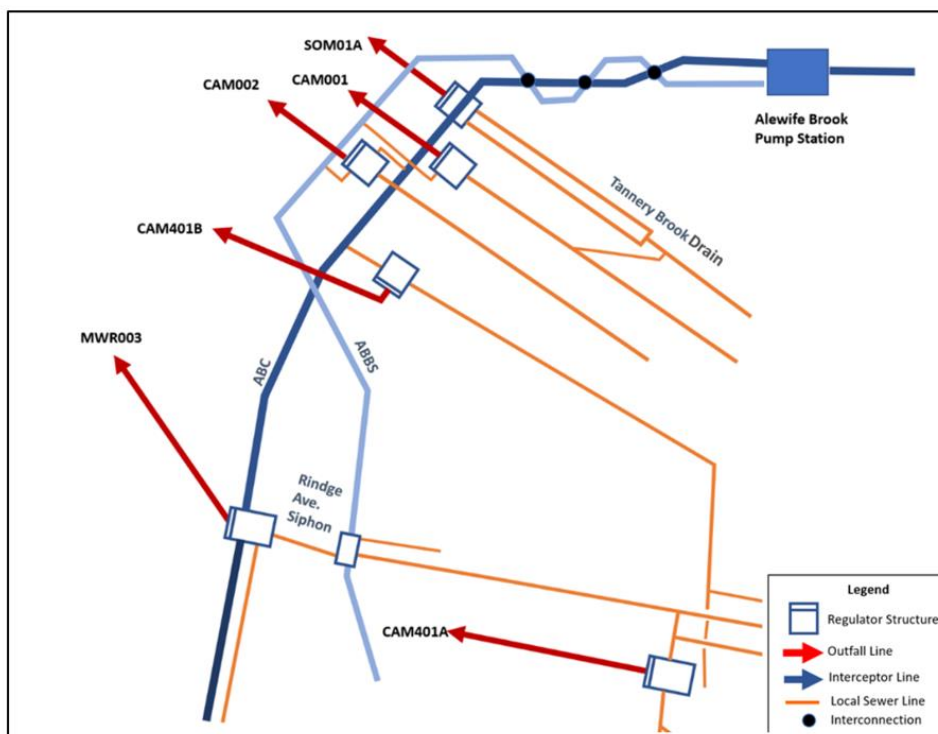


Figure 3-1. Schematic of Alewife Sub-System

Table 3-5 presents a summary of the alternatives that were evaluated with the goal of attaining LTCP goals at outfall SOM001A. The alternatives were evaluated using the Q1-2023 system conditions model with the exception of the green infrastructure alternative which used a model with additional detail that provides similar results to the model used in assessing LTCP goals. This more detailed model was used to assess green infrastructure in the area tributary to outfall SOM001A. For each of the five alternatives evaluated for outfall SOM001A, preliminary conceptual layouts and preliminary estimated construction costs were developed. As shown in Table 3-5, two storage alternatives and one regulator modification/stormwater relocation alternative were identified that could potentially meet the LTCP goals. The feasibility of the regulator modification/stormwater relocation alternative was highly uncertain. As indicated in Table 3-10 of the December 2021 *Task 6: Final CSO Post Construction Monitoring Program and Performance Assessment Report*, with CSO loads only, Alewife Brook would meet the Class B *E. coli* Single Sample Maximum Criterion 98.7% of the time for the Typical Year (2019 system conditions). Further levels of CSO control for outfall SOM001A would be more appropriately assessed in the context of the Updated CSO Control Plans being developed in accordance with the Variance for the Alewife Brook/Upper Mystic River.

Table 3-5. SOM001A Summary of Alternatives Evaluated to Attain LTCP Goals

Alternative	Meets LTCP Goals?	Comments	Preliminary Estimated Construction Cost (2023 dollars)	Benefit ⁽³⁾			
				Parameter	From	To	Reduction
Regulator modifications ⁽¹⁾ and lining the ABC and ABBS between ABPS and SOM001A	No ⁽²⁾	This alternative would put outfall MWR003 out of compliance with the LTCP goals	\$9.5 million	SOM001A Activation Frequency	8	3 ⁽²⁾	5
				SOM001A Vol. (MG)	4.47	1.23	3.24
				Total Volume to Alewife Brook (MG)	6.26	3.75	2.51
Regulator modifications ⁽¹⁾ and approximately 115 acres of stormwater relocation from the Tannery Brook drain upstream of SOM001A and new stormwater outfall for relocated stormwater	Yes	Feasibility of relocating 115 acres of stormwater directly to Alewife Brook and water quality impacts/Alewife Brook flood impacts have not been assessed.	\$0.5 million + Stormwater Relocation Costs	SOM001A Activation Frequency	8	3 ⁽²⁾	5
				SOM001A Vol. (MG)	4.47	0.77	3.70
				Total Volume to Alewife Brook (MG)	6.26	3.03	3.23
Box Storage Conduit (0.61 MG) to capture overflow from SOM001A to meet LTCP goal	Yes	Feasibility of locating the box storage conduit between the ABC and ABBS needs further evaluation.	\$45 million	SOM001A Activation Frequency	8	3	5
				SOM001A Vol. (MG)	4.47	1.26	3.21
				Total Volume to Alewife Brook (MG)	6.26	3.05	3.21
Microtunneled Storage (0.61 MG, 8 ft diameter, 1,800 feet long) to capture overflow from SOM001A to meet LTCP goal	Yes	Feasibility of locating areas for jacking and retrieving shafts needs further evaluation, along with further investigation of utility conflicts	\$32 million	SOM001A Activation Frequency	8	3	5
				SOM001A Vol. (MG)	4.47	1.26	3.21
				Total Volume to Alewife Brook (MG)	6.26	3.05	3.21
Green Infrastructure: 41 stormwater infiltration units to capture the first 0.5 inch of rain from 30.25 acres of separate stormwater areas. Infiltration unit dimensions are 10 ft wide by 25 ft long by 4 ft deep each with a hydrodynamic separator.	No	Additional investigations into soil and ground water conditions and potential sanitary connections to storm drain is needed to assess feasibility.	\$9 million	SOM001A Activation Frequency ⁽³⁾	8	7	1
				SOM001A Vol. (MG) ⁽³⁾	4.46	4.15	0.31

Notes:

- (1) Regulator modifications include raising the weir, enlarging the DWF connection, and adding a gate to restrict flow in storms larger than Typical Year storms.
- (2) Alternative would meet LTCP goals at outfall SOM001A but would force outfall MWR003 out of compliance.
- (3) Model results are representative of the Q1-2023 version of MWRA's model with the exception of the green infrastructure alternative which uses a model with additional detail that provides similar results to the model used in assessing LTCP goals.

3.3.2 Cottage Farm

The Cottage Farm CSO Facility is a CSO treatment facility that detains and treats CSO before it is discharged to the Charles River. The facility provides relief to the North Charles Metropolitan Sewer/Relief Sewer and to the South Charles Relief Sewer. This outfall is not meeting the LTCP goal for annual volume as shown in Table 3-6. A schematic of the interceptor system in the vicinity of the Cottage Farm Facility is presented in Figure 3-2.

Table 3-6. Cottage Farm Q1-2023 Conditions and LTCP Goal

OUTFALL	TYPICAL YEAR			
	Q1-2023 SYSTEM CONDITIONS MODEL		LONG TERM CONTROL PLAN	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
CHARLES RIVER				
MWR201 (Cottage Farm)	2	7.74	2	6.30

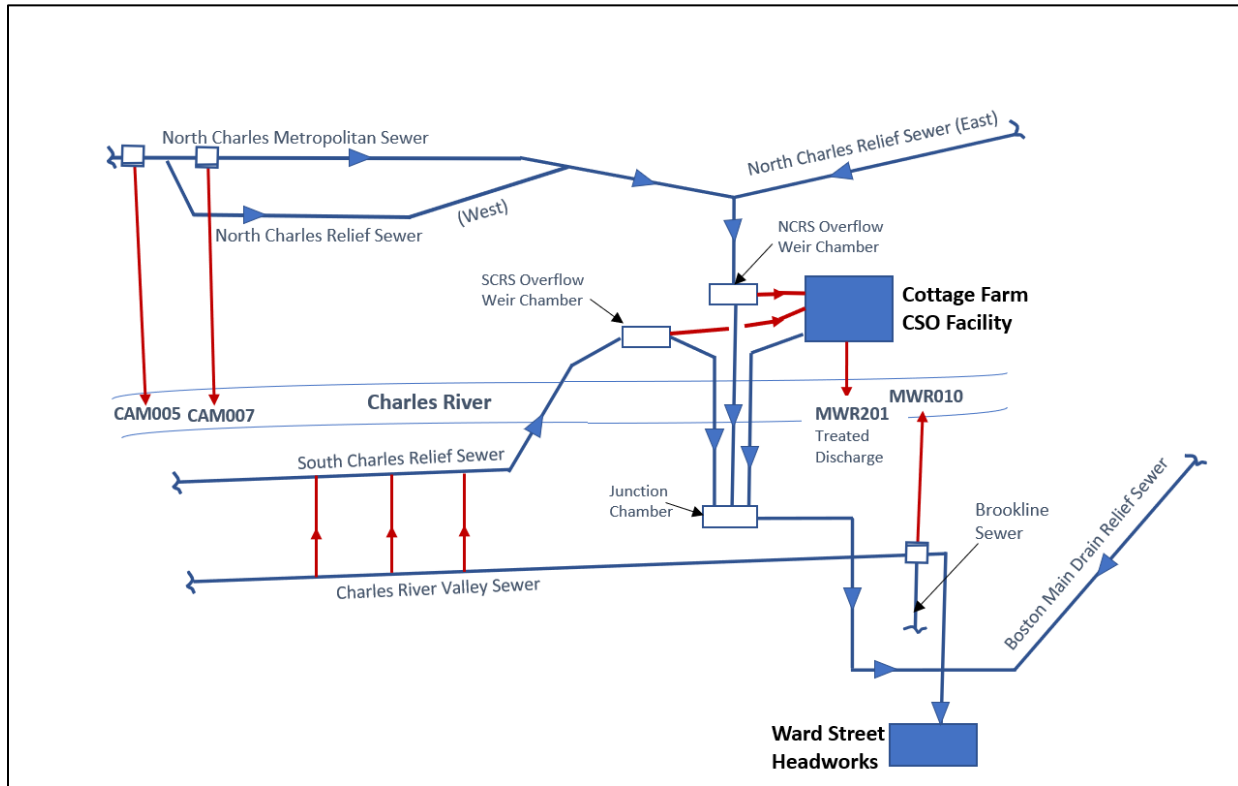


Figure 3-2 Schematic of the Charles River/Cottage Farm Sub-System

Table 3-7 presents a summary of the alternatives that were evaluated with the objective of attaining LTCP goals at the Cottage Farm CSO Facility. The alternatives were evaluated using the Q1-2023 system conditions model. For each of the alternatives evaluated, preliminary conceptual layouts and preliminary estimated construction costs were developed. As shown in Table 3-7, two storage alternatives and one sewer separation alternative were identified that could potentially meet the LTCP goals. As indicated in Table 3-5 of the December 2021 *Task 6: Final CSO Post Construction Monitoring Program and*

Performance Assessment Report, with CSO loads only, the Charles River would meet the Class B *E. coli* Single Sample Maximum Criterion 99.6% of the time for the Typical Year (2019 system conditions). Further levels of CSO control for the treated discharge from the Cottage Farm facility would be more appropriately assessed in the context of the Updated CSO Control Plans being developed in accordance with the Variance for the Charles River.

Table 3-7. Cottage Farm Summary of Alternatives Evaluated to Attain LTCP Goals

Alternative	Meets LTCP Goals?	Comments	Preliminary Estimated Construction Cost (2023 dollars)	Benefit ⁽¹⁾			
				Parameter	From	To	Reduction
Sewer Separation (300 ac.)	Yes	Net Increase in phosphorus loading by approximately 54.9 lbs per year. ⁽²⁾	\$155M	Activation Frequency	2	2	0
		Net increase in bacteria loading. Extensive construction impacts to residents and businesses.		Vol. (MG)	7.74	6.01	1.73
Box Conduit Storage (0.72 MG)	Yes	2 location options identified.	Option 1: \$35M Option 2: \$45M	Activation Frequency	2	2	0
		Construction impacts to passive recreation area, bike path and parking.		Vol. (MG)	7.74	6.3	1.44

Notes:

- (1) Model results are representative of the Q1-2023 version of MWRA's model.
- (2) For perspective on the phosphorus loading, the total phosphorus TMDL for the Lower Charles River is 19,544 kg, or approximately 43,000 lbs. (Final Nutrient TMDL Development for the Lower Charles River Basin, Massachusetts June 2003.) An increase of 54.9 lbs would represent a percent increase of less than 0.1%. Note however that Cambridge and Boston are (or will be soon) subject to municipal stormwater (MS4) permits that require them to reduce the load of phosphorus from stormwater. Under the current MS4 permit, Cambridge needs to eventually reduce its stormwater phosphorus load to the Charles River by 62% to reduce it below 195 kg/yr (488 lb/yr). Boston will likely need to reduce its stormwater phosphorus load to the Charles by 60% so that it is below 2,741 kg/yr (6,030 lb/yr).

3.3.3 CAM005

Outfall CAM005 is located on Mount Auburn Street at Longfellow Road at the entrance to Mount Auburn Hospital and discharges to the Charles River. This outfall is shown in the schematic for the Cottage Farm CSO Facility in Figure 3-2 (above).

Outfall CAM005 is not predicted to meet the LTCP goal for activation frequency as shown in Table 3-8 for the Q1-2023 system conditions. The *Task 8.2-8.3: Alewife Brook and Charles River System Optimization Evaluations* report dated December 22, 2022 recommended raising the weir at regulator RE051 by 1 foot and lengthening it to 10 feet. MWRA has developed a scope of services and will be contracting with its on-call consultant to further evaluate and if feasible, design modifications to the CAM005 regulator structure to increase the weir length and height. In coordination with the City of Cambridge and other impacted stakeholders, MWRA intends to follow this design with a construction contract if the construction is determined to be feasible. This recommendation along with planned sediment removal from the CAM005 overflow pipe and sewer separation in the area of Willard Street were used to create a Future Baseline Condition model for the purposes of further evaluating alternatives for outfall CAM005.

Table 3-8 presents the Typical Year model results for the Q1-2023 system conditions and the Future Baseline Condition. As indicated in Table 3-8, under the Future Baseline Condition, outfall CAM005 was predicted to meet the LTCP goal for annual CSO volume, however, it would not meet the LTCP goal for annual CSO activation frequency.

Table 3-8. CAM005 Q1-2023 Conditions and LTCP Goal

OUTFALL	Q1-2023 SYSTEM CONDITIONS MODEL		FUTURE BASELINE CONDITIONS ⁽¹⁾		LONG TERM CONTROL PLAN	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)	Activation Frequency (MG)	Volume (MG)
CHARLES RIVER						
CAM005	8	0.73	5	0.64	3	0.84

Note:

- (1) Includes raising and lengthening weir at CAM005, removing sediment from the CAM005 outfall, and Willard Street sewer separation.

Table 3-9 presents a summary of the alternatives that were evaluated with the objective of attaining LTCP goals at outfall CAM005. The alternatives were evaluated using the future conditions baseline model as described above. For each of the alternatives evaluated for outfall CAM005, preliminary conceptual layouts and preliminary estimated construction costs were developed. As shown in Table 3-9, one sewer separation and two green infrastructure alternatives were identified that could potentially meet the LTCP goals. As indicated in Table 3-5 of the December 2021 *Task 6: Final CSO Post Construction Monitoring Program and Performance Assessment Report*, with CSO loads only, the Charles River would meet the Class B *E. coli* Single Sample Maximum Criterion 99.6% of the time for the Typical Year (2019 system conditions). Further levels of CSO control for the discharge from outfall CAM005 would be more appropriately assessed in the context of the Updated CSO Control Plans being developed in accordance with the Variance for the Charles River.

Table 3-9. CAM005 Summary of Alternatives Evaluated to Attain LTCP Goals

Alternative	Meets LTCP Goals?	Comments	Preliminary Estimated Construction Cost (2023 dollars)	Benefit ⁽¹⁾			
				Parameter	From	To	Reduction
Sewer Separation and new storm drain tying into existing CAM005 outfall or discharging directly to the Charles River	Yes	Increases phosphorus loading by approximately 4.3 lbs per year ⁽²⁾ and creates net increase in bacteria load.	\$12 million	Activation Frequency	5	2	3
				Vol. (MG)	0.64	0.38	0.26
Green Infrastructure: Stormwater Infiltration (14 units) with hydrodynamic separators Green Infrastructure: 14 stormwater infiltration units to capture the first 0.5 inch of rain from 32 acres of separate stormwater area. Infiltration unit dimensions are 10 ft wide by 25 ft long by 4 ft deep each with a hydrodynamic separator.	Yes	Additional investigations into soil and ground water conditions and potential sanitary connections to storm drain are needed to determine feasibility.	\$3 million	Activation Frequency	5	3	2
				Vol. (MG)	0.64	0.44	0.20
Green Infrastructure: 60 catchbasin infiltration units to capture the first 0.5 inch of rain from 32 acres of separate stormwater area. Each catch basin unit was assumed to have an estimated storage volume of 200 cubic feet.	Yes	Additional investigations into soil and ground water conditions and potential sanitary connections to storm drain are needed to determine feasibility.	\$2 million	Activation Frequency	5	3	2
				Vol. (MG)	0.64	0.44	0.20

Notes:

- (1) Model results are representative of the Q1-2023 "Future Baseline Conditions" version of MWRA's model.
- (2) For perspective on the phosphorus loading, the total phosphorus TMDL for the Lower Charles River is 19,544 kg, or approximately 43,000 lbs (Final Nutrient TMDL Development for the Lower Charles River Basin, Massachusetts June 2003.) The additional 4.3 lbs of phosphorus would represent an increase of approximately 0.01%. Note however that Cambridge and Boston are (or will be soon) subject to municipal stormwater (MS4) permits that require them to reduce the load of phosphorus from stormwater. Under the current MS4 permit, Cambridge needs to eventually reduce its stormwater phosphorus load to the Charles River by 62% to reduce it below 195 kg/yr (488 lb/yr). Boston will likely need to reduce its stormwater phosphorus load to the Charles by 60% so that it is below 2,741 kg/yr (6,030 lb/yr).

3.3.4 MWR018/019/020

The regulator structures associated with outfalls MWR018, MWR019 and MWR020, which all discharge to the Charles River, provide relief to the Boston Marginal Conduit along the Esplanade in Boston. These three outfalls are not meeting the LTCP goals for activation frequency and volume as shown in Table 3-10. A schematic of the system associated with outfalls MWR018, MWR019 and MWR020 is presented in Figure 3-3.

Table 3-10. MWR018/019/020 Q1-2023 Conditions and LTCP Goal

OUTFALL	TYPICAL YEAR			
	Q1-2023 SYSTEM CONDITIONS MODEL		LONG TERM CONTROL PLAN	
	Activation Frequency	Volume (MG)	Activation Frequency	Volume (MG)
MWR018	2	0.43	0	0.00
MWR019	2	0.18	0	0.00
MWR020	2	0.04	0	0.00
Total	2	0.65	0	0.00

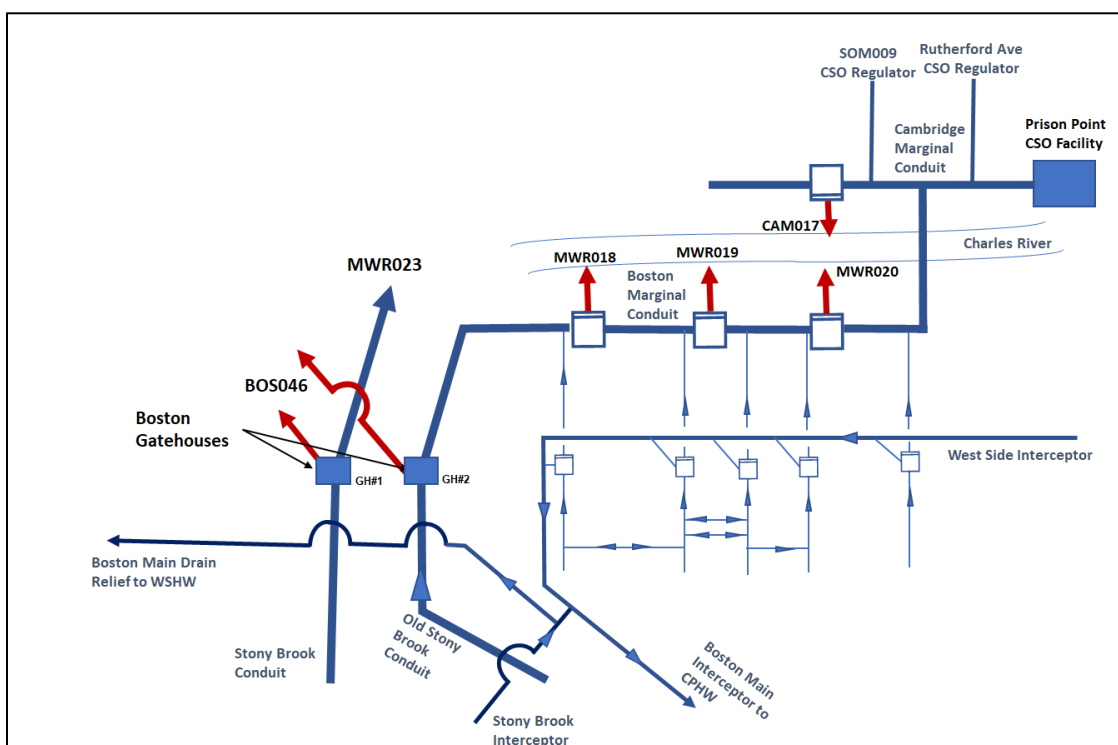


Figure 3-3. Schematic of Charles River/Prison Point Sub-System

Table 3-11 presents a summary of the alternatives that were evaluated with the goal of attaining LTCP goals at outfalls MWR018/MWR019/MWR020. For each of the alternatives evaluated at these locations, preliminary conceptual layouts and preliminary estimated construction costs were developed. As shown in Table 3-11, one sewer separation and two storage alternatives were identified that could potentially meet the LTCP goals. As indicated in Table 3-5 of the December 2021 *Task 6: Final CSO Post Construction Monitoring Program and Performance Assessment Report*, with CSO loads only, the Charles River would meet the Class B *E. coli* Single Sample Maximum Criterion 99.6% of the time for the Typical Year (2019 system conditions). Further levels of CSO control for the discharge from outfall MWR018, 019, 020 would be more appropriately assessed in the context of the Updated CSO Control Plans being developed in accordance with the Variance for the Charles River.

Table 3-11. MWR018/019/020 Summary of Alternatives Evaluated to Attain LTCP Goals

Alternative	Meets LTCP Goals ?	Comments	Preliminary Estimated Construction Cost (2023 dollars)	Benefit ⁽¹⁾			
				Parameter	From	To	Reduction
Remove Restrictions from Roxbury Canal Sewer	No	Alternative deemed infeasible due to projected increase in HGL in the 5-year storm	N/A	Activation Frequency	N/A	N/A	N/A
				Total Vol. for MWR018/019/020 (MG)	N/A	N/A	N/A
Sewer Separation and three new storm drains tying into existing outfalls	Yes	Increases phosphorus loading by approximately 49.5 lbs per year. ⁽²⁾ Assumes new storm drains will cross under BMC and tie into existing outfalls. Additional evaluations on the impact to the BMC are needed to assess feasibility.	\$62 million	Activation Frequency	MWR018: 2 MWR019: 2 MWR020: 2	MWR018: 0 MWR019: 0 MWR020: 0	MWR018: 2 MWR019: 2 MWR020: 2
				Total Vol. for MWR018/019/020 (MG)	0.65	0.00	0.65
Green Infrastructure: 327 stormwater infiltration units to capture the first 1.5 inches of rain from 61.5 acres of separate stormwater area. Infiltration unit dimensions are 10 ft wide by 25 ft long by 4 ft deep each with a hydrodynamic separator.	No	Additional investigations into soil and ground water conditions and potential sanitary connections to storm drain needed to assess feasibility.	\$68 million	Activation Frequency	MWR018: 2 MWR019: 2 MWR020: 2	MWR018: 2 MWR019: 2 MWR020: 0	MWR018: 0 MWR019: 0 MWR020: 2
				Total Vol. for MWR018/019/020 (MG)	0.65	0.23	0.42
Relocate Stormwater from OSBC to SBC with Limited Stormwater Connection to OSBC	No	Results in net increase in bacteria and phosphorus loads to Charles River	\$0.7 million	Activation Frequency	MWR018: 2 MWR019: 2 MWR020: 2	MWR018: 2 MWR019: 2 MWR020: 0	MWR018: 0 MWR019: 0 MWR020: 2
				Total Vol. for MWR018/019/020 (MG)	0.65	0.44	0.21
GI + Stormwater Relocation	No	High additional cost with nominal improvement compared to stormwater relocation without GI	\$69 million	Activation Frequency	MWR018: 2 MWR019: 2 MWR020: 2	MWR018: 2 MWR019: 2 MWR020: 0	MWR018: 0 MWR019: 0 MWR020: 2
				Total Vol. for MWR018/019/020 (MG)	0.65	0.30	0.52
Box Conduit Storage (0.84 MG)	Yes	Located in park land along the esplanade, potentially Article 97 legislation	\$45 million	Activation Frequency	MWR018: 2 MWR019: 2 MWR020: 2	MWR018: 0 MWR019: 0 MWR020: 0	MWR018: 2 MWR019: 2 MWR020: 2
				Total Vol. for MWR018/019/020 (MG)	0.65	0.00	0.65

Table 3-12. MWR018/019/020 Summary of Alternatives Evaluated to Attain LTCP Goals

Alternative	Meets LTCP Goals ?	Comments	Preliminary Estimated Construction Cost (2023 dollars)	Benefit ⁽¹⁾			
				Parameter	From	To	Reduction
Microtunneled Storage (0.84 MG, 7 ft diameter, 2,900 feet long)	Yes	Located in park land along the esplanade, potentially Article 97 legislation	\$36 million	Activation Frequency	MWR018: 2 MWR019: 2 MWR020: 2	MWR018: 0 MWR019: 0 MWR020: 0	MWR018: 2 MWR019: 2 MWR020: 2
				Total Vol. for MWR018/019/020 (MG)	0.65	0.00	0.65

Notes:

- (1) Model results are representative of the Q1-2023 version of MWRA's model.
- (2) For perspective on the phosphorus loading, the total phosphorus TMDL for the Lower Charles River is 19,544 kg, or approximately 43,000 lbs (Final Nutrient TMDL Development for the Lower Charles River Basin, Massachusetts June 2003.) The additional 4.3 lbs of phosphorus would represent an increase of approximately 0.01%. Note however that Cambridge and Boston are (or will be soon) subject to municipal stormwater (MS4) permits that require them to reduce the load of phosphorus from stormwater. Under the current MS4 permit, Cambridge needs to eventually reduce its stormwater phosphorus load to the Charles River by 62% to reduce it below 195 kg/yr (488 lb/yr). Boston will likely need to reduce its stormwater phosphorus load to the Charles by 60% so that it is below 2,741 kg/yr (6,030 lb/yr).

3.4 Summary

As noted in the introduction, the Court extended the time until December 2024 for the MWRA to complete identified projects and further evaluate alternatives to further reduce CSOs at the sixteen outfalls that did not meet the LTCP goals by December 31, 2021. As described above, of the 45 outfalls that remain active (i.e., are not physically closed or associated with the North Dorchester Bay CSO Storage Tunnel), 32 outfalls meet or materially meet the LTCP goals as of Q4-2023 conditions with the completion of the CHE008 modifications. Of the remaining 13 outfalls, seven have projects in design or construction to meet or materially meet the LTCP goals. These projects are expected to be completed by 2024 with the exception of the project upstream of the Somerville Marginal CSO Facility, which has experienced delays and is now expected to be completed in 2025. For the six remaining challenging outfalls, an alternatives analysis was conducted; however, no clear alternatives commensurate to the minimal receiving water quality benefits have been identified. In addition to the tables summarizing the alternatives analysis provided in this report, further detail on the alternatives evaluations will be provided in the December 2024 Supplement to the Updated CSO Control Plan. It is noted that the total Typical Year treated and untreated CSO volume for Q4-2023 conditions of 397 MG is below the overall LTCP goal of 404 MG. As noted above a number of projects are underway that will further reduce the total volume by 2024 and additional reduction will be achieved following completion of a project upstream of the Somerville Marginal CSO Facility in 2025. In addition, all four CSO communities continue to pursue work that will further reduce CSO discharges.

Appendix A Rainfall Processing and Analyses January 1, 2023 – December 31, 2023

A.1 Rainfall Analyses

This section presents the rainfall data measured from 17 gauges within the MWRA wastewater service area during the period of January 1, 2023, through December 31, 2023. It also describes the analysis of the rainfall data used to characterize the return period of each storm event and a comparison of measured rainfall for the 2023 period to the rainfall included in the Typical Year. As described in the *CSO Annual Report: Discharge Estimates and Rainfall Analyses report for Calendar Year 2021*, the MWRA's rainfall recurrence interval calculation methodology was updated from *Technical Paper 40 (TP-40) to Atlas-14*.

Values for Atlas 14 for Boston were extracted from NOAA's data server on April 12, 2022. The Atlas 14 partial duration curves were used to assign the recurrence intervals. The smallest storm the partial duration curves addresses is the 1-year storm, so the partial duration intensity-duration-frequency (IDF) curves for the 3-month and 6-month frequencies were extrapolated. All of the storm recurrence intervals identified in the text and sections below and in Appendix A are based on the 2019 edition of Atlas 14 referenced above.

A.1.1 Rainfall Data Collection and Processing

Rainfall was quantified for this analysis using 15-minute rainfall data collected at rain gauges distributed over the MWRA system. The rain gauges are listed in Table A-1 and the locations are shown in Figure A-1.

Table A-1. Rain Gauges

Gauge Code	Name	Owner	Gauge Code	Name	Owner
BO-DI-1	Ward St.	MWRA	BWSC006	Dorchester -Talbot	BWSC
BO-DI-2	Columbus Park	MWRA	Rox	Roxbury	BWSC
BWSC001	Union Park Pump Sta.	BWSC	CH-BO-1	Chelsea Ck.	MWRA
BWSC002	Roslindale	BWSC	FRESH_POND	USGS Fresh Pond	USGS
BWSC003	Dorchester Adams St.	BWSC	HF-1C	Hanscom AFB	MWRA
BWSC004	Allston	BWSC	RG-WF-1	Hayes Pump Sta.	MWRA
BWSC007	Charlestown	BWSC	SOM	Somerville Remote	MWRA
EB	East Boston	BWSC	Lex	Lexington Farm	Project ⁽¹⁾
BWSC008	Longwood Medical	BWSC	SP	Spot Pond	Project ⁽¹⁾
BWSC005	Hyde Park	BWSC	WF	Waltham Farm	Project ⁽¹⁾

(1) Project gauges were removed as of July 1, 2020. Project gauge data has been replaced with the nearest rain gauge, following the QA/QC procedures and closest rain gauges substitution table.

Quality assurance and quality control were provided by reviewing the data based on geographic location, comparing total rainfall depth and rainfall intensity values by month and for individual storm events. The shape of rainfall hyetographs was reviewed for irregularities. Rain gauges with significantly higher or lower total rainfall depths than other gauges, and unusual hyetograph shapes, were flagged as suspect and further reviewed.

Suspect or missing rain gauge data were replaced with data from the rain gauge in closest linear proximity. If the closest gauge also had suspect data, the second closest rain gauge was used. Table A-2

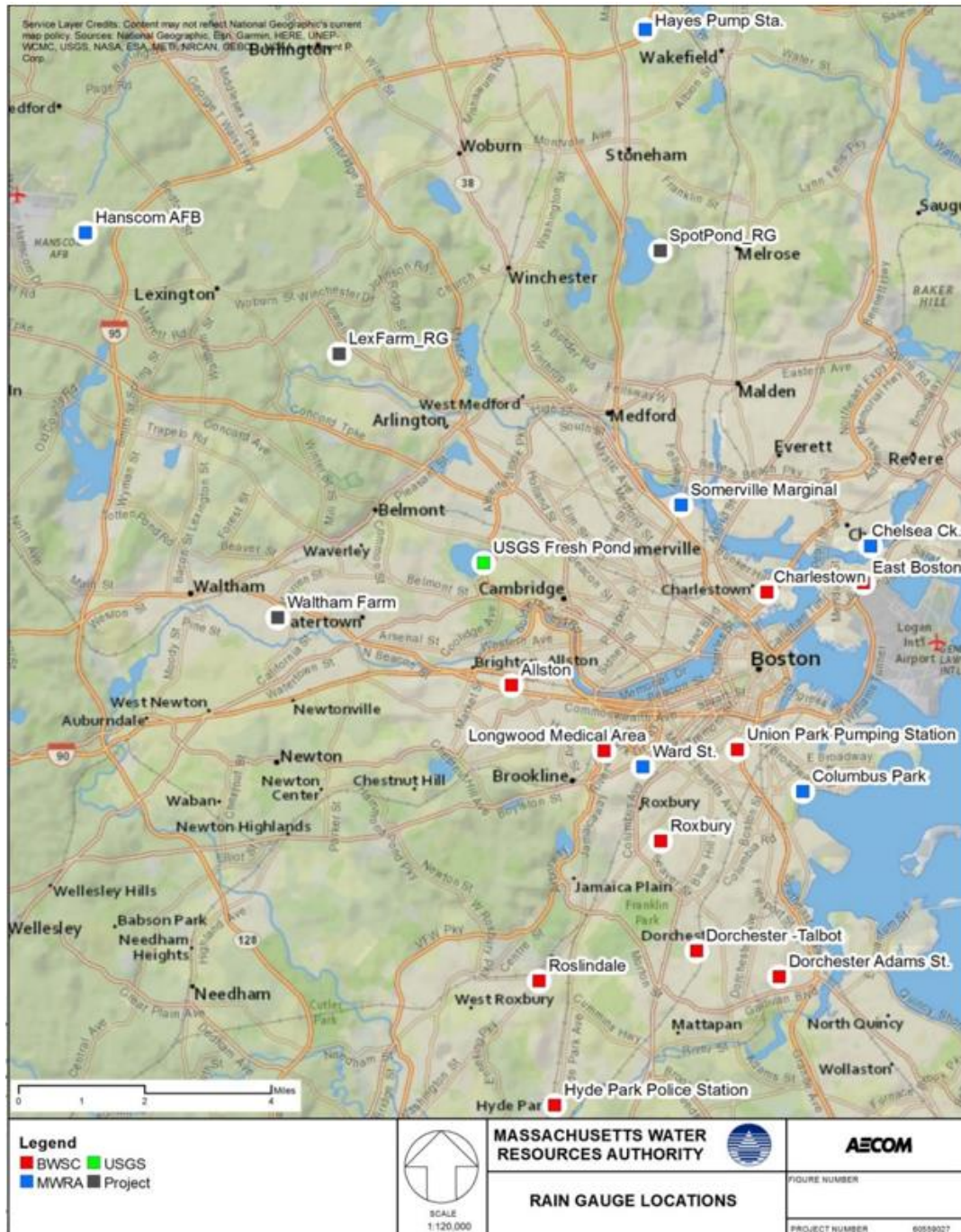


Figure A-1. Rain Gauge Location Plan

identifies the two closest rain gauges to each of the rain gauges. Replacement of suspect data was recorded in Table A-3.

Additional information on the methodologies for rainfall data collection and processing can be found in [Semiannual Reports 1 and 2](#).

Table A-2. Closest Rain Gauges for Data Substitution

Origin Gauge		Closest Gauge		Second Closest Gauge	
Gauge Name	Gauge Code	Gauge Code	Distance (mi)	Gauge Code	Distance (mi)
Ward Street	BO-DI-1	BWSC008	0.66	Rox	1.23
Columbus Park	BO-DI-2	BWSC001	1.24	Rox	2.39
Union Park Pumping Station	BWSC001	BO-DI-2	1.24	BO-DI-1	1.52
Roslindale	BWSC002	BWSC005	2.02	BWSC006	2.54
Dorchester Adams St.	BWSC003	BWSC006	1.37	Rox	2.88
Allston	BWSC004	BWSC008	1.81	FRESH_POND	2.03
Hyde Park Police Station	BWSC005	BWSC002	2.02	BWSC006	3.36
Dorchester -Talbot	BWSC006	BWSC003	1.37	Rox	1.86
Charlestown	BWSC007	EB	1.53	CH-BO-1	1.80
Longwood Medical Area	BWSC008	BO-DI-1	0.67	Roxbury	1.71
Chelsea Creek	CH-BO-1	EB	0.60	BWSC007	1.80
East Boston	EB	CH-BO-1	0.60	BWSC007	1.53
USGS Fresh Pond	FRESH_POND	BWSC004	2.21	SOM	3.26
Hanscom AFB	HF-1C	Lex	4.47	WF	6.92
Lexington Farm	Lex	FRESH_POND	4.08	WF	4.37
Hayes Pump Sta.	RG-WF-1	SP	3.58	Lex	7.13
Roxbury	Rox	BO-DI-1	1.23	BWSC008	1.71
Somerville	SOM	BWSC007	1.95	CH-BO-1	3.07
Spot Pond	SP	SOM	4.12	Lex	5.34
Waltham Farm	WF	FRESH_POND	3.37	BWSC004	3.86

Table A-3. Summary of Rainfall Data Replacement, January 1, 2023 – December 31, 2023

Rain Gauge	Replacement Data Start Time	Replacement Data End Time	Replacement Rain Gauge
Ward St. (BO-DI-1)	4/6/2023 23:00	4/6/2023 23:15	Union Park Pumping Station (BWSC001)
Roxbury (Rox)	12/31/2022 15:15	10/20/2023 0:00	Ward St. (BO-DI-1)
Roslindale (BWSC002)	1/16/2023 6:00	1/17/2023 13:00	Ward St. (BO-DI-1)
	1/22/2023 6:00	1/25/2023 5:00	Ward St. (BO-DI-1)
	2/22/2023 18:00	2/27/2023 21:00	Ward St. (BO-DI-1)
	6/16/2023 2:15	6/16/2023 12:45	Dorchester-Talbot (BWSC006)
	9/13/2023 9:15	9/13/2023 10:00	Dorchester-Talbot (BWSC006)
	10/23/2023 11:00	10/23/2023 13:00	Dorchester-Talbot (BWSC006)
Longwood Medical Area (BWSC008)	12/31/2022 15:15	12/31/2023 23:45	Roxbury (Rox)
Hyde Park Police Station (BWSC005)	12/31/2022 15:15	12/31/2023 23:45	Roslindale (BWSC002)
Dorchester-Talbot (BWSC006)	1/16/2023 6:00	1/17/2023 13:00	Ward St. (BO-DI-1)
	1/22/2023 6:00	1/25/2023 5:00	Ward St. (BO-DI-1)
	2/22/2023 18:00	2/27/2023 21:00	Ward St. (BO-DI-1)
	6/7/2023 14:45	6/16/2023 12:15	Dorchester-Adams (BWSC003)
	9/27/2023 13:45	9/27/2023 14:00	Dorchester-Adams (BWSC003)
	10/18/2023 12:00	10/18/2023 12:30	Dorchester-Adams (BWSC003)
Columbus Park (BO-DI-2)	12/15/2023 9:00	12/15/2023 10:00	Union Park Pumping Station (BWSC001)
Union Park Pumping Station (BWSC001)	1/16/2023 6:00	1/17/2023 13:00	Columbus Park (BO-DI-2)
	1/22/2023 6:00	1/25/2023 5:00	Columbus Park (BO-DI-2)
	2/22/2023 18:00	2/27/2023 21:00	Columbus Park (BO-DI-2)
	6/20/2023 7:15	6/20/2023 7:45	Columbus Park (BO-DI-2)
	9/7/2023 11:30	9/7/2023 12:00	Columbus Park (BO-DI-2)
	10/16/2023 10:00	10/16/2023 12:00	Columbus Park (BO-DI-2)
Dorchester-Adams (BWSC003)	1/16/2023 6:00	1/17/2023 13:00	Columbus Park (BO-DI-2)
	1/22/2023 6:00	1/25/2023 5:00	Columbus Park (BO-DI-2)
	2/22/2023 18:00	2/27/2023 21:00	Columbus Park (BO-DI-2)
	6/20/2023 7:15	6/20/2023 10:30	Dorchester-Talbot (BWSC006)
	9/27/2023 14:15	9/27/2023 14:30	Dorchester-Talbot (BWSC006)
	10/18/2023 13:00	10/18/2023 13:45	Dorchester-Talbot (BWSC006)
Somerville Marginal (SOM)	2/11/2023 12:45	2/22/2023 13:45	Charlestown (BWSC007)
	5/30/2023 5:00	5/31/2023 8:30	Charlestown (BWSC007)
	8/15/2023 5:30	8/15/2023 8:00	Charlestown (BWSC007)
	11/21/2023 17:15	11/27/2023 11:30	Charlestown (BWSC007)

Table A-3. Summary of Rainfall Data Replacement, January 1, 2023 – December 31, 2023

Rain Gauge	Replacement Data Start Time	Replacement Data End Time	Replacement Rain Gauge
Hayes Pump Station (RG-WF-1)	1/16/2023 6:00	1/17/2023 13:00	Somerville Marginal (SOM)
	1/22/2023 6:00	1/25/2023 5:00	Somerville Marginal (SOM)
	2/22/2023 18:00	2/27/2023 21:00	Somerville Marginal (SOM)
Spot pond (SP)	12/31/2022 15:15	1/1/2023 2:00	Somerville Marginal (SOM)
	1/1/2023 2:15	12/31/2023 23:45	Hayes Pump Station (RG-WF-1)
Charlestown (BWSC007)	1/16/2023 6:00	1/17/2023 13:00	Somerville Marginal (SOM)
	1/22/2023 6:00	1/25/2023 5:00	Somerville Marginal (SOM)
	2/22/2023 18:00	2/27/2023 21:00	Somerville Marginal (SOM)
	6/3/2023 5:45	6/16/2023 14:15	East Boston (EB)
	10/19/2023 9:00	10/20/2023 12:30	East Boston (EB)
East Boston (EB)	1/16/2023 6:00	1/17/2023 13:00	Somerville Marginal (SOM)
	1/22/2023 6:00	1/25/2023 5:00	Somerville Marginal (SOM)
	2/22/2023 18:00	2/27/2023 21:00	Somerville Marginal (SOM)
	6/20/2023 11:15	6/20/2023 11:30	Chelsea Ck. (CH-BO-1)
	8/23/2023 11:15	8/23/2023 11:30	Chelsea Ck. (CH-BO-1)
	10/19/2023 10:00	10/19/2023 12:00	Chelsea Ck. (CH-BO-1)
Chelsea Ck. (CH-BO-1)	1/16/2023 6:00	1/17/2023 13:00	Somerville Marginal (SOM)
	1/22/2023 6:00	1/25/2023 5:00	Somerville Marginal (SOM)
	2/22/2023 18:00	2/27/2023 21:00	Somerville Marginal (SOM)
Allston (BWSC004)	1/16/2023 6:00	1/17/2023 13:00	USGS fresh pond (FRESH_POND)
	1/22/2023 6:00	1/25/2023 5:00	USGS fresh pond (FRESH_POND)
	2/22/2023 18:00	2/27/2023 21:00	USGS fresh pond (FRESH_POND)
	6/20/2023 7:15	6/20/2023 9:00	Ward St. (BO-DI-1)
	9/13/2023 11:15	9/13/2023 12:00	USGS fresh pond (FRESH_POND)
	10/16/2023 13:00	10/16/2023 15:00	USGS fresh pond (FRESH_POND)
USGS fresh pond (FRESH_POND)	5/10/2023 9:00	5/10/2023 12:45	Allston (BWSC004)
	6/2/2023 15:00	8/19/2023 1:00	Allston (BWSC004)
	11/17/2023 11:45	11/17/2023 12:15	Allston (BWSC004)
Waltham Farm (WF)	12/31/2022 15:15	12/31/2023 23:45	USGS fresh pond (FRESH_POND)
Lex-Farm (Lex)	12/31/2022 15:15	12/31/2023 23:45	USGS fresh pond (FRESH_POND)
Hanscom AFB (HF-1C)	12/31/2022 15:15	12/31/2023 23:45	USGS fresh pond (FRESH_POND)

A.1.2 Monitored Storms and Comparison with Typical Year

For the period of January 1, 2023, to December 31, 2023, the rainfall data at each rain gauge were analyzed and summarized, providing the date and time, duration, volume, average intensity, peak 1-hour, 24-hour, and 48-hour intensities and storm recurrence intervals for each storm. The storm recurrence

intervals were assigned values of less than 3 months, 3 months, 3-6 months, 6 months, 1 year, 1-2 year, or the nearest year for recurrence intervals greater than 2-year, based on comparison to the IDF values from Atlas 14. Table A-4 presents the summary of storm events for Ward Street Headworks for the period of January 1, 2023, to December 31, 2023. These data show that 93 storm events occurred in the year long period at the Ward Street Headworks rain gauge (BO-DI-1). The majority of events had less than 3-month recurrence intervals at 1-hour, 24-hour or 48-hour durations.

Table A-4. Summary of Storm Events at Ward Street Headworks Rain Gauge (BO-DI-1) for January 1, 2023 to December 31, 2023

Event	Date & Start Time	Duration (hr)	Volume (in)	Average Intensity	Peak 1-hr Intensity (in/hr)	Peak 24-hr Intensity (in/hr)	Peak 48-hr Intensity (in/hr)	Atlas-14 Recurrence Interval		
								1-hr	24-hr	48-hr
1	12/31/22 16:30	9.25	0.4	0.04	0.10	0.02	0.01	<3m	<3m	N/A
2	1/3/23 8:00	20	0.65	0.03	0.10	0.03	0.01	<3m	<3m	N/A
3	1/4/23 20:30	16.25	0.34	0.02	0.10	0.01	0.01	<3m	<3m	N/A
4	1/6/23 9:15	9	0.22	0.02	0.07	0.01	0.00	<3m	<3m	N/A
5	1/7/23 9:45	0.25	0.01	0.04	0.01	0.00	0.00	<3m	<3m	N/A
6	1/12/23 12:00	52	0.61	0.01	0.16	0.02	0.01	<3m	<3m	<3m
7	1/15/23 20:15	17.5	0.15	0.01	0.06	0.01	0.00	<3m	<3m	N/A
8	1/18/23 8:30	0.5	0.03	0.06	0.03	0.00	0.00	<3m	<3m	N/A
9	1/19/23 14:45	26.25	1.17	0.04	0.31	0.05	0.02	3m	3m	3m
10	1/23/23 11:30	8.5	0.41	0.05	0.11	0.02	0.01	<3m	<3m	N/A
11	1/25/23 20:00	14.75	1.38	0.09	0.27	0.06	0.03	<3m	3m-6m	N/A
12	1/31/23 4:45	2.5	0.07	0.03	0.03	0.00	0.00	<3m	<3m	N/A
13	2/7/23 21:15	1	0.03	0.03	0.03	0.00	0.00	<3m	<3m	N/A
14	2/17/23 10:30	8	0.11	0.01	0.07	0.00	0.00	<3m	<3m	N/A
15	2/21/23 5:45	14.25	0.14	0.01	0.06	0.01	0.00	<3m	<3m	N/A
16	2/22/23 21:00	28.75	1.03	0.04	0.11	0.04	0.02	<3m	<3m	3m
17	2/28/23 5:45	15	0.36	0.02	0.06	0.02	0.01	<3m	<3m	N/A
18	3/2/23 5:00	4.25	0.59	0.14	0.21	0.02	0.01	<3m	<3m	N/A
19	3/4/23 1:15	11	0.83	0.08	0.12	0.03	0.02	<3m	<3m	N/A
20	3/11/23 3:30	9	0.05	0.01	0.04	0.00	0.00	<3m	<3m	N/A
21	3/13/23 17:15	31.75	3.21	0.10	0.28	0.13	0.07	<3m	1-2y	1-2y
22	3/25/23 15:30	10.5	0.11	0.01	0.05	0.00	0.00	<3m	<3m	N/A
23	3/27/23 19:30	16.5	0.65	0.04	0.12	0.03	0.01	<3m	<3m	N/A
24	3/31/23 17:30	18.5	0.54	0.03	0.16	0.02	0.01	<3m	<3m	N/A
25	4/6/23 3:45	0.25	0.01	0.04	0.01	0.00	0.00	<3m	<3m	N/A
26	4/17/23 0:00	13.75	0.16	0.01	0.10	0.01	0.00	<3m	<3m	N/A
27	4/22/23 22:30	24.25	0.74	0.03	0.20	0.03	0.02	<3m	<3m	<3m
28	4/27/23 12:00	5	0.11	0.02	0.06	0.00	0.00	<3m	<3m	N/A
29	4/29/23 19:45	36.5	2	0.05	0.31	0.07	0.04	3m	6m	6m
30	5/2/23 7:00	9.5	0.18	0.02	0.09	0.01	0.00	<3m	<3m	N/A
31	5/3/23 10:30	1	0.11	0.11	0.11	0.00	0.00	<3m	<3m	N/A
32	5/5/23 1:45	7.5	0.02	0.00	0.01	0.00	0.00	<3m	<3m	N/A
33	5/7/23 23:45	0.25	0.01	0.04	0.01	0.00	0.00	<3m	<3m	N/A
34	5/20/23 11:00	13.75	1.81	0.13	0.53	0.08	0.04	3m-6m	6m	N/A

Table A-4. Summary of Storm Events at Ward Street Headworks Rain Gauge (BO-DI-1) for January 1, 2023 to December 31, 2023

Event	Date & Start Time	Duration (hr)	Volume (in)	Average Intensity	Peak 1-hr Intensity (in/hr)	Peak 24-hr Intensity (in/hr)	Peak 48-hr intensity (in/hr)	Atlas-14 Recurrence Interval		
								1-hr	24-hr	48-hr
35	5/24/23 18:00	2	0.04	0.02	0.03	0.00	0.00	<3m	<3m	N/A
36	6/2/23 18:15	4	1.04	0.26	0.55	0.04	0.02	6m	3m	N/A
37	6/3/23 13:45	4	0.03	0.01	0.01	0.00	0.00	<3m	<3m	N/A
38	6/4/23 15:45	23	0.22	0.01	0.07	0.01	0.00	<3m	<3m	N/A
39	6/9/23 14:30	0.75	0.05	0.07	0.05	0.00	0.00	<3m	<3m	N/A
40	6/10/23 12:45	6.75	0.45	0.07	0.29	0.02	0.01	<3m	<3m	N/A
41	6/12/23 21:00	7.75	0.3	0.04	0.28	0.01	0.01	<3m	<3m	N/A
42	6/14/23 17:45	1.25	0.21	0.17	0.20	0.01	0.00	<3m	<3m	N/A
43	6/17/23 10:45	25.5	1.54	0.06	0.73	0.06	0.03	6m-1y	3m-6m	3m-6m
44	6/24/23 6:30	3.25	0.03	0.01	0.02	0.00	0.00	<3m	<3m	N/A
45	6/25/23 15:30	0.25	0.03	0.12	0.03	0.00	0.00	<3m	<3m	N/A
46	6/27/23 0:15	5.25	0.27	0.05	0.13	0.01	0.01	<3m	<3m	N/A
47	6/28/23 5:30	1.25	0.18	0.14	0.17	0.01	0.00	<3m	<3m	N/A
48	6/28/23 19:30	3	0.06	0.02	0.04	0.00	0.00	<3m	<3m	N/A
49	7/2/23 6:45	20.75	0.81	0.04	0.35	0.03	0.02	3m	<3m	N/A
50	7/4/23 0:00	16.5	0.58	0.04	0.19	0.02	0.01	<3m	<3m	N/A
51	7/10/23 7:00	12.25	0.88	0.07	0.42	0.04	0.02	3m	<3m	N/A
52	7/13/23 23:00	5.75	0.24	0.04	0.12	0.01	0.01	<3m	<3m	N/A
53	7/16/23 4:45	16.25	1.9	0.12	0.43	0.08	0.04	3m	6m	N/A
54	7/21/23 19:15	3.25	1.91	0.59	1.23	0.08	0.04	3y	6m	N/A
55	7/25/23 14:00	5.25	1	0.19	0.53	0.04	0.02	3m-6m	3m	N/A
56	7/27/23 17:00	1.75	0.26	0.15	0.22	0.01	0.01	<3m	<3m	N/A
57	7/29/23 12:00	9.25	3.26	0.35	1.63	0.14	0.07	9y	2y	N/A
58	8/8/23 2:45	11.5	1.59	0.14	0.99	0.07	0.03	1-2y	3m-6m	N/A
59	8/10/23 18:30	6	0.16	0.03	0.11	0.01	0.00	<3m	<3m	N/A
60	8/13/23 4:45	1	0.07	0.07	0.07	0.00	0.00	<3m	<3m	N/A
61	8/15/23 3:45	7.25	0.67	0.09	0.18	0.03	0.01	<3m	<3m	N/A
62	8/18/23 6:45	8.75	0.94	0.11	0.49	0.04	0.02	3m-6m	3m	N/A
63	8/21/23 19:00	2.25	0.52	0.23	0.50	0.02	0.01	3m-6m	<3m	N/A
64	8/24/23 23:30	15.5	1.94	0.13	0.53	0.08	0.04	3m-6m	6m	N/A
65	8/29/23 21:00	12	0.59	0.05	0.20	0.02	0.01	<3m	<3m	N/A
66	9/8/23 8:00	0.25	0.1	0.40	0.10	0.00	0.00	<3m	<3m	N/A
67	9/9/23 15:00	3.25	0.14	0.04	0.13	0.01	0.00	<3m	<3m	N/A
68	9/10/23 11:00	6	0.53	0.09	0.18	0.02	0.01	<3m	<3m	N/A
69	9/11/23 17:15	16.75	0.38	0.02	0.13	0.02	0.01	<3m	<3m	N/A
70	9/13/23 11:45	8.75	0.83	0.09	0.26	0.03	0.02	<3m	<3m	N/A
71	9/16/23 3:30	3.25	0.12	0.04	0.04	0.01	0.00	<3m	<3m	N/A
72	9/18/23 4:45	19	2.29	0.12	0.57	0.10	0.05	6m	6m-1y	N/A

Table A-4. Summary of Storm Events at Ward Street Headworks Rain Gauge (BO-DI-1) for January 1, 2023 to December 31, 2023

Event	Date & Start Time	Duration (hr)	Volume (in)	Average Intensity	Peak 1-hr Intensity (in/hr)	Peak 24-hr Intensity (in/hr)	Peak 48-hr intensity (in/hr)	Atlas-14 Recurrence Interval		
								1-hr	24-hr	48-hr
73	9/23/23 15:30	50.25	0.53	0.01	0.19	0.02	0.01	<3m	<3m	<3m
74	9/29/23 8:30	16.5	0.49	0.03	0.23	0.02	0.01	<3m	<3m	N/A
75	10/7/23 12:15	11.75	0.24	0.02	0.14	0.01	0.01	<3m	<3m	N/A
76	10/16/23 1:00	2.25	0.04	0.02	0.03	0.00	0.00	<3m	<3m	N/A
77	10/16/23 16:00	1.75	0.06	0.03	0.04	0.00	0.00	<3m	<3m	N/A
78	10/17/23 17:45	0.25	0.01	0.04	0.01	0.00	0.00	<3m	<3m	N/A
79	10/21/23 0:45	19.5	0.71	0.04	0.20	0.03	0.01	<3m	<3m	N/A
80	10/29/23 10:15	33	0.74	0.02	0.08	0.03	0.02	<3m	<3m	<3m
81	11/7/23 1:30	8.25	0.07	0.01	0.02	0.00	0.00	<3m	<3m	N/A
82	11/9/23 7:30	6.5	0.1	0.02	0.05	0.00	0.00	<3m	<3m	N/A
83	11/10/23 4:15	0.25	0.01	0.04	0.01	0.00	0.00	<3m	<3m	N/A
84	11/18/23 8:15	2	0.16	0.08	0.13	0.01	0.00	<3m	<3m	N/A
85	11/21/23 23:15	16.25	1.23	0.08	0.26	0.05	0.03	<3m	3m	N/A
86	11/26/23 23:15	6	0.48	0.08	0.21	0.02	0.01	<3m	<3m	N/A
87	12/1/23 21:00	3	0.06	0.02	0.04	0.00	0.00	<3m	<3m	N/A
88	12/3/23 7:45	19.25	1.01	0.05	0.15	0.04	0.02	<3m	3m	N/A
89	12/10/23 14:00	19.75	2.83	0.14	0.52	0.12	0.06	3m-6m	1-2y	N/A
90	12/17/23 17:45	23.5	2.96	0.13	0.63	0.12	0.06	6m	1-2y	N/A
91	12/24/23 15:45	11.5	0.03	0.00	0.01	0.00	0.00	<3m	<3m	N/A
92	12/27/23 22:30	39.5	0.86	0.02	0.12	0.03	0.02	<3m	<3m	3m
93	12/30/23 7:30	7.75	0.14	0.02	0.04	0.01	0.00	<3m	<3m	N/A

(1) Recurrence intervals given in ranges of less than 3 months (<3m), 3-months, (3m), 3-6 months (3-6m), 6 months (6m), 6 months-1year (6m-1y), 1 year (1y), 1 to 2 year (1y-2y) or the nearest year for recurrence intervals >2 year, based on Atlas 14.

The characteristics of the rain events that occurred in the January 1, 2023, to December 31, 2023, monitoring period were compared to rainfall characteristics from the Typical Year to help interpret the measured CSO activations and volumes in comparison to Typical Year performance.

The total rainfall and number of storms at each rain gauge were identified for the period January 1, 2023, to December 31, 2023, and the number of storms were categorized by depth. These values were then compared to the values from the Typical Year. Table A-5 presents this comparison. As indicated in Table A-5, during 2023 the rain gauges measured an average total rainfall volume of 55.35 inches, compared with 46.80 inches in the Typical Year, an 8.55-inch increase in precipitation compared to the Typical Year. While the average number of storms in 2023 matches the Typical Year with 93 events, the number of storms within the depth categories in Table A-5 skewed towards the larger storms compared to the Typical Year. The 2023 period had eight more storms with depths more than 0.5 inches and eight fewer storms with depths less than 0.5 inches.

Table A-5. Frequency of Events within Selected Ranges of Total Rainfall for January 1, 2023, to December 31, 2023

Rain Gauge	Total Rainfall (inches)	Total Number of Storms	Number of Storms by Depth				
			Depth	Depth	Depth	Depth	Depth
			< 0.25	0.25 to 0.5	0.5 to 1.0	1.0 to 2.0	≥2.0
			inches	inches	inches	inches	inches
Typical Year	46.80	93	49	14	16	8	6
January - December 2023							
Average of Rain Gauges							
Average	55.35	93	43	12	20	12	6
MWRA Rain Gauges							
Ward Street	57.16	93	43	11	20	13	6
Columbus Park	54.08	94	44	9	23	14	4
Chelsea Creek	52.42	95	44	13	21	13	4
Hanscom AFB	52.60	92	47	11	18	8	8
Somerville	54.65	88	37	16	17	11	7
Hayes PS	52.61	86	41	8	20	10	7
BWSC Rain Gauges							
Allston	57.92	95	46	11	19	11	8
Charlestown	52.84	89	37	16	20	9	7
Dorch-Adams	57.33	97	45	13	20	14	5
Dorch-Talbot	59.58	100	47	14	18	16	5
Hyde Park	60.69	93	42	11	19	16	5
East Boston	53.10	93	41	14	22	11	5
Longwood	57.09	93	43	11	21	12	6
Roslindale	60.69	93	42	11	19	16	5
Roxbury	57.09	93	43	11	21	12	6
Union Park	56.51	94	41	12	22	15	4
USGS Rain Gauge							
Fresh Pond	52.60	92	47	11	18	8	8
MWRA Project Gauges (Removed)							
Lexington Farm	52.60	92	47	11	18	8	8
Spot Pond	52.75	86	41	8	20	10	7
Waltham Farm	52.60	92	47	11	18	8	8

Storms with greater than 2 inches of total rainfall at the Ward Street, Columbus Park, Chelsea Creek Headworks, and USGS Fresh Pond rain gauges were identified and compared to storms with greater than 2 inches of total rainfall in the full Typical Year (Table A-6). Experience has shown that large storms often account for a disproportionate volume of CSO. Also, within the Typical Year, the storms with greater than 2 inches of rainfall were separated from each other by a period of at least one month. In 2023, two December storms recorded at the Ward Street and USGS Fresh Pond rain gauges with greater than 2 inches of rainfall were separated by only one week.

Table A-6. Comparison of Storms Between January 1, 2023 to December 31, 2023 and Typical Year with Greater Than 2 Inches of Total Rainfall

Rain gauge	Date	Duration (hr)	Total Rainfall (inches)	Average Intensity (in/hr)	Peak Intensity (in/hr)	Storm Recurrence Interval (24-hr) ⁽¹⁾
Typical Year	12/11/1992	50	3.89	0.08	0.2	1y-2y
	8/15/1992	72	2.91	0.04	0.66	6m
	9/22/1992	23	2.76	0.12	0.65	1y-2y
	11/21/1992	84	2.39	0.03	0.31	6m
	5/31/1992	30	2.24	0.07	0.37	6m-1y
	10/9/1992	65	2.04	0.03	0.42	<3m
January - December 2023 Rain Gauge Data						
Ward Street Headworks (BO-DI-1)	3/13/2023	31.75	3.21	0.10	0.28	1-2y
	4/29/2023	36.5	2	0.05	0.31	6m
	7/29/2023	9.25	3.26	0.35	1.63	2y
	9/18/2023	19	2.29	0.12	0.57	6m-1y
	12/10/2023	19.75	2.83	0.14	0.52	1-2y
	12/17/2023	23.5	2.96	0.13	0.63	1-2y
Columbus Park Headworks (BO-DI-2)	3/13/2023	33.5	3.44	0.10	0.36	2y
	7/16/2023	17	2.03	0.12	0.48	6m
	7/29/2023	9.5	3.32	0.35	1.69	2y
	12/10/2023	19.25	2.27	0.12	0.39	6m-1y
Chelsea Creek Headworks (CH-BO-1)	3/13/2023	30.5	3.05	0.10	0.27	1-2y
	4/29/2023	30.5	2.34	0.08	0.37	6m-1y
	7/29/2023	9.25	2.3	0.25	1.11	6m-1y
	12/10/2023	19.25	2.4	0.12	0.38	6m-1y
Fresh Pond (USGS)	3/13/2023	28.25	2.5	0.09	0.25	1y
	5/20/2023	14	2.27	0.16	0.79	6m-1y
	7/29/2023	9.25	3.05	0.33	1.05	1-2y
	8/8/2023	10	2.85	0.29	1.97	1-2y
	8/25/2023	14.75	2.46	0.17	0.79	1y
	9/18/2023	18.25	2.77	0.15	0.6	1-2y
	12/10/2023	18.75	2.32	0.12	0.55	6m-1y
	12/17/2023	21.75	2.47	0.11	0.53	1y

The largest storm event of the period was recorded at Columbus Park Headworks on March 13, 2023, with 3.44 inches of rainfall over 33.5 hours, which equates to a 2-year, 24-hour duration recurrence interval.

Storms with peak rainfall intensities greater than 0.40 in/hr at the Ward Street, Columbus Park, Chelsea Creek Headworks, and USGS Fresh Pond rain gauges were identified and compared to storms with greater than 0.40 in/hr of peak intensity in the Typical Year (Table A-7). Storms with intensities greater than 0.40 in/hr are of importance because higher intensity storms have been found to produce more CSO activations and volumes than lower intensity storms. The full Typical Year has nine storm events with intensities greater than 0.40 inches per hour. For the four gauges shown in Table A-7, the number of storms with peak intensities greater than 0.40 inches per hour ranged from ten to fifteen. The Fresh Pond gauge recorded a 20-year return interval for the 1-hour duration on August 8, 2023. The peak intensity recorded at the Ward Street and Columbus Park rain gauges on July 29, 2023 had a 9-year and 10-year return intervals, respectively for 1-hour duration. Both the July 29, 2023 and the August 8, 2023 storm events displayed high spatial variability and resulted in CSO activations across the sewershed. In addition, the Fresh Pond gauge had seven storms with peak intensity greater than 0.75 inches per hour, and the other three gauges had at least three storms each, compared to the Typical Year which had only one storm with greater than 0.75 inches per hour peak intensity.

For storms with peak rainfall intensities greater than 0.4 in/hr at Ward Street Headworks, Columbus Park Headworks, and Chelsea Creek Headworks rain gauges, hyetographs were developed. These hyetographs show the 15-minute rainfall intensities and show the distribution of rainfall during the storm. Rainfall distribution during a storm can impact the behavior of system hydraulics due to soil saturation. For example, a storm where the peak rainfall occurs towards the end of the event will generally create more CSO than a storm with similar total rainfall and peak intensity, where the peak occurs at the beginning of the storm. An example hyetograph for the September 18, 2023, storm at the Ward Street gauge is shown in Figure A-2. This hyetograph is a clear example of the peak of the storm occurring towards the end of the event, which could compound the impact of this event (2.29 inches total rainfall at the Ward Street gauge) on CSO volumes.

Table A-7. Comparison of Storms Between January 1, 2023 and December 31, 2023 and the Typical Year with Peak Intensities Greater than 0.40 inches/hour

Rain gauge	Date	Duration (hr)	Total Rainfall (inches)	Average Intensity (in/hr)	Peak Intensity (in/hr)	Storm Recurrence Interval (1-hr) ⁽¹⁾
Typical Year	10/23/1992	4	1.18	0.29	1.08	2y
	8/11/1992	11	0.87	0.08	0.75	6m-1y
	8/15/1992	72	2.91	0.04	0.66	6m-1y
	9/22/1992	23	2.76	0.12	0.65	6m-1y
	5/2/1992	7	1.14	0.16	0.63	6m
	9/9/1992	1	0.57	0.57	0.57	6m
	9/3/1992	13	1.19	0.09	0.51	3m-6m
	6/5/1992	18	1.34	0.07	0.44	3m
	10/9/1992	65	2.04	0.03	0.42	3m
January - December 2023 Rain Gauge Data						
Ward Street Headworks (BO-DI-1)	5/20/2023	13.75	1.81	0.13	0.53	3m-6m
	6/2/2023	4	1.04	0.26	0.55	6m
	6/17/2023	25.5	1.54	0.06	0.73	6m-1y
	7/10/2023	12.25	0.88	0.07	0.42	3m

Table A-7. Comparison of Storms Between January 1, 2023 and December 31, 2023 and the Typical Year with Peak Intensities Greater than 0.40 inches/hour

Rain gauge	Date	Duration (hr)	Total Rainfall (inches)	Average Intensity (in/hr)	Peak Intensity (in/hr)	Storm Recurrence Interval (1-hr) ⁽¹⁾
	7/16/2023	16.25	1.90	0.12	0.43	3m
	7/21/2023	3.25	1.91	0.59	1.23	3y
	7/25/2023	5.25	1.00	0.19	0.53	3m-6m
	7/29/2023	9.25	3.26	0.35	1.63	9y
	8/8/2023	11.5	1.59	0.14	0.99	1-2y
	8/18/2023	8.75	0.94	0.11	0.49	3m-6m
	8/21/2023	2.25	0.52	0.23	0.50	3m-6m
	8/24/2023	15.5	1.94	0.13	0.53	3m-6m
	9/18/2023	19	2.29	0.12	0.57	6m
	12/10/2023	19.75	2.83	0.14	0.52	3m-6m
	12/17/2023	23.5	2.96	0.13	0.63	6m
Columbus Park Headworks (BO-DI-2)	5/20/2023	13.5	1.85	0.14	0.58	6m
	6/10/2023	6.5	0.54	0.08	0.41	3m
	7/2/2023	21	1.24	0.06	0.53	3m-6m
	7/10/2023	12.5	0.73	0.06	0.43	3m
	7/16/2023	17	2.03	0.12	0.48	3m-6m
	7/21/2023	3.5	1.58	0.45	1	1-2y
	7/25/2023	4.5	1.39	0.31	0.87	1y
	7/29/2023	9.5	3.32	0.35	1.69	10y
	8/8/2023	8.5	0.97	0.11	0.54	6m
	8/18/2023	14.25	1.52	0.11	0.78	6m-1y
	8/21/2023	2.75	0.53	0.19	0.48	3m-6m
	8/29/2023	12	0.77	0.06	0.49	3m-6m
Chelsea Creek Headworks (CH-BO-1)	5/20/2023	13.5	1.8	0.13	0.56	6m
	6/14/2023	1.75	0.44	0.25	0.41	3m
	7/2/2023	21.5	1.02	0.05	0.5	3m-6m
	7/10/2023	27.5	0.88	0.03	0.51	3m-6m
	7/21/2023	3.25	1.83	0.56	0.92	1-2y
	7/25/2023	4.75	0.7	0.15	0.47	3m-6m
	7/29/2023	9.25	2.3	0.25	1.11	2y
	8/8/2023	6.5	1.78	0.27	1.14	2y
	8/18/2023	7.5	0.86	0.11	0.48	3m-6m
	8/24/2023	15.5	1.9	0.12	0.58	6m
Fresh Pond (USGS)	5/20/2023	14	2.27	0.16	0.79	6m-1y
	6/17/2023	24.5	1.71	0.07	0.71	6m-1y
	7/2/2023	21.25	1.10	0.05	0.51	3m-6m
	7/10/2023	12.5	1.45	0.12	0.79	6m-1y
	7/21/2023	3	1.59	0.53	1.08	2y
	7/29/2023	9.25	3.05	0.33	1.05	2y

Table A-7. Comparison of Storms Between January 1, 2023 and December 31, 2023 and the Typical Year with Peak Intensities Greater than 0.40 inches/hour

Rain gauge	Date	Duration (hr)	Total Rainfall (inches)	Average Intensity (in/hr)	Peak Intensity (in/hr)	Storm Recurrence Interval (1-hr) ⁽¹⁾
	8/8/2023	10	2.85	0.29	1.97	20y
	8/18/2023	13.25	0.70	0.05	0.41	3m
	8/21/2023	13	0.43	0.03	0.41	3m
	8/25/2023	14.75	2.46	0.17	0.79	6m-1y
	9/13/2023	9.5	1.52	0.16	0.77	6m-1y
	9/18/2023	18.25	2.77	0.15	0.60	6m
	12/10/2023	18.75	2.32	0.12	0.55	6m
	12/17/2023	21.75	2.47	0.11	0.53	3m-6m

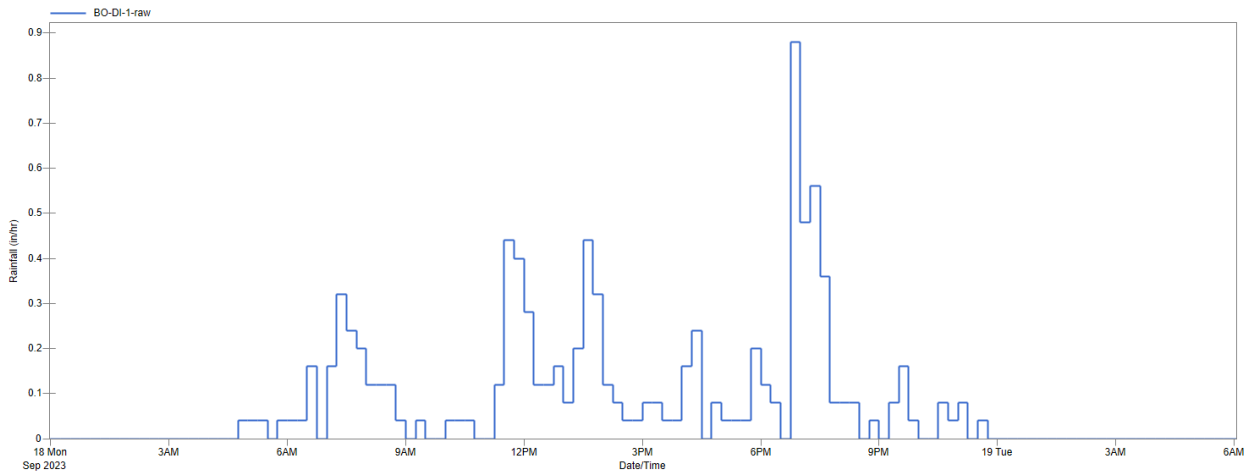


Figure A-0-2. Hyetograph from the Ward Street Headworks Gauge for September 18, 2023

The following is a summary of the rainfall comparison of January 1, 2023, to December 31, 2023, to the Typical Year:

- 2023 averaged 93 storm events with an average annual rainfall depth of 55.35 inches, compared to 93 storm events with an average annual rainfall depth of 46.80 inches for the Typical Year (Table A-5).
- In general, the breakdown of numbers of storms by rainfall depth categories for 2023 skewed towards the larger storms compared to the Typical Year. The 2023 period had eight more storms with depths greater than 0.5 inches and eight fewer storms with depths lower than 0.5 inches. (Table A-5).
- In terms of larger storms, for the four gauges shown in Table A-6 the average number of storms with greater than 2 inches of total rainfall in 2023 ranged from four to eight, an average of six storms, which is same as the Typical Year count of six storms. In 2023, 6 storm events were recorded to have a depth greater than 2 inches at Ward St (BO-DI-1), 4 storms for Columbus

Park (BO-DI-2) and Chelsea Creek (CH-BO-1) respectively, as well as 8 storms at USGS Fresh Pond. The largest storm in 2023 had a depth of 3.44 inches, compared to the largest storm in the Typical Year which has a depth of 3.89 inches (Table A-6). Within the Typical Year, the storms with greater than 2 inches of rainfall were separated from each other by a period of at least one month. In 2023, two December storms recorded at the Ward Street and USGS Fresh Pond rain gauges with greater than 2 inches of rainfall were separated by only one week (Table A-6).

- For the four gauges shown in Table A-7, the number of storms with peak intensities greater than 0.40 inches per hour ranged from ten to fifteen, compared to nine for the Typical Year. The two months of July and August are noted to include eight to ten of these intense storm events. The Typical Year had one storm with a peak intensity of 1.08 inches per hour with the remaining eight storms having peak intensities between 0.42 and 0.75 inches per hour. In 2023, the Fresh Pond gauge measured a storm with a peak intensity of 1.97 inches per hour (determined to equate to a 20-year 1-hour event) and measured a total of seven storms with peak intensities greater than 0.75 inches per hour. The other three gauges represented in Table A-7 had individual storms with peak intensities between 1.14 to 1.69 inches per hour and each measured three storms with peak intensity greater than 0.75 inches per hour. (Table A-7).

In 2023, Metropolitan Boston experienced significantly more volume of rain, higher intensity storm events, and about the same number of large storms in terms of depth greater than 2 inches compared to the Typical Year. The Typical Year total rainfall depth of 46.80 inches was 8.55 inches lower than the average depth across the collection system's rain gauges in 2023 of 55.35 inches. The exceptional number of high intensity events during the two month of July and August 2023 resulted in 2023 being classified by the National Weather Service as the second wettest summer on record in Boston region. The impact of higher rainfall (in terms of total rainfall, as well as peak intensity), is evident in the 2023 vs. Typical Year rainfall comparisons in the rainfall summary tables, and in comparing the modeled CSO discharge estimates for the Typical Year and 2023. For example, in the Typical Year Prison Point is predicted to discharge 250.39 MG, compared to the 2023 Prison Point modeled discharge volume of 385.49 MG, a 135.10 MG difference. Also in 2023 the total modeled CSO discharge was 713 MG compared to the Typical Year predicted total CSO discharge of 397 MG.

Exhibit B



MASSACHUSETTS WATER RESOURCES AUTHORITY

Deer Island
33 Tafts Avenue
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November 28, 2023

Michele Barden
U.S. Environmental Protection Agency – Region 1
5 Post Office Square, Suite 100 (06-4)
Boston, MA 02109-3912

Claire Golden
Massachusetts Department of Environmental Protection
150 Presidential Way
Woburn, MA 01801

Re: Comments on the draft Deer Island Treatment Plant and Combined Sewer Overflow NPDES Permit (MA0103284) and Draft Surface Water Discharge Permit: Deer Island Treatment Plant (MA 0103284)

Dear Ms. Barden and Ms. Golden:

The Massachusetts Water Resources Authority (MWRA) appreciates the opportunity to comment on the U.S. Environmental Protection Agency's (EPA) draft National Pollutant Discharge Elimination System (NPDES) permit number MA0103284 for the Deer Island Treatment Plant and the accompanying fact sheet (Draft Permit), which were noticed on May 31, 2023, and the Massachusetts Department of Environmental Protection's draft Surface Water Discharge Permit MA 0103284. MWRA is providing the following comments in accordance with 40 C.F.R. §124.13. This letter and its Attachments comprise MWRA's comments on the Draft Permit, Fact Sheet, Permit Attachments, and the State Permit.

MWRA's Deer Island Wastewater Treatment Plant (DITP) is the centerpiece of a \$5 billion program to protect Boston Harbor against pollution from Metropolitan Boston's sewer systems. The plant removes human, household, business and industrial pollutants from wastewater that originates in homes and businesses in 43 Greater Boston communities. The Deer Island Treatment Plant is in compliance with all federal and state environmental standards. It has been 23 years since DITP first discharged treated wastewater into Massachusetts Bay. In 2022, MWRA earned a Platinum 16 award from the National Association of Clean Water Agencies for consistently meeting permit requirements for 16 consecutive years. The health of Boston Harbor has improved considerably over the last two decades, without harming Massachusetts Bay; monitoring in the Bay has shown no adverse effects on the water, the sea floor, or the fish and shellfish.

MWRA has also completed projects to address combined sewer overflows (CSOs); over \$900 million in spending on 82 construction contracts, 33 engineering contracts, and 10 planning and technical assistance contracts necessary to complete 35 separate projects has resulted in an 88%

reduction in CSO discharges, with 94% of those overflows receiving treatment (disinfection and dechlorination).

It is important to take a step back to reflect on the improvements that the Boston Harbor Cleanup and CSO Program have made on the quality of life for the residents of Greater Boston. In the late 1980s, the Boston area had the dubious distinction of having the dirtiest harbor in America. The urban beaches were frequently closed for days, even after modest rainfall. Much of the harbor floor was considered virtually dead with a black mayonnaise consistency. Residents living along the waterfront often had to close their windows because of the foul smell of the harbor. The situation was a national embarrassment for the region.

Today, the results of our efforts are an irrefutable success. Our beaches are now considered the cleanest urban beaches in the country. The Charles and Mystic Rivers have each received a B grade from the EPA. Waters surrounding the Boston Harbor Islands National & State Park have been rejuvenated and meet swimming standards, even in rainy weather. Conditions now, in 2023, are dramatically different from those that existed in 1997-2000, the period when MWRA was issued its first NPDES permit.

MWRA has invested billions of dollars into the construction, operation, and ongoing maintenance of modern wastewater treatment facilities and the ocean outfall. The industrial pretreatment program continues to effectively prevent toxic contaminants from entering the waste stream. High-quality sludge is now reused as Class A fertilizer, and the methane generated during digestion is captured and used to help power DITP. The 35 projects in the CSO Long-Term Control Plan are completed, and CSO reduction efforts continue in cooperation with our member communities. Programs for training staff and for operation and maintenance of MWRA's facilities are well established. Hundreds of scientific reports document the quality of MWRA discharges, the recovery of Boston Harbor, and the lack of adverse impacts to Massachusetts Bay. To minimize excess flow to the treatment plant, MWRA has demonstrated its commitment to work with its communities to reduce infiltration and inflow (I/I). As of June 2023, MWRA's I/I Local Financial Assistance Program has distributed \$532 million in grants and interest-free loans to fund 664 I/I identification & rehabilitation projects within the 43 sewer member communities.

Each school year, the MWRA School Education Program conducts hundreds of Pre-K through college-level classroom presentations, educating thousands of students about the importance of a clean Boston Harbor. In 2022, to highlight the improved conditions of Boston Harbor and to allow people of all ages to experience this first hand, the School Program partnered with the Massachusetts Division of Marine Fisheries, national and state park services, Save the Harbor/Save the Bay, and other local organizations to introduce "Reel Fun Fishing Days" on Boston Harbor. These programs promote local involvement and understanding of water quality issues throughout the MWRA service area.

MWRA's existing permit was developed years before the treatment plant and outfall were operational. At that time, there was public concern and scientific uncertainty about the environmental effects of moving the DITP discharge from the old outfalls in Boston Harbor to a new outfall in Massachusetts Bay. The renewed permit should reflect an updated understanding of the performance of DITP and the overall environmental benefits of the Boston Harbor Project. The

comments we provide reflect the shared goals we have to protect the environment, maintain permit compliance, and provide value for our ratepayers.

The summary below provides an overview of MWRA's major comments. In some areas of the permit MWRA appreciates EPA's careful consideration of the decades of data that have been collected and supports changes that are made. In other cases MWRA opposes the draft permit requirements. These concerns are raised with consideration of how some requirements may affect our ability to prioritize programs effectively and ensure ongoing high-quality operations. Some comments are focused on maintaining a successful cooperative engagement with our communities, and reflect the commitment we have to our ratepayers.

MWRA appreciates that the Draft Permit is supported by sound science in the following respects: there is a reasonable limit for Enterococcus, there is no unnecessary nitrogen limit, and the outdated Contingency Plan is not included.

Blending is one way MWRA maximizes flow to the treatment plant to reduce CSO discharges, and it maintains the integrity of the treatment process. As the plant is designed, flows exceeding 700 million gallons per day (MGD) are diverted around the secondary process and then blended with the secondary treated flow before disinfection and discharge. These blended flows meet all permit limits. However, blending is not addressed in the Draft Permit; it is important that the process of bypassing secondary treatment for flows in excess of the 700 MGD secondary process limit be considered an authorized bypass.

MWRA objects to the inclusion of Co-Permittees; this change to communities' regulatory obligations exceeds EPA and Massachusetts Department of Environmental Protection authority and threatens to disrupt the longstanding relationships between MWRA and the communities it serves.

The Major Storm Event Plan requirements would impose significant burdens on MWRA and communities. The proposed mandates in the Operation & Maintenance section would impact not only MWRA, but all 43 connected communities. MWRA agrees that climate resiliency planning for wastewater infrastructure is important and, like most major utilities, considers natural disasters and other emergencies as part of routine facility planning. MWRA has a long history of considering the effects of climate change; the Deer Island Wastewater Treatment Plant was one of the first designed with sea-level rise incorporated into its design. More recently, MWRA has specifically focused on the vulnerability of its other coastal infrastructure to climate change and proactively taken steps to adapt. However, the implementation, timelines, and level of effort required to fulfill the Draft Permit requirements are significant and out of sync with other pressing priorities.

It is inappropriate to use the Exhibit B Typical Year discharge activations and volumes as effluent limits in a NPDES permit. The Draft Permit proposes to use the CSO Long Term Control Plan Typical Year goals for activations and volumes as effluent limitations. This is not appropriate, premature, inconsistent with the CSO Control Policy and EPA Guidance, and could create a risk of EPA enforcement action or civil lawsuit despite the completion of the system improvements required by the Long Term Control Plan. As detailed in MWRA comments, the

Exhibit B activations and volumes (EPA proposed Attachment I to the Draft Permit) were not meant to be strict, inflexible limits. Moreover, including such activation and volume figures would upset the schedule in the Boston Harbor Litigation, usurp the role of the District Court, contravene the requirement for EPA permit writers to use all reasonable available and relevant data and undermine the core purpose of the NPDES program and Clean Water Act's permit shield. MWRA in its comments proposes more appropriate, alternative approaches to achieve EPA's objectives.

Rapid-response monitoring of harmful algal blooms would be a significant burden in terms of cost, coordination and level of effort. Nuisance and harmful algal blooms in Massachusetts Bay have no clear connection to MWRA's outfall. While MWRA appreciates EPA's desire to collect more information on harmful algal blooms (HABs) and nuisance algae species, in the absence of a proven outfall effect on these species, MWRA believes the specific monitoring activities should not be part of MWRA's NPDES permit. Additionally, expensive weekly rapid-response surveys might be required at times -- again, without a clear objective. Questions about HABs and nuisance algae species should at least be aligned with the Massachusetts Division of Marine Fisheries, but the requested monitoring is inconsistent with, and goes well beyond the scope of their program.

MWRA also has concerns with the following:

The strict Acute Toxicity limit does not recognize the high level of dilution provided by the location of the outfall and the design of the outfall diffusers.

The requirement to sample CSO facilities in spring, summer, and fall is not supported by the existing data, which do not show a seasonal trend. Seasonal sampling requirements will make an already difficult program even harder to implement.

The costly outfall tunnel video inspection is unnecessary. Existing continuous monitoring of flow and head elevations are a much more sensitive indicator of any problems with the outfall and diffusers.

The requirement for discharges to "not cause exceedances of water quality standards" is vague, does not conform to the usual process of identifying technologies that will be in compliance, and leaves MWRA vulnerable to inadvertent and unknowable non-compliance.

The language in the pretreatment section of the Draft Permit needs to take into account the size, complexity, and long-standing effectiveness of MWRA's pretreatment program.

The detailed comments attached to this letter are organized by section of the Draft Permit, Draft Permit attachments, and the Fact Sheet. Comments specific to the Massachusetts Surface Water Quality Permit follow comments on the EPA permit.

In conclusion, we at MWRA are proud of our record of environmental stewardship; the recovery of Boston Harbor is one of the most dramatic environmental success stories ever documented. Ratepayers have borne the burden of the \$5 billion dollar investment in MWRA's wastewater

system. The cleanup of the Harbor, its tributary rivers and its beaches has brought about a renaissance of recreational activity and waterfront development. We value our partnership with EPA, MassDEP and others on these important matters. We will continue our efforts to reduce combined sewer overflows, and responsibly maintain and operate the Deer Island Treatment Plant and other facilities to protect invaluable ocean and river resources in Massachusetts.

We appreciate the opportunity to comment on the Draft Permit issued for the Deer Island Treatment Plant. Please do not hesitate to contact Dr. Betsy Reilley with any questions, at Betsy.Reilley@mwra.com.

Sincerely,



Frederick Laskey
Executive Director
Massachusetts Water Resources Authority

Attachments:

1. MWRA Detailed Comments on the draft Deer Island Treatment Plant and Combined Sewer Overflow NPDES Permit (MA0103284) and Draft NPDES Surface Water Discharge Permit: Deer Island Treatment Plant (MA 0103284)
2. MWRA Comments on the draft Deer Island Treatment Plant and Combined Sewer Overflow NPDES Permit (MA0103284) Fact Sheet
3. MWRA Comments on the Draft Surface Water Discharge Permit: Deer Island Treatment Plant (MA 0103284)
4. Blending Stipulation and Order entered and ordered in the Boston Harbor Litigation, U.S. v. Metropolitan District Commission et al., Civil Action No. 85-0489-RGS Doc. No. 1707
5. Corrected version of Attachment I to the Draft Permit: Current (2008) version of "Exhibit B" to the Second Stipulation in the Boston Harbor Litigation, U.S. v. Metropolitan District Commission et al., Civil Action No. 85-0489-RGS Doc. Nos. 1691 and 1693
6. Citations for the Administrative Record for NPDES permit MA0103284

cc: Ken Moraff, EPA
Lealdon Langley, MassDEP

EPA and MassDEP
 Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284
 November 28, 2023
 Page 1 of 80

MWRA Comments on the draft Deer Island Treatment Plant and Combined Sewer Overflow NPDES Permit (MA0103284) and Draft NPDES Surface Water Discharge Permit: Deer Island Treatment Plant (MA 0103284)

Table of Contents entries refer to Parts of the Draft Permit.

Contents

Comments on addresses 4

Comments on inclusion of Co-permittees 4

Comments on Part I..... 5

Comments on Part I.A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS 5

I.A.1. Table A.1..... 5

I.A.1. Table A.1. Effluent Characteristic – Flow 5

 Misapplication of Footnotes Five and Six 6

 Content of Footnote Six and Bypass Procedures Stipulated in the Boston Harbor Litigation..... 6

I.A.1. Table A.1. Effluent Characteristic – Bacteria 8

I.A.1. Footnote 10 – Fecal coliform..... 9

I.A.1. Footnote 11 – Memorandum of Understanding with Massachusetts Division of Marine Fisheries..... 9

I.A.1. Footnote 12 – Provisional Bacteria Limits 9

I.A.1. Table A.1. Effluent Characteristic – Oil and Grease 10

I.A.1. Table A.1. Effluent Characteristic – Nitrogen 10

I.A.1. Table A.1. Effluent Characteristic – PFAS 11

I.A.1. Table A.1. Effluent Characteristic – Adsorbable Organic Fluorine monitoring of influent and effluent..... 11

I.A.1. Table A.1. Effluent Characteristic – Whole Effluent Toxicity and Footnotes 17-19..... 12

Acute toxicity..... 13

Chronic toxicity..... 15

Dilution Water for Toxicity Testing with DITP Effluent..... 15

I.A.2. Narrative Requirements..... 16

I.A.8.a Notice of any new introduction of pollutants 17

Comments on Part I.B. COMBINED SEWER OVERFLOWS (CSOs) 17

I.B.1 List of CSO outfalls..... 17

I.B.2. General Limitations on effluent..... 18

EPA and MassDEP
 Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284
 November 28, 2023
 Page 2 of 80

I.B.2.a. & f. Narrative Requirements	18
I.B.2.c.-e. Authorized typical year discharge activations and volumes - Issues Relating to Use of Exhibit B (Attachment I) as “Effluent Limits”	18
I.B.2.d. and e.: Variances – Issues Relating to the Incorporation of Current Variances as Attachments J and K.	32
I.B.3. Nine Minimum Controls Implementation Levels	33
I.B.3.j. Signage	33
I.B.3.m. Public Notification Plan	33
I.B.5 Nine Minimum Controls Reporting Requirement	33
I.B.7 CSO Effluent Limitations for CSO Treatment Facilities	36
I.B.7.b CSO Effluent Limits	36
<i>Effluent Characteristic Sampling - Somerville Marginal Relief MWR205A</i>	36
<i>Effluent Characteristic Sampling - Chlorine Residual Limits</i>	37
<i>Effluent Characteristic Sampling - Measurement Frequency</i>	38
<i>Effluent Characteristic Sampling - Dilution water for WET tests (Footnotes 32 and 34)</i>	39
<i>Effluent Characteristic Sampling - Chronic toxicity (marine outfalls) (Footnote 33)</i>	40
Comments on Part I.C. UNAUTHORIZED DISCHARGES	41
I.C.2 Unauthorized discharge – public notifications	41
I.C.4. Bypassing of wastewater flows is not authorized	42
Comments on Part I.E. OPERATION AND MAINTENANCE OF THE TREATMENT AND CONTROL FACILITIES	42
I.E.1.a Wastewater Treatment Facility (WWTF) Major Storm and Flood Events Major Storm and Flood Events Plan and I.E.2.e.(2) Sewer System Flood Events Plan	42
Comments on “Adaptation Plan” included in recent final Permits	45
I.E.2. Sewer System	46
I.E.2.c Infiltration/Inflow	47
<i>I.E.2.c.(1) Control of I/I</i>	47
<i>I.E.2.c.(2) I/I Reduction Plan</i>	47
<i>I.E.2.c.(3) Annual I/I Reduction Report and I.E.4.(f) Annual Reporting Requirement</i>	48
I.E.2.d. Sewer System Mapping	48
<i>I.E.d.2 Security Concerns related to Sewer System Mapping</i>	48
I.E.2.e. Sewer System O&M Plan	48

EPA and MassDEP
 Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284
 November 28, 2023
 Page 3 of 80

Comments on Part I.G. INDUSTRIAL USERS AND PRETREATMENT PROGRAM	49
I.G.2. Compliance Reports	49
I.G.4. and I.G.10. Industrial dischargers to be sampled for PFAS	49
I.G.6.i. Pretreatment Enforcement	50
I.G.7.b. Local Limit Development	50
I.G.8. (and I.A.8.) Notification Requirements	50
I.G.9. (and I.J.3.) Annual Report Requirements	51
Comments on Part I.I. SPECIAL CONDITIONS	52
I.I.2. Pollution Prevention Plan	52
I.I.3. Outfall BMP	53
I.I.4. DMF notification	53
I.I.6. Ambient Monitoring Plan	54
Schedule for revising Ambient Monitoring Plan	55
I.I.6.c. Table 1: Water Column Survey Schedule	56
I.I.6.d. Monitoring Stations	56
I.I.6.e. Table 2: Water Column Parameters	57
I.I.6.e. Table 3: Water Column Parameters, Cape Cod Bay and Stellwagen NMS	58
I.I.6.f. Harmful Algal Blooms and nuisance algae	58
<i>I.I.6.f(1)(i). Conditions for Alexandrium rapid response surveys</i>	63
I.I.6.f(2). Pseudo-nitzschia spp.	64
I.I.6.f(3) to I.I.6.f(6). General comments on nuisance algae species	68
<i>I.I.6.f(3). Dinophysis spp.</i>	69
<i>I.I.6.f(4) Phaeocystis pouchetii</i>	69
<i>I.I.6.f(5). Karenia mikimotoi</i>	71
<i>I.I.6.f(6). Margalefidinium polykrikoides</i>	73
I.I.6.k. Modifications to Ambient Monitoring Plan	75
I.I.6.l. Annual Report	75
I.I.6.m. Special Studies	76
Effluent monitoring required by the Ambient Monitoring Plan	76
I.I.7. Dye studies for CSO Treatment Facilities discharge locations	76

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 4 of 80

Comments on Part I.J. REPORTING REQUIREMENTS	77
I.J.2. Submittal of Reports as NetDMR Attachments.....	77
I.J.6. Submittal of Sewer Overflow and Bypass Reports and Notifications.....	77
Comments on Part I.K. STATE 401 CERTIFICATION CONDITIONS	78
I.K.2. pH.....	78
I.K.3. CSO Public Notification Plans	78
Comments on Permit Attachments	78
Attachment A: CSO Outfalls and Responsible Party.....	78
Attachment G: Industrial Pretreatment Program Annual Report	80
Attachment I: Authorized Typical Year CSO Discharge Activation and Frequency.....	80

The Massachusetts Water Resources Authority (MWRA) provides the following detailed comments on the draft U.S. Environmental Protection Agency’s (EPA) draft National Pollutant Discharge Elimination System (NPDES) permit number MA0103284 for the Deer Island Treatment Plant (DITP) (Draft Permit). These comments also apply to the Massachusetts Department of Environmental Protection’s (MassDEP): (1) draft Surface Water Discharge Permit MA 0103284 (State Permit); and (2) the federal Clean Water Act Section 401 Certification. Comments on the accompanying fact sheet and additional comments on the State Permit are contained in Attachments 2 and 3. These comments are provided in accordance with 40 C.F.R. §124.13.

Comments on addresses

(2023 Draft Permit – page 2 of 68)

The correct mailing address for the City of Chelsea is as follows:

City of Chelsea
 Department of Public Works
 500 Broadway Room 310
 Chelsea, MA 02150

Comments on inclusion of Co-permittees

(2023 Draft Permit – page 2 of 68)

In Section 3.1 of the Draft Permit Fact Sheet, EPA requested comments on the clarity of the Co-permittee and CSO-responsible Co-permittee language. Below we provide our comments.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 5 of 80

The Draft Permit and the draft Surface Water Discharge Permit attempt to regulate 43 separate sewer communities as “Co-permittees,” including four communities as “CSO-responsible Co-permittees,” which up until this point, have been regulated under four separate individual NPDES permits. The Federal Clean Water Act, 33 U.S.C. § 1251 *et seq.* (“CWA”), and the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26 through 53 do not provide statutory authorization for EPA or MassDEP to take such actions in their respective draft permits. Moreover, even if it can be argued that these statutes provide discretionary authority for EPA and MassDEP to regulate the identified Co-permittees in a single NPDES or State Surface Water Discharge permit, the EPA/MassDEP’s actions nevertheless constitute an abuse of that discretion. Further, the MWRA further adopts and incorporates by reference into these comments the comments and proposed alternative permit language submitted by the MWRA Advisory Board in Sections II, III, and IV of their comments dated November 28, 2023.¹ Finally, in accordance with the Draft Permit Fact Sheet specific request for comments regarding the “...clarity of the several liability for the Permittee,...” and for the further removal of doubt, **MWRA requests that EPA and MassDEP include the following statements in their respective permits:**

In no event shall the Permittee be liable under the CWA (including, but not limited to, any liability arising under 33 U.S.C. §§ 1319, 1321, & 1365), the Massachusetts Clean Waters Act, or otherwise be responsible for: (a) any act or failure to act of any CSO-responsible Co-permittee or Co-permittee; (b) any failure to properly operate or maintain any collection system or portion of a collection system that it does not own or operate; or (c) enforcing the terms of this Permit against any CSO-responsible Co-permittee or Co-permittee. In the event of any conflict between the above provisions and any other term or provision of this Permit, the above provisions shall control.

Comments on Part I

Comments on Part I.A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

I.A.1. Table A.1.

I.A.1. Table A.1. Effluent Characteristic – Flow
(2023 Draft Permit – page 4 of 68)

Rolling Average Effluent Flow & Effluent Flow
(2023 Draft Permit – page 4 of 68)

In Part I.A.1. of the Draft Permit, the table depicting the Effluent Limitations and Monitoring Requirements for Outfall T01 contains two Effluent Characteristics regarding flow, including: (1)

¹ Comments by MWRA to provisions that include CSO-responsible Co-permittees and Co-permittees are without prejudice to MWRA’s request that CSO-responsible Co-Permittees and Co-Permittees be deleted from the Permit.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 6 of 80

the Rolling Average Effluent Flow; and (2) the Effluent Flow. For the Rolling Average Effluent Flow, the corresponding Effluent Limitation is 361 million gallons per day (MGD) on an Average Monthly basis. Next, for the Effluent Flow, the corresponding Effluent Limitations are to Report the MGD on both an Average Monthly and Maximum Daily basis. Footnotes five and six to the Table, however, are being applied to the wrong effluent characteristics. In addition to being misapplied, the content of footnote six is incomplete and/or inaccurate. Accordingly, Part I.A.1. of the Draft Permit requires modifications.

Misapplication of Footnotes Five and Six
(2023 Draft Permit – page 4, 8, and 9 of 68)

Part I.A.1. footnote five of the Draft Permit generally does three things: (a) it explains that the 365-calendar day running average “dry day” flow shall not exceed 361 MGD; (b) it defines what a “dry day” means; and (c) it describes how the flow limit is calculated for purposes of compliance. Accordingly, it makes sense that footnote five is currently listed in the table next to the Rolling Average Effluent Flow and the 361 MGD limit, however, the footnote is also listed next to Effluent Flow. Given the dry-day-flow focus of the footnote language, this appears inappropriate. Likewise, Part I.A.1. footnote six of the Draft Permit generally deals with the notification and other requirements for wet weather events where wastewater may be diverted around secondary treatment facilities. This footnote six is listed next to both Effluent Flow and Rolling Average Effluent Flow, the latter of which is dry-day-flow. These may be simple typographical errors or perhaps were intended to require reporting of the monthly average plant flow and the maximum daily plant flow as in the current permit – not the monthly average dry day flow and the maximum daily dry day flow. **Accordingly, the footnote references should be corrected with the following redline modifications:**

Effluent Characteristic	Effluent Limitation		
	Average Monthly	Average Weekly	Maximum Daily
Rolling Average Effluent Flow ^{5,6}	361 MGD ⁵	---	---
Effluent Flow ^{5,6}	Report MGD	---	Report MGD

While the Permit includes a dry day rolling average effluent flow limit of 361 MGD, it is important to note that the Deer Island Treatment Plant has capacity up to 1,270 MGD peak flow; 700 MGD flow receiving full primary and secondary treatment, and flows over 700 MGD receiving primary and disinfection treatment.

Content of Footnote Six and Bypass Procedures Stipulated in the Boston Harbor Litigation
(2023 Draft Permit – page 9 of 68)

Part I.A.1, footnote six of the Draft Permit describes the requirements when a portion of high flows are diverted around the secondary treatment process to produce a combination of primary and secondary treatment effluent. As detailed below, the Draft Permit either ignores or attempts to

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 7 of 80

rewrite the wet weather “bypass” processes that have been successfully utilized by MWRA, EPA, and MassDEP since 2008. In so doing, the Draft Permit reverts back to an antiquated case-by-case bypass process, which is a huge step backwards for all parties involved.

Wet weather considerations were a part of the design of the DITP, in order to protect the secondary treatment plant from solids washout and long-term upsets. In particular, during wet weather events, one of the bedrock tools that MWRA utilizes to reduce combined sewer overflow (CSO) discharges is to maximize the amount of sewage flow to the DITP for treatment. Maximizing flow in this fashion is one of the Nine Minimum Controls set forth in EPA’s *Combined Sewer Overflow (CSO) Control Policy*, 59 Fed. Reg. 18688 (April 19, 1994) (CSO Control Policy) and the terms of the existing DITP NPDES permit.

On September 8, 2008, a Stipulation and Order was entered and ordered in the Boston Harbor Litigation, *U.S. v. Metropolitan District Commission et al.*, Civil Action No. 85-0489-RGS Doc. No. 1707 and attached hereto as Attachment 4 (Order), wherein MWRA has been required to maintain a “secondary process limit” of at least 700 MGD for the DITP. Order at ¶ 8.a. The term “secondary process limit” generally refers to the setting in the process control system for the DITP, which directs flows up to and including that flow rate through secondary treatment. *Id* at ¶ 8.c. The Order, however, establishes two excepted conditions:

- (1) Condition A - In the event of a bypass of secondary treatment, both of the conditions set forth in Part II.B.4.b. of MWRA’s NPDES permit and in 40 C.F.R. §122.41(m)(2) (“Bypass not exceeding limitations. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation.”) are satisfied with respect to all flows bypassed;
- (2) Condition B - In the event of a bypass of secondary treatment, all three of the conditions set forth in Part II.B.4.d. of MWRA’s NPDES permit and in 40 C.F.R. §122.41(m)(4) are satisfied with respect to all flows bypassed.

Id at ¶ 8.b.

The Order further provides that MWRA shall notify the EPA by telephone or email within 24 hours after the commencement of any diversion of waste water around secondary treatment facilities at the DITP, followed by a written report within five days containing a description of the diversion and its cause and time period. *Id* at ¶ 9.

The Order contemplated that the secondary process limit would remain in effect, unless a different secondary process limit is established in a subsequent NPDES permit. *Id* at ¶ 8.b. Ultimately, MWRA’s “...obligations under Paragraphs 8 and 9 of this Order shall terminate when a new NPDES permit is issued to the MWRA by the EPA relating to DITP and it becomes effective.” *Id* at ¶ 19.b.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 8 of 80

While on the one hand, Part I.A.1, footnote 6 of the Draft Permit contains reporting requirements similar to those found in the Order. On the other hand, the Draft Permit makes no mention of the secondary process limit of 700 MGD. This is problematic for several reasons.

First, the secondary process limit was and remains important to the Authority because this process limit has, after extensive experimentation in 2005-2007, been determined to minimize washout in the secondary clarifiers and flooding in the clarifiers and downstream channels; MWRA has demonstrated and contemporaneously documented with EPA and MassDEP that at this secondary process limit the operators can maintain process stability and produce high-quality effluent compliant with secondary treatment standards and Effluent Limitations. Second, the Draft Permit is ambiguous insofar as it is unclear whether EPA intends to have the provisions of the Order continue to govern or if, by omission, is attempting to modify the secondary process limit. Third, and in any event, paragraph 19.b. of the Order reads such that once a new NPDES permit for DITP is finalized, the Order obligations terminate.

As required by the Order, over the last fifteen years, MWRA has been utilizing the 700 MGD secondary process limit and notifying EPA by telephone or email within 24 hours after the commencement of any diversion of waste water around secondary treatment facilities at the DITP, followed by a written report within five days containing a description of the diversion and its cause and time period. Use of the 700 MGD secondary process limit as the triggering event, has afforded both MWRA and EPA a clear and consistent notification process. Furthermore, MWRA provides notification of blending events to the public, EPA, and MassDEP within two hours as required by state regulation, *314 C.M.R 16.00: Notification Requirements to Promote Public Awareness of Sewage Pollution*.

Accordingly, MWRA does not object to a permit requirement that continues the existing and longstanding notification and reporting regime, as long as it is clearly tied to the 700 MGD secondary process limit. In order to ensure that the process remains clear, however, **MWRA requests Part I.A.1, footnote 6 of the Draft Permit be modified to incorporate the process set forth in the Order and confirm that bypassing secondary treatment for flows in excess of the 700 MGD secondary process limit is not an unauthorized bypass, which is fully consistent with the CSO Control Policy and related EPA guidance. See e.g., Combined Sewer Overflows Guidance for Permit Writers, EPA 832-B-95-008 at section 4.9.1. (September 1995)**(“Based on the technical justification developed and submitted by the permittee, the permit writer should include in the Permit the conditions under which a CSO-related bypass would be authorized, as well as specify any required treatment, monitoring, or effluent limitations related to the bypass event.”).

I.A.1. Table A.1. Effluent Characteristic – Bacteria

MWRA appreciates the recognition by EPA that years of Massachusetts Bay monitoring data show no effect on bacteria levels near the DITP outfall. MWRA also agrees with EPA’s decision to make the *Enterococcus* limit a seasonal one, as it relates to recreational use of the receiving water.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 9 of 80

As *Enterococcus* is a new permit requirement, MWRA requests that it be monitor-only for the first year of the Permit, without an effluent limit.

I.A.1. Footnote 10 – Fecal coliform

(2023 Draft Permit – page 10 of 68)

To conform with the current NSSP (2019) classification analytical methods² when using fecal coliform as a bacterial indicator, **MWRA requests adding the following text to Footnote 10:**

The maximum daily limit for fecal coliform is expressed as not more than 10% of individual sample results collected in a month exceeding the limit of 1,960 organisms/100 ml.

I.A.1. Footnote 11 – Memorandum of Understanding with Massachusetts Division of Marine Fisheries

(2023 Draft Permit – page 10 of 68)

MWRA does not have any objection to adding station N21 to the sampling plan for bacteria monitoring in Massachusetts Bay. However, Footnote 11 erroneously says that the US Food and Drug Administration (FDA) is a party to the Memorandum of Understanding (MOU) between the MWRA and the Massachusetts Division of Marine Fisheries (DMF). Note that the National Shellfish Sanitation Program regulations require DMF to provide a copy of the final MOU to FDA. **Therefore this footnote should be modified appropriately.**

I.A.1. Footnote 12 – Provisional Bacteria Limits

(2023 Draft Permit – page 11 of 68)

The Draft Permit contains a provision (Footnote 12) for much more stringent fecal coliform limits in the event DMF and/or the FDA determines this is necessary to protect shellfish resources. MWRA notes that it may be difficult for DITP to meet these stringent limits without adding significantly more sodium hypochlorite, with all the resulting environmental harm that may result from the increased truck traffic and possible formation of disinfection byproducts in the effluent. Ambient bacteria monitoring conducted under the MOU with DMF over many years has demonstrated that the current level of disinfection is sufficient to keep fecal coliform values well within the shellfishing standards in the vicinity of the outfall.

To conform with the current NSSP (2019) classification analytical methods when using fecal coliform as a bacterial indicator, **MWRA suggests adding the following text to Footnote 12:**

² U.S. FDA, 2019. National Shellfish Sanitation Program (NSSP) Guide for the Control of Molluscan Shellfish 2019 Revision. Available at <https://www.fda.gov/media/143238/download>

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 10 of 80

The maximum daily limit for fecal coliform is expressed as not more than 10% of individual sample results collected in a month exceeding the limit of 28 organisms/100 ml.

I.A.1. Table A.1. Effluent Characteristic – Oil and Grease

(2023 Draft Permit – page 4 of 68)

Fats, oil and grease (FOG) sampling currently takes place weekly³, in support of the Contingency Plan. Over twenty years of weekly sampling demonstrates that oil and grease is very seldom detected in the effluent.

The MWRA's industrial pretreatment program strictly limits oil and grease from industries (360 CMR 10.023(10)) including limiting FOG to the collection system via a grease trap program in accordance with 360 CMR 10.017 and requiring gas/oil separators at garages, parking lots, and places where petroleum based products are used or stored per 360 CMR 10.016. MWRA staff inspect about 650 gas/oil separators per year to assure they are properly serviced and maintained.

MWRA monitoring typically includes testing at over 200 industries each year in addition to the self-monitoring that is required to be conducted by the industries. Another 300 non-industrial samples from the collection system and treatment plant are tested each year in support of the ongoing regulation program.

The Draft Permit's requirement for daily effluent sampling is excessive, will strain laboratory resources, and will add cost to the effluent monitoring, for very little benefit since the FOG levels have been demonstrated to be consistently negligible. Over the last five years, from 2018-2023, MWRA has collected nearly 370 weekly effluent FOG samples, one (0.27%) of which measured FOG above the minimum level of detection. **Accordingly, MWRA requests that the oil and grease sampling frequency be set to weekly in the final Permit.**

I.A.1. Table A.1. Effluent Characteristic – Nitrogen

(2023 Draft Permit – page 4 of 68)

MWRA agrees with EPA's reasoning in section 5.0.1.1 of the Fact Sheet, that there is no basis for imposing a numerical limit for nitrogen, and does not object to continued monitoring.

³ See section 2.3.4. of MWRA. 2021. Ambient monitoring plan for the Massachusetts Water Resources Authority effluent outfall revision 2.1. Boston: Massachusetts Water Resources Authority. Report 2021-08. 107 p. Available at <https://www.mwra.com/harbor/enquad/pdf/2021-08.pdf>.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 11 of 80

I.A.1. Table A.1. Effluent Characteristic – PFAS
(2023 Draft Permit – page 5 and 7 of 68)

MWRA is pleased to see that the quarterly influent, effluent, and sludge sampling for PFAS calls for grab samples rather than composite samples, which is consistent with the requirements of Method 1633.

I.A.1. Table A.1. Effluent Characteristic – Adsorbable Organic Fluorine monitoring of influent and effluent
(2023 Draft Permit – pages 5, 7, and 12 of 68)

MWRA is concerned that monitoring of Adsorbable Organic Fluorine (AOF) is untested and the data may be impossible to interpret. MWRA recognizes the value of a measurement that would cover all of the thousands of possible PFAS compounds as a class, however, the method is not ready for use in NPDES monitoring. The justification in the Fact Sheet does not address several issues with the method (Draft Method 1621).

Draft Method 1621 (dated April 2022) explicitly states that “[t]his document represents a draft of an AOF method currently under development by the EPA Office of Water, Engineering and Analysis Division (EAD). *This method is not approved for Clean Water Act compliance monitoring until it has been proposed and promulgated through rulemaking.*” (emphasis supplied)

Conversely, EPA issued a memo allowing permit writers to include Draft Method 1633 in permits, even though it has also not been finalized and promulgated. This memo indicates that “*The draft Adsorbable Organic Fluorine CWA wastewater method 1621 can be used in conjunction with draft method 1633, if appropriate.*” MWRA believe that this is not appropriate at this time for the following reasons.

AOF in aqueous matrices by combustion ion chromatography (CIC) is a “method-defined parameter” defined solely by the method used to determine the analyte. Any changes to the method necessitated by the results of the multi-laboratory validation study or public comments on the method could invalidate any prior data collected using the draft procedure.

EPA is adding this method to NPDES permits without having completed the multi-laboratory validation study. However, in the absence of that study being completed and published, there is no way for MWRA to know what to expect when multiple labs are employed to meet the permit required testing in terms of precision, accuracy, comparability, or repeatability.

By requiring measurement of AOF using Method 1621 in the draft NPDES permit, EPA is side-stepping the requirements of the Paperwork Reduction Act, instead of following the information collection procedures required by that Act. EPA is currently engaged in planning a national Information Collection Rule (ICR) study to collect the information that adding it to NPDES permits would accomplish. EPA should complete that process, and properly promulgate Method 1621 prior to requiring it in NPDES permits.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 12 of 80

The current detection limits are on the order of 5,000 ng/L as F. In addressing concerns about the presence of PFAS at ng/L levels, the analysis may not produce useful results, even aside from questions about precision, accuracy, comparability, or repeatability noted above. EPA should complete the ICR study described above, and demonstrate a benefit associated with requiring AOF measurements in NPDES permits.

MWRA estimates a cost for this analysis of about \$300 - \$400 per sample. Other NACWA members have been quoted prices as high as \$1,200 per sample. The pricing situation may improve once EPA has fully promulgated Method 1621, but is not likely to improve before the method has been promulgated.

Permittees may not be able to find laboratories to do this analysis, as based on inquiries we have made there is currently a shortage of labs currently able to perform this test. At a minimum, there would be additional cost related to sample handling and shipping. This cost is an unreasonable burden to put on permittees, especially because the data generated prior to Method 1621 being approved are likely to be unusable for decision-making.

MWRA recommends that the requirement to monitor and report on AOF be removed from the Permit. At a minimum, it should be deferred until an available approved method is promulgated.

Alternatively, MWRA recommends using the language included in the recently issued final permits for other Massachusetts communities:

Until there is an analytical method approved in 40 CFR Part 136 for Adsorbable Organic Fluorine, monitoring shall be conducted using Method 1621. This reporting requirement takes effect the first full calendar quarter following 6 months after EPA notifies the Permittee that Method 1621 has been multi-lab validated.

I.A.1. Table A.1. Effluent Characteristic – Whole Effluent Toxicity and Footnotes 17-19

(2023 Draft Permit – pages 5 and 12 of 68)

(2023 Draft Permit Fact Sheet – page 87 & 88 of 195)

In the 2000 permit, acute toxicity limits for whole effluent toxicity (WET) testing with the Inland Silverside (*Menidia beryllina*) and the Mysid Shrimp (*Mysidopsis bahia*) are, $LC_{50} \geq 50\%$. Chronic toxicity for *M. beryllina* and the Sea Urchin (*Arbacia punctulata*) are, $C\text{-NOEC} \geq 1.5\%$.

In the Draft Permit EPA proposes an $LC_{50} \geq 100$ for *M. beryllina* and *M. bahia*, while maintaining the $C\text{-NOEC} \geq 1.5$ for *A. punctulata*.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 13 of 80

Acute toxicity

EPA justifies the more stringent LC₅₀ by referring to the MassDEP 1990's "Massachusetts Water Quality Standards Implementation Policy for the Control of Toxic Pollutants in Surface Waters". This document recommends allowable whole effluent toxicity limitations and testing requirements based on available dilution at critical conditions. The document acknowledges "...for marine waters, critical conditions are more difficult to define and *must* be established case-by-case." (Emphasis ours.) Based on the MassDEP document, and applying a dilution factor of 70 for the Massachusetts Bay outfall, EPA determined that the acute toxicity limit should be greater than or equal to 100%, as this dilution factor falls between <10 and 100. However, it is clear from the quote above that the document also gives the regulating agency some leeway for marine discharges, as critical conditions "...*must* be established on a case-by-case" basis (again, emphasis ours). MWRA believes there are a number of factors that should lead to a maintenance of the 2000 permit's acute toxicity limit of LC₅₀ ≥ 50%.

First, EPA's assigned dilution factor of 70 for the Deer Island Treatment Plant is far closer to 100 than <10. Dye studies of the effluent plume in July 2001 indicated even higher real world dilutions, with dilution factors of at least 94 under worst case, stratified water column conditions (typically April-October).⁴ Using the same July 2001 data, modeling using the NRFIELD (formerly RSB) software showed that under stratified water column conditions, the minimum dilution factor was 104. The NRFIELD results are spatially averaged, and so may be more reflective of actual conditions since the model may capture short term spatial and temporal fluctuations and variability better than the instantaneous field sampling. Under non-stratified conditions (which occur approximately half the year), dilution is even greater.

Second, data collected over more than two decades do not indicate any effect of toxic pollutants in the vicinity of the Deer Island Treatment Plant outfall. Indeed, the active diffuser cap monitored as part of MWRA's benthic monitoring program shows a healthy hard-bottom community, similar to distant reference sites. Almost by definition, any benthic community directly atop a diffuser cap and immediately adjacent to the effluent discharge should be affected by the discharge, if there were any negative effects. The fact that the diffuser community has consistently been similar to distant reference sites indicates that the effluent has had no negative effect on the benthos. MWRA, as part of its Ambient Monitoring Plan, has regularly conducted both soft- and hard-bottom benthic surveys that have shown negligible effects on benthic communities from the discharge. This evidence has been so convincing that the proposed Ambient Monitoring Plan in this Draft Permit does not include benthic monitoring.

Third, throughout the Permit Fact Sheet (and in the reasonable potential calculation, Appendix G), EPA acknowledges that there is "*no reasonable potential to cause or contribute to an excursion of water quality standards (WQS)*" from metals and other organic toxicants measured in the effluent. EPA also acknowledges that "*data collected in 2021 show that contaminant*

⁴ Hunt CD, Mansfield AD, Mickelson MJ, Albro CS, Geyer WR, Roberts PJW. 2010. Plume tracking and dilution of effluent from the Boston sewage outfall. *Marine Environmental Research* (70): 150-161.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 14 of 80

concentrations were considerably less than contingency warning and threshold levels in the majority of the baseline data”, and that the structure and health of benthic and pelagic communities were not affected by the outfall (Fact Sheet pp. 150-164).

Finally, the 2000 permit was issued with an acute permit limit of $LC_{50} \geq 50\%$. At that time, there was considerable uncertainty about the potential environmental effects of the outfall – hence the Ambient Monitoring and Contingency Plans, which have been pared back over the years (and in the case of the Contingency Plan, entirely eliminated in the Draft Permit). In 2023, we know a lot more about the environmental effects of the outfall – which are not a lot, especially when it comes to toxicity in the environment. There is no environmental reason for this tighter limit.

Nonetheless, EPA applies the more stringent LC_{50} in the Draft Permit, stating that WET “testing is conducted to ensure that the additivity, antagonism, synergism and persistence of the pollutants in the discharge do not cause toxicity, even when the pollutants are present at low concentrations in the effluent” (Fact Sheet p 87). The idea is for the EPA to set a conservative (non-time dependent) acute limit.

However, **MWRA requests EPA retain the more appropriate existing permit limit (or consider assigning an intermediate limit between 50% and 100%) for the acute toxicity** for the above organisms because the concentrations of most toxicants have been consistently very low or not detected in the effluent and the environment since the diversion of the outfall to Massachusetts Bay. EPA concludes in the fact sheet to this permit that there is no reasonable potential for water quality excursion in the Bay and rightly removes effluent monitoring and permit limits for these chemicals. Even by applying the conservative dilution factor of 70:1 at the nearfield, the chemicals will be completely dissipated in the water column after mixing. Therefore, the more stringent acute limit in the Draft Permit has no rational basis, given that chemical and biological sampling show no evidence of toxicity and the potential for future water quality excursion and biological toxicity is negligible to none.

Acute toxicity tests have a dilution series consisting of 100, 50, 25, 12.5, 6.25, 0 percent effluent which the test organisms are then exposed to. LC_{50} results between 100% and 50% (or any intermediate value between the dilutions) are dependent on partial mortalities of test organisms in the dilution series and the statistical method chosen to calculate the LC_{50} based on the number of partial mortalities.⁵ Unlike a laboratory analysis for chemical parameters such as nutrients or metals, toxicity testing is depending on the health of the test organisms, which is often is variable. Although there is a test acceptability clause for both the *Mysidopsis* and *Menidia* tests that requires “90% or greater survival of test organisms in control solution”, that does not fully account for the potential hardiness (or lack thereof) of the test organisms. The acute limit of $LC_{50} \geq 50\%$ in the 2000 permit allows for some variability in test organism health with the risk of permit violations. There is no leeway with an LC_{50} permit limit of 100%.

⁵ EPA. October 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organism, 5th ed. EPA 821-R-02-012. https://www.epa.gov/sites/default/files/2015-08/documents/acute-freshwater-and-marine-wet-manual_2002.pdf

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 15 of 80

MWRA has analyzed monthly acute toxicity test data submitted since 2001. While MWRA has never had a violation of the current LC₅₀ permit limit of 50%, there are a number of instances where the calculated LC₅₀ has been above 50% (the current permit limit) but below 100% (the proposed limit in the Draft Permit). These LC₅₀ results of <100% do not align with any known changes in the treatment process or the industrial pretreatment program, or external conditions such as plant flow, so the lower results are most likely the result of test randomness. This is not reasonable when it comes to permit compliance and violation of permit limits.

Reliance on the 1990 MassDEP policy document also raises the questions about the very wide range of dilutions that require the acute toxicity limit to be greater than or equal to 100%. EPA should reconsider this “one size fits all” use of the MassDEP policy. For example, MWRA believes that the current policy of all dischargers with dilution factors of less than or equal to 100 having an acute toxicity limit of greater than or equal to 100% should have more incremental resolution between <10 and 100, perhaps with a Toxic Unit value of 1.5 for dilutions >50:1 and 100:1. This would yield an acute toxicity limit of 66%. As noted above, the document also gives the regulators leeway when the discharge is to certain environments, so the document does not have to be taken literally.

Chronic toxicity

Further, the MassDEP document mentioned above that EPA uses to justify a more conservative LC₅₀ assumes that “chronic toxicity is not a concern in mixing zones because swimming and drifting organisms will not be in the zone long enough for chronic exposure” at the >10-100 dilution range. Yet, EPA proposes chronic testing for the Sea Urchin simply stating that “the Draft Permit maintains the chronic testing and limitation of C-NOEC > 1.5% from the 2000 Permit for Sea Urchin” (Fact Sheet, p 88). **EPA should remove the requirement for chronic toxicity testing, as it is inconsistent with the state policy** cited above as justification for the stringent acute toxicity limit.

Dilution Water for Toxicity Testing with DITP Effluent

(Draft Permit footnotes 17, 18, 19 (p 12); Fact Sheet p. 88; Attachments C and D)

Footnote 19, referring to Attachments C and D states, “*samples shall be taken from the receiving water at a point immediately outside of the permitted discharge’s zone of influence at a reasonably accessible location*”. Moreover, Attachments C and D state that “*samples of receiving water must be collected from a location in the receiving water body immediately upstream of the permitted discharge’s zone of influence at a reasonably accessible location*”.

In the context of Massachusetts Bay, this requirement raises some safety/accessibility concerns. For an offshore discharge this means just outside the outfall mixing zone; for MWRA’s 9.5 mile outfall, it would be a location at least six miles offshore. Weather conditions greatly impact accessibility and such a sampling endeavor can be dangerous, especially during the winter months where storms create hazardous conditions for navigation and staff safety. Even MWRA’s ambient

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 16 of 80

monitoring surveys in the area, using a larger (costly) contracted vessel, are frequently postponed due to weather.

For the reasons stated above, alternate dilution waters have been used in conducting the bioassay test for the Deer Island outfall. For example, Enthalpy Analytical, LLC used seawater collected from the Hampton/Seabrook Estuary (NH), a class SA-1 water that has been used to culture marine test organisms since 1981. Our current contractor, New England Bioassay, Inc. (NEB) uses the following diluents:

- Artificial saltwater for *Americamysis bahia* and *Menidia beryllina*
- Natural seawater (from Narragansett Bay) for *Arbacia punctulata*

In September 2022, in anticipation of a new NPDES permit for DITP, MWRA sent a letter⁶ to EPA requesting permission to use alternate dilution water (ADW) for toxicity testing with DITP's effluent, given the hazard and difficulty to collect water samples in Massachusetts Bay on a regular basis as required by the WET protocol.

MWRA here reiterates this request to use an alternate dilution water while we are waiting for a response from EPA. If permission for using an ADW as diluent is granted, we would also like to clarify that MWRA will separately collect at least three seawater samples for metals and total organic carbon, and submit the results with its next permit application.

I.A.2. Narrative Requirements

(2023 Draft Permit – page 14 of 68)

The Draft Permit's generic prohibitions against violating water quality standards (see Parts I.A.2, I.B.2.a and I.B.2.f (collectively, "Generic Prohibitions") run afoul of the Clean Water Act, the CSO Control Policy (codified at 33 U.S.C. § 1342(q)) and EPA's permitting regulations and guidance. As such, MWRA requests that such provisions be stricken from the Draft Permit. As grounds for its request, MWRA adopts and incorporates by reference into these comments the comments submitted by the MWRA Advisory Board in Section I of their comments dated November 28, 2023, regarding the Generic Prohibitions.

With the potential for substantial civil and criminal penalties and injunctive relief, "[t]he CWA is a potent weapon. It imposes what have been described as 'crushing' consequences 'even for inadvertent violations.'" *Michael Sackett, et ux. v. Environmental Protection Agency et al.*, 598 U.S. 651, 660 (2023), quoting *Army Corps of Engineers v. Hawkes Co.*, [578 U.S. 590, 602](#) (2016) (Kennedy, J. concurring). Therefore, MWRA and the communities must have clear and unequivocal notice of their compliance obligations. Anything short of that will deprive MWRA and the communities of the protections of the permit shield that Congress expressly granted

⁶ September 19, 2022 letter from B. Reilly, MWRA to M. Barden, EPA, re: Renewal of NPDES Permit #: MA0103284, Request for Alternate Dilution Water (ADW) for Whole Effluent Toxicity Tests for the Deer Island Wastewater Treatment Plant

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 17 of 80

permittees under 33 U.S.C. § 1342(k). The Generic Prohibitions fall far short of providing unambiguous notice of the compliance obligations under the Draft Permit. **To preserve the liability protections of the permit shield the Generic Prohibitions should be removed from the Permit.**

I.A.8.a Notice of any new introduction of pollutants

(2023 Draft Permit – page 14 of 68)

Parts I.A.8. and I.G.8. of the Draft Permit both include provisions that require MWRA to provide notice to EPA under certain circumstances, including when new or existing indirect dischargers' (*i.e.*, Industrial Users) pollutant loadings change. A side-by-side comparison of these two Parts, however, suggest a significant level of overlap between the two notice provisions. In particular, Part I.G.8. largely subsumes I.A.8. both in substance and in practical implementation (and includes far more detailed instructions and requirements depending on the circumstances). Moreover, everything in the *NPDES Permit Writer's Manual* suggests that I.A.8. was included as an inadvertent drafting error. For example, while Part I.A.8. of the Draft Permit uses the term "industrial discharger" the *NPDES Permit Writer's Manual* clearly explains that an "...indirect discharger is defined as, 'a nondomestic discharger introducing pollutants to a POTW.'.... The National Pretreatment Program controls industrial and commercial indirect dischargers..." *See, NPDES Permit Writer's Manual*, EPA-833-k-10-001 at section 1.3.4 (September 2010). Finally, as there are enough subtle differences between the two Parts, having both provisions creates unnecessary compliance ambiguities for MWRA, **such that I.A.8. should be removed from the Permit in its entirety.**

See also comments below regarding Part I.G.8. of the Draft Permit, below, wherein Part I.A.8.a. is also discussed.

Comments on Part I.B. COMBINED SEWER OVERFLOWS (CSOs)

I.B.1 List of CSO outfalls

(2023 Draft Permit – page 15 of 68)

Part I.B.1. of the Draft Permit refers to Attachment A as the list of CSO outfalls authorized to discharge under the NPDES. Attachment A, however, includes only the untreated CSO outfalls, and is missing the following five outfalls: (1) MWR201; (2) MWR203; (3) MWR205; (4) MWR205A; and (5) MWR215, which are all associated with treatment facilities. Since requirements derived from the Nine Minimum Controls and (where applicable) CSO water quality standards variances apply to these treated CSO outfalls, **it would be clearer to include all CSO outfalls by inserting the five missing outfalls into Attachment A.** See additional specific comments on Attachment A below.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 18 of 80

I.B.2. General Limitations on effluent

(2023 Draft Permit – page 15 of 68)

There appears to be a typographical error in Part I.B.2.b. of the Draft Permit, wherein the reference to Part I.B.2. should be changed to Part I.B.3., as depicted in the following redline revisions:

....These Nine Minimum Controls and the Nine Minimum Controls Implementation Levels which are detailed further in Part I.B.~~2.3.~~ are requirements of this Permit and include:....

I.B.2.a. & f. Narrative Requirements

(2023 Draft Permit – pages 15-16 of 68)

Please refer to comments above regarding Part I.A.2. of the Draft Permit, which also apply to Parts I.B.2.a. and f.

I.B.2.c.-e. Authorized typical year discharge activations and volumes - Issues Relating to Use of Exhibit B (Attachment I) as “Effluent Limits”

(2023 Draft Permit – page 16 of 68)

EPA should not use Exhibit B to the Second Stipulation as technology-based effluent limitations in Attachment I, but instead should use narrative technology-based effluent limitations relying on the Nine Minimum Controls.

For a variety of reasons, incorporating Exhibit B⁷ to the Second Stipulation (“Exhibit B”) as Attachment I as a stand-in for technology-based effluent limitations (TBELs) is inappropriate, premature, inconsistent with the CSO Control Policy and EPA Guidance, and could create a risk of EPA enforcement action or civil lawsuit despite the completion of the system improvements required by its Long Term Control Plan (LTCP).⁸ Each of these reasons, which are set forth more fully in the sections that follow, justifies removing Attachment I from the permit. Rather than imposing numerical TBELs, EPA should instead employ narrative TBELs requiring MWRA to operate its CSO controls consistent with the Nine Minimum Controls.

⁷ Based on the description in the Draft Permit fact sheet and a review of the Court filings in the Boston Harbor Case, *U.S. v. Metropolitan District Commission et al.*, Civil Action No. 85-0489-RGS, Doc. No. 1636, *Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control* (March 15, 2006) (“Second Stipulation”), Attachment I to the Draft Permit appears to be a document taken from Exhibit B to the Second Stipulation. This document, however, was subsequently amended and superseded through filings with, and ultimately approved by, the Court in April and May 2008. *See*, Doc. Nos. 1691 and 1693 (attached hereto as Attachment 5). Accordingly, Attachment I to the Draft Permit is out-of-date.

⁸ MWRA’s LTCP presently consists of MWRA’s July 31, 1997, *Final Combined Sewer Overflow Facilities Plan and Environmental Impact Report* (1997 Facilities Plan), as modified by the planning documents identified in Exhibit A, to the Second Stipulation, as amended in May 2008.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 19 of 80

This is not a novel concept. To the contrary, EPA has implemented narrative TBELs in NPDES permits for other critical metropolitan wastewater plants. Employing narrative TBELs would acknowledge the successful completion of more than 35⁹ CSO control projects over the past several decades at a combined cost of nearly a billion dollars, which have collectively achieved an overall CSO volume reduction goal of 88% from 1988 levels. Represented in raw numbers, MWRA has reduced the Typical Year system-wide total discharge volume to 396 million gallons (MG), which is 8 MG better than the 404 MG target in its LTCP. Employing narrative TBELs would also require MWRA to operate and maintain its combined sewer system responsibly and in compliance with the Nine Minimum Controls, which are already incorporated into the Draft Permit.

In the alternative, if EPA declines to adopt this reasoned narrative TBEL approach and nevertheless chooses to utilize Exhibit B as numerical limits, the figures in Exhibit B must be adjusted to reflect the most current model outputs. Such modifications to Exhibit B would reflect the technology-based level of control that MWRA *actually achieved* following the completion of the CSO control projects required in the LTCP over the past several decades (and the additional projects it has proposed).

It is axiomatic that the effluent reductions achieved by the construction of the required technologies controls are, by definition, the limits of those technologies. EPA should not hold MWRA to some imprecise and outdated projection developed in 2008, long before the CSO control projects were completed. To do so would be facially at odds with the CSO Control Policy, federal regulations and EPA's own NPDES permit drafting guidance, which uniformly require that TBELs incorporate and utilize all reasonably available current information. EPA should not proceed as though nothing has happened to MWRA's CSOs in the intervening over 15 years since Exhibit B was developed.

Current Status of CSO Outfalls

As a requirement of the Boston Harbor Litigation, on at least an annual basis, MWRA has been fastidiously reporting to the District Court and the parties to the Boston Harbor Litigation on the CSO control efforts of MWRA and others. At the conclusion of 2022, Typical Year discharge activations and volumes were met, or materially met, at 72 of the 86 CSO outfalls included in MWRA's LTCP performance assessment. Among the 72 CSO outfalls are five – BOS013, BOS057, BOS060, MWR203, and CAM007 – where the difference between performance at the end of 2022 (Q4-2022) and the LTCP goal is relatively nominal, and the inability to precisely meet the activation and/or volume goals at these locations is considered immaterial. For the remaining 14 CSO outfalls, there are eight – SOM007A/MWR205A, MWR205, BOS017, CHE008, BOS009, BOS062, BOS065, and BOS070/DBC – where projects forecasted to enable these outfalls to meet or materially meet their respective discharge activations and volumes are in design

⁹ MWRA's LTCP required the completion of 35 projects. Those projects were completed as of December of 2021. In addition, in the Boston Harbor Litigation, MWRA has proposed the completion of other projects by MWRA or other communities.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 20 of 80

or construction. The final six outfalls - SOM001A, CAM005, MWR018, MWR019, MWR020, and MWR201 –are not expected to meet their respective Typical Year discharge activations and/or volumes by the end of 2024.^{10,11} CSO outfalls BOS013, BOS057, BOS060, MWR203, CAM007, SOM007A/MWR205A, MWR205, BOS017, CHE008, BOS009, BOS062, BOS065, BOS070/DBC, SOM001A, CAM005, MWR018, MWR019, MWR020, and MWR201 are collectively referred to herein as the “19 CSO Outfalls.”

It is inappropriate to use the activation and volume figures in Exhibit B as TBELs in the Permit.

There are obvious practical reasons to jettison Exhibit B. Paramount of these is the fact that Exhibit B would impose static, immutable effluent limitations. In effect, the Draft Permit (pp. 15-16) proposes to use Exhibit B as a current TBEL notwithstanding the fact that it includes only *modeled* and *predicted* “Typical Year” activation and volume limits that were based on data that were available in 2008, many years *before* MWRA constructed its suite of court-mandated and EPA-approved CSO control projects. Said differently, Exhibit B was a forward looking prediction based on data, modeling, and expectations that were available at the time.

Indeed, documents dating from the 1980s through 2006 – including contemporaneous documents from the period when Exhibit B was developed – confirm the inherent uncertainty in the activation and volume figures and acknowledged that the figures would need to be modified from time to time to reflect the results of the CSO control technologies that were to be constructed.

As far back as 1987, the parties to the Boston Harbor Litigation acknowledged the forward-looking nature of the technology-based controls that were to be constructed by MWRA. The First Stipulation in the Boston Harbor Litigation confirmed that “[t]he *technology-based level of treatment to be achieved upon completion of the projects for the five CSO project areas* is set forth in the Enforcement Schedule Compliance Letter, which was entered into in conjunction with the issuance of the old permit and which is attached hereto as Exhibit B.”¹² In 1987, the impacts of the yet-to-be constructed CSO controls were just theory. That remained true 10 years later when MWRA, MassDEP and EPA finalized and approved MWRA’s LTCP. The LTCP is replete with equivocation regarding future conditions. In turn, this equivocation, some examples of which are quoted below, established that predictions about activation and volume reductions were simply

¹⁰ See AECOM, 2023. *MWRA Annual Report for Calendar Year 2022 and CSO Discharge Estimates and Rainfall Analyses for Calendar Year 2022*, Table 3-1 (available at <https://www.mwra.com/cso/pcmpa-reports/042823-annualcso.pdf>.)

¹¹ These six outfalls discharge to variance waters. Receiving water modeling demonstrated that the impact to water quality from these outfalls was minimal; compliance with bacteria standards is 97.9-99.9% during the Typical Year when CSOs are the only contributor. The most significant impact to water quality was from stormwater, where modeling showed that standards are met only 47-64% of the time when assessing only stormwater contributions. See Table 3-12 of AECOM. 2021a. *Task 6: Final CSO Post Construction Monitoring Program and Performance Assessment Report*, available at <https://www.mwra.com/cso/pcmpa-reports/Final12302021.pdf>.

¹² *Boston Harbor Case, U.S. v. Metropolitan District Commission et al.*, Civil Action No. 85-0489-RGS, First Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control (February 27, 1987) p. 2 (emphasis supplied).

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 21 of 80

estimates based on modeling and information that the stakeholders had available to them at the time:

- “MWRA completed its CSO conceptual plan in December 1994. This plan recommended varying levels of CSO controls that would address water quality issues in distinct receiving water segments defined in Boston Harbor and its tributaries. The planning process also *included technology-based evaluations that demonstrated that the recommended CSO control alternatives were the best available technology economically achievable (BAT)*... Although the conceptual evaluations had shown that the CSO control goals selected were appropriate and that greater control of CSO discharges would have little, if any, impact on improving water quality or increasing beneficial uses, an optimization analysis was performed for the recommended CSO alternatives to demonstrate that the optimum control would be achieved based on cost/performance evaluations.”¹³
- “As a result of the recommended CSO control improvements, water quality standards *are predicted* to be met greater than 95 percent of the time in all receiving waters assuming other sources of pollution were controlled.”¹⁴
- “The [1994] conceptual plan has undergone more rigorous evaluation and refinement as part of the facilities planning process to produce a long-term CSO control plan that is based on thorough assessment of receiving waters and impacts of CSO discharges, that provides *maximum pollution reduction benefits reasonably attainable*, and that meets water quality standards and protects designated uses.”¹⁵
- “As discussed in response to the federal criteria, *modeling results have demonstrated that CSO discharges will not cause frequent or significant violations of water quality standards*. Considering the impacts from CSO only discharges, the fecal coliform bacteria standards for swimming and boating are predicted to be met greater than 98 percent of the time on an annual basis (Table 7.1-4). *Non-CSO sources are the predominant cause of water quality violations in most receiving water segments.*”¹⁶ This statement remains true today and has been confirmed by recent modeling analysis, which specifically concluded that “[f]or both the Charles River and the Alewife Brook/Upper Mystic River ... [l]oadings due to stormwater and upstream boundaries were the two largest sources of *E. coli* and *Enterococcus* in both the 1-year and 3-month design storms and for the Typical Year.”¹⁷

¹³ 1997 Facilities Plan Vol. I, p. 236 (emphasis supplied).

¹⁴ 1997 Facilities Plan Vol. I, p. 240 (emphasis supplied).

¹⁵ 1997 Facilities Plan Vol. I, p. 284 (emphasis supplied).

¹⁶ 1997 Facilities Plan Vol. I, p. 318 (emphasis supplied).

¹⁷ See AECOM. 2021b. *CSO Post Construction Monitoring and Performance Assessment: Task 5.3 Water Quality Assessment - Revision 1*. Boston: Massachusetts Water Resources Authority. Report 2021-09. 68 p. plus appendices. Available at <http://www.mwra.com/harbor/enquad/pdf/2021-09.pdf>.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 22 of 80

- “MWRA's CSO control plan fulfills the requirements of federal and state CSO policies and complies with water quality regulations. The recommended plan will provide a high level of CSO control to minimize water quality impacts and protect designated water body uses... The recommended plan *will substantially reduce the annual number of CSO activations over future planned conditions*. Compared to future planned conditions, the total annual volume of CSO discharges will be reduced by 57 percent. The annual total volume of untreated CSOs will be reduced by 92 percent. Of the CSO volume remaining after implementation of the recommended plan, 92 percent will receive treatment at MWRA CSO facilities.”¹⁸
- “[Chapter 26 of the LTCP], *which describes the anticipated impacts of the recommended CSO control plan*, is organized by receiving water segment.”¹⁹

Contemporaneous correspondence from MassDEP confirmed that the future effluent reductions that stakeholders anticipated in 1997 would, of course, need to be revised and refined in future years based on new information developed during implementation of MWRA's LTCP. In particular, a 1997 Letter from MassDEP to EPA regarding MassDEP's Use Attainability Analysis (“UAA”) confirmed that MassDEP realized that “during the course of project design there is always the *potential that planning-level delineation will require optimization which might affect, to a limited degree, the nature/extent of activation(s)/discharge(s)....*”²⁰

A March 2006 filing from the Department of Justice (DOJ) in the Boston Harbor Litigation in support of the Second Stipulation confirms that the predicted, modeled activation and volume figures were developed with the express understanding that changes to the modeled outputs would occur periodically to reflect new information. As a result of that filing, the parties modified the activation and volume goals in the LTCP for a specific outfall based on new information gathered in the nine years since the LTCP was finalized. That filing said, in pertinent part:

- “In the 1997 Facilities Plan, MWRA predicted that implementation of the LTCP would, in the typical year, result in 25 CSO activations at the Prison Point facility discharging an estimated 228 million gallons of treated effluent. *Since that time, the MWRA developed a more detailed model of its collection system using more advanced software. The new model predicts that the Prison Point treatment facility will actually discharge 335 million gallons in as many as 30 activations in a typical year. As reflected in Exhibit B to the Second Stipulation, the United States and the MWRA are modifying the LTCP to reflect the volume and frequency now expected at Prison Point following implementation of the LTCP.*”²¹

¹⁸ 1997 Facilities Plan Vol. IV, p. 136 (emphasis supplied).

¹⁹ 1997 Facilities Plan Vol. IV, p. 139 (emphasis supplied).

²⁰ December 31, 1997 Letter from Arleen O'Donnell (MassDEP) to Ron Manfredonia (EPA Region 1), p. 6 (emphasis supplied).

²¹ Memorandum of the United States of America in Support of Joint Motion to Amend Schedule Six with Respect to the Charles River, Alewife Brook and East Boston (March 15, 2006), p. 11 (emphasis supplied).

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 23 of 80

Thus, it was understood that the activation and volume figures in the LTCP (and as later modified in Exhibit B) were modeled predictions that would necessarily change over time during implementation of the LTCP. It would be inappropriate to now incorporate Exhibit B as strict, immutable, and enforceable Permit effluent limits against MWRA.

Including the Exhibit B activation and volume figures as TBELs would upset the parties' agreed upon schedule in the Boston Harbor Litigation and usurp the role of the District Court.

Following MWRA's filing of an Assented to Motion to Amend Schedule Seven in February of 2022, the District Court and the parties agreed that:

“In December of 2024, the MWRA will file a supplemental report that contains: (i) the final Typical Year performance of all 86 outfalls as compared to 1992 system conditions and the LTCP; and (ii) the MWRA's final results and conclusions as to the 16 outfalls, which shall include an alternatives analysis describing what further actions could be taken, and costs associated with those actions, to further reduce or meet LTCP activation and volume goals for any of the 16 outfalls^[22] that have not met their respective LTCP goals. This supplemental report, coupled with the performance assessment report and water quality assessment report filed in December 2021, will provide information to EPA, MassDEP, and the Court to make the final determinations as to attainment of the levels of control in the LTCP and draw any final conclusions.”²³

In other words, all parties and the District Court agreed to a process by which evaluations of the effectiveness of the system improvements would be made at the end of 2024 and any determinations as to what, if anything, else should be done, would not be made until after that date following the filing of a supplemental report by MWRA. The Draft Permit would disrupt and undermine that process. EPA has even recognized the critical role of the District Court process in acknowledging, on page 22 of the Draft Permit, that the activation volumes and frequencies may be “amended by the court,”²⁴ and by reciting, in great detail on pages 107-109 of the Fact Sheet, the history of the “Federal Court-ordered Obligations” applying to CSOs.²⁵ The District Court has recently made clear that it was reserving judgment about what to do with any non-compliant outfalls.²⁶ Including current Exhibit B in an MWRA NPDES permit would upset the agreement of the parties and expectations of the Court.

²² Note that these “16 outfalls” identified in the February 2022 Compliance Order did not include the 5 outfalls for which the difference between Q4-2022 performance and the LTCP goal is relatively nominal, and the inability to precisely meet the activation and/or volume goals at these locations is considered immaterial. *See* 2022 Annual Report at Section 3.1, Table 3-1.

²³ Fact Sheet p. 109, quoting the Schedule Seven Compliance Order Number 250, February 18, 2022.

²⁴ MWRA notes that this page of the Draft Permit refers to the “estimates within the MWRA Final CSO Facilities Plan,” which MWRA assumes to mean the estimated Typical Year activation and volume limits in Exhibit B.

²⁵ Please see comments in Attachment 2 relating to errors in the Fact Sheet concerning the Boston Harbor Litigation.

²⁶ Schedule Seven Compliance Order Number 252, dated May 11, 2023, p. 4. (“Recognizing that the history of this now decades-long project has not been static nor has every insoluble problem encountered over its course remained unsolved, the court will reserve judgment on the problem outfalls until the final milestone is reached. I recognize, as

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 24 of 80

Although MWRA cannot predict what the District Court may do after December of 2024 regarding the 19 CSO Outfalls, EPA's inclusion of the activation and volume goals of Exhibit B as TBELs would moot the carefully negotiated agreement among the parties as to what would happen after MWRA files its compliance report and may result in inconsistent obligations with any future revisions to Exhibit B ordered by the District Court. It would also tie the hands of the parties to the Boston Harbor Litigation and prevent, or at least complicate, any potential agreement regarding the ultimate fate of the 19 CSO Outfalls. The District Court's May 11, 2023 Schedule Seven Compliance Order Number 252 acknowledged what it termed the "incurable outfalls" and reserved judgment on what should be done with them. But, in reserving judgment, the District Court made clear that it would be the final arbiter.²⁷

Significantly, the parties agreed that by the end of 2024, MWRA would complete an "alternatives analysis describing what further actions could be taken, and costs associated with those actions, to further reduce or meet LTCP activation and volume goals for any of the 16 outfalls that have not met their respective LTCP goals."²⁸ However, as written, the Permit would, in effect, require MWRA to immediately design and construct additional CSO control projects necessary to meet the Exhibit B limitations before the Permit takes effect, which it cannot do, regardless of the level of water quality improvement and cost or burden to MWRA and its ratepayers. The only alternative for MWRA would be to accept the risk of an enforcement action or civil lawsuit despite all of the projects in its LTCP having been completed. That is not the collaborative framework on which the parties agreed when approving MWRA's LTCP 26 years ago, and it does not reflect the parties' agreement in the Boston Harbor Litigation.

Including the Exhibit B activation and volume figures as TBELs would contravene the requirement for EPA permit writers to use all reasonably available and relevant data.

Beyond the clear history of Exhibit B, which confirms that it was never intended to be an immutable, numerical TBEL,²⁹ requiring MWRA to comply with the 15 to 26-year-old predictions would also violate federal law and EPA Guidance. More specifically, incorporating Exhibit B without modifying the activation and volume figures to reflect the *actual* technology-based level

the MWRA posits, that there may come a point of diminishing return at which spending an additional \$100 for a \$1 incremental benefit would make no sense from a public policy view. In the words of a distinguished former Justice: "The . . . reason that it matters whether the nation spends too much to buy a little extra safety is that the resources available to combat health risks are not limitless." Stephen Breyer, *Breaking the Vicious Circle: Toward Effective Risk Regulation* 18 (1993)."

²⁷ See note 26, *supra*. See also Fact Sheet p. 109 (noting that "the Court [will] make the final determinations as to attainment of the levels of control in the LTCP and draw any final conclusion.")

²⁸ *Id.*

²⁹ To be clear, the Draft Permit proposes to use the Typical Year activation and volume figures in Exhibit B as TBELs, which are effluent limitations on a point source based on how effectively technology can reduce the pollutant being discharged. See 33 U.S.C. §§ 1311(b), (e), 1314(b); see also *PUD No. 1 of Jefferson Cty. v. Wash. Dep't of Ecology*, 511 U.S. 700, 704 (1994) (holding that, to achieve goals of CWA, EPA is required to "establish and enforce technology-based limitations on individual discharges into the country's navigable waters from point sources").

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 25 of 80

of control that MWRA has achieved over the past 15 years would violate the specific direction that EPA has given its own permit writers.

Regarding TBELs, section 9.2.3 of the NPDES Permit Writers' Manual is unambiguous: "Under the CWA, CSOs must comply with Best Available Technology Economically Achievable (BAT) for nonconventional and toxic pollutants and Best Conventional Technology (BCT) for conventional pollutants. *However, there are no promulgated BAT or BCT limitations in effluent guidelines for CSOs. As a result, permit writers must use BPJ [best professional judgment] in developing technology-based permit requirements for controlling CSOs.*"³⁰ The Permit Writers' Manual then defines best professional judgment as "[t]he method used by permit writers to develop technology-based NPDES permit conditions on a case-by-case basis *using all reasonably available and relevant data.*"³¹ As applied to MWRA's Permit, this directive is clear – the TBELs in the Permit must be based on all reasonably available and relevant data, including any relevant data gathered over the last 15 years. This clear instruction to permit writers finds support in both federal regulations and EPA's CSO Control Policy.³²

The Draft Permit does not explain how Exhibit B reflects "all reasonably available and relevant data." EPA lacks discretion to use stale data in fashioning TBELs when more recent and pertinent data is available. Therefore, EPA should not ignore 15-years' worth of additional modeling and data.

However, that does not mean EPA is without options. To the contrary, there are two clear alternatives that would not only comply with federal law, but also establish enforceable technology-based limits on MWRA in operating its optimized combined sewer system: 1) include narrative TBELs; or 2) modify certain of the activation and volume figures in Exhibit B to reflect the results actually achieved by the technological controls.

³⁰ NPDES Permit Writers' Manual, §9.2.3 (emphasis supplied).

³¹ NPDES Permit Writers' Manual, Exhibit A-2 Glossary (emphasis supplied).

³² See 40 C.F.R. § 125.3 ("(a) General. Technology-based treatment requirements under section 301(b) of the Act represent the minimum level of control that must be imposed in a permit issued under section 402 of the Act. (See §§ 122.41, 122.42 and 122.44 for a discussion of additional or more stringent effluent limitations and conditions.) Permits shall contain the following technology-based treatment requirements in accordance with the following statutory deadlines; ... (2) For dischargers other than POTWs except as provided in § 122.29(d), effluent limitations requiring: (i) The best practicable control technology currently available (BPT)—... (B) For effluent limitations established on a case-by-case basis based on Best Professional Judgment (BPJ) under Section 402(a)(1)(B) of the Act in a permit issued after February 4, 1987, compliance as expeditiously as practicable but in no case later than three years after the date such limitations are established and in no case later than March 31, 1989."); 59 Fed. Reg. 18695 ("All permits for CSOs should require the nine minimum controls as a minimum best available technology economically achievable and best conventional technology (BAT/BCT) established on a best professional judgment (BPJ) basis by the permitting authority (40 CFR 125.3)").

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 26 of 80

Issuing a Permit with which MWRA cannot comply undermines the core purposes of the NPDES program and the Clean Water Act's permit shield.

If Exhibit B were to be included in the final Permit, these 19 CSO Outfalls could subject MWRA and the CSO-responsible Co-permittees to a risk of EPA enforcement action or civil lawsuit despite all of the system improvements required by MWRA's LTCP having been completed. That is not how Congress designed the EPA NPDES program to work. Furthermore, it would be antithetical to the permit shield concept codified in the Clean Water Act (CWA).³³

Congress initially passed the CWA in 1972 to protect the "integrity of the Nation's waters."³⁴ The CWA sought to fix a regulatory framework that relied on states setting "ambient water quality standards specifying the acceptable levels of pollution in a State's interstate navigable waters" and using waters' attainment with those standards as the basis for enforcement against individuals.³⁵ However, that system lacked "standards to govern the conduct of individual polluters" and "proved ineffective."³⁶ Thus, Congress amended the CWA and replaced this ineffective scheme with a requirement that anyone discharging pollutants into navigable waters must obtain a NPDES permit issued by EPA or an authorized state.³⁷ Significantly, rather than rely on standards for receiving waters, these permits must set "effluent limitations."³⁸

In other words, the CWA reflects Congress's considered decision to adopt a permitting system whereby regulators must tell permittees exactly what they must do to protect water quality *before* those discharges occur. Indeed, today, the CWA places the burden on permittees to apply for a permit before discharging and on NPDES permit writers to establish discharger-specific effluent limitations that are sufficiently precise so that permittees can readily determine whether individual discharges are compliant. Here, however, Exhibit B undermines the Congressional intent to give dischargers the opportunity to prevent illegal discharges before they occur; for example, model

³³ See 33 U.S.C. § 1342(k) - **Compliance with permits**. Compliance with a permit issued pursuant to this section shall be deemed compliance, for purposes of sections 309 and 505 [33 USCS §§ 1319, 1365], with sections 301, 302, 306, 307, and 403 [33 USCS §§ 1311, 1312, 1316, 1317, 1343], except any standard imposed under section 307 [33 USCS § 1317] for a toxic pollutant injurious to human health. Until December 31, 1974, in any case where a permit for discharge has been applied for pursuant to this section, but final administrative disposition of such application has not been made, such discharge shall not be a violation of (1) section 301, 306, or 402 of this Act [33 USCS § 1311, 1316, or 1342], or (2) section 13 of the Act of March 3, 1899 [33 USCS § 407], unless the Administrator or other plaintiff proves that final administrative disposition of such application has not been made because of the failure of the applicant to furnish information reasonably required or requested in order to process the application. For the 180-day period beginning on the date of enactment of the Federal Water Pollution Control Act Amendments of 1972 [enacted Oct. 18, 1972], in the case of any point source discharging any pollutant or combination of pollutants immediately prior to such date of enactment which source is not subject to section 13 of the Act of March 3, 1899 [33 USCS § 407], the discharge by such source shall not be a violation of this Act [33 USCS §§ 1251 et seq.] if such a source applies for a permit for discharge pursuant to this section within such 180-day period.

³⁴ 33 U.S.C. § 1251(a).

³⁵ *EPA v. California ex rel. State Water Res. Control Bd.*, 426 U.S. 200, 202 (1976).

³⁶ *Id.* at 202-03.

³⁷ See 33 U.S.C. §§ 1311(a), 1342(a)-(c).

³⁸ 33 U.S.C. § 1362(11).

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 27 of 80

outputs for several of the outfalls predict Typical Year discharges in excess of the Exhibit B limits, a situation which could not be rectified within a reasonable time frame or at any reasonable cost.³⁹

Far from animating the CWA's permit shield provision, EPA's inclusion of Exhibit B as a TBEL in the final Permit could subject MWRA and CSO-responsible Co-permittees to risk of an EPA enforcement action or civil lawsuit, rendering the permit shield illusory. Doing so on the heels of decades of construction and hundreds of millions of ratepayer dollars would be fundamentally at odds with the "certainty" and "finality" that were purportedly the aims of Congress in 1972.⁴⁰ At bottom, EPA must recognize that incorporating Exhibit B into MWRA's Permit as a TBEL would undermine the core policies that breathed life into the NPDES program over 50 years ago.

Including Exhibit B activation and volume figures as TBELs may disincentivize the undertaking of further system improvements in certain circumstances.

As part of its ongoing system improvement analysis and work, MWRA has considered or implemented projects that would significantly reduce CSO activation and/or volume at one or more CSO outfalls, while sometimes yielding small and/or temporary increases in CSO activations and/or volumes at other outfalls. For example, as explained in MWRA's December 23, 2021 submission to EPA and MassDEP,⁴¹ based on preliminary modeling, the Somerville-Marginal New Pipe Connection Project MWRA is undertaking showed significant CSO activations and volume reductions from the Somerville-Marginal Treatment Facility (outfalls SOM007A/MWR205 and MWR205A), but a corresponding modest increase in the volumes of treated CSO discharged at MWRA's Prison Point Treatment Facility (outfall MWR203) and at outfall BOS017 in a Typical Year. However, work anticipated by the City of Somerville, including sewer separation in the Union Square area and activation of the Poplar Street Pump Station to move separated stormwater out of the MWRA interceptor over the next several years is expected to offset a portion, if not all, of this increased CSO volume at the Prison Point facility. Also, system modifications within the BOS017 combined sewer system anticipated by the Boston Water and Sewer Commission is expected to offset the modest discharge increase at BOS017 resulting from the Somerville-Marginal Project. With significant overall CSO activation and volume reductions, and associated environmental benefits, MWRA committed in the Boston Harbor Litigation that it would perform the Somerville-Marginal project.⁴² However, including the Exhibit B activation/volume figures as TBELs may cause MWRA to reconsider projects of this nature in the future, as environmentally beneficial as they may be, for fear of exceeding these limits and

³⁹ See *Natural Resources Defense Council v. EPA*, 808 F.3d 556, 564 (2d Cir. 2015).

⁴⁰ See *E.I. du Pont de Nemours & Co. v. Train*, 430 U.S. 122 (1977) (Permit shield "serves the purpose of giving permits finality.")

⁴¹ *Task 8.4: Somerville-Marginal CSO Facility Evaluation* (December 21, 2021), available at <https://www.mwra.com/cso/variances/122721-somerville.pdf>

⁴² MWRA Annual Report for Calendar Year 2022 available at <https://www.mwra.com/quarterly/bhp/annual/2022.pdf> and AECOM, 2023, CSO Annual Report – January 1 to December 31, 2022: CSO Discharge Estimates and Rainfall Analyses available at <https://www.mwra.com/cso/pempa-reports/042823-annualcso.pdf>

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 28 of 80

being out of compliance with the Permit limitations. At a minimum, the Permit must account for this type of circumstance and include a provision whereby MWRA and the CSO-responsible Co-permittees shall not be in violation of the Permit for any exceedances of the volume and/or activation limits at certain outfalls caused by system changes that reduce the CSO discharges at other outfalls.

The Somerville Marginal New Pipe Connection Project also serves to confirm the inappropriate use of Exhibit B as TBELs and the shortcomings and potential unintended consequences of such an approach. First, the Typical Year volume limitation at the Prison Point outfall (MWR203) and at BOS017 is based on results from a model that will be updated after construction. Thus, past modeling results should not be the basis of TBELs. Second, utilizing the Exhibit B limits for MWR203 and BOS017 conflicts with MWRA's commitment in the Boston Harbor Litigation to perform the Somerville Marginal New Pipe Connection Project. Potential conflicts or inconsistencies with the ongoing Boston Harbor Litigation is justification enough to set aside this approach. And third, but for its commitment in the Boston Harbor Litigation, MWRA would have had significant reservations about performing the Somerville Marginal New Pipe Connection Project because, again, it would result in an expected increase of CSO volume at MWR203 and BOS017, exceeding the fixed effluent limitation proposed. Thus, in some circumstances, Exhibit B could serve as a roadblock for future system improvements. The Somerville-Marginal New Pipe Connection Project highlights why inflexible, rigid effluent limitations as proposed in the Permit's Attachment I are not advisable. MWRA urges EPA to adopt a different approach for TBELs.

EPA should impose narrative TBELs.

EPA should impose narrative TBELs to require that MWRA operate its combined sewer system in compliance with the Nine Minimum Controls ("NMC") prescribed in EPA's CSO Control Policy. A similar approach was employed by EPA in the NPDES Permit for San Francisco's Oceanside Water Pollution Control Plant. That permit is clear: for wet weather, only narrative TBELs apply: "*During wet weather, the Discharger shall comply with the narrative technology-based effluent limitations contained in Provision VI.C.5.a (Nine Minimum Controls).*"^{43, 44} Requiring compliance with the NMC, which already appear as requirements in the Draft Permit, would be consistent with EPA's approach elsewhere and in accord with the CSO Control Policy. It would also be eminently logical here because it would reflect the fact that the technology-based controls prescribed in MWRA's LTCP *have already been constructed*.

⁴³ *Oceanside Permit*, p. 7 (emphasis supplied). See also *id.* at p. F-16 ("During wet weather, the *Combined Sewer Overflow (CSO) Control Policy* establishes the minimum technology-based requirements for combined sewer systems as the implementation of the nine minimum controls based on 40 C.F.R. section 125.3. Provision VI.C.5.a of this Order contains these requirements.") and p. F-17 ("**Combined Sewer System.** The Westside Transport/Storage Structure and combined sewer discharge points discharge only during wet weather. As such, the *Combined Sewer Overflow (CSO) Control Policy* establishes the minimum technology-based requirements for combined sewer systems as the implementation of nine minimum controls based on 40 C.F.R. section 125.3. Provision VI.C.5.a of this Order contains these requirements.")

⁴⁴ We note that, although the Oceanside permit has numerical TBELs for dry weather, none are required here because EPA has specifically prohibited all dry weather discharges from CSOs in the MWRA system.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 29 of 80

Using narrative TBELs is also fundamentally equitable because it would credit MWRA's and the CSO communities' diligence in completing these considerable construction projects over the past several decades. It is self-evident that the technology-based level of control actually achieved through this programmatic CSO control effort is, of course, the limit of the technologies that MWRA constructed. EPA, MassDEP and MWRA no longer need to predict those limits – they are what they are. MWRA should not be required to comply with technology-based limits more stringent than those actually achieved and narrative TBELs would reflect that equitable principle, while still imposing meaningful and measurable requirements.

In the alternative, EPA should modify the activation and volume figures in Attachment I to reflect the technology-based limits actually achieved for the 19 CSO Outfalls (with two exceptions).

If EPA nevertheless desires to use a version of Exhibit B as a stand in for numerical TBELs, then it should modify the Typical Year activation and volume figures for the 19 CSO Outfalls to reflect the current output of the system model. More specifically, EPA should modify these figures to reflect the Q4-2022 Typical Year system conditions, which were included as Table 3-1 of the 2022 CSO Annual Report (Revised May 19, 2023) filed in the Boston Harbor Litigation.⁴⁵ For the reasons set forth above, EPA may not require MWRA to comply with 15-year-old predictions of the limits of control that might be achieved by certain technologies, when those predictions are more stringent than the limits of control that were actually achieved post construction.

The volume figures in Table 3-1 for the 19 CSO Outfalls should also be modified to remove one significant digit after the decimal point, because the additional digit reflects possible false precision and fails to acknowledge the computational variability, unrelated to changes in the physical condition of the system, in MWRA's complex system model. MWRA recommends rounding (either up or down, as is customary) to the 100,000 gallons, which is reflected in Table 1 included below:

Table 1. 19 CSO Outfalls Typical Year Activation Frequencies and Volumes (as rounded),
Based on Q4-2022 Conditions (except MWR203 and BOS017)

	Activation Frequency	Volume (MG)
BOS013	8	0.3
BOS057	2	0.6
BOS060	2	0.4
MWR203	N/A*	N/A*
CAM007	2	0.5

⁴⁵ AECOM, 2023, CSO Annual Report – January 1 to December 31, 2022: CSO Discharge Estimates and Rainfall Analyses <https://www.mwra.com/cso/pcmpa-reports/042823-annualcso.pdf>

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 30 of 80

	Activation Frequency	Volume (MG)
SOM007A/MWR205A	5	4.5
MWR205	30	100.4
BOS017	6	0.5**
CHE008	6	1.9
BOS009	10	0.7
BOS062	5	1.2
BOS065	1	0.5
BOS070/DBC	7	4.9
SOM001A	8	4.5
CAM005	8	0.8
MWR018	2	0.4
MWR019	2	0.2
MWR020	2	0.1
MWR201	2	7.8

*Activation Frequency and Volume will not be established until such time as all work impacting the activation frequency and volume at Prison Point MWR203 is complete.

**It is expected that volume discharge from BOS017 will increase to 0.5 MG as a result of the Somerville Marginal pipeline improvements but decrease after certain improvement work upstream of BOS017 is performed.

In connection with the Boston Harbor Litigation, MWRA is performing the Somerville Marginal New Pipe Connection Project that is expected to greatly reduce CSO discharges from SOM007A/MWR205 and MWR205A but temporarily increase CSO discharges from the Prison Point outfall, MWR203, and from outfall BOS017 at a level exceeding the Q4-2022 Typical Year model output and Exhibit B LTCP Typical Year goal.⁴⁶ To reconcile this conflict, a limitation should not be applicable to the Prison Point outfall (MWR203) until all the system improvements that effect performance at this outfall are complete. With respect to BOS017, the volume limit should reflect the Q4-2022 model prediction plus the nominal increase expected with the Somerville New Pipe Connection Project.⁴⁷ Moreover, performing system improvements under the Boston Harbor Litigation should not be a trigger for Permit violations.

⁴⁶ MWRA evaluated alternatives for system improvements for the Somerville-Marginal CSO Facility. It ultimately selected "Option 2" - constructing a new connection from a 42-inch storm drain to the Somerville-Medford Branch Sewer. Preliminary modeling showed an expected Typical Year 9.9MG increase in volume at Prison Point MWR203 (263.6 versus 253.66). *See supra*, footnote 41, at Table 4-3. Utilizing the Q4-2022 model output would result in expected Typical Year volume at the Prison Point MWR203 outfall of 254.9. The same modeling analysis shows a 0.11 MG increase in volume at BOS017. Utilizing the Q4-2022 model output would result in expected Typical Year volume at BOS017 outfall of 0.5.

⁴⁷ MWRA continues to track Somerville's Union Square, Poplar St. Pump Station project that is expected to offset a portion, if not all, of the expected increased CSO volume at Prison Point. Also, work by Boston Water and Sewer Commission is expected to offset a portion, if not all, of the increase at BOS017.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 31 of 80

Critically, modifying the activation and volume figures in Attachment I for the 19 CSO Outfalls would not violate EPA's anti-backsliding rules for NPDES permits, which restrict the relaxation of final effluent limitations and the relaxation of standards or conditions contained in existing permits.⁴⁸ That is because: 1) Exhibit B has never been incorporated into any prior MWRA NPDES permit; and 2) as explained in previous sections, the activation and volume figures in Exhibit B are not "limits" in any sense of the word, but rather modeled, typical year predictions made 15 to 26 years ago.⁴⁹

In addition, if EPA is going to reject MWRA's request that Exhibit B not be included as effluent limitations, in order to preserve the integrity of the judicial process and avoid placing MWRA in an untenable position, the Permit must, at a minimum, include provisions: 1) acknowledging that compliance for the 19 CSO Outfalls should not be measured until after the District Court makes its decision following the December 2024 supplemental report; and 2) automatically incorporating into the Permit any future changes to Exhibit B ordered by the District Court.

Finally, as EPA is well aware, MWRA's model is subject to periodic refinements, corrections and recalibrations that produce different model outputs without any actual change to discharge activation and volume. As such, if EPA includes numerical limits in Attachment I, it must include a provision that MWRA and the CSO-responsible Co-permittees shall not be in violation of the Permit for any exceedances of the volume and/or activation limits caused by model refinements, corrections or recalibrations (unrelated to changes to physical conditions of the system).

⁴⁸ 40 C.F.R. 122.44(l)(1).

⁴⁹ However, even if modifications to Exhibit B were to trigger the anti-backsliding rule, there are three exceptions to that rule, at least one of which would apply here. In particular, the exception at 40 C.F.R. 122.44(l)(2)(i)(B)(1) would permit the proposed changes to be made. It allows a relaxation in the stringency of effluent limits when "[i]nformation is available which was not available at the time of permit issuance (other than revised regulations, guidance, or test methods) and which would have justified the application of a less stringent effluent limitation at the time of permit issuance." Over the past 15 years, MWRA has gathered a wealth of data about the physical features of its combined sewer system [see, e.g., section 10.3.1 of AECOM. 2021b. *CSO Post Construction Monitoring and Performance Assessment: Task 5.3 Water Quality Assessment - Revision 1*. Boston: Massachusetts Water Resources Authority. Report 2021-09. 68 p. plus appendices. <http://www.mwra.com/harbor/enquad/pdf/2021-09.pdf>], which, had such data been available in 2008, it would have been incorporated into MWRA's model and resulted in changes to Typical Year activation and volume figures for the 19 CSO Outfalls. In other words, the new data that has been used to recalibrate MWRA's CSO model – as reflected most recently in the Q4-2022 Typical Year model run – reflects the institutional learning developed over the past 15 years and would have justified less stringent effluent limitations in 2008. This change in the model to reflect real-world conditions that were unknown in 2008 would bring the proposed changes to Exhibit B squarely within the scope of this exception. To be clear, recalibrating or updating the MWRA model to reflect new information about MWRA's combined sewer system is not a "change in test method," and, therefore the exclusion to the anti-backsliding exception in 40 C.F.R. 122.44(l)(2)(i)(B)(1) does not apply.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 32 of 80

I.B.2.d. and e.: Variances – Issues Relating to the Incorporation of Current Variances as Attachments J and K.

(2023 Draft Permit – page 16 of 68)

EPA should include unequivocal language in the Permit confirming that compliance with the conditions in the variances for the Charles River Basin (Attachment J) and Alewife Brook/Mystic River Basin (Attachment K) means that MWRA and/or CSO-responsible Co-permittees are in compliance with the Permit as it relates to the CSO discharges into and water quality standards for those receiving waters.

EPA should include the following language as the final sentence in sections I.B.2.d. and I.B.2.e. (both appearing on page p. 16 of the Draft Permit):

“Provided that MWRA and/or CSO-responsible Co-permittees are in compliance with the conditions of the variance from water quality standards (as it may be extended, amended, or replaced), or any subsequently issued variance for the same receiving waters, MWRA and CSO responsible Co-permittees shall be deemed to be in compliance with all aspects of the Permit relating to the CSO discharges and deviations from water quality standards for those CSO outfalls that discharge to such waters.”

Although sections I.B.2.d. and I.B.2.e. acknowledge the existence of the Charles River and Alewife Brook/Mystic River Basin variances and declare that those variances are “incorporated into and are enforceable elements of this Permit,” they do not specifically address the compliance obligations of the Permit related to the variances. The above-described changes to sections I.B.2.d. and I.B.2.e. are consistent with the approach in the Draft Permit section I.B.2.f and consistent with the concepts of certainty and finality embodied in the CWA’s permit shield provision.⁵⁰ Thus, the final Permit must make clear that MWRA’s compliance with the variance conditions shall be deemed compliance with the Permit. Accordingly, MWRA requests adding the above-described, unambiguous language to make clear that compliance with the variances in Attachments J and K (as they may be amended or updated), or any subsequently issued variance for the same receiving waters, means compliance with the Permit with respect to CSO discharges and any deviations from water quality standards. This streamlined approach would be far less burdensome than requiring MWRA to seek a future Permit modification to account for new variances.

EPA should revise Attachment A in order to make clear which CSO outfalls are subject to the variances.

In addition, corrections are needed in Attachment A of the Draft Permit, in order to make clear which CSO outfalls are subject to the Variances. See further comments on Attachment A, below.

⁵⁰ 33 U.S.C § 1342(k).

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 33 of 80

I.B.3. Nine Minimum Controls Implementation Levels

(2023 Draft Permit – page 16 of 68)

In Part I.B.3. of the Draft Permit, there are certain obligations and deliverables assigned to MWRA and the “CSO-responsible Co-permittees,” including the Boston Water & Sewer Commission (BWSC), as well as the cities of Cambridge, Chelsea, and Somerville regarding the CSO Nine Minimum Controls. It is unclear in this Part of the Draft Permit, however, whether MWRA and *each* CSO-responsible Co-permittee is individually responsible for the requirements for its own permitted CSO outfalls. For example, this Part of the Draft Permit includes the following requirement: “[w]ithin 1 year of the effective date of the Permit, the Permittee and CSO-responsible Co-permittees shall submit to EPA and MassDEP through NetDMR an updated NMC program.” The MWRA believes that EPA intends for *each* entity to individually submit an updated NMC program for their respective CSO outfalls. Consistent with this assumption, **EPA should further clarify the deliverables language in this Part of the Draft Permit by inserting the word “each” into the various deliverables in order to accurately assign the responsibilities** (*i.e.*, “...the Permittee and CSO-responsible Co-permittees...” would be replaced with “...the Permittee and **each** CSO-responsible Co-permittee...”).

I.B.3.j. Signage

(2023 Draft Permit – page 18 of 68)

MWRA requests that EPA provide the “universal wet weather sewage symbol” to be included on the signs at the CSO outfalls.

I.B.3.m. Public Notification Plan

(2023 Draft Permit – page 20 of 68)

Part I.B.3.m. of the Draft Permit states the Permittee and CSO-responsible Co-permittees must implement their preliminary and final CSO Public Notification Plans as approved by MassDEP. MWRA appreciates that the CSO Public Notification requirement in Part I.B.3.m. of the Draft Permit cites 314 CMR 16.00. MWRA and CSO-responsible Co-permittees have put forth considerable effort and resources toward developing public notification programs in accordance with 314 CMR 16.00, and this language will ensure consistency with requirements for public notification.

Nevertheless, **MWRA recommends that EPA update this Part by striking the word “preliminary,” because the final CSO Notification Plans, with any revisions required by MassDEP, supersede the preliminary CSO Public Notification Plans.**

I.B.5 Nine Minimum Controls Reporting Requirement

(2023 Draft Permit – pages 20-22 of 68)

Notwithstanding comments made above on Section I.B.2.c.-e., MWRA provides comments on Part I.B.5. of the Draft Permit, which, while stylized as reporting requirements regarding the NMC,

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 34 of 80

the requirements are broader CSO-related annual reporting requirements (*e.g.*, activation frequency and discharge volumes, compilation of sampling data, annual precipitation data, *etc.*). Accordingly, the Part should be retitled. Further, some of the language in this Part, which appears to be carried forward from the previous NPDES permits for MWRA or for the CSO-responsible Co-permittees, is largely outdated. For example, “future planned conditions” is not a clearly defined term, and in any event all of the CSO control projects in the Final CSO Facilities Plan were complete by December 2015.

Moreover, consistent with prior comments made above, this Part should also make clear, that reporting requirements under the NPDES permit apply to MWRA and to each CSO-responsible Co-permittee, for only those CSOs for which they are the “Responsible Permittee or Co-permittee” listed in Attachment A. For example, **Part I.B.5.b. should be revised as follows:**

- b. Activation frequency and discharge volumes for each CSO outfall **for which they are the “Permittee or CSO-responsible Co-permittee”** listed on **Attachment A** during the previous calendar year. For each day of an MWRA CSO discharge event, the MWRA Report shall include the daily flow at DITP and note whether there was a bypass of secondary treatment, and the volume bypassed.

MWRA also recommends reorganizing Parts I.B.5.d. and I.B.5.f. to more clearly distinguish rainfall analysis and other reporting related to precipitation, from reporting on estimated CSO discharges for the prior year. In previous annual CSO reports submitted by MWRA, the rainfall analysis section usually included all rainfall analysis results, including total rainfall, peak and average intensities, storm recurrence intervals, and comparison to the Typical Year.

MWRA suggests the following language modifications to Parts I.B.5.d. and I.B.5.f. in order to clarify these Parts and to align them with existing requirements in the Federal Court Order and CSO Variances:

- d. **Analysis of** precipitation during the previous year ~~for each day~~, including total rainfall, peak intensity, and average intensity, **at rain gauges representative of CSO tributary areas.**
 - (1) **A comparison between the precipitation for the previous year and the precipitation in the typical year under future planned conditions used in the MWRA Final CSO Facilities Plan or “Notice of Project Change” document, or subsequent document, whichever is appropriate. This comparison shall include the number of events and size of events (including recurrence interval).**

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 35 of 80

- (2) **For each storm resulting in CSO event discharges from an outfall for which they are the “Responsible Permittee or Co-permittee” listed on Attachment A, an estimate of the recurrence interval of the storm event, using the rainfall data collected and the information included in the NOAA Atlas 14, or other technical reference for defining storm event recurrence.**
- e. Status of the implementation of CSO outfall abatement work for which the Permittee or **each** CSO-responsible Co-permittees is directly responsible in accordance with the MWRA Final CSO Facilities Plan, the Federal Court Order, as amended and any related subsequent documents and the requirements of a CSO Variance. The authorized Typical Year CSO discharge activations and volumes can be found in **Attachment I**.
- f. For the outfalls **for which they are the Permittee or CSO-responsible Co-permittee** listed in **Attachment A**, provide the following information in the Annual Report for year 3 and every two years thereafter using **for comparison** the updated MWRA model [**MWRA, 2021. Task 6: Final CSO Post Construction Monitoring Program and Performance Assessment Report**] (or equivalent) ~~for comparison~~:

 - ~~(1) A comparison between the precipitation for the previous year and the precipitation in the typical year under future planned conditions used in the MWRA Final CSO Facilities Plan or “Notice of Project Change” document, or subsequent document, whichever is appropriate. This comparison shall include the number of events and size of events (including recurrence interval).~~
 - (1) i. For each CSO outfall **for which they are the Permittee or CSO-responsible Co-permittee**, a comparison between the activation volume and frequency for the previous year and the volume and frequency expected **during a for the Typical Year rainfall under future planned conditions.**

 - ~~ii. For each CSO event, an estimate of the recurrence interval of the storm event, using the rainfall data collected and the information included in the NOAA Atlas 14, or other technical reference for defining storm event recurrence.~~

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 36 of 80

- (2) **iii.** An evaluation of whether the CSO outfall activation volumes and frequencies for the previous year, **for outfalls for which they are the Permittee or CSO-responsible Co-permittee**, are in accordance with the estimates in the MWRA Final CSO Facilities Plan or as amended by the Court, given the precipitation which occurred during the year, and the CSO outfall abatement activities which have been implemented. Where CSO outfall discharges are determined to be greater than the activation frequency or volume in either document above, the Permittee or CSO- responsible Co-permittees shall include their assessment of such result, a discussion of remaining CSO outfall abatement activities and an assessment of the impact of those projects on attaining the level of CSO outfall control identified in the relevant document, or any amendments thereto.

I.B.7 CSO Effluent Limitations for CSO Treatment Facilities

I.B.7.b CSO Effluent Limits

(2023 Draft Permit – page 24 of 68)

Effluent Characteristic Sampling - Somerville Marginal Relief MWR205A

(2023 Draft Permit – page 24 & 28 of 68)

(2023 Draft Permit Fact Sheet – page 118 of 195)

The Draft Permit requires monitoring of MWRA’s treated CSO effluent, including at outfalls MWR205 and MWR205A. The Somerville Marginal CSO treatment facility primarily discharges at outfall MWR205, below the Amelia Earhart Dam into the Mystic River. Outfall MWR205A is a side-outlet relief outfall off outfall MWR205, discharging downstream of the Somerville Marginal Facility and upstream of the Amelia Earhart Dam. This outfall can activate and discharge treated flow during storm events when high tides restrict the discharge from outfall MWR205. A simple diagram of the treatment facility and outfalls is included as Figure 1.

The volume discharged at MWR205A is a fraction of the flow treated at the Somerville Marginal facility. As seen in Figure 1 below, it also includes separate stormwater that enters the Somerville Marginal Conduit downstream of the CSO treatment facility. Under the MWRA’s existing NPDES permit, flow data (peak flow rate and total volume) reported from the Somerville Marginal CSO treatment facility are combined for outfalls MWR205 and MWR205A and reported under MWR205. Activations are reported separately on the individual discharge monitoring reports (DMRs) for each outfall. MWRA requests that EPA continue to allow MWRA to report combined flow data for MWR205 and MWR205A, on the MWR205 DMR.

Some of the monitoring requirements in this Part of the Draft Permit are duplicative, as the sampling locations for MWR205 and MWR205A are the same, representing effluent from the treatment facility (Figure 1). The same event composite samples can be used to satisfy permit requirements for both outfalls, as is the current practice under MWRA’s existing NPDES permit.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 37 of 80

EPA acknowledges this in the Fact Sheet (Section 5.7.1.4.1) stating, “[e]ffluent data is not currently required for discharges from MWR205A as it is only used when MWR205 is unavailable due to tidal conditions.” EPA further indicates this in Footnote 28 observing, “[a]t least one of the sampled events shall include a period of discharge from MWR205A.” **MWRA requests that EPA continue to approve MWRA reporting of event composite data (biochemical oxygen demand and total suspended solids) collected from the Somerville Marginal Facility, both for MWR205, and for MWR205A when tidal conditions restrict discharge of the treated CSO effluent from MWR205.**



Figure 1. Diagram showing the Somerville Marginal CSO Treatment Facility and outfalls MWR205 and SOM007A/MWR205A.

*Effluent Characteristic Sampling - Chlorine Residual Limits
(2023 Draft Permit – page 24 of 68)*

MWRA notes that some of the monthly average limits for total residual chlorine (TRC) are lower than the minimum level for the most sensitive EPA-approved Part 136 method. As such, **MWRA**

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 38 of 80

requests that EPA add a statement regarding TRC that “For any permit limits below 20 µg/L, the compliance level for TRC is 20 µg/L” to ensure that values reported as “< ML” will not be flagged as a permit violation if the ML is greater than the Permit limit, so long as the method was sufficiently sensitive (*i.e.*, the “compliance level” for TRC should be set to 20 µg/L, subject to adjustment if a new method with a lower ML is approved by EPA).

Effluent Characteristic Sampling - Measurement Frequency
(2023 Draft Permit – page 28-29 of 68)

According to Part I.B.7.b. of the Draft Permit, MWRA is required to collect conventional samples at its CSO treatment facilities four times per year. Footnote 28 in that same section, however, states that “[s]ampling shall be concentrated during the ‘critical’ use periods.” Critical use periods are defined as March 1 – April 30 (one sampling event), May 1 – August 31 (two sampling events), and September 1 – October 31 (one sampling event). MWRA is not aware of any seasonal variation in CSO effluent quality, and therefore recommends that limiting the sampling period be removed from the Permit. There is no explanation in the Fact Sheet of how critical use periods were defined, or why samples collected in November-February would be considered less representative.

Sampling CSO facilities during storm events, especially those that activate infrequently or only briefly, is complex and requires full-time, experienced staff in multiple departments working together. The schedule in the Draft Permit limits the amount of time to capture storm events to only eight months of the year. Furthermore, two sampling events are required in the summer, which tends to be the driest season. Obtaining samples from CSO facilities is a challenge to plan, schedule, and align resources; weather forecasts support these planning activities, but highly localized weather events makes such planning difficult. Because of the success of the CSO control program in reducing overflows, discharges may be of short duration, further hindering ability to collect samples. Adding restrictions on the time of sampling is overly complicated, and unnecessarily increases the risk of unintentional and unavoidable noncompliance. For these reasons, **MWRA requests that the seasonal restriction on sampling CSOs for conventional pollutants be removed from the Permit.**

If the seasonal sampling requirement is retained, MWRA requests clarification of how this should be implemented, as it is unclear what happens if one or more CSO treatment facilities do not activate during a critical use period. MWRA asks for the same clarity regarding WET testing at the CSO treatment facilities. Part I.B.7.b. of the Draft Permit requires MWRA to conduct WET testing two times per year, but Footnotes 31 and 33 state that acute toxicity testing should be conducted once from April 1 – June 30 and once from July 1 – September 30. As for conventional samples, MWRA is not aware of any seasonal variation in CSO effluent toxicity, and therefore recommends that this date restriction on sampling be removed from the Permit. Furthermore, there is no explanation as to why EPA identified calendar Quarters two and three for WET testing rather than the critical use periods sampled for other effluent characteristics (March-April, May-August, September-October). In addition, MWRA points out that should a re-test be required, the first available opportunity may fall outside the designated quarter. It is unclear how this would be

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 39 of 80

categorized, and could lead to an unintentional violation. As with conventional sampling targeted periods, **MWRA requests this requirement be removed from the Permit.**

Finally, in the table of effluent characteristic sampling, at the top of page 26, the second column is labeled “monthly average” and the table requires MWRA to “Report” the monthly average LC50. This appears to be a typographical error because with two sampling events per year, in different seasons, reporting the monthly average would be redundant with reporting the daily maximum value. Note that, MWRA’s existing NPDES permit does not require reporting of monthly average LC50. **MWRA requests EPA to correct this error in the Permit.**

Effluent Characteristic Sampling - Dilution water for WET tests (Footnotes 32 and 34)
(2023 Draft Permit – page 29 of 68)

The Draft Permit requires MWRA to follow WET testing protocols, which are Attachments to the Draft Permit. In addition, Footnote 32 states:

If toxicity test(s) using the receiving water as diluent show the receiving water to be toxic or unreliable, the Permittee shall follow procedures outlined in **Attachment E**, Section IV., DILUTION WATER. Minimum levels and test methods are specified in **Attachment E**, Part VI. CHEMICAL ANALYSIS.

Footnote 34 explains:

If toxicity test(s) using the receiving water as diluent show the receiving water to be toxic or unreliable, the Permittee shall follow procedures outlined in **Attachment C**, Section IV., DILUTION WATER. Minimum levels and test methods are specified in **Attachment C**, Part VI. CHEMICAL ANALYSIS.

Draft Permit Attachment E, the freshwater acute toxicity protocol, states that a grab sample of dilution water shall be collected from the receiving water at a “point immediately upstream of the permitted discharge’s zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist.” Draft Permit Attachment C, the marine acute toxicity protocol, says the same.

Attachments E and C require that “*samples of receiving water must be collected from a location in the receiving water body immediately upstream of the permitted discharge’s zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist*”. All of the CSO outfall receiving waters are located in large urban areas and receive stormwater from different point and non-point sources (such as parking lots, garages, etc). These episodic events carry heavy loads of organic and inorganic pollutants to the water, some of which (e.g., PAHs and PCBs) may persist in the water column and the sediments for a long period of time. It

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 40 of 80

is not possible for MWRA to ensure that samples of receiving water be collected outside of the area of influence of those sources.

Outfalls MWR203, MWR205, and MWR215 do not have upstream locations. Outfall MWR215 discharges into a large combined sewer system some distance from the eventual discharge into Fort Point Channel. Outfalls MWR203 and MWR205 discharge at dams and there is no marine water upstream. Sampling locations even some distance away in Boston Inner Harbor are likely to be impacted by road runoff and storm sewers, as well as by untreated discharges from other combined sewer overflows.

For the freshwater outfalls, there is no suitable upstream location at the remaining outfalls, MWR201 and MWR205A that is free from road runoff, storm sewers and/or stagnant conditions. Since the issuance of MWRA's existing NPDES permit in 2000, lab water synthesized according to EPA's guidance^{51,52} has been used as toxic-free dilution water for the WET tests.

Therefore, MWRA requests that EPA authorize the continuous use of lab water as alternate dilution water for the marine and freshwater CSO outfalls. If required, MWRA can submit a request letter to this effect to the email address provided in attachments C and E.

As an additional comment on these footnotes, there appear to be typographical errors in Footnotes 32 and 34. **Specifically, the references to Part I.B.6. should be to Part I.B.7. in both footnotes.**

Effluent Characteristic Sampling - Chronic toxicity (marine outfalls) (Footnote 33)
(2023 Draft Permit – page 29 of 68)

MWRA notes that there is an apparent typographical error in Footnote 33, perhaps from copying the marine toxicity Footnote 17 from Part I.A.1. The table of b. CSO Effluent Limits includes acute toxicity tests (LC₅₀) only, as chronic toxicity is not relevant to short-term discharges from treated CSO outfalls. **Therefore, the footnote should not include mention of a chronic toxicity test, as depicted in the following redline revisions:**

33. The Permittee shall conduct acute toxicity tests (LC₅₀) two times per year, once in Quarter 2 (April 1 - June 30), and once in Quarter 3 (July 1 - Sep 30). The LC₅₀ is defined in Part II.E. of this Permit. The Permittee shall perform an acute toxicity test using the Inland Silverside (*Menidia beryllina*) and Mysid Shrimp (*Mysidopsis bahia*) in accordance with test procedures and protocols specified in **Attachment C** of this Permit. ~~The Permittee shall perform a chronic toxicity test using the 1-hour fertilization test with the Sea Urchin (*Arbacia punctulata*) in accordance with test procedures and protocols specified in Attachment D of this Permit.~~ Toxicity test

⁵¹ USEPA. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms Fourth Edition. October 2002.

⁵² USEPA. Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms. Third Edition. October 2002

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 41 of 80

samples shall be collected during the first flush or as a composite over the duration of the overflow, not to exceed 24 hours.

Chronic toxicity testing for CSO outfalls would be contrary to current practice. Moreover, it is unlikely that relatively brief discharges from treated CSO outfalls will chronically effect aquatic organisms. Further, MWRA notes that there is no mention of chronic toxicity in section 5.7.1.9 of the Fact Sheet. Accordingly, MWRA believes that the statement is a typographical error and perhaps a carryover from Part I.A.1. (footnote 17) of the Draft Permit. In either event, the language should be removed from Part I.B.7.b. (footnote 33) of the Permit.

Comments on Part I.C. UNAUTHORIZED DISCHARGES

I.C.2 Unauthorized discharge – public notifications

(2023 Draft Permit – page 30 of 68)

MWRA agrees that public notification of sanitary sewer overflows (SSOs) is important; however, these reporting requirements should be consistent with recently implemented Massachusetts regulation 314 CMR 16.00.

The reason why this is important is that MassDEP has made clear in 314 CMR 16.00, and an accompanying flowchart of events requiring notification⁵³, that the primary driver of public notification of SSOs is if they reach a surface water. This is also the stated purpose of Chapter 322 of the Acts of 2020, *An Act Promoting Awareness Of Sewage Pollution In Public Waters*, now codified at M.G.L. c. 21, Section 43A (“Notification Act”), which is “to authorize forthwith certain requirements and procedures to notify the public of sewage discharges into the waters of the Commonwealth,” so the public may know to avoid recreating in or contact with that water. Public notification of an SSO that does not reach a surface water is inconsistent with the Notification Act and MassDEP’s regulations, 314 CMR 16.03(1), and will likely lead to public confusion.

The required public notifications are generally consistent with requirements permittees must already meet under the state regulation, 314 CMR 16.00, however, **MWRA requests that EPA further align Part I.B.2 with 314 CMR 16.00, as follows:**

The Permittee must provide notification to the public within 24 hours of becoming aware of any unauthorized discharge, except SSOs that do not impact a surface water ~~or the~~ **public**, on a publicly available website, and it shall remain on the website for a minimum of 12 months.

⁵³ <https://www.mass.gov/doc/reportable-events-flowchart/download>

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 42 of 80

I.C.4. Bypassing of wastewater flows is not authorized.

(2023 Draft Permit – page 30 of 68)

As detailed above in the comments on Part I.A.1, “Content of Footnote Six”, **MWRA requests that the Permit explicitly state that bypassing secondary treatment for flows in excess of the 700 MGD process limit is not an unauthorized bypass.**

Comments on Part I.E. OPERATION AND MAINTENANCE OF THE TREATMENT AND CONTROL FACILITIES

I.E.1.a Wastewater Treatment Facility (WWTF) Major Storm and Flood Events Major Storm and Flood Events Plan and I.E.2.e.(2) Sewer System Flood Events Plan

(2023 Draft Permit – page 31-44 of 68)

MWRA, like most major utilities, considers natural disasters and other emergencies as part of routine facility planning. MWRA believes a critical part of these planning efforts is adapting to the impacts of climate change, such as installing flood protection measures at its facilities that are vulnerable to sea level rise. However, as detailed below, the requirements included in both the WWTF Major Storm and Flood Events Plan and the Sewer System Major Storm and Flood Events Plan are onerous and go beyond what is needed for useful, pragmatic planning for climate change. Any new requirements should encourage and support thoughtful development of locally relevant plans for each Co-permittee, rather than requiring a hasty, expensive, “one size fits all” approach.

The Draft Permit Fact Sheet section 5.6 on Operation and Maintenance notes that

The requirements of 40 CFR § 122.41(d) impose a ‘duty to mitigate,’ which requires the permittee to “take all reasonable steps to minimize or prevent any discharge in violation of the permit that has a reasonable likelihood of adversely affecting human health or the environment.”

MWRA asserts that the steps EPA has required in Part I.E.1.a and I.E.2.e.(2) are *not* reasonable. Moreover, EPA has not explained wherefrom it derives the authority to require extensive planning for extreme events. In addition, the requirements are unduly burdensome, raise serious security concerns, and represent an expensive, unfunded mandate. Finally, the requirements are also confusing, inflexible, and not consistent with EPA guidance. An alternative approach similar to emergency planning for drinking water systems in the American Water Infrastructure Act of 2018 (AWIA) would be more appropriate.

The requirements for the major storm plans are unduly burdensome and have unreasonable timelines

The Wastewater Treatment Facility Major Storm and Flood Events and the Sewer System Major Storm and Flood Events plan both include requirements for MWRA and its Co-permittees to assess asset vulnerabilities and systemic asset vulnerabilities, develop comprehensive mitigation

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 43 of 80

alternatives analysis and schedule, and begin implementation of these measures within 12 months of the Permit being finalized. The proposed impractical and unreasonable schedule would place serious burdens on MWRA and its communities, forcing other critical projects to be postponed.

In addition to the time required to complete the plan, Co-permittees will need time to obtain funding – which may take a year, even assuming rapid approval by Town Meeting or City Council – and then procurement of the professional services would add several more months. **If the requirement is retained, a minimum of 36 months should be provided (24 months for the asset vulnerability evaluation and another 12 months for the mitigation alternatives analysis) to complete the *Wastewater Treatment Facility Major Storm and Flood Events Plan* and the *Sewer System Major Storm and Flood Events Plan*. Additional time will be required to implement a plan.**

The proposed permit language represent an unfunded mandate

Unfortunately, since the requirement has been inserted into a Draft Permit rather than promulgated as a regulation, EPA has not had to calculate the financial burden of the Major Storm and Flood Events Plan on permittees. MWRA strongly urges EPA to make this calculation, and publish it for public comment. As written, the development of the plan would require hundreds of staff hours – thousands, in the case of a large or complex system – and is likely to have significant cost implications.

MWRA and the Co-permittees do not have the expertise or resources to develop the extensive resiliency planning required in the constricted schedule provided. Compliance will require procuring professional engineering services, at a significant cost, and the number of available firms with expertise in climate change planning is limited.

The costs associated with developing such an extensive plan could result in deferring important projects with more immediate needs. For larger municipalities, these costs may be absorbed, but for smaller ones the development of a plan on this scale and in the proposed timeframe could have immediate impacts on a Co-permittee's ability to fund other projects. Any rate impacts will be felt by the most vulnerable populations served by MWRA or any Co-permittees. Since about 60% of MWRA's service area comprises Environmental Justice communities, this is of particular concern.

The requirements are confusing, inflexible, and not consistent with EPA guidance

Wastewater utilities and public works departments consider natural disasters and other emergencies as part of routine facilities planning. Using local expertise, plans are tailored to the particular circumstances of their municipality and region. The requirement in the Draft Permit is a “one size fits all” approach that will result in wasted resources.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 44 of 80

EPA cites flood resiliency guidance⁵⁴ and risk assessment tools in its Creating Resilient Water Utilities program⁵⁵. The guidance documents cited are significantly narrower and better defined, than the conditions included in the Draft Permit. They also consider a more reasonable shorter planning horizon, which would allow for a more realistic capital planning process.

The language of the requirements is also confusing. In one of the many footnotes, EPA directs permittees to use "...at a minimum, the worst-case data..." This makes little sense; the same footnote requires using a variety of climate projection sources, which very likely conflict (particularly for more distant dates) and are subject to change over time. The same footnote requires "Evaluation must be completed by a qualified person..." without defining the required qualifications.

There is a requirement to revise plans "...as data sources used for such evaluations are revised or generated..." This is beyond the control of the permittee, and could result in perpetual and costly re-evaluations.

Requiring a permitting horizon of 40 years and beyond is unreasonable; there is too much uncertainty in climate predictions to adequately assess risk and propose mitigation measures in longer time frames. NPDES permits are five year permits; the Draft Permit requires an entity to plan out 80-100 years. Meanwhile, the life expectancy of many wastewater assets is closer to 20 years. Accordingly, this exercise is misplaced as part of a 5-year permit.

Additionally, the requirement to develop a flood events plan and mitigation measures for 80-100 years in the future ignores that adaptation planning for the extremes of climate change possible in 2100 and beyond requires iterative collaboration between the surrounding municipalities. The decisions a permittee makes to protect against extreme sea level rise, for example, are directly related to the measures taken by the entire region. A facility might be protected from rising waters, but if the adjacent communities fail to build adaptive infrastructure, the areas outside the facility would be flooded, making it inaccessible. While facility-specific mitigation measures like flood barriers are pragmatic for mid-term planning, long-term planning requires a region-wide approach, which goes beyond the scope of this permit.

Annual reporting, besides being subject to the same security concerns mentioned below in comments on Part I.E.d.2, is excessive for long-term planning. If progress reporting is required, a five-year cycle seems more appropriate.

For all these reasons, MWRA requests that Sections I.E.1.a WWTF Major Storm and Flood Events Major Storm and Flood Events Plan and I.E.2.e.(2) Sewer System Flood Events Plan be removed from the Permit.

⁵⁴ https://www.epa.gov/sites/default/files/2015-08/documents/flood_resilience_guide.pdf

⁵⁵ <https://www.epa.gov/crwu>

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 45 of 80

MWRA recommends that EPA, before including such language in a permit, provide the MWRA, Co-permittees, and the public a formal cost-benefit analysis and calculate the cost burden of the Major Storm and Flood Events Plan. Permittees and the public need the opportunity to weigh the net environmental and public health benefits of an onerous climate planning mandate versus the benefits that will be deferred or delayed for other water quality improvement projects.

Examples of more appropriate regulatory approaches

Examples of a less prescriptive, more effective approach are available, such as:

- State Revolving Fund loans require utilities to develop an asset management program.
- AWIA Risk and Resilience Assessments and ERPs are kept on file at the utilities to protect security-sensitive information that could be exposed if plans are submitted to EPA.
- Community water systems may use any standards, methods or tools, provided that risk and resilience assessment and emergency response plans fully address AWIA requirements.

Rather than require the same onerous procedures for all municipalities as part of a NPDES permit, EPA should work collaboratively with those permittees whose systems are at highest risk from flooding under present and future climate conditions.

Comments on “Adaptation Plan” included in recent final Permits

MWRA appreciates many of EPA’s changes to the Operation and Maintenance section of the recently issued final NPDES Permits for Northampton, Hoosac, Montague, and other Massachusetts communities. It’s clear that many of the comments EPA received regarding substantial concerns with the requirements of the Major Storm and Flood Events Plan were taken into consideration and resulted in a much improved Adaptation Plan. Several of the improvements directly respond to MWRA’s comments above. For example, MWRA appreciates that the Adaptation Plan schedule allows for longer time periods, has more reasonable assessments, removes unclear terms such as “at a minimum, worst–case data”, and “qualified person”, shortened climate change planning horizons, and has provided guidance materials.

But even these modified requirements represent an overreach of EPA authority. While EPA has authority under the CWA over the “discharge of a pollutant” by “any person” from any “point source” to a “navigable water”, the Adaptation Plan requirements go well beyond these criteria. **These Adaptation Plan requirements should be removed from the Permit. Furthermore, these requirements have not undergone a public comment period, and if included in the Final Permit, must be re-noticed.**

If EPA still adds these requirements, MWRA requests the five year limit on applicability of prior assessments be dropped. Placing the arbitrary condition of not being able to apply prior assessments completed more than five years before the effective date to satisfying the requirements of the Adaptation Plan disregards critical work. As described in our comments on the draft Deer

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 46 of 80

Island permit, MWRA has been proactive in making our facilities resilient to the impact of climate change and should not be penalized for completing some assessments more than five years ago.

MWRA assessed each of its coastal and near-coastal facilities to determine if the facility would be flooded in a 100-year storm (based on FEMA maps) with 2.5 feet of sea level risk, corresponding to roughly a 2050 to 2060 sea level rise benchmark. The result was a ranking of 16 facilities that could be impaired, most of which are part of the wastewater system. MWRA has installed flood protection measures at most facilities and is completing work at the remaining facilities – including walls around critical equipment, stop logs at windows and doors, and elevating critical equipment in facilities undergoing substantial rehabilitation projects. Although the assumption of 2.5 feet of sea level rise was determined several years ago, this is still in line with the latest projections in Massachusetts’ Coastal Flood Risk Model and the Greater Boston Research Advisory Group Report⁵⁶ through the middle of the century – significantly mitigating the near- and mid-term risk to MWRA’s infrastructure. MWRA should be able to use these assessments, which still align with the latest projections to comply with the relevant requirements of the Adaptation Plan.

MWRA further adopts and incorporates by reference into these comments the comments on the Adaptation Plan submitted by the MWRA Advisory Board in Section VI of their comments dated November 28, 2023.

I.E.2. Sewer System

(2023 Draft Permit – page 35 of 68)

The initial paragraphs of this section should also mention Parts B, I.4, and K.3 of this permit, as shown below:

Operation and maintenance (O&M) of the sewer system owned and operated, respectively, by the Permittee, CSO-responsible Co-permittees: Boston Water and Sewer Commission (BWSC), City of Cambridge, City of Chelsea and City of Somerville; and each of the Co-permittee municipalities listed in **Attachment B** shall be in compliance with the terms and conditions of **Part B**, Part C, Part D, Part E, Part F, **Part I.4, and** Part J, **and Part K.3** of this Permit and the General Requirements of Part II, of this Permit for only its own infrastructure, activities and required reporting with respect to the portions of the collection system that it owns or operates.

No Permittee shall be responsible for violations of **Part B**, Part C, Part D, Part E, Part F, **Part I.4, and** Part J, **and Part K.3** of this Permit and/or the General Requirements of Part II committed by another Permittee relative to the portions of the collection system owned and operated by such other Permittee. In the event of any conflict between the above provisions and any other term or provision of this Permit, the above provisions

⁵⁶ Douglas E. and Kirshen, P. 2022. *Climate Change Impacts and Projections for the Greater Boston Area: Findings of the Greater Boston Research Advisory Group Report*. Boston: University of Massachusetts, Boston, June 2022.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 47 of 80

shall control. The Permittee and Co-permittees are required to complete the following activities for the respective portions of the collection system which they operate:

I.E.2.c Infiltration/Inflow

I.E.2.c.(1) Control of I/I

(2023 Draft Permit – page 36 of 68)

MWRA is committed to a continuing effort to work with our communities to reduce infiltration/inflow (I/I) in MWRA and community sewer systems. Through June 2023, the MWRA has distributed \$532 million in grants and interest-free loans to fund 664 I/I identification & rehabilitation projects within the 43 sewer member communities through the I/I Local Financial Assistance Program. Since 1993, a total of \$861 million in grant and loan funds has been authorized by the Board and allocated to member sewer communities through the Program's 14 funding phases.

As required by the 2000 NPDES Permit conditions, MWRA I/I reduction plan and program summaries are currently provided to EPA / MassDEP every September as part of MWRA's Annual I/I Reduction Report. Typically, MWRA provides: (1) an overview of I/I identification/rehabilitation work performed by MWRA Field Operations Department's Technical Inspection Program. Program work includes internal inspection of MWRA-owned interceptor and inverted siphon barrels and physical inspection of sewer manholes and tidegates. I/I sources and structural defects are noted in the MWRA maintenance database and scheduled for prompt repair; (2) a summary overview of the MWRA's annual sewer manhole rehabilitation contract; and (3) a status summary of MWRA's Interceptor Renewal/Asset Protection Program. This Program includes a series of twelve interceptor renewal projects to be completed over multiple years. Each project will provide structural repairs for existing pipelines and reduce I/I entering the MWRA interceptor system.

I.E.2.c.(2) I/I Reduction Plan

(2023 Draft Permit – page 36 of 68)

Significant progress has been made on I/I reduction and SSO mitigation. MWRA will continue its aggressive I/I reduction and SSO mitigation efforts under the current plan. There has been significant progress under the current plan, and MWRA agrees that there are a number of elements that have been substantially completed and should be revised or removed during a plan update. However, the 12-month time frame outlined in the Draft Permit is inadequate to appropriately research, revise and document any useful changes in our approach. **MWRA believes that making any effective plan updates that usefully consider newer technologies and strategies will require a time frame of 18 to 24 months.**

MWRA believes that the language in Part I.E.2.c.(2) does not adequately delineate MWRA vs Co-permittee obligations as they pertain to updating the 2002 Regional I/I Reduction Plan. **If EPA chooses to keep the Co-permittee language in the final Permit, the Permit language must clearly delineate which planning, implementation and reporting obligations are MWRA's**

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 48 of 80

and which are those of the Co-permittees. There cannot be ambiguous or overlapping responsibilities in a legally binding permit.

I.E.2.c.(3) Annual I/I Reduction Report and I.E.4.(f) Annual Reporting Requirement
(2023 Draft Permit – page 37 of 68)

Under the existing 2000 NPDES Permit, MWRA is responsible for reporting on I/I control actions that sewer member communities had undertaken during the previous FY. If EPA chooses to include the Co-permittee requirements in the final Permit, **the final Permit must make it clear that MWRA will be relieved of this community reporting task (as Co-permittees, member communities would be now be self-reporting their own activities). The final Permit should clearly delineate reporting responsibilities, avoiding duplicative efforts, and providing clarity on binding obligations.**

I.E.2.d. Sewer System Mapping
(2023 Draft Permit – page 38 of 68)

I.E.d.2 Security Concerns related to Sewer System Mapping

MWRA is pleased that EPA improved the language regarding sewer system mapping compared to previously issued draft NPDES permits for Holyoke and other municipalities. As mentioned in MWRA’s comments on Holyoke’s draft NPDES permit, **MWRA strongly opposes making sewer system maps available online due to serious security concerns.** Publishing such sensitive information online puts MWRA’s critical infrastructure at greater risk of attacks by malicious actors.

Although the current language is an improvement, it is vague and remains a security concern: the map “shall be kept up-to-date and available for review by federal, state, or local agencies upon request.” The frequency of updates is not specified and it implies that MWRA would have to provide the map to any public agency upon request. This is clearly preferable to the maps being public, but making them available to any public entity that asks would risk them being shared too widely. **MWRA requests that EPA alter the language to specify that federal, state, and local agencies would only be able to review sewer maps at MWRA locations.** This is in line with the American Water Infrastructure Act, in which utilities do not have to submit risk assessments and emergency response plans to EPA, but rather certify that they were developed and made available to review in person. Additionally, in the past EPA recognized the security issues associated with sensitive documents and took the added step of destroying or returning these types of files, such as the Vulnerability Assessments required under the Bioterrorism Act.

I.E.2.e. Sewer System O&M Plan
(2023 Draft Permit – page 38 of 68)

See comments above on “Part I.E.1.a WWTF Major Storm and Flood Events Major Storm and Flood Events Plan and Part I.E.2.e.(2) Sewer System Flood Events Plan.” As detailed in those

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 49 of 80

comments, **the requirements for the Sewer System Major Storm and Flood Events Plan exceed EPA’s statutory authority, are vague, unreasonable, and onerous, mandate unfeasible deadlines, and are financially burdensome.**

Comments on Part I.G. INDUSTRIAL USERS AND PRETREATMENT PROGRAM

I.G.2. Compliance Reports.

(2023 Draft Permit – page 45 of 68)

This section requires that “original” Baseline Monitoring Reports and 90-day Compliance Reports received by MWRA are to be sent to EPA. In order to maintain the integrity of the Permit record, MWRA must keep the original documents on file. **MWRA requests that EPA allow the Industrial User filing the Baseline Monitoring Report or 90-day Compliance report to submit a “copy” to EPA and MassDEP.** That would allow MWRA to add the requirement to the Sewer Use Discharge Permit, making this a permit requirement and enforceable.

I.G.4. and I.G.10. Industrial dischargers to be sampled for PFAS

(2023 Draft Permit – pages 46 and 52 of 68)

Parts I.G.4. and I.G.10. of the Draft Permit each requires MWRA to annually sample several types of industrial discharges (*e.g.*, commercial car washes, platers/metal finishers, *etc.*) for PFAS. The list of the types of discharges also includes “known or suspected PFAS contaminated sites” and “any other known or expected sources of PFAS.” These broad categories set a near-impossible and inappropriate standard for any pretreatment program and, in any event, are likely duplicative of hazardous waste investigations and sampling performed by or under the requirements established by MassDEP pursuant to the Massachusetts Contingency Plan, 310 CMR 40.000 *et seq.*, and M.G.L. c. 21E. **Accordingly, these categories should be removed from the Permit.**

Moreover, given the large service area at issue, some of these categories such as Commercial Car Washes may have hundreds of sites to be sampled. Accordingly, at a minimum, **MWRA requests that EPA reduce the annual sampling requirement to biennial and thereafter remove the annual or biennial requirement for known or suspected sources that are proven not to have PFAS after the first round of sampling.**

Further, please see the comment below on Part I.G.9. regarding the annual report covering a fiscal year. **MWRA requests that EPA align the required PFAS sampling with the MWRA fiscal year.**

Finally, Parts I.G.4. and I.G.10. are largely identical, except that Part G.4 requires the sampling information be reported “as an electronic attachment to the March discharge monitoring report due April 15 of the calendar year following the testing,” while Part G.10 requires that the information be “included in the annual report.” In light of this duplication, coupled with EPA’s Industrial Users and Pretreatment Program conditions in other recent publicly owned treatment works NPDES

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 50 of 80

permits, such as the Town of Montague NPDES Permit No. MA0100137, the Town of Amherst NPDES Permit No. MA0100218, and Hoosac Water Quality District NPDES Permit No. MA010051 (which require one but not both types of PFAS sampling information submittals), **MWRA believes either Part I.G.4. or Part I.G.10. of the Draft Permit was inserted in error and Part I.G.4. should be removed.** This will also clarify that the results are to be submitted in October.

I.G.6.i. Pretreatment Enforcement

(2023 Draft Permit – page 49 of 68)

Part I.G.6.i. of the Draft Permit sets certain pretreatment enforcement obligations for the MWRA, including the requirement to “...enforce all applicable Pretreatment Standards and requirements and obtain remedies for noncompliance by any industrial user.” As EPA is aware, the MWRA has a long history of successfully enforcing its pretreatment program consistent with the terms of its EPA-approved enforcement response plan and the terms of its existing NPDES permit. For example, in Part I.15.a.iii. of MWRA’s existing NPDES permit “...MWRA shall perform the following activities in implementing and operating its industrial pretreatment program:...obtain *appropriate* remedies for noncompliance by any industrial user with any pretreatment standard and/or requirement...[emphasis added].” **In order to help maintain this success, as well as ensure consistency with the terms of the existing NPDES Permit, MWRA requests that the word “appropriate” be added to the referenced clause in Part I.G.6.i., as follows:**

“...enforce all applicable Pretreatment Standards and requirements and obtain **appropriate** remedies for noncompliance by any industrial user”

I.G.7.b. Local Limit Development

(2023 Draft Permit – page 49 of 68)

Part I.G.7. of the Draft Permit requires the development of a technical evaluation of the MWRA’s current local limits to determine whether or not any specific limits need to be revised within 90 days of the final Permit’s issuance date. In the Metropolitan Sewerage Service Area, there are approximately 2273 permitted Industrial Users, of which 181 are Significant Industrial Users (SIUs). In order to adequately conduct a reevaluation of the current local limits for the Metropolitan Sewerage Service Area, MWRA believes more time is warranted, as was allowed in the prior permit. **Accordingly, MWRA requests that this time be increased to 180 days due to the complexity of Deer Island’s operations and the extensive Pretreatment Program covering the Metropolitan Sewerage Service Area.**

I.G.8. (and I.A.8.) Notification Requirements

(2023 Draft Permit – page 50 of 68)

As noted above in comments on Part I.A.8., there is a significant level of overlap, but some subtle inconsistencies, between the notice provisions. Part I.G.8. largely subsumes I.A.8. both in substance and in practical implementation (and includes far more detailed instructions and

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 51 of 80

requirements depending on the circumstances). Therefore, since having both provisions creates unnecessary compliance ambiguities for MWRA, **Part I.A.8. should be removed from the Permit in its entirety.**

Part I.G.8. of the Draft Permit, however, is also not completely clear, as currently written. For example, sub-Part (a) requires MWRA to notify EPA within 60 days of the introduction of new pollutants from any industrial user. If the issuance of a permit to a new company is considered the introduction of new pollutants, reporting will be extremely frequent and perhaps not in accordance with EPA's intent. For reference, in FY 2023, MWRA issued over 175 new permits, most of which were for "Category 10s" (low flow and low pollutant) and "Category D1s" (dental discharges) as defined in 360 CMR 10.101(2)(g). This would not include the number of permitted industries that change the processes to include a new pollutant. **MWRA requests that the language in sub-Part (a) which requires MWRA to notify EPA within 60 days of the introduction of new pollutants from any industrial user to be rephrased to "MWRA shall notify EPA within 60 days of the introduction of new pollutants from any new SIUs, new connections at a permitted SIU, or any amendment to an existing SIU permit. All other new permits will be reported in the annual pretreatment report."**

I.G.9. (and I.J.3.) Annual Report Requirements

(2023 Draft Permit – page 51 of 68)

Part I.G.9. of the Draft Permit requires the pretreatment annual report to cover a calendar year and to be submitted by March 31. The Fact Sheet lists the due date for the same report as October 31. For 20 years, MWRA has submitted its industrial pretreatment report, which covers two NPDES permits (MA0103284 and MAG590033) on a fiscal year basis (July-June) due October 31. Changing the due date for one of the permits requires the two permits to be tracked, administered and reported differently, requiring two Annual Reports. MWRA's Pretreatment Information Management System (PIMS) is set up for fiscal year reporting. The EPA monitoring plan and associated annual fees are based on fiscal year calculating and reporting.

MWRA requests the deadline be changed to October 31 rather than 60 days after the reporting period for completion of the annual report in order to provide sufficient time to verify data reports and allow MWRA to report the two permits together. Accordingly, **MWRA requests the following redline changes to the last paragraph of Part I.G.9.:**

The Permittee shall provide EPA with an annual report describing the Permittee's pretreatment program activities ~~for the twelve (12) month period ending 60 days prior to the due date in accordance with required by~~ 40 CFR § 403.12(i) **by October 31st of each year for the reporting period of July 1 – June 30.** The annual report shall be consistent with the format described in Attachment G (NPDES Permit Requirement for Industrial Pretreatment Annual Report) of this Permit ~~and shall be submitted by March 31st of each year.~~

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 52 of 80

Next, MWRA notes that Attachment G to the Draft Permit includes new substantive reporting requirements regarding items to be included in the Pretreatment Annual Report. Items two, five, and six of Attachment G all require a more granular detail and summary information concerning MWRA's pretreatment compliance and enforcement activities on an annual basis. MWRA does not object to these enhanced reporting requirements and is proactively taking steps to comply with these provisions, but they will require changes to MWRA electronic systems and business practices. Since this is an annual reporting requirement, however, the issuance date and any modified conditions in any final NPDES permit will affect MWRA's ability to comply on a retroactive basis. For example, if a final NPDES permit issues in January 2024, this is already six months into MWRA's annual reporting cycle. Accordingly, MWRA is requesting certain revisions to Attachment G to accommodate this timing and other concerns.

Finally, under Parts I.G.9. and I.J.3., MWRA notes that beginning on December 21, 2025, all annual reports submitted in compliance with this section must be submitted electronically by the POTW Pretreatment Program to EPA or initial recipient, as defined in 40 CFR § 127.2(b). Electronic submittals shall be in compliance with this section and 40 CFR Part 3 (including, in all cases, subpart D to Part 3), 40 CFR § 122.22(e), and 40 CFR Part 127 (Part 127 is not intended to undo existing requirements for electronic reporting). Prior to this date, and independent of 40 CFR Part 127, EPA may also require POTW Pretreatment Programs to electronically submit annual reports under this section if specified by a particular permit or if required to do so by state law.

Consistent with comments submitted on December 10, 2013 RE: Docket ID No. EPA-HQ-OECA-2009-0274, MWRA anticipates significant staff time and resources will need to go into developing the reporting requirements to fit the Annual Report electronic submittal fields and/or requirements. As such, **EPA should share the format of the electronic report by December 15, 2024, or one year prior to implementation.**

See also comments on Attachment G, below.

Comments on Part I.I. SPECIAL CONDITIONS

I.I.2. Pollution Prevention Plan

(2023 Draft Permit – page 54 of 68)

MWRA agrees with updating the Household Hazardous Waste (HHW) brochure to address current issues related to pharmaceuticals and personal care products, PFAS, and microplastics. MWRA also recognizes that outreach to residents is an important element of pollution prevention. Rather than making a hard-copy booklet, which is expensive and resource-intensive to produce, MWRA recommends this information be provided primarily on-line, including as a printable version. **MWRA requests the following revision to Part I.I.2.a:**

- a. The Permittee, MWRA, shall update ~~and continue to make available~~ their Household Hazardous Waste (HHW) ~~brochure booklet in both hard copy~~ **and continue to make it available** on-line **including in a printable** formats.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 53 of 80

The updates should include information on the sources and proper disposal of Pharmaceuticals and Personal Care Products (PPCPs), PFAS, and microplastics. MWRA shall make this information available on their website **and in hard copy, upon request, to all the sewer member communities.**

I.I.3. Outfall BMP

(2023 Draft Permit – page 54 of 68)

The Draft Permit requires outfall inspection by diver or remote-operated submersible. Doing this is labor intensive, expensive, and provides little value. MWRA's in-plant monitoring (required by I.I.3.e) can detect, via changes in the head height in the outfall drop shaft, if there are any changes in outfall operation that would be indicative of the intrusion of salt water or damage to the outfall or risers. A set of algorithms built into the Process Instrumentation and Control System tracks this on a real time basis, calculating theoretical outfall head based on flow and sea level. A dedicated tide height sensor at Deer Island collects continuous sea level measurements, and the system continuously compares theoretical to actual. Except during rough weather or in rare instances of seawater intrusion in the outfall, the anomaly is small. Thus any damage or occlusion could readily be detected by the ongoing remote monitoring, and inspection by a diver or remotely operated submersible is not necessary. Furthermore, the outfall was designed with the possibility that there could be growth/blockage at the discharge ports or other issues. There are currently 271 open ports, and 424 total ports available, should adjustments be required. However, flow monitoring continues to demonstrate no issues within the outfall tunnel or diffusers. The Fact Sheet does not provide any justification for this requirement, and **MWRA requests that I.I.3.b be modified to require inspection only if the in-plant monitoring of the flow versus hydraulic head relationship indicates a problem.** If an inspection is still required by the Permit, additional time is requested to design an appropriate inspection program and procure services (36 months).

I.I.4. DMF notification

(2023 Draft Permit – page 55 of 68)

MWRA notes that as this section requires that notification of certain conditions be sent to the Massachusetts Division of Marine Fisheries within 24 hours, it is not practical to require the notification to be sent to a postal address. **MWRA requests that an email address be provided in place of the postal address listed, and that email notification be permitted as an alternative to telephone notification.**

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 54 of 80

MWRA proposes the following revision:

...The notification shall be sent to the following **electronic** mailing addresses and telephone number:

Division of Marine Fisheries
Shellfish Management Program
30 Emerson Avenue
Gloucester, MA 01930
shellfish.gloucester@mass.gov
shellfish.newbedford@mass.gov
(978) 282-0308
(978) 491-6244

I.I.6. Ambient Monitoring Plan

(2023 Draft Permit – page 55 of 68)

MWRA has conducted an extensive ambient monitoring program in Massachusetts Bay since 1992. The current Deer Island NPDES Permit, issued in 2000, incorporated this monitoring, as the Ambient Monitoring Plan, or AMP. Based on the expertise developed over these decades of monitoring, MWRA has the following comments on the Ambient Monitoring Plan requirement in the Draft Permit.

In 1990, the National Research Council (NRC) published a report entitled *Managing Troubled Waters*.⁵⁷ NRC intended the report to improve the effectiveness of marine monitoring programs by studying how to best design monitoring programs to meaningfully support environmental decision-making. *Managing Troubled Waters* has been the definitive reference for design of marine environmental monitoring programs for thirty years, and the current MWRA program followed the recommendations in the report.

The primary NRC recommendation was that the goals and objectives of the monitoring program be clearly articulated using questions that were meaningful to the public. These questions would provide the basis for the design of the monitoring program. Also, the program should be sufficiently flexible to be modified based on new information. NRC also recommended that data analysis and interpretation, as well as data management, be part of the program design.

MWRA's ambient monitoring program was designed around these principles, and has proven to be very successful in providing relevant data and in addressing the 33 monitoring questions that were adopted when developing the monitoring plan. MWRA appreciates that EPA has eliminated the benthic, as well as the fish and shellfish, monitoring sections of the plan as those questions

⁵⁷ National Research Council. 1990. *Managing Troubled Waters: The Role of Marine Monitoring*. Washington, DC: National Academy Press. 125 pp.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 55 of 80

have all been answered.⁵⁸ Although the Contingency Plan is separate from the AMP in the current permit, the two are closely related, and MWRA appreciates EPA's removal of the Contingency Plan in the Draft Permit.

While the continuation of the water column monitoring is easily understood because of the older monitoring questions, the addition of Harmful Algal Bloom (HAB) and nuisance algae monitoring is not consistent with the NRC design principles summarized above. The Fact Sheet says "The AMP requirements has [*sic*] been revised to focus on the potential for nutrient-related impacts with regard to biological and oceanographic regime change in Massachusetts Bay" with a footnote to an EPA technical memorandum.^{59, 60} Review of this technical memorandum does not provide any specific, targeted monitoring questions or any guidance for monitoring program design besides a few suggested guiding principles. MWRA was unaware of this document until the publication of the Draft Permit, which suggests it did not undergo any outside peer review.

While MWRA appreciates EPA's desire to collect more information on HABs and nuisance algae species in Massachusetts Bay, in the absence of a proven outfall effect on these species, MWRA believes these specific monitoring activities should not be part of MWRA's NPDES permit or Ambient Monitoring Plan. Questions about HABs and nuisance algae species should be under the purview of a regional authority, perhaps the "Massachusetts Bay Science Advisory Board" mentioned in the Fact Sheet,⁶¹ or at least aligned with the Massachusetts Division of Marine Fisheries program, the organization responsible for such monitoring.

MWRA requests that EPA reconsider the new HAB and nuisance algae requirements and use the NRC recommendations to guide their approach. If EPA does not remove the new HAB and nuisance algae monitoring requirements from the Permit, MWRA provides recommended modifications below.

Schedule for revising Ambient Monitoring Plan

The Draft Permit requires that "Within 30 days of the effective date of the Permit, the Permittee shall submit a revised Ambient Monitoring Plan to EPA and MassDEP."

MWRA requests 180 days to submit the new Ambient Monitoring Plan (AMP) to EPA and MassDEP. MWRA appreciates that the revised AMP can be based on the current AMP, Revision

⁵⁸ MWRA. 2019. *Ambient Monitoring Plan and Contingency Plan for the Massachusetts Bay Outfall: Monitoring Questions Status and 2000-2018 Threshold Test Results*. Boston: Massachusetts Water Resources Authority. Report 2019-03. 36 p. <http://www.mwra.com/harbor/enquad/pdf/2019-03.pdf>

⁵⁹ EPA. 2023. MWRA Draft Permit fact sheet, page 167. <https://www3.epa.gov/region1/npdes/mwra/pdf/2023/mwra-2023-fact-sheet.pdf>

⁶⁰ Hagi, J., Gleason, T., Oczkowski, A., Tatters, A. and Wan, Y. 2022a. *Technical Memorandum: Recommendations to adapt Ambient Monitoring and Contingency Thresholds to monitor potential ecological risks to Massachusetts Bay resulting from the Deer Island Discharge*. EPA, Washington, DC, EPA/600/R-22/064.

https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=355408&Lab=CEMM

⁶¹ EPA, 2023. Draft Permit fact sheet, p. 168.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 56 of 80

2.1,⁶² but believes that with the additional water column monitoring, and especially the new harmful algal bloom and nuisance algae requirements more time will be needed to develop the new AMP.

I.I.6.c. Table 1: Water Column Survey Schedule

(2023 Draft Permit – page 56 of 68)

MWRA requests a change in Table 1, Water Column Survey Schedule. MWRA requests that the September survey be moved to week 38; assessment of the data collected for over 20 years demonstrates the original two-week gap between mid-August and September does not provide any useful differentiation in data. This adjustment would result in more consistent spacing between surveys through the full calendar year and ease logistical challenges in the current schedule. Per the current AMP, Revision 2.1, one intention of the September survey is to capture water column characteristics “prior to overturn” of the water column. Since mixing has typically been observed after mid-October, moving the September survey to week 38 remains in line with the intentions of the AMP.

I.I.6.d. Monitoring Stations

(2023 Draft Permit – page 56 of 68)

MWRA requests clarifications and modifications to the tables and associated text regarding the monitoring as described in the following sections.

Part I.I.6(d) says “The Plan shall include the existing eleven (11) monitoring stations in Massachusetts Bay: F22, N04, N01, N21, N18, N07, F23, F15, F13, F10, and F06 and the existing three (3) monitoring stations in Cape Cod Bay: F29, F02 and F01.”

MWRA would like to clarify that the eleven monitoring stations in Massachusetts Bay are administratively distinct from the three monitoring stations in Cape Cod Bay. Unless the Cape Cod Bay/CCS sampling locations are specifically called out in the comments below, a sampling “station” or “location” refers only to the eleven MWRA Massachusetts Bay locations, and not the Cape Cod Bay/CCS locations.

Scientifically, there is ample evidence that the outfall does not impact water quality in Cape Cod Bay, offshore, or in Stellwagen Bank National Marine Sanctuary, but monitoring has continued at these three Cape Cod Bay locations due to the sensitivity of these environments. An MWRA consultant samples Massachusetts Bay stations while the Center for Coastal Studies (CCS; Provincetown, MA) samples the Cape Cod Bay stations under a cost-share agreement with MWRA. CCS does not necessarily have the same resources as MWRA for sample collection and analysis, and MWRA is appreciative that Tables 2 and 3 in this section of the Draft Permit mostly reflect that.

⁶² MWRA. 2021. *Ambient monitoring plan for the Massachusetts Water Resources Authority effluent outfall revision 2.1*. Boston: Massachusetts Water Resources Authority. Report 2021-08. 107 p.

<http://www.mwra.com/harbor/enquad/pdf/2021-08.pdf>

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 57 of 80

I.I.6.e. Table 2: Water Column Parameters*(2023 Draft Permit – page 57 of 68)*

In the “Hydro profile” row, **MWRA would like to request the deletion of Turbidity from the list of measured parameters.** As transmissometry has been measured as part of the MWRA program since 1992, turbidity is not necessary (nor as robust) given the current measurement of beam attenuation/transmissometry. Additionally, Dr. Collin Roesler of Bowdoin College has analyzed turbidity data from Buoy A01 off Cape Ann and has concluded that turbidity does not show a strong seasonal pattern and does not show a biological signal.⁶³ On the “Water Chemistry” row, **MWRA requests that “Particulate carbon” be listed more clearly as “Particulate organic carbon”.**

“Phytoplankton” and “Zooplankton” should have separate rows to clarify the slight differences in methodology between the two.

The zooplankton is collected via net tow, also at all stations except N21. Consistent with the current AMP, neither phytoplankton nor zooplankton is collected at N21, as nearfield plankton is adequately characterized by samples collected at the other four nearfield stations.

Please replace the combined Phytoplankton/Zooplankton row with the following:

ANALYTE	DEPTH	PARAMETER
Phytoplankton	Near surface Plankton will not be measured at station N21 because nearfield plankton is adequately characterized by data collected at the other four nearfield stations	Identification Enumeration
Zooplankton	Net tow Plankton will not be measured at station N21 because nearfield plankton is adequately characterized by data collected at the other four nearfield stations	Identification Enumeration

⁶³ Collin Roesler, personal communication. Dr. Roesler is the William R. Kenan Professor of Earth and Oceanographic Science at Bowdoin College. She specializes in modeling of phytoplankton using bio-optical means, with special interest in harmful algal blooms.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 58 of 80

I.I.6.e. Table 3: Water Column Parameters, Cape Cod Bay and Stellwagen NMS
(2023 Draft Permit – page 58 of 68)

The “Hydro profile” row, “Depth” column should state only “Downcast data continuous”, removing “with upcast data at any sampled depth”. Survey vessels used in Cape Cod Bay monitoring do not have the capability to deploy rosettes with simultaneous multiple depth sampling and profiling. The conductivity-temperature-depth (CTD) system is lowered by hand independent of the grab sampler. Grab samples are taken at near-surface and near-bottom depths, so there is no upcast on which to collect profile data.

The “Hydro profile” row, “Parameter” column should not include “Transmissometry”. This is collected routinely at Massachusetts Bay locations but is currently not included in the monitoring plan for Cape Cod Bay stations, and should not be going forward. Adding the instrumentation to collect this data would be expensive and nontrivial to add the necessary equipment to the CTD system.

The *Alexandrium catenella* row should be removed from Table 3 of the Permit. Multiple depth sampling of *Alexandrium* and testing via gene probe methods at Cape Cod Bay monitoring locations is not part of the current AMP, as *Alexandrium* is rarely observed in Cape Cod Bay. However, *Alexandrium* is enumerated and identified as part of routine, near-surface, phytoplankton sampling in Cape Cod Bay. These stations are also not in the list of planned stations in the *Alexandrium Rapid Response Study Survey Plan, Revision 1*,⁶⁴ that MWRA is to follow per Part I.I.6.f(1) of the Draft Permit. As noted in this plan, MWRA may collect additional samples in Cape Cod Bay when conditions warrant.

I.I.6.f. Harmful Algal Blooms and nuisance algae
(2023 Draft Permit – page 58 of 68)

In the comments below, MWRA requests changes to several threshold limits, elimination of rapid analysis method for threshold comparison purposes, and elimination of rapid response surveys for species other than *Alexandrium*.

General comments

MWRA appreciates that HABs can have a major effect on the health and the livelihoods of citizens in New England, as well as potentially impacting protected marine species. MWRA’s current monitoring program identifies and enumerates the taxa listed in the Draft Permit. However, the rationale for adding the additional special monitoring for *Pseudo-nitzschia*, and especially the nuisance species, in the Draft Permit is not well supported.

⁶⁴ Libby S, Rex AC, Keay KE, Mickelson MJ. 2013. *Alexandrium rapid response study survey plan. Revision 1*. Boston: Massachusetts Water Resources Authority. Report 2013-06. 13 p.

<http://www.mwra.com/harbor/enquad/pdf/2013-06.pdf>

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 59 of 80

As mentioned in the introduction of this section, EPA has not followed the NRC guidelines for developing a monitoring program when it comes to the new HAB and nuisance algae requirements. The Draft Permit does not articulate monitoring questions for the new HAB and nuisance algae requirements, nor link HAB or nuisance algae blooms to MWRA's outfall. *Managing Troubled Waters* explains that the most effective marine monitoring plans are those that ask specific, testable questions, which stakeholders help develop. EPA has done none of those things in writing the HAB and nuisance algae requirements into the Draft Permit.

The EPA report *Technical Memorandum: Review of MWRA Water Quality Monitoring Results to Address Potential for Harmful Effects of the Deer Island Discharge on Threatened and Endangered Species in Massachusetts Bay*⁶⁵ finds the effluent discharge “does not create a eutrophic condition in Massachusetts Bay”. Nor did the report find evidence in the MWRA data to conclude that the observed increase in HABs is currently affecting North Atlantic right whales in Massachusetts Bay or that such impacts are likely in the future.

While MWRA understands that climate change may result in changes in HABs and nuisance algae presence and some changes have been observed in areas in and around Massachusetts Bay, the addition of threshold levels, response surveys, and time-sensitive analyses for non-*Alexandrium* species does not appear to be supported at this time. EPA has not documented a link between these species and the MWRA outfall. Such additional surveys, analyses, back-end data management, and rapid reporting are time consuming, take up limited resources such as ship time, and do not have a clear rationale as to how the data relate to the outfall discharge, or otherwise provide actionable information necessitating the rapid turnaround.

The permit Fact Sheet does not mention response surveys for the nuisance algae species in their general discussion of HABs and nuisance algae. Pages 143 and 144 of the Fact Sheet note, respectively:

EPA recommends that this question be explored further in a revised ambient monitoring program with a focus on HAB species including the continuation of *Alexandrium* rapid response surveys, the addition of rapid response criteria for *Pseudo-nitzschia* spp. and the enumerating and reporting *Dinophysis*, *Phaeocystis*, *Karenia mikimotoi*, and *Margalefidinium polykrikoides* as nuisance species of interest.⁶⁶

Monitoring program [*sic*] should focus on HAB species including the continuation of *Alexandrium* rapid response surveys, enumerating and reporting all *Pseudo-nitzschia* spp. abundance, and adding *Karenia mikimotoi*, *Dinophysis* and *Margalefidinium*

⁶⁵ Hagy J, Gleason T, Oczkowski A, Tatters A, and Wan Y. 2022b. *Technical Memorandum: Review of MWRA Water Quality Monitoring Results to Address Potential for Harmful Effects of the Deer Island Discharge on Threatened and Endangered Species in Massachusetts Bay*. U.S. EPA, Washington, DC, EPA/600/R-22/063. Available at https://cfpub.epa.gov/si/si_public_record_Report.cfm?dirEntryId=355407&Lab=CEMM

⁶⁶ EPA, 2023. Draft Permit factsheet, page 143.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 60 of 80

polykrikoides as nuisance species of interest. Additional rapid response variables will be included for *Pseudo-nitzschia*.⁶⁷

There is no mention in the Fact Sheet of response surveys for *Dinophysis* spp., *Phaeocystis pouchetii*, *Karenia mikimotoi*, and *Margalefidinium polykrikoides* – merely “enumerating and reporting,” which is inconsistent with the Draft Permit, which does include response surveys for the latter three species.

MWRA proposes instead that identification and enumeration for these HAB and nuisance species continue in the routine monitoring program. The current special response program for *Alexandrium* would continue, as *Alexandrium* occupies, and should continue to occupy, a special place based on its historic public health and fishery impacts. Although *Pseudo-nitzschia* is a potential public health hazard due to its association with amnesic shellfish poisoning (ASP), the only ASP shellfish closures in Massachusetts Bay occurred in 2016. This closure was not connected with MWRA’s outfall.

The continued identification and enumeration of HAB and nuisance algae species during routine monitoring at MWRA’s 11 regular monitoring sites, along with other water quality data, will help develop the trend information to identify whether these species – including *Pseudo-nitzschia* – are a concern (e.g., consistently increasing abundances over time), and ensure comparability with historical data. MWRA and other parties can further evaluate these data to assess shellfish and other marine impacts due to the presence of toxins or toxin producers. Data on HABs and nuisance algae species would be reported in the Annual Report required in Part I.I.6(1).

Furthermore, MWRA could add monitoring for these algal species in any triggered *Alexandrium* Rapid Response Study (ARRS) surveys. While these additional surveys may or may not align temporally with blooms of other organisms, it will further develop a data set to inform future decisions. MWRA proposes to report these findings in the required Annual Report, with specific reporting on each of the new HAB and nuisance species requested by EPA (*Pseudo-nitzschia* spp., *Dinophysis* spp., *Phaeocystis pouchetti*, *Karenia mikimotoi*, and *Margalefidinium polykrikoides*). As with all data that MWRA collects, it would be available upon request.

MWRA agrees with the Hagy *et al.* report when it suggests:

...a cautious approach is warranted that includes continued monitoring of ecological changes near the outfall and in the surrounding areas of Massachusetts and Cape Cod Bays. Monitoring should be adjusted to focus on the most pertinent and prospective environmental concerns and their potential relationship to the discharge...⁶⁸

MWRA believes the proposed monitoring above is in line with this approach.

⁶⁷ EPA, 2023. Draft Permit factsheet, page 144.

⁶⁸ Hagy et al, 2022b.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 61 of 80

If the final Permit requires the additional HAB and nuisance algae thresholds and monitoring aside from *Alexandrium*, MWRA would also like to clarify that these additions are confined to the 11 Massachusetts Bay monitoring locations, and are not applicable to the three monitoring locations in Cape Cod Bay. This is the current setup for *Alexandrium* monitoring in the current Ambient Monitoring Plan.

Finally, MWRA would like to address EPA's reliance on the rapid analysis method in the Draft Permit. In the following sections on HABs and nuisance algae, the Draft Permit asks MWRA to compare abundance data (cells/L) for *Pseudo-nitzschia* spp., *Dinophysis* spp., *Phaeocystis pouchetti*, *Karenia mikimotoi*, and *Margalefidinium polykrikoides* to genera or species-specific thresholds set by EPA. It appears that EPA intends for the results from the rapid analysis method to be compared to the thresholds.

MWRA emphasizes that the rapid analysis method is a qualitative technique that is "to quickly verify the presence or absence of nuisance species. The analysis will also produce a qualitative impression of the types and abundance of dominant taxa."⁶⁹ The phytoplankton rapid analysis sample was designed to characterize the abundance levels of dominant taxa in the MWRA nearfield area immediately (i.e., several days) after the completion of each MWRA water column monitoring survey, and was not designed to be a quantitative analysis method. When the number of cells counted in the rapid analysis method are low, the cell count estimate range is very large, and is intended only for capturing reasonable estimates for the dominant taxa present at high cell counts. MWRA's expert consultant, Dr. David Borkman,⁷⁰ has confirmed that the results of the qualitative, rapid analysis method are not suitable for comparison to numerical thresholds.

HAB phytoplankton taxa are rarely the dominant phytoplankton of the Massachusetts Bay phytoplankton community. This results in a rapid sample count in which many (often hundreds) cells of the dominant, non-HAB phytoplankton are counted while only a few (often <10) cells of HAB taxa are observed in the rapid analysis sample. There is large uncertainty in the abundance estimate associated with a phytoplankton count based on a low number of individual cells observed (Table 2). For example, an abundance estimate of 10,000 cells/L based on four cells observed yields a 95% confidence interval that spans from 0 cells/L to 20,000 cells/L (Table 3). In the case of *Pseudo-nitzschia*, observing just a single cell would exceed the trigger of 15,000 cells/L based on the rapid analysis method which estimates an abundance of >1–30,000 cells/L.

⁶⁹ Libby PS, Whiffen-Mansfield AD, Nichols KB, Lescarbeau GR, Borkman DG, Turner JT. 2023. *Quality assurance project plan (QAPP) for water column monitoring 2020-2023: Tasks 4-7 and 10, Revision 2*. Boston: Massachusetts Water Resources Authority. Report 2023-02. Page 43.

⁷⁰ Dr. Borkman is the Principal Environmental Scientist and Program Supervisor for Routine Monitoring and HABs at the Rhode Island Department of Environmental Management.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 62 of 80

Table 2. 95% Confidence limits for a 10,000 cell/L phytoplankton abundance estimate based on number of individual cells observed for each abundance estimate (n = 1 to 1,000 cells observed).⁷¹

#cells counted	confidence limit (%)	For estimated abundance of 10,000 cells/L	
		Cells/L estimate (LOW)	Cells/L estimate (HIGH)
1	200	Present	30,000
2	141	Present	24,100
3	116	Present	21,600
4	100	0	20,000
5	89	1,100	18,900
6	82	1,800	18,200
7	76	2,400	17,600
8	71	2,900	17,100
9	67	3,300	16,700
10	63	3,700	16,300
15	52	4,800	15,200
20	45	5,500	14,500
40	32	6,800	13,200
50	28	7,200	12,800
100	20	8,000	12,000
200	14	8,600	11,400
400	10	9,000	11,000
500	9	9,100	10,900
1000	6	9,400	10,600

As the rapid analysis is a qualitative test, it is not appropriate to compare to a quantitative threshold. High-effort HAB contingency actions (such as added sampling cruises) should not be based solely on an abundance estimate with this large of an uncertainty.

While the results from the rapid analysis are available quickly (usually within a week), it is important to point out and recognize the difference between the qualitative rapid analysis and the quantitative counts – which are done using the “whole water” method. The whole water method is considered the “official” method for plankton counts in the Ambient Monitoring Plan.⁷² (In fact, the rapid analysis method does not actually appear in the current Ambient Monitoring Plan – and never has – and the current annual water column report does not report results from this method.)

The rapid analysis method produces qualitative results for the dominant species in the sample and certain targeted species, but the whole water method produces quantitative counts for nearly all taxa in the sample. As a quantitative method, results from the whole water method are more appropriate to compare to the thresholds. However, the whole water method is labor intensive and results can take up to two months to be finalized, so results from this method are not timely enough for rapid response surveys.

⁷¹ Throndsen J. 1978. Chapter 4. Preservation and storage. In: Sournia A (ed.): Phytoplankton manual. *UNESCO Monogr. Oceanogr. Method.* UNESCO 6: 69-74

⁷² Libby et al, 2023, page 42-43.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 63 of 80

Additionally, the rapid analysis sample is spatially limited to only a single station (N18) and a single depth (the chlorophyll maximum). The whole water counts are from every station in Massachusetts Bay, except N21, and at two depths. MWRA believes that it is worth the wait to submit these more comprehensive results.

Alexandrium is the exception, as the NA1 gene probe method (a method separate from both the rapid analysis and whole water methods) can provide rapid, actionable results for management purposes.

Please see the taxon-specific sections for further comments.

I.I.6.f(1)(i). Conditions for *Alexandrium* rapid response surveys
(2023 Draft Permit – page 59 of 68)

MWRA appreciates that the requirements for *Alexandrium* monitoring are unchanged. This monitoring has successfully sampled multiple blooms since 2005 and aided in overall understanding of *Alexandrium* blooms in the Bay. The human health implications of these blooms make continuation of the rapid response surveys an important part of the MWRA water column monitoring program. There are two key aspects that make this program successful: the weekly DMF paralytic shellfish poisoning toxicity testing and the availability of a molecular probe method developed for this species⁷³ that allows for rapid, quantitative analyses of samples from across the survey area.

MWRA requests that EPA clarify Part I.I.6(f)(1)(i)(b) with the added clause in bold: “If *Alexandrium* values exceed 100 cells/L in samples collected during MWRA’s regular Massachusetts Bay surveys.” This added language would align the Permit requirements with the current *Alexandrium* rapid response triggers. Additionally, since the triggering data would come from MWRA, this would ensure a timely response survey.

Part I.I.6(f)(1)(i)(f) indicates MWRA should submit a written report “following completion of the survey” within 60 days. Historically, there have been multiple *Alexandrium* response surveys for several weeks when there is a bloom. This is a very high tempo to maintain for several weeks, so MWRA’s consultant does not produce a report until the end of the response survey sequence. This report then covers all the response surveys. This also allows the processing and inclusion of the hydrographic data, which is potentially important to understanding the bloom.

For the purposes of maintaining high data quality, and including the hydrographic data in the survey report, **MWRA requests this language be changed to “Once an ARRS survey sequence begins, the Permittee shall submit a written report with the monthly DMR due 60 days following the completion of the final survey in the sequence.”**

⁷³ Anderson DM, Kulis DM, Keafer BA, Gribble KE, Marin R, Scholin CA. 2005. Identification and enumeration of *Alexandrium* spp. from the Gulf of Maine using molecular probes. *Deep-Sea Research II* 52:2467-2490.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 64 of 80

I.I.6.f(2). Pseudo-nitzschia spp.

(2023 Draft Permit – page 60 of 68)

MWRA requests that the threshold for *Pseudo-nitzschia* be increased to 30,000 cells/L, that rapid analysis testing results not be used for threshold comparisons, and rapid response surveys be removed from the Permit.

MWRA does not agree with the new rapid response permit requirements for *Pseudo-nitzschia*. While MWRA agrees that domoic acid producing species of *Pseudo-nitzschia* are a potential public health threat, the proposed *Pseudo-nitzschia* rapid response survey program is missing the key element that makes the *Alexandrium* rapid response program work – the existence of a molecular probe for *Pseudo-nitzschia*. EPA acknowledges this fact in Part I.I.6.f(2)(ii)(b), where EPA asks for an assessment of a “...species-specific DNA probe for the toxic species *P. australis*...” As of this writing, neither MWRA nor its expert consultant, Dr. Don Anderson,⁷⁴ knows of a usable gene probe method for any *Pseudo-nitzschia* species.

Without the availability of a rapid, accurate gene probe method, MWRA is left with several subpar options for a “rapid response”. The Draft Permit sets a threshold of 15,000 cells/L but the qualitative rapid analysis method is not appropriate for threshold comparisons. The quantitative whole water method is appropriate for threshold comparison, but results can take up to two months for MWRA to see even semi-vetted data. This delay is not conducive to a useful “rapid response.”

As mentioned in the General Comments to Part I.I.6.f, MWRA believes that a good way forward without a gene probe method is to continue to enumerate *Pseudo-nitzschia* in the monitoring program and report specifically on *Pseudo-nitzschia* in the required annual report. There should be no rapid response component in the Permit, as the triggering mechanisms are either not scientifically appropriate (the qualitative rapid analysis) or take too long for a true and useful “rapid response” (the quantitative whole water analysis).

If some form of rapid response is necessary, MWRA suggests that its *Pseudo-nitzschia* response program be synchronized with the Massachusetts Division of Marine Fisheries *Pseudo-nitzschia* program, perhaps through some type of mutual agreement. MWRA believes it is especially important that its program and DMF’s are in sync due to the potential public health and fisheries policies issues (i.e., ASP and shellfish closures). MWRA is not a shellfish management agency, and does not have public health expertise with shellfish biotoxins, whereas DMF has both (as the agency in charge of managing shellfish in Massachusetts), as well as experience communicating with stakeholders in the shellfishing industry. DMF also provides critical data (results of paralytic shellfish poisoning [PSP] toxicity testing) to MWRA for *Alexandrium* rapid response.

⁷⁴ Dr. Anderson is a Senior Scientist at Woods Hole Oceanographic Institution and a world-renowned expert in HABs.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 65 of 80

With this in mind, MWRA requests that the threshold in the Draft Permit for *Pseudo-nitzschia* of 15,000 cells/L be raised to 30,000 cells/L to align with the DMF threshold of 30,000 cells/L.⁷⁵ DMF uses this threshold for additional monitoring and potential domoic acid testing. MWRA suggests that criteria for rapid response surveys be developed with support of DMF; for example, if DMF begins additional monitoring and testing for domoic acid, MWRA will mobilize for *Pseudo-nitzschia* rapid response surveys. This would ensure that MWRA and DMF are moving in the same direction and presenting useful, non-contradictory information about ASP and potential shellfishing closures to the public and stakeholders in the industry. On a *Pseudo-nitzschia* rapid response survey, MWRA will follow the sample collection and data analysis laid out in the ARRS plan (i.e., nutrient analyses and collection of hydrographic data).⁷⁶

Historically, 2016 was the only year that ASP closures were in effect in Massachusetts Bay. MWRA's data also show that the *Pseudo-nitzschia* cell counts were not particularly high that year in either the outfall nearfield or farfield. In fact, a number of years have had numerous counts above the Draft Permit threshold, with no historical evidence of ASP. Figures 1 and 2 show the highest *Pseudo-nitzschia* count per survey in the nearfield and farfield, respectively. The counts are from the quantitative whole water method. The solid grey line represents EPA's proposed 15,000 cells/L threshold. The data span 1992 – early 2023. There are a number of exceedances of the threshold throughout the period, and the majority of the highest counts were in 1998-99, before the outfall went into operation. As a reminder, the only shellfish closure for ASP in Massachusetts Bay was in 2016, when *Pseudo-nitzschia* cell counts were not comparatively high.

⁷⁵ Kennedy J, Petitpas C, and Hickey M. August 14, 2022. *Massachusetts Marine Biotxin Management and Contingency Plan, 2022 Update*.

⁷⁶ Libby et al, 2013.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 66 of 80

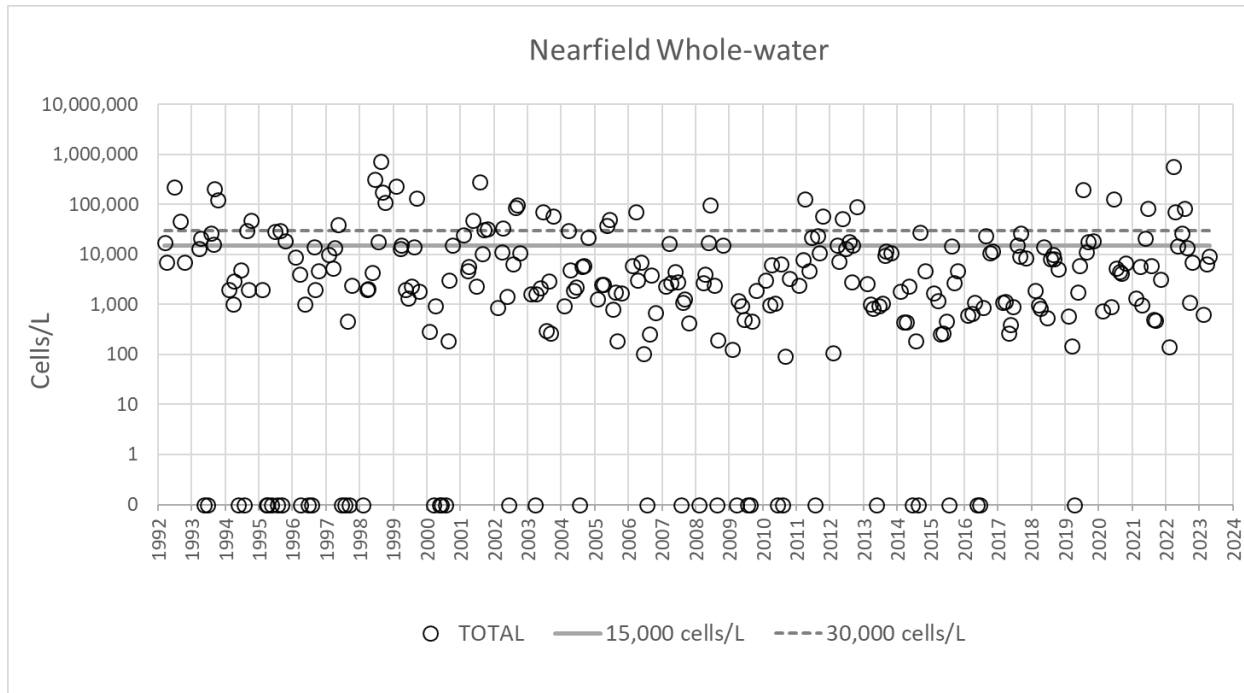


Figure 1. Maximum per survey counts of *Pseudo-nitzschia* spp. in the nearfield. Cell counts made using the whole water method. Solid grey line is the 15,000 cells/L EPA-proposed threshold for rapid response surveys. The dashed line is the 30,000 cells/L threshold used by DMF.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 67 of 80

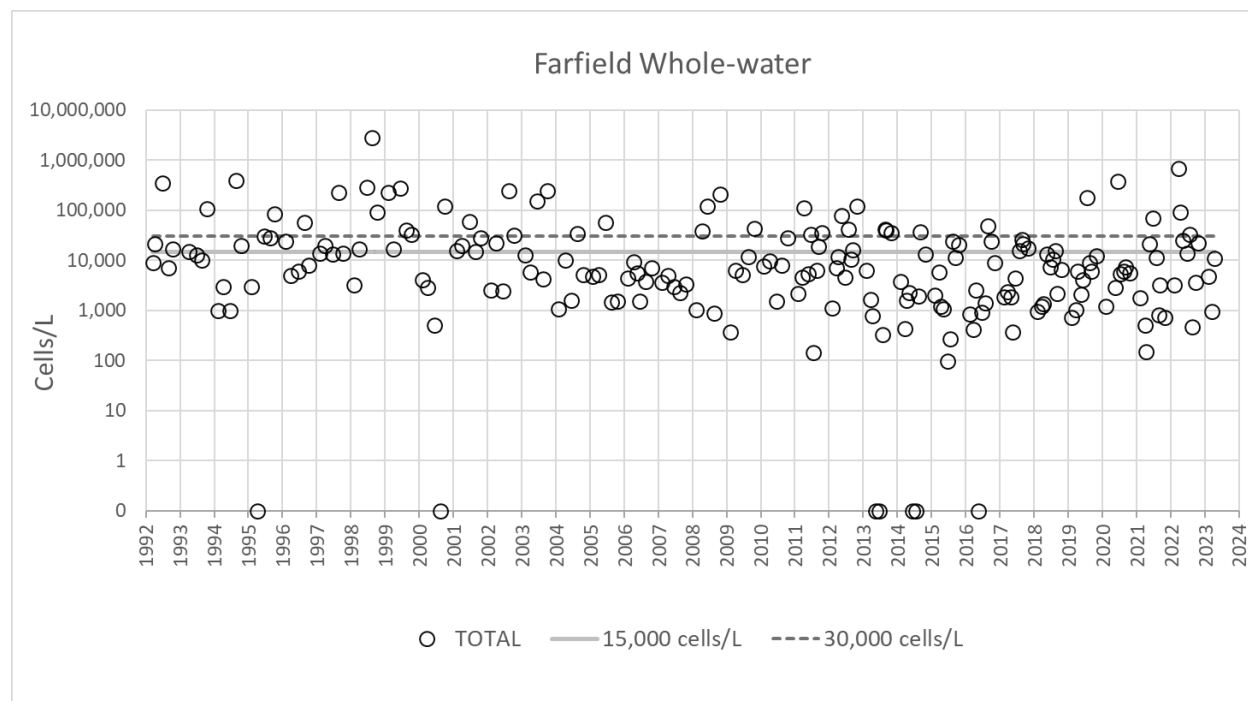


Figure 2. Maximum per survey counts of *Pseudo-nitzschia* spp. in the farfield. Cell counts made using the whole water method. Solid grey line is the 15,000 cells/L EPA-proposed threshold for rapid response surveys. The dashed line is the 30,000 cells/L threshold used by DMF.

As currently written in the Draft Permit, a scenario could occur where MWRA conducts intensive rapid response surveys in response to high cell counts while DMF has not declared a consumption advisory for ASP and/or closed shellfishing areas. This situation could lead to confusion among the public and stakeholders as to the safety of shellfish. DMF is the proper lead agency for these decisions, not MWRA. Additionally, a threshold level of 15,000 cells/L could result in numerous costly rapid response surveys with no clear benefit to the public or the environment.

MWRA has further comments on the language in Part I.I.6.f(2):

“*Pseudo-nitzschia* shall continue to be identified and enumerated using the screened, rapid-analysis method detailed in the 2021 QAPP.”

MWRA will continue to identify *Pseudo-nitzschia* as part of the rapid analysis that occurs on each survey at station N18 at the chlorophyll maximum depth. **The referenced rapid analysis method is not a quantitative method and does not enumerate *Pseudo-nitzschia*, therefore “and enumerated” should be deleted from the first sentence.**

In Part I.I.6.f(2)(i), EPA mentions the collection of 20 L of concentrated seawater for domoic acid testing via the Scotia Rapid Test (or equivalent) if certain cell count thresholds are met. MWRA believes the collection and testing of this amount of filtered seawater is logistically very difficult.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 68 of 80

The logistics of adding this amount of sampling to a regular water column survey would likely compromise the ability to complete other required sampling activities, and provide little additional information relative to the effort and cost associated with the sampling, and **MWRA requests deletion of this requirement.**

In Part I.I.6.f(2)(ii)(b), **MWRA requests that EPA add the bolded phrase below:**

MWRA shall assess the availability of a species-specific DNA probe to confirm the presence of the highly toxic and problematic species *Pseudo-nitzschia australis* and, if available, MWRA shall implement this probe into routine water column sampling and *Pseudo-nitzschia* Rapid Response Sampling **upon completion of testing and validation by an appropriate entity.**

It is imperative that any new and novel technologies be fully tested before they are used for management purposes. MWRA expects that DMF will participate in evaluating any new technology.

In Part I.I.6.f(2)(iv), **MWRA requests the following change (in bold) if *Pseudo-nitzschia* rapid response surveys are required. “Once a *Pseudo-nitzschia* Rapid Response survey sequence begins,** the Permittee shall submit a written report with the monthly DMR **due** 60 days following the completion **of the final survey in the sequence.”** This language is consistent with the requested change in the *Alexandrium* section, and would allow for inclusion of the hydrographic data in the survey report. If there are no rapid surveys in a year, *Pseudo-nitzschia* results would be reported in the Annual Report.

I.I.6.f(3) to I.I.6.f(6). General comments on nuisance algae species
(2023 Draft Permit – page 62-63 of 68)

MWRA requests that the requirement for use of the rapid analysis method for threshold comparisons be removed for the four nuisance species, that trigger thresholds be modified, that collection of additional samples or rapid response surveys be removed from the Permit, and that MWRA be required to report results for the nuisance species only in the Annual Report.

The Draft Permit requires the use of the rapid analysis screened sample for each of these four nuisance species. As noted above, the rapid sample is a qualitative analysis and does not provide useful quantitative data for any but the most abundant species present. This may be helpful for *Phaeocystis* or even *Karenia* when blooms are present, but not on a consistent basis. This is especially true for some of the species with relatively low trigger levels – see comments on the rapid analysis method in the “General Comments” section at the beginning of the HABs and nuisance algae section (Part I.I.6.f). The AMP should use a quantitative method to compare against the thresholds in the Draft Permit.

MWRA notes that pages 62 and 63 of the Draft Permit list the collection of additional samples in response to *Phaeocystis pouchetii*, *Karenia mikimotoi*, and *Margalefidinium polykrikoides*

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 69 of 80

abundances above a threshold when there is a decrease in dissolved oxygen (DO) levels. However, the timing of the two metrics (high cell count abundances and decreases in DO levels) will likely be offset by weeks or months. Additionally, the lengthy time of analysis for the whole water method precludes a rapid response. Furthermore, it is unclear why such additional sampling would be required and how it would inform our understanding of the blooms of these species and relationships with the MWRA discharge.

For the above reasons, MWRA is requesting the deletion of the response survey requirements for nuisance algae species.

The Draft Permit language does not define the location(s) or depths where the counts would be compared against the thresholds. MWRA suggests these details be clarified in the updated AMP.

MWRA also requests that the 45 day reporting requirements for the nuisance algae species be changed to reporting the data in the required Annual Report. As recommended in *Managing Troubled Waters*, MWRA has a comprehensive, long running, and effective data management process for environmental monitoring data. The quantitative whole water analysis counts take up to two months for preliminary results, and longer for fully checked and validated data. MWRA should not be required to regularly submit data to EPA that has not undergone the full quality assurance and quality control process. MWRA would provide preliminary data, marked as such, upon request.

I.I.6.f(3). *Dinophysis* spp.

(2023 Draft Permit – page 62 of 68)

MWRA has laid out why the results from the qualitative rapid analysis method should be not be used for threshold comparisons. **Since there are no requirements for response surveys for *Dinophysis*, the quantitative whole water method should be used to compare to the threshold, and MWRA requests that results be presented in the Annual Report. If a faster reporting requirement is required, MWRA requests that the reporting requirement be changed to “If cell counts of *Dinophysis* spp. exceed 100,000 cells/L by the whole water method, then this shall be reported within 60 days of MWRA receiving results.”** Part J.2 of the Draft Permit ensures that these will be reported with the next monthly DMR.

MWRA agrees with EPA that, as stated in the Fact Sheet, “A rapid response survey is not necessary as *Dinophysis* does not threaten human life...nor does it threaten marine life...”

I.I.6.f(4) *Phaeocystis pouchetii*

(2023 Draft Permit – page 62 of 68)

MWRA requests that the typographical error in the Draft Permit that states the *Phaeocystis pouchetii* threshold of “6 x 10⁶ cells/L” be corrected to “6 x 10⁶ cells/L”.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 70 of 80

As noted above, results of the qualitative rapid analysis method cannot be compared to thresholds, and the time needed for whole water analysis precludes a rapid response. However, there are a number of other reasons why MWRA believes a rapid response for *Phaeocystis pouchetii* is inappropriate.

Layering on another response requirement for an algal species that is defined by the Draft Permit as a “nuisance” species rather than a HAB species is unnecessary and overly resource-intensive. Neither the Maine Department of Marine Resources,⁷⁷ Rhode Island Department of Environmental Management,⁷⁸ nor the Massachusetts Division of Marine Fisheries⁷⁹ defines *Phaeocystis pouchetii* as a public health hazard.

Phaeocystis previously had seasonal Contingency Plan thresholds in the 2000 Deer Island NPDES permit. The thresholds were removed in 2018 with the concurrence of the Outfall Monitoring Science Advisory Panel (OMSAP) and EPA. The thresholds were removed following long-term evaluation of *Phaeocystis* blooms and discussions with regulators and OMSAP in 2016 and 2017. MWRA has continued to monitor and report data on *Phaeocystis* as part of the current Ambient Monitoring Plan since the thresholds were removed.

The *Phaeocystis* thresholds were established from data collected during baseline monitoring years before the Massachusetts Bay outfall went online. *Phaeocystis* was infrequently observed during the baseline years, particularly during summer and autumn, resulting in thresholds set lower than the natural variability of populations in Massachusetts Bay and lower than abundances at which blooms could be associated with nuisance or noxious effects. Exceedances of the thresholds triggered evaluations that strongly documented that *Phaeocystis* blooms are regional in nature and not indicative of degradation of Massachusetts Bay due to MWRA’s effluent discharge.

Further, a lack of demonstrated nuisance or noxious impacts from *Phaeocystis* blooms supported the removal of the threshold from the Contingency Plan. As part of the discussions to modify the *Phaeocystis* Contingency Plan thresholds, MWRA proposed alternative threshold options based on survey mean abundances from 1992-2005 which were not put into place. EPA did not object to deleting the *Phaeocystis* thresholds from the Contingency Plan entirely, which is what actually occurred.

For these reasons (and others laid out in “I.I.6.f(3) to I.I.6.f(6) General comments on nuisance algae species”), **MWRA requests elimination of the response requirement** and believes enumeration and reporting of *Phaeocystis pouchetii* from samples collected on the nine routine surveys (and ARRS surveys) suffices.

⁷⁷ Maine Department of Marine Resources. 2020. *Management Plan for the Control of Marine Toxins in Maine*.

⁷⁸ Kennedy et al, 2022.

⁷⁹ Rhode Island Departments of Environmental Management and Health. November 2021. *Harmful Algal Bloom and Shellfish Biotxin Monitoring and Contingency Plan*.

<https://dem.ri.gov/sites/g/files/xkgbur861/files/programs/benviron/water/shellfish/pdf/habplan.pdf>

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 71 of 80

Regarding reporting, as with *Dinophysis*, MWRA asks that the reporting requirement be changed to presentation of data in the Annual Report. If faster submission of the data is required, MWRA suggests the following change to the Permit language: “If *Phaeocystis pouchetii* cell counts exceed 6×10^6 cells/L **by the whole water method, then this shall be reported within **60 days of MWRA receiving results**.”** Part J.2 of the Draft Permit ensures that these will be reported with the next monthly DMR.

I.I.6.f(5). *Karenia mikimotoi*

(2023 Draft Permit – page 62-63 of 68)

EPA has not provided documentation in the Fact Sheet about how the *Karenia mikimotoi* threshold of 10,000 cells/L was calculated outside of a reference to a paper on *Karenia* in Cape Cod Bay, which does not directly reference any particular abundance as harmful to the environment.⁸⁰

A review of *Karenia mikimotoi* by Li et al⁸¹ compiled *Karenia* abundance for 41 blooms that were associated with adverse effects on marine life (defined as finfish, shellfish, benthic invertebrates; see Li et al, Table 1). An analysis of these data showed that harmful effects due to *Karenia* blooms predominantly occur at cell abundance levels of greater than 1,000,000 cells per liter (see Figure 3). The minimum *Karenia* abundance associated with harmful effects – and the only incident associated with less than 1,000,000 cells/L – was a bloom of 100,000 cells/L. This clearly indicates that the 10,000 cell/L threshold proposed in the Draft Permit is too low by at least one order of magnitude. **Since most harmful effects associated with *Karenia mikimotoi* blooms are associated with abundance of one million cells/L or greater, the Permit threshold for *Karenia mikimotoi* should be set to 500,000 cells/L.**

⁸⁰ Scully ME, Geyer WR, Borkman D, Pugh TL, Costa A, and Nichols OC. 2022. Unprecedented summer hypoxia in southern Cape Cod Bay: an ecological response to regional climate change? *Biogeosciences* 19: 3523-3536. <https://bg.copernicus.org/articles/19/3523/2022/bg-19-3523-2022.pdf>

⁸¹ Li et al. 2019. A review of *Karenia mikimotoi*: Bloom events, physiology, toxicity and toxic mechanisms. *Harmful Algae* 90, <https://doi.org/10.1016/j.hal.2019.101702>

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 72 of 80

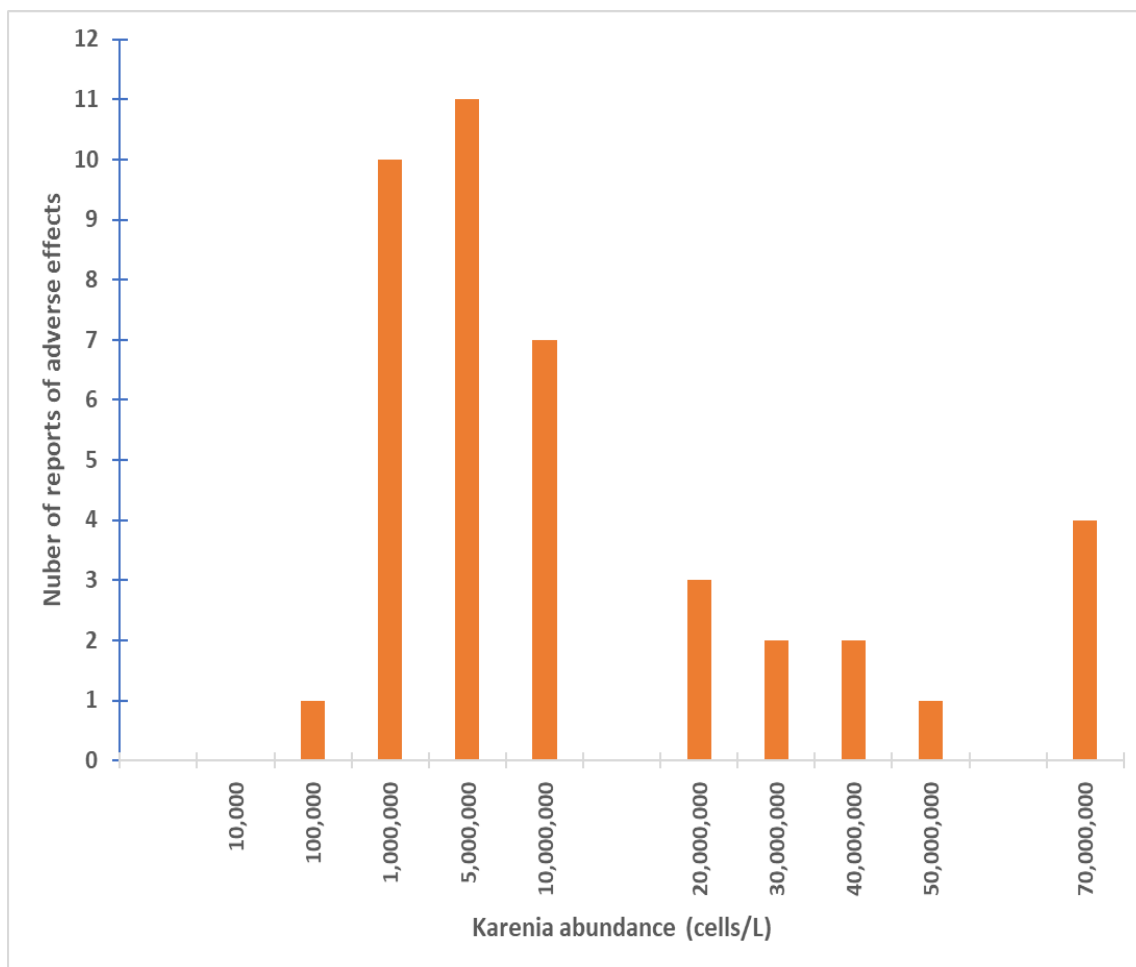


Figure 3. Distribution of *Karenia mikimotoi* bloom abundance levels (cells/L) associated with harmful effects on marine life.⁸²

MWRA does not agree with the requirement for response surveys for *Karenia mikimotoi*. The Rhode Island Department of Environmental Management,⁸³ the Maine Department of Marine Resources,⁸⁴ and Massachusetts Division of Marine Fisheries⁸⁵ do not consider blooms of *Karenia mikimotoi* a threat to public health. Based on this information, **MWRA requests that the response survey requirements be removed from the Permit.**

The Scully et al. paper⁸⁶ referenced in the Fact Sheet lays out a strong case for *Karenia mikimotoi* as a contributor to the 2019 and 2020 hypoxic event in southern Cape Cod Bay. However, in no

⁸² Li et al., 2019, Table 1

⁸³ RI Departments of Environmental Management and Health 2021.

⁸⁴ ME Department of Marine Resources 2020.

⁸⁵ Kennedy et al 2022, see footnote 2 to Table 1, page 7.

⁸⁶ Scully et al., 2022.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 73 of 80

place does the paper or the subsequent public forum⁸⁷ discussing the event place the blame on the MWRA outfall, or say that influence (i.e., nutrients) from the outfall triggered the *Karenia mikimotoi* bloom. Although Massachusetts Bay has seen several Contingency Plan exceedances of low dissolved oxygen in recent years, MWRA has concluded, and OMSAP agreed, that those exceedances are likely due to regional trends of rising ocean temperatures. MWRA recommends the resource-intensive rapid response requirements for *Karenia mikimotoi* be deleted. Enumeration and reporting of *Karenia mikimotoi* on the nine routine surveys will continue, along with additional sampling on ARRS surveys.

MWRA believes that *Karenia* results can be presented in the Annual Report with no need for a rapid reporting requirement. However, if rapid reporting is required, MWRA requests a slight change to the Permit language: “If *Karenia mikimotoi* cell counts exceed 500,000 cells/L by the whole water method, then this shall be reported within 60 days of MWRA receiving results.” Part J.2 of the Draft Permit ensures that these results will be reported with the next monthly DMR.

I.I.6.f(6). *Margalefidinium polykrikoides*
(2023 Draft Permit – page 63 of 68)

Like the other nuisance species, MWRA does not agree with the requirement for rapid response surveys for *Margalefidinium polykrikoides*, and requests that it be removed. Although this species can impact shellfish aquaculture operations, it is not considered a public health hazard by either the Rhode Island Department of Environmental Management,⁸⁸ the Maine Department of Marine Resources,⁸⁹ or the Massachusetts Division of Marine Fisheries.⁹⁰

MWRA requests that the threshold be raised to 500,000 cells/L. Table 3 shows a compilation of *Margalefidinium* abundance levels associated with harmful effects. A survey of the literature indicates that harmful effects on marine life require *Margalefidinium* abundance of at least 1,000,000 cells/L (Table 3). In many experimental studies *Margalefidinium* levels of tens of millions of cells/L are associated with harmful effects. The threshold recommended in the Draft Permit of 1,000 cells/L is *three orders of magnitude* lower than the 1,000,000 cells/L minimum level associated with harmful effects.

⁸⁷ MassBays National Estuary Partnership. Presentations to the forum “Investigating and Responding to Hypoxia in Cape Cod Bay” on October 29, 2021. Video of the forum available at https://www.youtube.com/watch?v=d9tclCC-ypE&ab_channel=MassBaysNEP

⁸⁸ RI Departments of Environmental Management and Health 2021.

⁸⁹ ME Department of Marine Resources 2020.

⁹⁰ Kennedy et al 2022.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 74 of 80

Table 3. *Margalefidinium polykrikoides* abundance levels (cells/L) associated with mortality of fish, shellfish and phytoplankton.^{91, 92, 93, 94, 95}

Margalefidinium abundance (cells/L)	Organism	Source
50,000,000	Finfish	Gobler et al., 2008
50,000,000	Shellfish	Gobler et al., 2008
15,000,000	Shellfish (scallops)	Griffith et al., 2019
10,000,000	Finfish	Mulholland et al., 2009
10,000,000	Shellfish	Mulholland et al., 2009
1,900,000	Larval Finfish	Rountos et al., 2014
1,000,000	Phytoplankton	Tang & Gobler, 2009

MWRA requests deletion of the resource-intensive response requirement. MWRA will continue to enumerate and report on *Margalefidinium polykrikoides* abundances on the nine routine surveys, along with additional sampling on ARRS surveys.

As with the other nuisance species, MWRA requests that reporting be done through the Annual Report. If faster results are desired, MWRA requests a slight change to the Permit language, which should be changed to “If *Margalefidinium polykrikoides* cell counts exceed **500,000** cells/L **by the whole water method**, then this shall be reported within **60** days **of MWRA receiving results.**” Part J.2 of the Draft Permit ensures that these will be reported with the next monthly DMR.

⁹¹ Gobler et al 2008. Characterization, dynamics, and ecological impacts of harmful *Cochlodinium polykrikoides* blooms on eastern Long Island, NY, USA. *Harmful Algae* 7: 293-307.

⁹² Griffith et al., 2019. Differential mortality of North Atlantic bivalve molluscs during harmful algae blooms caused by the dinoflagellate *Cochlodinium* (aka *Margalefidinium*) *polykrikoides*. *Estuaries and Coasts* 42: 190-203.

⁹³ Mulholland et al., 2009. Understanding Causes and Impacts of the Dinoflagellate, *Cochlodinium polykrikoides*, Blooms in the Chesapeake Bay. *Estuaries and Coasts*. DOI 10.1007/s12237-009-9169-5.

⁹⁴ Rountos et al., 2014. Toxicity of the harmful dinoflagellate *Cochlodinium polykrikoides* to early life stages of three estuarine forage fish. *Mar Ecol Progr Ser* 505: 81-94.

⁹⁵ Tang and Gobler. 2009 Characterization of the toxicity of *Cochlodinium polykrikoides* isolates from Northeast US estuaries to finfish and shellfish. *Harmful Algae* 8: 454-462.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 75 of 80

I.I.6.k. Modifications to Ambient Monitoring Plan

(2023 Draft Permit – page 64 of 68)

MWRA appreciates the ability to modify the AMP, as usefulness of some sampling may end, and new sampling may need to be added. The ability to modify the sampling plan is also one of the NRC recommendations in *Managing Troubled Waters*. However, as the Draft Permit now directly incorporates the AMP, MWRA is concerned that when the Permit expires five years after issuance, changes to the AMP will no longer be possible. **MWRA requests that a general reference to the monitoring program be included in the Permit and the plan be referenced as a separate attachment, with language that confirms the ability to modify the plan beyond the five year permit period, as appropriate.**

In addition, MWRA requests clarification of the Permit language for requesting modifications. It is imperative that MWRA be part of a collaborative process to design, plan, and implement changes to monitoring, but that is not apparent in the current language. At a minimum, MWRA would need to evaluate if any proposed modifications are technically and logistically feasible.

To both these ends, **MWRA suggests moving all of Part I.I.6 to a new Attachment L of the Permit and replacing the language in Part I.I.6(k) with the improved and more flexible language below.** These changes are based on the AMP modification language in both the Draft Permit and the current Deer Island NPDES permit from 2000.⁹⁶

k. Modifications to the Ambient Monitoring Plan

The Ambient Monitoring Plan described in Attachment L may be modified as follows:

The Permittee or any member of the public may propose modifications at any time. To do so, the Permittee or any member of the public must provide written notice to EPA, MassDEP, and MWRA. After consultation with MWRA, EPA and MassDEP may modify the Ambient Monitoring Plan as deemed appropriate and necessary.

I.I.6.l. Annual Report

(2023 Draft Permit – page 64 of 68)

As part of the Annual Report required by this section, MWRA intends to include HAB and nuisance algae data.

However, **the sentence “Reporting on HABs and nuisance algae shall be reported as an attachment to the monthly DMR 60 days after the survey is concluded” should be deleted.** There are already timelines for reporting HAB and nuisance algae results in their corresponding

⁹⁶ 2000 MWRA Deer Island NPDES permit: <https://www3.epa.gov/region1/npdes/mwra/pdf/mwrafpm1.pdf> (see page 9, Part I.7.c.i, Part I.7.c.iii, and Part I.7.c.v)

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 76 of 80

sections of the Draft Permit, so this adds confusion. Additionally, this sentence seems out of place in a section on annual reporting. As always, MWRA is willing to provide data upon request.

I.I.6.m. Special Studies

(2023 Draft Permit – page 64 of 68)

MWRA appreciates the language in the Draft Permit limiting any special studies to being “specific to the MWRA discharge.”

Effluent monitoring required by the Ambient Monitoring Plan

(2023 Draft Permit Fact Sheet – page 136 of 195)

MWRA appreciates EPA’s assessment that the redundant effluent monitoring in the AMP can be discontinued, since the effluent monitoring questions have been answered.⁹⁷ EPA backs this up in the Fact Sheet:

“EPA finds that the effluent related questions in the AMP are addressed by the effluent limits and monitoring requirements in the 2000 Permit and the Draft... Effluent monitoring is no longer required as part of the AMP as it is redundant with the requirements of the Draft Permit.”⁹⁸

Since the effluent monitoring questions have been answered,⁹⁹ and EPA believes the current effluent limits are adequate, **MWRA requests that effluent monitoring related to the Ambient Monitoring Plan, revision 2.1¹⁰⁰ be ended upon the issuance of the final Permit**, at the latest, regardless of the schedule for submitting a revised AMP.

I.I.7. Dye studies for CSO Treatment Facilities discharge locations

(2023 Draft Permit – page 64 of 68)

Part I.7. of the Draft Permit requires MWRA to conduct dye studies during the five-year permit term for each of the five CSO Treatment Facility outfalls. The completed dye studies must be submitted by MWRA six months before the end of the Permit term (concurrent with the NPDES application). According to the Draft Permit, the dye studies will be used to determine the dilution at the point of discharge during the applicable hydraulic in 314 CMR 4.03(3), and that MWRA should consult with MassDEP as to the applicable hydraulic condition for each discharge location.

MWRA requests that the requirement to conduct a dye study to confirm dilution, be broadened to allow either computer dilution model study or a dye study for several reasons,

⁹⁷ MWRA 2019.

⁹⁸ EPA, 2023. Draft Permit fact sheet, p. 136.

⁹⁹ MWRA 2019.

¹⁰⁰ MWRA, 2021.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 77 of 80

including: (1) feasibility; (2) cost; and (3) limited benefit. First, a computer dilution model study may be more feasible for some CSO treatment facility outfall locations because discharges are infrequent and unpredictable, making field work difficult and costly. Second, with respect to cost, a computer model may provide equivalent information more cost-effectively. Third, a dye study offers only limited benefit when compared to a computer model because a computer model can predict dilution under a range of conditions. Further, MWRA notes that the applicable hydraulic condition consultation with MassDEP will need to take into account that CSO discharges occur only during wet weather when river flows are elevated; for some of the CSO facilities, CSO discharges occur only during quite large storms. Finally, regardless of the type of study, **the effluent limits that EPA has modified should be delayed until after the studies have been completed** to avoid imposing excessively stringent limits that cannot be made more appropriate in future permit cycles, due to the antibacksliding rule.

Comments on Part I.J. REPORTING REQUIREMENTS

I.J.2. Submittal of Reports as NetDMR Attachments

(2023 Draft Permit – page 65 of 68)

MWRA notes a typographical error – the reference to Part I.J.8. should be to Part I.J.7, which is the section that describes state reporting requirements.

I.J.6. Submittal of Sewer Overflow and Bypass Reports and Notifications

(2023 Draft Permit – page 66 of 68)

MWRA notes a typographical error – this section contains one paragraph, numbered “c” rather than “a”.

6. Submittal of Sewer Overflow and Bypass Reports and Notifications

- c. The Permittee shall submit required reports and notifications under Part II.B.4.c, for bypasses, and Part II.D.1.e, for sanitary sewer overflows (SSOs) electronically using EPA’s NPDES Electronic Reporting Tool (“NeT”), which will be accessible through EPA’s Central Data Exchange at <https://cdx.epa.gov/>.

Also, the language above includes “reports and notifications”, Part II.B.4.c uses the term “notice”, so **it would be clearer to revise the above paragraph to say “The Permittee shall submit required reports and notices.”**

The system for electronic reporting of SSOs, which MWRA understands is called “NeT-SewerOverflow,” is not yet available to Massachusetts permittees and it is relatively untested. Furthermore, MWRA’s understanding is that it is not yet capable of accepting notices of anticipated bypasses required by Part II.B.4.c.(1). Therefore, **MWRA recommends that the**

EPA and MassDEP
 Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284
 November 28, 2023
 Page 78 of 80

Permit provide for an alternate permitted method in case a permittee is unable to access CDX or the NeT-SewerOverflow program service. For example, add the clause:

unless the permittee is able to demonstrate a reasonable basis that precludes the use of NeT-SewerOverflow for submitting reports.

and add information about how to submit reports if NeT-SewerOverflow is not available.

Comments on Part I.K. STATE 401 CERTIFICATION CONDITIONS

I.K.2. pH

(2023 Draft Permit – page 67 of 68)

For clarity, **this section should indicate that the pH Adjustment Demonstration Project and pH limits mentioned, apply only to the Deer Island Treatment Plant Outfall, T01.**

I.K.3. CSO Public Notification Plans

(2023 Draft Permit – page 68 of 68)

This section references “preliminary and final” notification plans; as the final plans supersede the preliminary ones, **this section should be modified by deleting “preliminary and”.**

Comments on Permit Attachments

Attachment A: CSO Outfalls and Responsible Party

Attachment A should include all of the CSO outfalls, including the outfalls associated with treatment facilities, as discussed in the comments above.

Outfall No.	Responsible Permittee or Co-permittee	Receiving Water	Latitude and Longitude
MWR201 (Cottage Farm CSO Facility)	Massachusetts Water Resources Authority	Charles River	42° 21’ 10” N, 71° 6’ 40” W
MWR203 (Prison Point CSO Facility)	Massachusetts Water Resources Authority	Boston Inner Harbor	42° 22’ 8” N, 71° 3’ 39” W
MWR205 (Somerville Marginal CSO Facility)	Massachusetts Water Resources Authority	Mystic River (marine)	42° 23’ 39” N, 71° 4’ 34” W

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 79 of 80

Outfall No.	Responsible Permittee or Co-permittee	Receiving Water	Latitude and Longitude
MWR205A (Relief outfall, Somerville Marginal CSO Facility)	Massachusetts Water Resources Authority	Mystic River	42° 23' 54" N, 71° 5' 0" W
MWR215 (Union Park CSO Facility: internal outfall, discharges to BOS070)	Massachusetts Water Resources Authority	Boston Inner Harbor/Fort Point Channel	42° 20' 34" N, 71° 3' 40" W

Also, MWRA notes the following corrections:

- BOS013 and BOS014 discharge to Chelsea River (Chelsea Creek, MassDEP segment MA71-06) not to the Mystic River or to the Boston Inner Harbor.
- Correct location for BOS014 outfall is 42° 22' **56**" N, 71° 1' **37**" W
- Correct location for BOS010 outfall is 42° 22' **26**" N, 71° 2' **30**" W
- CHE008 is listed twice in the table; remove the first instance.
- The MassDEP segment MA70-02 (Boston Inner Harbor) encompasses also Little Mystic Channel, Fort Point Channel, and the Reserved Channel. MWRA recommends that the receiving waters for inner harbor CSOs be listed as follows:
 - BOS062, BOS064, BOS065, BOS068, BOS070, BOS073: "Boston Inner Harbor/Fort Point Channel"
 - MWR203 "Boston Inner Harbor"
 - BOS076, BOS078, BOS079, BOS080: "Boston Inner Harbor/Reserved Channel" (note the correct name for the water body is "Reserved" Channel not "Reserve")
- MWR003 discharges to Little River (MassDEP segment MA71-22) rather than to Alewife Brook.
- The correct location for MWR003 is 42° **23' 50**" N, 71° **8' 39**" W
- The correct location for CAM001 is 42° 24' 7" N, 71° 8' **8**" W
- The correct location for CAM401B is 42° 24' **3**" N, 71° 8' **11**"W
- The correct location for the CAM009 outfall is 42° 22' **13**" N, 71° 7' **27**" W
- The correct location for the CAM011 outfall is 42° 22' **9**" N, 71° 7' **6**" W
- The correct location for the BOS019 outfall is 42° 22' **47**" N, 71° 3' **6**" W
- CHE003 and CHE004 discharge to Chelsea River (Chelsea Creek, MassDEP segment MA71-06) not to the Mystic River.

EPA and MassDEP

Attachment 1: MWRA Detailed Comments on 2023 Draft NPDES Permit No. MA0103284

November 28, 2023

Page 80 of 80

Attachment G: Industrial Pretreatment Program Annual Report

Item 5(a)

As stated above, MWRA does not take issue with the specific requirements in Attachment G, but new reports will need to be developed to capture the additional reporting requirements. New business practices will need to be created in order to track and document, which may be impacted by when the NPDES permit becomes effective. **EPA should provide advance notice on what must be reported and how it will be set up in the electronic annual reporting system so that MWRA can perform any necessary reprogramming in our system.**

Item 18

“Section E.7” reference should be to the part currently numbered as Part I. section G.10. (But see comment about duplicate sections G.4 and G.10, above.)

Header block of each page has a typographical error – all four pages say “Page 1 of 4”

Item 19

As explained above in MWRA’s comments on Part I.G.9 of the Draft Permit, enhanced reporting requirements will require changes to MWRA electronic systems and business practices and will not be able to comply on a retroactive basis. **Therefore, MWRA requests the following redline revisions to Item 19:**

19. Any other information that may be deemed necessary by the Approval Authority **including, but not limited to, an explanation of any deviations to this Attachment G that may be necessary in order to account for the effective date of the Permit and any other relevant considerations.**

Attachment I: Authorized Typical Year CSO Discharge Activation and Frequency

Based on the description in the Draft Permit fact sheet and a review of the Court filings in the Boston Harbor Case, U.S. v. Metropolitan District Commission et al., Civil Action No. 85-0489-RGS, Doc. No. 1636, Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control (March 15, 2006) (“Second Stipulation”), Attachment I to the Draft Permit appears to be a document taken from Exhibit B to the Second Stipulation. This document, however, was subsequently amended and superseded through filings with, and ultimately approved by, the Court in April and May 2008. See, Doc. Nos. 1691 and 1693 (attached hereto as Attachment 5). Accordingly, **Attachment I to the Draft Permit is out-of-date.**

EPA and MassDEP
 Attachment 2: MWRA Comments on 2023 Draft NPDES Permit No. MA0103284 Fact Sheet
 November 28, 2023
 Page 1 of 10

MWRA Comments on the Draft Deer Island Treatment Plant and Combined Sewer Overflow NPDES Permit (MA0103284) Fact Sheet

Table of Contents entries refer to sections of the Fact Sheet.

Contents

Sections 4.1.2 Boston Inner Harbor and 4.1.3 Dorchester Bay..... 1

Section 5.1.7 Total Residual Chlorine (TRC)..... 2

Section 5.1.6 Bacteria..... 2

Section 5.1.11 Metals..... 2

Section 5.1.12 Other Toxics..... 3

Section 5.4 Infiltration/Inflow..... 3

Section 5.7 Combined Sewer Overflows..... 4

Section 5.7.1.6. Total Residual Chlorine (TRC)..... 7

Section 5.7.2. Conditions for Discharge..... 7

Section 5.9. Assurance of Compliance with 436 MGD Flow Limit..... 7

Section 5.10. Pollution Prevention Plan..... 7

Section 5.12.1. Effluent Monitoring..... 8

Section 5.12.2. Water Column Monitoring..... 8

Figure 10: Extent of MWRA Collection System..... 8

Figure 17: Infiltration as % of Average Daily Flow..... 9

Appendix A to the Fact Sheet..... 9

Appendix H to the Fact Sheet..... 9

Sections 4.1.2 Boston Inner Harbor and 4.1.3 Dorchester Bay
(2023 Draft Permit Fact Sheet – page 23-28 of 195)

Tables 2 and 3 in the Fact Sheet note that segments of Boston Inner Harbor and Dorchester Bay are designated as impaired For Fish Consumption. The Massachusetts Water Resources Authority (MWRA) notes that this designation in the Massachusetts Surface Water Quality Standards, is based entirely on the application of Fish Consumption Advisories by the Massachusetts Department of Public Health (DPH), based on data collected in the 1970s and early 1980s, before the completion of the Boston Harbor Project. More recent data collected by MWRA has

EPA and MassDEP

Attachment 2: MWRA Comments on 2023 Draft NPDES Permit No. MA0103284 Fact Sheet

November 28, 2023

Page 2 of 10

documented that current fish tissue contamination levels are well below^{1,2} U.S. Food and Drug Administration (FDA) action levels³. However, in our understanding, DPH never removes advisories once applied, regardless of how safe and wholesome the fish become.

Section 5.1.7 Total Residual Chlorine (TRC)

(2023 Draft Permit Fact Sheet – page 54 of 195)

Note that the calculation of the acute limit at the top of page 55 is incorrect, as it uses 11 µg/L instead of the correct water quality criterion 13 µg/L.

Section 5.1.6 Bacteria

(2023 Draft Permit Fact Sheet – page 48 of 195)

The Fact Sheet states

The receiving waters are currently classified as shellfishing waters although they are classified as “prohibited” for shellfishing by the Massachusetts Division of Marine Fisheries (MA Marine Fisheries) due to the existence of the DITP outfall.

This is incorrect; the receiving waters are classified as prohibited because the Massachusetts Division of Marine Fisheries does not monitor offshore Massachusetts Bay for shellfish safety. (J. Kennedy, Massachusetts Division of Marine Fisheries, personal communication).

Section 5.1.11 Metals

(2023 Draft Permit Fact Sheet – page 80-81 of 195)

MWRA appreciates that, after considering substantial effluent data (over 20 years) and conducting a reasonable potential analysis, EPA rightly concludes there is no reasonable potential to cause or contribute excursion of water quality standards (WQS) from metals and remove effluent limits for these chemicals. As for the requirement that “*ambient monitoring for each of these metals will continue to be required in the WET tests*”, we discuss in our comments on the whole effluent toxicity section (Attachment 1, Part I.A, “Dilution Water for Toxicity Testing with DITP Effluent”) the difficulty to comply with this requirement given geographical constraints and safety concerns related to the receiving waters, and the fact that, technically, laboratory artificial waters can be used as good surrogates for receiving water samples.

¹ Kane-Driscoll S., M. Edwards, A. Pembroke, E.C. Nestler, and C. Gurshin. 2008. Changes in contaminants in winter flounder, lobster, and caged mussels in Massachusetts and Cape Cod Bays and Boston Harbor: 1995-2006. Boston: Massachusetts Water Resources Authority. Report 2008-09. 73p. <https://www.mwra.com/harbor/enquad/pdf/2008-09.pdf>

² Nestler EC, Pembroke A, Lao Y. 2016. 2015 fish and shellfish tissue chemistry report. Boston: Massachusetts Water Resources Authority. Report 2016-13. 44 p. <https://www.mwra.com/harbor/enquad/pdf/2016-13.pdf>

³ U.S. FDA, 2019. National Shellfish Sanitation Program (NSSP) Guide for the Control of Molluscan Shellfish 2019 Revision. Available at <https://www.fda.gov/media/143238/download>

EPA and MassDEP

Attachment 2: MWRA Comments on 2023 Draft NPDES Permit No. MA0103284 Fact Sheet

November 28, 2023

Page 3 of 10

Section 5.1.12 Other Toxics

(2023 Draft Permit Fact Sheet – page 81 of 195)

MWRA supports the conclusion from EPA’s reasonable potential analysis that the monitoring requirement for pesticides, PCBs and mercury be removed from the Permit.

Section 5.4 Infiltration/Inflow

(2023 Draft Permit Fact Sheet – page 99 of 195)

In the Fact Sheet (page 99 of 105), EPA suggests that ‘infiltration and inflow is at excessive levels in the MWRA collection system’.

It should be noted that the MWRA sewer system is an older conveyance system, covering an area of about 500 square miles, with many member sewer communities situated in low-lying and coastal environments.

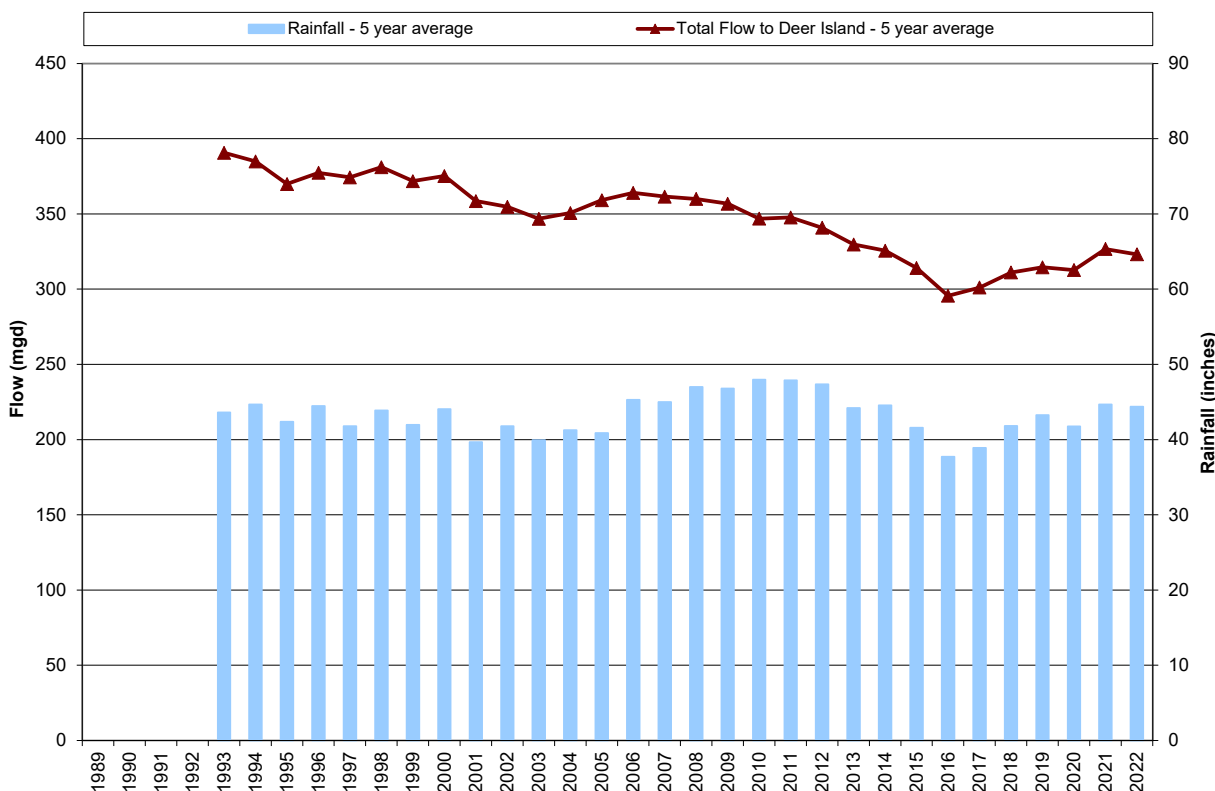
A large portion of the Metropolitan Boston sewer system was built from 1891 through 1933. In the 1950s, sewer extensions were made to serve the Hingham North Sewer District, Holbrook and Randolph, as well as Ashland, Framingham and Natick. During the 1970s, additional sewer extensions were built to serve Bedford, Burlington, Wilmington and Westwood. MWRA’s sewer service area today remains essentially the same as that following the 1970s system expansion.

The MWRA sewer system serves 43 communities with a total population of about 2.3 million people. The regional collection system encompasses about 226 miles of MWRA-owned sewer pipelines, 5350 miles of publicly owned community sewers, and 5500+ miles of private sewer service connections. The average age of MWRA’s 226-mile gravity sewer system is approximately 70 years old, with nearly 40% of the sewers more than 100 years old. Most of the service area is served by separate sanitary sewers; while portions of five communities (Boston, Brookline, Cambridge, Chelsea and Somerville) utilize combined sewers.

As reported in MWRA’s Annual Infiltration and Inflow (I/I) Reduction Report submission to EPA/MassDEP, and clearly shown in the included wastewater flow graph, MWRA and community efforts to manage I/I have been successful at reducing flows to the system. The five-year running average daily flow has declined from approximately 391 million gallons per day (MGD) in the five year period beginning in 1989 to approximately 324 MGD in the most recent 5-year period, a reduction of 67 MGD or 17% of wastewater flow tributary to the Deer Island Treatment Plant.

EPA and MassDEP
 Attachment 2: MWRA Comments on 2023 Draft NPDES Permit No. MA0103284 Fact Sheet
 November 28, 2023
 Page 4 of 10

Figure 1. MWRA Long-Term Regional Flow Data Five Year Running Averages and Five-Year Running Average NOAA Rainfall at Logan Airport



Section 5.7 Combined Sewer Overflows
 (2023 Draft Permit Fact Sheet – pages 103-115 of 195)

The Fact Sheet states on page 104:

Performance improvements for 6 of the 16 are either in construction or design as of December 2021²⁸⁴. For the remaining 10 outfalls, MWRA has identified alternatives that will achieve the LTCP goals at 4 outfalls and evaluations will continue for the remaining 6.

Note that these numbers are correct as of the December 2021 Final CSO Post Construction Monitoring Program and Performance Assessment Report⁴; however, the number of CSOs meeting LTCP goals has increased since that time.

⁴ AECOM, 2021. Task 6: Final CSO Post Construction Monitoring Program and Performance Assessment Report. Available at <https://www.mwra.com/cso/pcmpa-reports/Final12302021.pdf>

EPA and MassDEP
Attachment 2: MWRA Comments on 2023 Draft NPDES Permit No. MA0103284 Fact Sheet
November 28, 2023
Page 5 of 10

Page 108 of the Fact Sheet:

The most current estimates of CSO discharge frequency and volume expected in a typical year after full implementation of the CSO abatement projects required by the court order are documented in Exhibit B of the “Second Stipulation” (See Appendix I of this Fact Sheet).

Note that Appendix I of the Fact Sheet is not “Exhibit B of the ‘Second Stipulation’ ” and does not include current estimates of CSO discharge frequency and volume in a Typical Year. It appears that EPA included the wrong document as Appendix I. The appendix includes metered (or possibly modeled, in some cases) CSO discharge frequencies and volumes in actual years 2018-2022.

See also comments on Attachment I to the Draft Permit, which is an outdated version of “Exhibit B of the ‘Second Stipulation’.”

Also on page 108, last sentence:

The modeled estimates of the number of CSO activations and volumes currently discharged in a typical year and those actually discharged based on Quarter 4 2021 conditions and actual rainfall data are shown in Appendix I.

Appendix I to the Fact Sheet does not contain any modeled estimates of the number of CSO activations and volumes currently discharged in a typical year. Nor are the actual discharge results shown based on Quarter 4 2021 conditions, with the possible exception of the “2021” columns.

MWRA has not checked the values in this table, but the table footnotes indicate that the 2018-2021 data are “Activations and volumes from metered data reported in MWRA and communities' CSO Annual Reports”, while the 2022 data are “Activations and volumes from metered data in MWRA 2022 CSO Annual Report.” Therefore, the sentence quoted above is incorrect.

For Quarter 4 2021 conditions, modeled estimates of the number of CSO activations and volumes discharged in a Typical Year can be found in “Table 3-1. Typical Year Performance: Baseline 1992, Q4-2022 Conditions and LTCP Goals” of the December 2021 Final CSO Post Construction Monitoring Program and Performance Assessment Report. The most recent estimates would be found in the most recent annual report, which is currently the report covering 2022⁵.

On page 111, the text again incorrectly cites Appendix I as containing “Information on the authorized CSO treatment facilities, and the activation frequency and annual volume limits...” As noted above, Appendix I appears to contain actual year estimated CSO discharges. It does not list the LTCP goals for the outfall performance in a typical year.

⁵ See Table 2-6. Summary of 2022 Modeled and Metered CSO Discharges, in AECOM, 2023, CSO Annual Report – January 1 to December 31, 2022: CSO Discharge Estimates and Rainfall Analyses. Available at <https://www.mwra.com/cso/pcmpa-reports/042823-annualcso.pdf>

EPA and MassDEP

Attachment 2: MWRA Comments on 2023 Draft NPDES Permit No. MA0103284 Fact Sheet

November 28, 2023

Page 6 of 10

There are several errors in the tables starting on page 111.

Table 19: CSO discharges authorized to Boston Inner Harbor, Class SB – CSO, pages 111-112

- The activation and volume goals listed for BOS070 include only the Dorchester Brook Conduit (DBC), and not those for the other two regulators discharging through BOS070: BOS070/RCC (Roxbury Canal Conduit, 2 activations/0.26 MG) or the Union Park CSO treatment facility (MWR215, 3 activations/2.19 MG).
- BOS072 is missing from the table (0 activations/0 MG).
- Outfalls BOS081, BOS082, BOS084 and BOS085 discharge to Dorchester Bay, which is Class SB waters, not to Boston Inner Harbor, so they should be removed from this table or the table heading should be modified.
- If Boston Inner Harbor can be considered to include the Mystic/Chelsea Confluence (Class SB-CSO), then CHE003, CHE004, and CHE008 belong in this table (note, they are also included incorrectly in Table 22, see below.) BOS017 and BOS019 were erroneously listed in Table 22, and should be in Table 19.

Table 20: CSO outfalls authorized to Charles River, Class B -Variance for CSO outfalls, page 113

- BOS046 discharges to the Back Bay Fens/Muddy River, which is designated as Class B-CSO, not to the Charles River, and is not subject to the Variance conditions.

Table 22: CSO outfalls authorized to Mystic River, Class B -Variance for CSO outfalls, page 115, and preceding paragraph

Only MWR205A discharges to the Upper Mystic with Class B designation. All other CSOs in this table discharge to the Mystic/Chelsea Confluence which has a Class SB-CSO designation and is not subject to the Variance conditions.

On page 115 there is an error in a citation for the Second CSO Stipulation:

As required in the variance, the typical year activation frequency and volume for each discharge shall be in accordance with the performance of the CSO Long-term Control Plan, as defined in Exhibit B of the Second CSO Stipulation incorporated into the Federal Court Order on April 27, 2006.

As noted in comments on the Draft Permit, Exhibit B was updated in 2008.

EPA and MassDEP

Attachment 2: MWRA Comments on 2023 Draft NPDES Permit No. MA0103284 Fact Sheet

November 28, 2023

Page 7 of 10

Section 5.7.1.6. Total Residual Chlorine (TRC)

(2023 Draft Permit Fact Sheet – page 121 of 195)

With respect to Combined Sewer Overflows, the Fact Sheet states, “The DMR data submitted during the review period show that there have been numerous exceedances of the TRC limitations.” Nearly all of these are due to a coding error in EPA’s Integrated Compliance Information System (ICIS) database, which identified a violation whenever monthly average chlorine residual at Cottage Farm, was below 0.1 mg/L. See comments on Appendix H to the Fact Sheet, below, for more details.

Section 5.7.2. Conditions for Discharge

(2023 Draft Permit Fact Sheet – page 127 of 195)

MWRA notes two errors in this paragraph:

Certain outfalls, such as MWR401 and MWR205 discharge in dry weather – they are connected to additional infrastructure and the weir/regulator controlling the CSO discharge is upstream of these connections or separate.

There is no outfall MWR401. Perhaps the reference is intended to be CAM401A? Also, for clarity it should note that certain outfalls discharge stormwater and/or groundwater – not combined sewage – during dry weather.

Section 5.9. Assurance of Compliance with 436 MGD Flow Limit

(2023 Draft Permit Fact Sheet – page 128 of 195)

The 2000 Permit requires MWRA to submit an annual report describing demand management programs, including water conservation programs. MWRA maintains, and will continue to maintain, an active water conservation program providing information and water saving devices to allow customers to reduce their water use, control their costs, and provide environmental benefits. Notwithstanding that commitment, with the introduction of design flow limits in the Draft Permit, MWRA believes that EPA has made an appropriate and logical decision to discontinue the filing of an annual Water Demand Management Report.

Section 5.10. Pollution Prevention Plan

(2023 Draft Permit Fact Sheet – page 129-130 of 195)

MWRA notes a typographical error in this sentence at the bottom of page 129/top of page 130:

It is also noted that there is no reasonable potential for total PCBs in the effluent to cause or contribute to an exceedance of WQS and PCB Aroclors 1016, 1221, 1232, 1242, 1248, 1254, and 1260 have not been reported as zero in the DITP effluent DMR reports (see Sections 5.1.12.11 and 5.1.12.12).

EPA and MassDEP
Attachment 2: MWRA Comments on 2023 Draft NPDES Permit No. MA0103284 Fact Sheet
November 28, 2023
Page 8 of 10

This sentence should say that the PCB Aroclors “have been reported as zero”, or, “have not been detected”.

Section 5.12.1. Effluent Monitoring

(2023 Draft Permit Fact Sheet – Summary, page 136 of 195)

As noted in Attachment 1, the following statement in the Fact Sheet should be added to Part I.I.6 of the Permit, as the status, as of the effective date of the Permit, of effluent monitoring associated with the Ambient Monitoring Plan (AMP) is unclear.

Effluent monitoring is no longer required as part of the AMP as it is redundant with the requirements of the Draft Permit.

Section 5.12.2. Water Column Monitoring

(2023 Draft Permit Fact Sheet – page 144 & 147 of 195)

Footnote 370 of the Fact Sheet has misspelled the last name of the lead author of the cited paper. It is “Hattenrath-Lehmann” rather than “Kattenrath-Lehmann”.

The Fact Sheet makes the following unconditional statement, but without references (page 144):

The dynamics of harmful algal blooms have changed throughout Massachusetts Bay and the greater Gulf of Maine, especially in regard to the toxin producing *Alexandrium* and *Pseudo-nitzschia* and the nuisance alga *Karenia mikimotoi*.⁶

MWRA believes this unconditional statement needs backing from the scientific literature, and requests references from EPA.

Section 5.13 Contingency Plan (CP)

(2023 Draft Permit Fact Sheet – page 165 of 195)

MWRA agrees that the Contingency Plan is obsolete, as more than 20 years of monitoring data show no impacts from the Deer Island Treatment Plant (DITP) discharge.

Comments on Figures appended to the Fact Sheet

Figure 10: Extent of MWRA Collection System

(2023 Draft Permit Fact Sheet – page 184 of 195)

The figure shows an incorrect division of service area into North and South. Boston, Brookline, Newton, and Milton are split between the North and South collection systems. See https://www.mwra.com/biobot/v5__north-south-1.jpg

⁶ EPA 2023. Page 144.

EPA and MassDEP

Attachment 2: MWRA Comments on 2023 Draft NPDES Permit No. MA0103284 Fact Sheet

November 28, 2023

Page 9 of 10

Figure 17: Infiltration as % of Average Daily Flow*(2023 Draft Permit Fact Sheet – page 191 of 195)*

Note that the values for Infiltration as a percentage of average daily flow for all MWRA sewer communities averaged, for the years 2014-2016 are incorrect. The values shown in the figure are much higher than the reported values in Table 2 of the corresponding report. Correct values are shown below.

Calendar Year	Average Infiltration (MGD)	Average Sanitary Flow (MGD)	Percent infiltration	Source
2014	90.37	308.83	29.3 %	Annual Infiltration and Inflow (I/I) Reduction Report for Fiscal Year 2015 https://www.mwra.com/harbor/pdf/infinf15.pdf
2015	77.71	282.34	27.5 %	Annual Infiltration and Inflow (I/I) Reduction Report for Fiscal Year 2016 https://www.mwra.com/harbor/pdf/infinf16.pdf
2016	70.01	269.31	26 %	Annual Infiltration and Inflow (I/I) Reduction Report for Fiscal Year 2017 https://www.mwra.com/harbor/pdf/infinf17.pdf

Appendix A to the Fact Sheet

See comments on the Draft Permit's Attachment A on pages 78-79 of Attachment 1; these same errors occur in Appendix A to the Fact Sheet.

Appendix H to the Fact Sheet*(2023 Draft Permit Fact Sheet: Appendix H – page 3-4 & 27-28 of 32)*

Pages 3 and 4 of this Appendix incorrectly indicate that there were 13 violations of the chlorine residual monthly average limit at Cottage Farm between 2018 and 2022. Because the limit was incorrectly coded in EPA's database as a "Monthly Ave Min" instead of a maximum allowable value, all non-detect and very low chlorine residual values were interpreted by EPA's computer as violations, while the one actual violation, on 4/30/2019, was interpreted as in compliance.

MWRA informed EPA of this coding error in 2016 when we moved to using EPA's electronic system for DMRs, but we were told that because the permit had expired the permit limit could not be corrected in the reporting system. Therefore, MWRA notes the error in the DMR comments field whenever we report monitoring results for Cottage Farm.

EPA and MassDEP

Attachment 2: MWRA Comments on 2023 Draft NPDES Permit No. MA0103284 Fact Sheet

November 28, 2023

Page 10 of 10

On pages 27 and 28, note that a similar coding error means that *Enterococcus* data at Union Park are recorded in EPA's system as *E. coli*.

EPA and MassDEP

Attachment 3: MWRA Comments on the Draft Surface Water Discharge Permit: Deer Island Treatment Plant (MA 0103284)

November 28, 2023

Page 1 of 2

MWRA Comments on the Draft Surface Water Discharge Permit: Deer Island Treatment Plant (MA 0103284)

The Massachusetts Water Resources Authority (MWRA) has the following comments on the 2023 Draft Massachusetts Permit to Discharge Pollutants to Surface Waters (State Permit) for the Deer Island Treatment Plant and Combined Sewer Overflows (CSOs), and the Draft Massachusetts Clean Water Act Section 401 Certification For the Proposed 2023 National Pollutant Discharge Elimination System (NPDES) Permit For the Massachusetts Water Resources Authority Deer Island Treatment Plant Permit No. MA0103284.

Comment on Item 6

In the State Permit, monitoring of Significant Industrial Users (SIUs) must begin within six months of the effective date of the permit. **MWRA requests that this be modified to coincide with a fiscal year that we use for our pretreatment programs, by rephrasing this section as shown in the red text below:**

The permittee shall commence annual monitoring of all Significant Industrial Users discharging into the POTW using Draft Method 1633 **at the start of the next fiscal year following the date that this Permit becomes effective.**

A corresponding change should be made to the Draft Massachusetts Clean Water Act Section 401 Certification.

Comment on Item 8

“On or before January 31, 2024” should be modified to “Within 90 days of the permit effective date”.

Also, updates to this list should be due on the same schedule as MWRA’s annual Industrial Pretreatment Annual Report to the U.S. Environmental Protection Agency (EPA), that is, October 31 of each year.

A corresponding change should be made to the Draft Massachusetts Clean Water Act Section 401 Certification.

Comment on inclusion of co-permittees

The EPA draft Permit and the Massachusetts Department of Environmental Protection (MassDEP) draft Surface Water Discharge Permit attempt to regulate 43 separate sewer communities as “Co-permittees,” including four communities as “CSO-responsible Co-permittees,” which up until this point, have been regulated under four separate individual NPDES permits. The Federal Clean Water Act, 33 U.S.C. § 1251 *et seq.* (“CWA”), and the Massachusetts Clean Waters Act, M.G.L.

EPA and MassDEP

Attachment 3: MWRA Comments on the Draft Surface Water Discharge Permit: Deer Island Treatment Plant (MA 0103284)

November 28, 2023

Page 2 of 2

c. 21, §§ 26 through 53 do not provide statutory authorization for EPA or MassDEP to take such actions in their respective draft permits. Moreover, even if it can be argued that these statutes provide discretionary authority for EPA and MassDEP to regulate the identified Co-permittees in a single NPDES or State Surface Water Discharge permit, the EPA's and MassDEP's actions nevertheless constitute an abuse of that discretion. Further, MWRA adopts and incorporates by reference into these comments the proposed alternative permit language and comments and submitted by the MWRA Advisory Board in Sections II, III, and IV of their comments dated November 28, 2023. Finally, in accordance with the specific request for comments in the Draft Permit Fact Sheet regarding the "...clarity of the several liability for the Permittee..." and for the further removal of doubt, **MWRA requests that EPA and MassDEP include the following statements in their respective permits:**

In no event shall the Permittee be liable under the CWA (including, but not limited to, any liability arising under 33 U.S.C. §§ 1319, 1321, & 1365), the Massachusetts Clean Waters Act, or otherwise be responsible for: (a) the acts or failure to act of Co-permittees; (b) the failure to properly operate or maintain any collection system or portion of a collection system that it does not own or operate; or (c) enforcing the terms of this Permit against any Co-permittee. In the event of any conflict between the above provisions and any other term or provision of this Permit, the above provisions shall control.

Comment on Appendices

In Appendix C to the State Permit, note that the correct mailing address for the City of Chelsea is as follows:

City of Chelsea
Department of Public Works
500 Broadway Room 310
Chelsea, MA 02150

MWRA Comments on 2023 Draft NPDES Permit No. MA0103284

Attachment 4: Blending Stipulation and Order

the provisions of this Order and Appendix A; and

- vi. a description of the environmental and public health benefits resulting from implementation of the SEP (with a quantification of the benefits and any pollutant reductions, if feasible).

b. The SEP Completion Reports shall be signed by an MWRA official with knowledge of the SEP and shall include the following certification language:

I certify under penalty of law that this document and all attachments were prepared under my direction and supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

5. Upon receipt of a SEP Completion Report, EPA will either (i) indicate in writing that EPA concludes that the SEP has been completed in accordance with the provisions of this Order and Appendix A, (ii) indicate in writing that EPA concludes that the SEP has not been completed in accordance with the provisions of this Order and Appendix A, with a statement of reasons for its conclusion, or (iii) request supplementation of the SEP Completion Report, with a specification of the supplemental information required.

6. Any written public statement, in print, film, or other media, made by the MWRA making reference to the SEPs under this Order shall include the following language: "This project was undertaken in connection with the settlement of an enforcement action, United States v. Massachusetts Water Resources Authority, taken on behalf of the U.S.

c. The term "secondary process limit" refers to the setting in the process control system for the Deer Island Treatment Plant which directs flows up to and including that flow rate through secondary treatment.

d. Nothing in this Stipulation and Order constitutes a stipulation or determination by the MWRA, the United States, or the Court as to whether bypasses of secondary treatment of flows at the DITP below, at, or above 700 MGD satisfy the bypass conditions set forth in Part II.B.4.b. or d. of the MWRA's NPDES permit and in 40 C.F.R. § 122.41(m)(2) or (4).

9. Within 24 hours after the commencement of any diversion of waste water around secondary treatment facilities at the DITP, the MWRA shall notify the EPA by telephone or email of the commencement of the diversion of waste water around secondary treatment facilities. Within 5 days after the commencement of any diversion of waste water around secondary treatment facilities at the DITP, the MWRA shall provide to EPA a written submission containing a description of the diversion and its cause and the period of the diversion, including its exact dates and times. If the diversion has not stopped by the time the written submission is due, the written submission shall also include a statement as to the anticipated time it is expected to continue and any steps taken or planned to reduce or eliminate the diversion.

Stipulated Penalties

10. a. For each of the SEPs, if the MWRA does not complete the implementation of the SEP in accordance with the Order and Appendix A by the final completion date specified in Appendix A for that SEP, the MWRA shall, subject to the provisions of Paragraph 10.c. hereof, be liable for stipulated penalties of \$ 250 per day for the 1st

through 30th day, \$500 per day for the 31st through 60th day, and \$1000 per day for the 61st day and beyond. Stipulated penalties shall begin to accrue on the date the SEP was to be completed in accordance with the Order and Appendix A and shall accrue until the SEP has been completed.

b. If the MWRA does not submit the SEP Completion Reports, containing the information required under Paragraph 4, by the dates specified in Appendix A, the MWRA shall, subject to the provisions of Paragraph 10.c. hereof, be liable for stipulated penalties of \$ 250 per day for the 1st through 30th day, \$500 per day for the 31st through 60th day, and \$ 1,000 per day for the 61st day and beyond. Stipulated penalties shall begin to accrue on the date the SEP Completion Report was to be submitted and shall accrue until the SEP Completion Report, containing the required information, has been submitted.

c. Force Majeure.

i. For the purposes of this Paragraph, "force majeure" shall mean any event that is beyond the control of the MWRA that delays the timely completion of a SEP in accordance with the Order and Appendix A beyond the final completion date for that SEP set forth in Appendix A or the timely submission of the SEP Completion Report beyond the submission due date specified in Appendix A despite the MWRA's best efforts to fulfill the obligation. The requirement that the MWRA exercise "best efforts to fulfill the obligation" includes best efforts to anticipate any potential force majeure event and best efforts to address the effects of any such event (a) as it is occurring and (b) after it has occurred to prevent or minimize any resulting delay to the greatest extent possible.

ii. If any event occurs that may delay the completion of a SEP beyond

the final completion date set forth in Appendix A or the submission of the SEP Completion Report beyond the submission due date set forth in Appendix A, as to which the MWRA intends to assert a claim of force majeure, the MWRA shall notify the United States at the addresses specified in Paragraph 18, in writing, as soon as practicable but no later than ten (10) calendar days from the date the MWRA first knew of the event. The notice shall include a description of the event; an explanation of the reasons for the delay; the anticipated duration of the delay; all actions taken or to be taken to prevent or minimize the delay; a schedule for implementation of any measures to be taken to prevent or minimize the delay; and the MWRA's reasons for attributing the event to force majeure. Compliance with the notice requirement of Paragraph 10.c.ii. shall be a condition to any claim of force majeure.

iii. If EPA agrees that the delay or anticipated delay is attributable to a force majeure event, the MWRA shall not be liable for stipulated penalties under Paragraph 10.a. or b. for delay attributable to the event and the time for completion of the SEP or submission of the SEP Completion Report will be extended for the period of delay attributable to the event. If EPA does not agree that the delay or anticipated delay has been or will be caused by a force majeure event, the MWRA may assert in defense of any demand for stipulated penalties under Paragraph 10 or 11 that the delay was due to a force majeure event. In any such proceeding arising from such a demand, the MWRA shall have the burden of demonstrating by a preponderance of the evidence that the delay was due to a force majeure event, that the duration of the delay was warranted under the circumstances, that best efforts were exercised to avoid or minimize the delay, and that the MWRA provided the notice required under Paragraph 10.c.ii. If the MWRA carries this burden, stipulated penalties shall not be due for the period of delay due to

the force majeure event.

11. If EPA concludes that the MWRA is liable for stipulated penalties under Paragraph 10.a. or b. above, EPA may send the MWRA a written demand for stipulated penalties. If EPA sends the MWRA such a demand, the MWRA shall pay the stipulated penalties within thirty days of receiving the demand unless the MWRA disputes EPA's conclusion that the MWRA is liable for stipulated penalties under Paragraph 10.a. or b. above. In the event the MWRA disputes EPA's conclusion, the MWRA shall bear the burden of proof of demonstrating that EPA's conclusion is incorrect. In the event the MWRA disputes EPA's conclusion, any stipulated penalties, together with interest, determined to be due and owing shall be paid within thirty days of an agreement between the MWRA and the United States or a ruling by this Court, or, if appealed, the First Circuit, resolving the dispute.

Other Provisions

12. This Order resolves the civil claims of the United States for the violations alleged in the Supplemental Complaint filed in this action through the date of the filing of the Supplemental Complaint. The MWRA's execution of this Stipulation and Order is not, and shall not be construed to be, an admission by the MWRA of the truth of any of the allegations of the Supplemental Complaint concerning conduct or omissions to act by the MWRA which are alleged therein to constitute a violation of the Clean Water Act, of the regulations under that Act, or of the terms of the MWRA's NPDES permit.

13. The United States reserves all legal and equitable remedies available to enforce the provisions of this Order. This Order shall not be construed to limit the rights of the United States to obtain penalties or injunctive relief under the Clean Water Act or implementing

regulations, or under other federal laws, regulations, or permit conditions, except as expressly specified in Paragraph 12.

14. In any subsequent or previously filed administrative or judicial proceeding initiated by the United States for injunctive relief, civil penalties, or other appropriate relief relating to the Deer Island Treatment Plant, the MWRA shall not assert, and may not maintain, any defense or claim based upon the principles of waiver, res judicata, collateral estoppel, issue preclusion, claim preclusion, claim-splitting, or other defenses based upon any contention that the claims raised by the United States in the subsequent or previously filed proceeding were or should have been brought in the instant case, except with respect to claims that have been specifically resolved pursuant to Paragraph 12 of this Order.

15. This Order is not a permit, or modification of any permit, under any federal, State, or local laws or regulations. The MWRA is responsible for achieving and maintaining complete compliance with all applicable federal, State, and local laws, regulations, and permits; and the MWRA's compliance with this Order shall be no defense to any action commenced pursuant to any such laws, regulations, or permits, except as set forth herein. The United States, by moving to enter this Order, does not warrant or aver in any manner that the MWRA's compliance with any aspect of this Order will result in compliance with provisions of the Clean Water Act, 42 U.S.C. § 1251, et seq. or with any other provisions of federal, State, or local laws, regulations, or permits.

16. Nothing in this Order limits the rights or defenses available under Section 309(e) of the Clean Water Act, 33 U.S.C. § 1319(e), in the event that the laws of the State, as currently or hereafter enacted, may prevent the MWRA from raising revenues needed to comply with the Order.

17. This Stipulation and Order shall be lodged with the Court for a period of not less than 30 days for public notice and comment in accordance with 28 C.F.R. § 50.7. The United States reserves the right to withdraw or withhold its consent to the Stipulation and Order if the comments regarding the Stipulation and Order disclose facts or considerations indicating that the Stipulation and Order is inappropriate, improper, or inadequate. The MWRA agrees not to withdraw from or oppose entry of this Stipulation and Order by the Court or to challenge any provision of the Stipulation and Order, unless the United States has notified the MWRA in writing that it no longer supports entry of the Stipulation and Order as lodged with the Court.

18. For purposes of this Order, the addresses of the United States Attorney's Office, the U.S. Department of Justice - EES, and EPA are:

Anton P. Giedt
Assistant United States Attorney
John J. Moakley U.S. Court House
1 Courthouse Way, Suite 9200
Boston, MA 02210

Chief, Environmental Enforcement Section
U.S. Department of Justice - EES
P.O. Box 7611, Ben Franklin Station
Washington, D.C. 20044-7611

Michael Wagner
Assistant Enforcement Counsel
Office of Environmental Stewardship
U.S. Environmental Protection Agency, Region I
One Congress Street, Mail Code SEL
Boston, MA 02114-2023

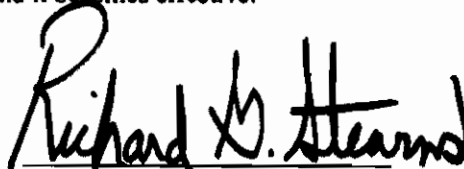
Todd Borci
Environmental Engineer
Office of Environmental Stewardship
U.S. Environmental Protection Agency, Region I
One Congress Street, Suite 1100 - Mail Code SEW
Boston, MA 02114-2023

19. a. This Court shall retain jurisdiction over this case for the purpose of resolving any disputes under this Stipulation and Order or effectuating or enforcing compliance with the terms of the Stipulation and Order.

b. Compliance with the requirements of Paragraphs 1 through 7 and 10 and 11 of this Stipulation and Order and Appendix A shall constitute compliance in full with the penalty and SEP provisions of this Stipulation and Order. The MWRA's obligations under Paragraphs 8 and 9 of this Order shall terminate when a new NPDES permit is issued to the MWRA by the EPA relating to the DITP and it becomes effective.

SO ORDERED.

9-8-08.


United States District Judge

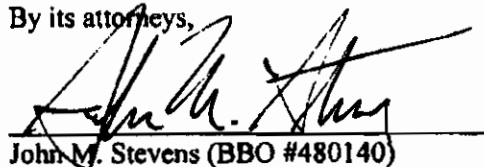
Stipulated to:

Massachusetts Water Resources Authority

United States of America

By its attorneys,

By its attorneys,



John M. Stevens (BBO #480140)
Foley, Hoag LLP
155 Seaport Boulevard
Boston, Massachusetts 02210

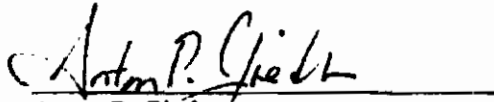
Ronald J. Tenpas
Assistant Attorney General
Environment and Natural Resources
Division
U.S. Department of Justice
Washington, D.C. 20530

Of Counsel:



Steven A. Remsberg
General Counsel
Massachusetts Water Resources Authority
100 First Avenue
Boston, MA 02109

Michael J. Sullivan
United States Attorney
District of Massachusetts
John J. Moakley U.S. Court House
One Courthouse Way, Suite 9200
Boston, Massachusetts 02210



Anton P. Giedt
Assistant U.S. Attorney
John J. Moakley U.S. Court House
One Courthouse Way, Suite 9200
Boston, Massachusetts 02210

Of Counsel:

Michael Wagner
Assistant Enforcement Counsel
U.S. Environmental Protection Agency
One Congress Street, Mail Code SEL
Boston, MA 02114-2023

APPROVED
 25 11 2008
 7/12/08

disposal or recycling. The MWRA shall provide copies of such documentation to EPA upon request. The amounts of debris removed can be measured through photographs, records of the number of dumpsters filled with various types of debris, and/or other methods of documentation.

Eligible SEP costs are the costs of the actual removal work and disposal or recycling charges. The MWRA's administrative costs shall not be counted towards the cost of the SEP.

Estimated Cost of the SEP: \$105,000¹

Schedule:

Activity	Milestone
Commence debris removal.	Prior to the end of twelve months from the entry of the Stipulation and Order
Complete debris removal on the Neponset River, Belle Island Inlet, Mystic River, Malden River, Fore River, Town River Bay, Chelsea River, and Charles River.	Prior to the end of eighteen months from the entry of the Stipulation and Order (SEP final completion date)
Submit SEP Completion Report. The report shall include a summary of the times and locations of work, the amounts and types of debris removed, the methods and locations of recycling or disposal, and copies of applicable cost documentation, including any contracts or other agreements entered into for performance of the work, purchase orders, and invoices.	Prior to the end of twenty-one months from entry of the Stipulation and Order (SEP Completion Report due date)

^{1/} If the cost of the sewage pumpout boat purchased by the MWRA under the sewage pumpout boat SEP exceeds \$100,000, the MWRA may reduce the scope of work for debris removal in this SEP commensurate with the amount that the price of the pumpout boat exceeds \$100,000, provided that the total amount the MWRA spends on the three SEPs in this Appendix is at least \$305,000.

2. Sewage Pumpout Boat to Service Commercial Vessels

The MWRA shall provide a fully operational sewage pumpout boat to the City of Boston that will be used by the City to service commercial vessels in Boston Harbor and vicinity. The boat shall be at least 30 feet long and have a containment cell with a capacity of at least 950 gallons. It is estimated that the boat will cost approximately \$100,000. In order to proceed with this SEP, the MWRA shall obtain from the City an enforceable written commitment to the MWRA to (a) own, maintain, and operate the sewage pumpout boat provided by the MWRA for five years, (b) use the boat to pump sewage primarily out of commercial vessels in Boston Harbor and vicinity, (c) dispose of sewage pumped out in accordance with regulatory requirements, (d) maintain records concerning the operation and usage of the boat, including the numbers and types of vessels served, the volume of sewage pumped out, and the location(s) of disposal of the sewage pumped out, and (e) provide annual summaries regarding the operation and usage of the boat.²

The MWRA shall procure a contract for the design and construction of the sewage pumpout boat. Following construction of the sewage pumpout boat, the MWRA shall provide the boat, with appropriate title and registration documents, to the City. Following provision of the boat to the City, the MWRA shall provide annual summaries regarding the operation and usage of the boat to EPA as specified below.

Eligible SEP costs are the cost of the fully operational sewage pumpout boat. The MWRA's administrative costs shall not be counted towards the cost of the SEP.

Estimated Cost of the SEP: Approximately \$100,000³

² If the City of Boston does not provide a written commitment to the MWRA as specified above prior to the end of three months from the entry of the Stipulation and Order, the MWRA shall not be required to implement this SEP and shall instead utilize the \$100,000 estimated cost of this SEP in the implementation of another SEP, following approval by EPA of the SEP. *Unless a different SEP is proposed by the MWRA and approved by EPA, the \$100,000 shall be utilized on an additional marine debris/floatables cleanup SEP for tributaries to Boston Harbor following approval by EPA of the tributary selection and schedule.*

³ If the cost of the sewage pumpout boat purchased by the MWRA under this SEP exceeds \$100,000, the MWRA may reduce the scope of work for debris removal under the marine debris/floatables cleanup SEP commensurate with the amount that the price of the pumpout boat exceeds \$100,000, provided that the total amount the MWRA spends on the three SEPs in this Appendix is at least \$305,000.

NEW JERSEY
STATE DEPARTMENT OF
TREASURY
OFFICE OF THE
CONTROLLER

Schedule:

Activity	Milestone
Award a contract for the design and construction of the fully operational sewage pumpout boat and notify EPA, DOJ, and the U.S. Attorney's Office by letter of the award, including information about the vendor and type of boat.	Prior to the end of six months from the entry of the Stipulation and Order
Provide the fully operational sewage pumpout boat to the City of Boston and notify EPA, DOJ, and the U.S. Attorney's Office by letter of the provision of the boat to the City of Boston, including information about the boat as designed and constructed and documentation of the cost of the boat.	Prior to the end of twelve months from the date of entry of the Stipulation and Order
Provide annual summaries regarding operation and usage of the boat.	By the end of March following each calendar year for the first five years after the boat is provided to the City.
Complete sewage pumpout boat operation	By the end of the fifth year after the boat is provided to the City (SEP final completion date)
Submit SEP Completion Report.	By the end of June following the due date of the fifth annual summary (SEP Completion Report due date)

7/27/2011 10:00 AM
10/27/2011 10:00 AM
10/27/2011 10:00 AM

3. Installation of Low Flow Toilets in Municipal Buildings

The MWRA shall implement a project to install low-flow toilets, and associated plumbing fixtures, piping and connections, in public buildings owned and in use by Massachusetts municipalities that are members of the MWRA's sewer service area and/or by municipal housing authorities within these cities and towns. The MWRA shall expend \$100,000 on this project. The MWRA estimates that the SEP will include the installation of at least 80 low-flow toilets. To the extent practicable with the level of funding, the MWRA will increase the number of low-flow toilets installed. Low flow toilets are generally designed to use approximately 1.6 gallons of water, a reduction of approximately 50% -70% of the water usage of older standard units which typically use between 3.5 to 7 gallons per flush. The low flow toilets shall only be installed to replace old, non-low flow toilets in older public buildings where there is no pre-existing renovation project either planned or ongoing which originally included replacement of toilet fixtures. They may not be installed in conjunction with new construction or with already planned or ongoing renovation projects unless the MWRA documents that the plans for the renovation did not originally include replacement of toilet fixtures.

The MWRA may enter into agreements with contractor(s) or other entities for the implementation of the installation. The contractor(s) or other entities that enter into such agreements with the MWRA may include, without limitation, the municipalities that are members of the MWRA's sewer service area and/or municipal housing authorities within these cities and towns. The MWRA shall at all times remain responsible for the satisfactory completion of this SEP.

The number of installations performed in each of the communities that are members of the MWRA's sewer service area, including installations in buildings owned by municipal housing authorities, shall be roughly proportionate to the community's percentage of the MWRA's system-wide sewer assessment, except that if a community declines to participate in the project the MWRA will re-allocate the number of installations among the remaining participating communities.

The SEP shall include the documentation of the location where each installation occurred and the expenditures for each installation. The SEP Completion Report shall include information on the locations where the installations occurred, the expenditures for each installation, and an estimate of the aggregate reduction in water use and the reduction in waste water volume.

Eligible SEP costs are the costs of the fixtures and the direct costs of the plumbing installation work. The MWRA's administrative costs shall not be counted towards the cost of the SEP.

Estimated Cost of the SEP: \$100,000

9/30/24
7:30
18/183

Schedule:

Activity	Milestone
Commence installation of the low-flow toilets.	Prior to the end of twelve months from the entry of the Stipulation and Order
Complete installation of the low-flow toilets.	Prior to the end of twenty-seven months from the entry of the Stipulation and Order (SEP final completion date)
Submit SEP Completion Report. The report shall include documentation of the location where each installation occurred and of the expenditures for each installation, including copies of any contracts or other agreements entered into by the MWRA with municipalities, municipal housing authorities, or other entities for implementation of the project and copies of the purchase orders, invoices, or other documentation for the cost of the fixtures and installation work.	Prior to the end of thirty months from the entry of the Stipulation and Order (SEP Completion Report due date)

MWRA Comments on 2023 Draft NPDES Permit No. MA0103284

Attachment 5: Corrected version of Attachment I to the Draft Permit

UNITED STATES DISTRICT COURT
for the
DISTRICT OF MASSACHUSETTS

.....
UNITED STATES OF AMERICA,

Plaintiff,

v.

METROPOLITAN DISTRICT COMMISSION,
et al.,

Defendants.
.....

CIVIL ACTION
No. 85-0489-RGS

.....
CONSERVATION LAW FOUNDATION OF
NEW ENGLAND, INC.,

Plaintiff,

v.

METROPOLITAN DISTRICT COMMISSION,

Defendants.
.....

CIVIL ACTION
No. 83-1614-RGS

**MOTION TO AMEND SECOND STIPULATION OF THE UNITED STATES AND
THE MASSACHUSETTS WATER RESOURCES AUTHORITY ON
RESPONSIBILITY AND LEGAL LIABILITY FOR COMBINED SEWER OVERFLOW**

The Massachusetts Water Resources Authority ("Authority") hereby
moves for an order amending the Second Stipulation of the United States and
the Massachusetts Water Resources Authority on Responsibility and Legal
Liability for Combined Sewer Overflow Control dated March 15, 2006 by
deleting Exhibits A and B and adding revised Exhibits A and B which include

additional facilities planning documentation and updated long-term level of control (activation frequency and volume) for combined sewer overflow ("CSO") outfall MWR203.

Prior to reaching agreement with the Authority on the overall long-term CSO control plan in March 2006, the United States requested that two milestones be added to Schedule Seven requiring the Authority to commence an optimization study to identify operating procedures at the Prison Point CSO treatment facility and related structures to minimize treated discharges from the facility without increasing untreated overflows elsewhere by April 2006 and to submit a report on the study, implement optimization measures, and propose flow limits for the Prison Point CSO treatment facility (CSO outfall MWR203) based on the study by March 2007. The United States requested that these milestones be added because the Authority's typical-year volume model predictions for the Prison Point CSO treatment facility (CSO outfall MWR203) changed from 25 activations and a volume of 227.8 million gallons in the Authority's 1997 Long-Term CSO Control Plan to 30 activations and 335 million gallons in the Authority's 2006 planning documents.

In March 2007, the Authority submitted its Prison Point Optimization Study to the United States Environmental Protection Agency ("EPA") and the Massachusetts Department of Environmental Protection in compliance with Schedule Seven. The study recommended implementing certain operating strategies at the Prison Point CSO facility and related structures which were predicted by the Authority's hydraulic model to reduce treated discharges from

30 discharges in a typical year with an average annual treated discharge volume of 335 million gallons to 17 activations in a typical year with an average annual treated discharge volume of 250 million gallons without increasing untreated overflows elsewhere. The study also recommended that the Authority operate the Prison Point CSO treatment facility with the proposed operational strategies for one year in order to verify that the modeled prediction results were achievable and that the implementation of these strategies would not increase untreated overflows. EPA concurred with the study's recommendations and requested that the Authority propose formal incorporation of the revised level of control for the Prison Point CSO treatment facility (CSO outfall MWR203) by April 2008.

During the one-year field verification period, the Authority collected performance data and rainfall records to adjust the system's hydraulic model and update the model's predictions of facility performance over a range of storms and for the typical rainfall year. The refined model predictions, and field-verification of the performance of the facility, indicated that the optimization measures should limit treated discharges at the Prison Point CSO facility to 17 activations and 243 million gallons total discharge volume in a typical year, which is slightly lower than the 17 activations and 250-million gallons total discharge volume previously predicted. The updated model predictions and field data also suggested that the optimization measures should not affect the levels of control for untreated overflows elsewhere in a typical year. Based upon the results of the field verification, the Authority is

recommending that long-term level of control for the Prison Point CSO facility be revised from 30 activations and 350 million gallons to 17 activations and 243 million gallons in a typical year. However, these recommended operating strategies result in increased risks of untreated discharges as hydraulic grade lines will be raised to higher elevations in order to maximize system storage capacity and will require the exercise of judgment by the Authority's staff in reacting quickly to varying conditions for each storm event and in responding to weather forecasts and rapidly changing flow levels at depth sensors in the upstream and downstream systems. Therefore, it should be noted that in some cases the Authority may need to deviate from the standard operational procedures to address storm-specific flow characteristics and mechanical performance of the facility in order to avoid increasing untreated discharges.

Accordingly, the Authority is now proposing to replace Exhibit A of the Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control with a revised Exhibit A that references the recent related planning documents for the Prison Point CSO facility optimization project and Exhibit B with a revised Exhibit B that incorporates the updated activation frequency and volume numbers for the Prison Point CSO treatment facility (CSO outfall MWR203).

For these reasons, the Authority respectfully requests that the Court issue an order amending the Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability

for Combined Sewer Overflow Control dated March 15, 2006 by deleting Exhibits A and B and adding revised Exhibits A and B as set forth in the form of the order in Attachment "A."

By its attorneys,

/s/ John M. Stevens
John M. Stevens (BBO No. 480140)
Jonathan M. Ettinger (BBO No. 552136)
Foley Hoag LLP
155 Seaport Boulevard
Boston, Massachusetts 02210
(617) 832-1000
jstevens@foleyhoag.com

Of Counsel:

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

CERTIFICATE OF SERVICE

I hereby certify that a true and accurate copy of this document, which was filed via the Court's ECF system, will be sent electronically by the ECF system to the registered participants as identified on the Notice of Electronic Filing (NEF) and paper copies will be sent to those indicated as non-registered participants on April 30, 2008.

/s/ John M. Stevens
John M. Stevens (BBO No. 480140)
jstevens@foleyhoag.com

Dated: April 30, 2008

CERTIFICATION PURSUANT TO LOCAL RULE 7.1(A)(2)

I, John M. Stevens, hereby certify that counsel for the Authority attempted to contact and confer with counsel for all other parties on April 28 and 30, 2008 in a good faith attempt to resolve or narrow the issues presented by the motion and that the Conservation Law Foundation and the Boston Water and Sewer Commission assent to the motion, the United States does not oppose the motion, the Commonwealth has not taken a position with respect to the motion and counsel for the Authority was unable to reach counsel for the City of Quincy and the Town of Winthrop.

/s/ John M. Stevens

John M. Stevens (BBO No. 480140)

jstevens@foleyhoag.com

Dated: April 30, 2008

UNITED STATES DISTRICT COURT
for the
DISTRICT OF MASSACHUSETTS

.....
UNITED STATES OF AMERICA,

Plaintiff,

v.

METROPOLITAN DISTRICT COMMISSION,
et al.,

Defendants.
.....

CIVIL ACTION
No. 85-0489-RGS

.....
CONSERVATION LAW FOUNDATION OF
NEW ENGLAND, INC.,

Plaintiff,

v.

METROPOLITAN DISTRICT COMMISSION,

Defendants.
.....

CIVIL ACTION
No. 83-1614-RGS

ORDER

Stearns, D.J.

Upon consideration of the motion of the Massachusetts Water Resources Authority to amend the Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control dated March 15, 2006, it is hereby ORDERED that Second Stipulation of the United States and the Massachusetts



Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control is amended by deleting Exhibits A and B and adding the attached revised Exhibits A and B.

SO ORDERED.

Richard G. Stearns
United States District Judge

**Exhibit A
to Second Stipulation**

MWRA Long-Term CSO Control Plan Facilities Planning Documentation

Planning Document	Project	Receiving Water
Final Combined Sewer Overflow Facilities Plan and Environmental Impact Report, July 31, 1997 <i>Minor modifications were addressed in Notice of Project Change, March 1999</i>	Hydraulic Relief for CAM005	Upper and Lower Charles River Basin
	Stony Brook Sewer Separation	
	Floatables Control at CAM007, CAM009, CAM011 and CAM017	
	Baffle Manhole Separation at SOM 001 and SOM 006-007	Alewife Brook/Upper Mystic River
	Hydraulic Relief for BOS 017 ⁽¹⁾	Mystic/Chelsea Confluence
	Chelsea Branch Relief Sewer	
	Trunk Sewer Relief for CHE 002-004	
	Outfall Repairs and Floatables Control at CHE 008	Upper Inner Harbor
	Storage Conduit for BOS 019	Fort Point Channel
	Detention/Treatment Facility at Union Park Pump Station	South Dorchester Bay
	South Dorchester Bay Sewer Separation	Constitution Beach
	Constitution Beach Sewer Separation	Neponset River
	Neponset River Sewer Separation	
The following reports supplement information in the Final CSO Facilities Plan and Environmental Impact Report, July 31, 1997		
Upgrades to Existing CSO Facilities, Supplemental Environmental Impact Report, September 30, 1998	Cottage Farm Facility Upgrade	Upper Charles River Basin
	Prison Point Facility Upgrade	Upper Inner Harbor
	Somerville Marginal Facility Upgrade	Upper Mystic River; Mystic/Chelsea Confluence
	Commercial Point Facility Upgrade	South Dorchester Bay
Upgrades to the Fox Point CSO Treatment Facility, Supplemental Environmental Impact Report, December 31, 1998	Fox Point Facility Upgrade	South Dorchester Bay
Fort Point Channel CSO Storage Conduit Notice of Project Change, June 2003, and MWRA Long Term CSO Control Plan, Fort Point Channel Sewer Separation and System Optimization Project, Level of Control at CSO Outfalls BOS072 and BOS073, June 7, 2004.	Sewer Separation for BOS072 and BOS073	Fort Point Channel

**Exhibit A
to Second Stipulation**

MWRA Long-Term CSO Control Plan Facilities Planning Documentation

Planning Document	Project	Receiving Water
Re-Assessing Long Term Floatables Control for Outfalls MWR018, 019 and 020, February 2001 Report on Re-Assessment of CSO Activation Frequency and Volume for Outfall MWR010, April 2001, and supplemental letter report (Metcalf & Eddy, Inc.), May 31, 2001	Regionwide Floatables Controls and Outfall Closing Projects	Regionwide
Final Variance Report for Alewife Brook and the Upper Mystic River, July 2003, and supplemental letter report (Metcalf & Eddy, Inc.), July 8, 2003	Sewer Separation at CAM004 and CAM400 Interceptor Connection Relief and Floatables Control at CAM002, CAM401B and SOM01A, and Floatables Control at CAM001 and CAM401A Control Gate/Floatables Control at Outfall MWR003 and MWRA Rindge Avenue Siphon Relief	Alewife Brook
East Boston Branch Sewer Relief Project Reevaluation Report, February 2004 Recommendations and Proposed Schedule for Long-Term CSO Control for the Charles River, Alewife Brook and East Boston, August 2, 2005	Interceptor Relief For BOS003-014	Mystic/Chelsea Confluence; Upper and Lower Inner Harbor
Supplemental Facilities Plan and Environmental Impact Report on the Long-term CSO Control Plan for North Dorchester Bay and Reserved Channel, April 27, 2004	North Dorchester Bay Storage Tunnel and Related Facilities	North Dorchester Bay
	Pleasure Bay Storm Drain Improvements	
	Morrissey Boulevard Storm Drain	
Recommendations and Proposed Schedule for Long-Term CSO Control for the Charles River, Alewife Brook and East Boston, August 2, 2005, and MWRA Revised Recommended CSO Control Plan for the Charles River, Typical Year CSO Discharge Activations and Volumes, November 15, 2005	Reserved Channel Sewer Separation	Reserved Channel
	Brookline Connection, Cottage Farm Overflow Chamber Interconnection and Cottage Farm Gate Control	Upper and Lower Charles River Basin
	Brookline Sewer Separation	
	Bulfinch Triangle Sewer Separation	
	Charles River Valley/South Charles Relief Sewer Gate Controls	
Evaluation of Additional Charles River Interceptor Interconnection Alternatives		

**Exhibit A
to Second Stipulation**

MWRA Long-Term CSO Control Plan Facilities Planning Documentation

Prison Point Optimization Study, March 30, 2007	Prison Point CSO Facility Optimization	Upper Inner Harbor
Proposed Modification of Long-Term Level of Control for the Prison Point CSO Facility, April 2008		

⁽¹⁾ Also "MWRA Long-Term CSO Control Plan Target CSO Activation Frequency and Volume by Outfall," letter dated December 9, 2005.

**Exhibit B
to Second Stipulation**

SUMMARY OF TYPICAL YEAR CSO ACTIVATION FREQUENCY AND VOLUME

OUTFALL	TYPICAL YEAR		REFERENCE ^(*)
	LONG TERM CONTROL PLAN 2005 ^(*)		
	Activation Frequency	Volume (MG)	
ALEWIFE BROOK^(*)			
CAM001	5	0.19	5
CAM002	4	0.69	5
MWR003	5	0.98	5
CAM004	To be closed	N/A	5
CAM400	To be closed	N/A	5
CAM401A	5	1.61	5
CAM401B	7	2.15	5
SOM001A	3	1.67	5
SOM001	Closed	N/A	
SOM002A	Closed	N/A	
SOM003	Closed	N/A	
SOM004	Closed	N/A	
TOTAL		7.29	
UPPER MYSTIC RIVER			
SOM007A/MWR205A (Somerville Marginal)	3	3.48	
SOM007	Closed	N/A	
TOTAL		3.48	
MYSTIC / CHELSEA CONFLUENCE			
MWR205 (Somerville Marginal)	39	60.58	
BOS013	4	0.54	6
BOS014	0	0.00	6
BOS015	Closed	N/A	6
BOS017	1	0.02	9
CHE002	4	0.22	
CHE003	3	0.04	
CHE004	3	0.32	
CHE008	0	0.00	
TOTAL		61.72	
UPPER INNER HARBOR			
BOS009	5	0.59	6
BOS010	4	0.72	6
BOS012	5	0.72	6
BOS019	2	0.58	
BOS050	Closed	N/A	
BOS052	Closed	N/A	
BOS057	1	0.43	
BOS058	Closed	N/A	
BOS060	0	0.00	
MWR203 (Prison Point)	17	243.00	10
TOTAL		246.04	
LOWER INNER HARBOR			
BOS003	4	2.87	6
BOS004	5	1.84	6
BOS005	1	0.01	6
BOS006	4	0.24	6
BOS007	6	1.05	6
TOTAL		6.01	

Exhibit B to Second Stipulation

SUMMARY OF TYPICAL YEAR CSO ACTIVATION FREQUENCY AND VOLUME

OUTFALL	TYPICAL YEAR		REFERENCE ^(*)
	LONG TERM CONTROL PLAN 2005 ^(*)		
	Activation Frequency	Volume (MG)	
CONSTITUTION BEACH			
MWR207	Closed	N/A	
TOTAL		0.00	
FORT POINT CHANNEL			
BOS062	1	0.01	
BOS064	0	0.00	
BOS065	1	0.06	
BOS068	0	0.00	
BOS070			
BOS070/DBC	3	2.19	3
UPPS	17	71.37	
BOS070/RCC	2	0.26	
BOS072	0	0.00	4
BOS073	0	0.00	4
TOTAL		73.89	
RESERVED CHANNEL			
BOS076	3	0.91	7
BOS078	3	0.28	7
BOS079	1	0.04	7
BOS080	3	0.25	7
TOTAL		1.48	
NORTHERN DORCHESTER BAY			
BOS081	0 / 25 year	N/A	
BOS082	0 / 25 year	N/A	
BOS083	0 / 25 year	N/A	
BOS084	0 / 25 year	N/A	
BOS085	0 / 25 year	N/A	
BOS086	0 / 25 year	N/A	
BOS087	0 / 25 year	N/A	
TOTAL		0.00	
SOUTHERN DORCHESTER BAY			
BOS088	To be closed	N/A	
BOS089 (Fox Point)	To be closed	N/A	
BOS090 (Commercial Point)	To be closed	N/A	
TOTAL		0.00	
UPPER CHARLES			
BOS032	Closed	N/A	
BOS033	Closed	N/A	
CAM005	3	0.84	8
CAM007	1	0.03	8
CAM009	2	0.01	8
CAM011	0	0.00	8
TOTAL		0.88	

Exhibit B to Second Stipulation

SUMMARY OF TYPICAL YEAR CSO ACTIVATION FREQUENCY AND VOLUME

OUTFALL	TYPICAL YEAR		REFERENCE ^(*)
	LONG TERM CONTROL PLAN 2005 ^(*)		
	Activation Frequency	Volume (MG)	
LOWER CHARLES			
BOS028	Closed	N/A	
BOS042	Closed	N/A	
BOS049	To be closed	N/A	
CAM017	1	0.45	8
MWR010	0	0.00	2
MWR018	0	0.00	1
MWR019	0	0.00	1
MWR020	0	0.00	1
MWR021	Closed	N/A	
MWR022	Closed	N/A	
MWR201 (Cottage Farm)	2	6.30	8
MWR023	2	0.13	
SOM010	Closed	N/A	
TOTAL		6.88	
NEPONSET RIVER			
BOS093	Closed	N/A	
BOS095	Closed	N/A	
TOTAL		0.00	
BACK BAY FENS			
BOS046	2	5.38	
TOTAL		5.38	

(*) Long-term Control Plan activation frequency and volumes were established in the 1997 CSO Facilities Plan and Environmental Impact Report or as noted in the "Reference" column.

- 1- Re-assessing Long Term Floatables Control for Outfalls MWR018, 019 and 020, February 2001.
- 2- Report on Re-Assessment of CSO Activation Frequency and Volume for Outfall MWR010, April 2001, and supplemental letter report (Metcalf & Eddy, Inc.), May 31, 2001.
- 3- Report on Re-Assessment of CSO Activation Frequency and Volume to Dorchester Brook Conduit and Outfall BOS086, January 2001 and supplemental letter report (Metcalf & Eddy, Inc.), June 28, 2001.
- 4- MWRA Long Term CSO Control Plan, Fort Point Channel Sewer Separation and System Optimization Project, Level of Control at CSO Outfalls BOS072 and BOS073, June 7, 2004.
- 5- Final Variance Report for Alewife Brook and the Upper Mystic River, July 2003, and supplemental letter report (Metcalf & Eddy, Inc.), July 8, 2003.
- 6- East Boston Branch Sewer Relief Project Reevaluation Report, February 2004.
- 7- Supplemental Facilities Plan and Environmental Impact Report on the Long-term CSO Control Plan for North Dorchester Bay and Reserved Channel, April 27, 2004.
- 8- Recommendations and Proposed Schedule for Long-Term CSO Control for the Charles River, Alewife Brook and East Boston, August 2, 2005; MWRA Revised Recommended CSO Control Plan for the Charles River, Typical Year CSO Discharge Activations and Volumes, November 15, 2005; MWRA Long-Term CSO Control Plan, Response to Additional EPA Questions Regarding Prison Point Discharges, January 9, 2005 (2006).
- 9- MWRA Long Term CSO Control Plan Target CSO Activation Frequency and Volume by Outfall, December 9, 2005.
- 10- Prison Point Optimization Study, March 30, 2007; Proposed Modification of Long-Term Level of Control for the Prison Point CSO Facility, April 2008

UNITED STATES DISTRICT COURT
for the
DISTRICT OF MASSACHUSETTS

.....
UNITED STATES OF AMERICA,

Plaintiff,

v.

METROPOLITAN DISTRICT COMMISSION,
et al.,

Defendants.
.....

CIVIL ACTION
No. 85-0489-RGS

.....
CONSERVATION LAW FOUNDATION OF
NEW ENGLAND, INC.,

Plaintiff,

v.

METROPOLITAN DISTRICT COMMISSION,

Defendants.
.....

CIVIL ACTION
No. 83-1614-RGS

ORDER

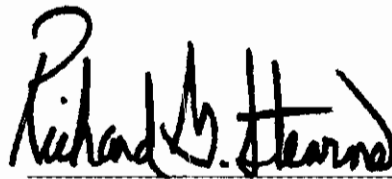
Stearns, D.J.

Upon consideration of the motion of the Massachusetts Water Resources Authority to amend the Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control dated March 15, 2006, it is hereby ORDERED that Second Stipulation of the United States and the Massachusetts

Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control is amended by deleting Exhibits A and B and adding the attached revised Exhibits A and B.

SO ORDERED.

5-7-08.



Richard G. Stearns
United States District Judge

EPA and MassDEP

Attachment 6: Citations for the Administrative Record for NPDES permit MA0103284

November 28, 2023

Page 1 of 3

Additional citations

The following documents cited in MWRA's comments will be transmitted under separate cover to EPA to be entered into the Administrative Record for the permit.

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AECOM. 2021b. CSO Post Construction Monitoring and Performance Assessment: Task 5.3 Water Quality Assessment - Revision 1. Boston: Massachusetts Water Resources Authority. Report 2021-09. 68 p. plus appendices. http://www.mwra.com/harbor/enquad/pdf/2021-09.pdf
AECOM, 2021c. Task 8.4: Somerville-Marginal CSO Facility Evaluation (December 21, 2021), available at https://www.mwra.com/cso/variances/122721-somerville.pdf
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EPA and MassDEP

Attachment 6: Citations for the Administrative Record for NPDES permit MA0103284

November 28, 2023

Page 2 of 3

Griffith et al., 2019. Differential mortality of North Atlantic bivalve molluscs during harmful algae blooms caused by the dinoflagellate <i>Cochlodinium</i> (aka <i>Margalefidinium</i>) <i>polykrikoides</i> . <i>Estuaries and Coasts</i> 42: 190-203.
Kennedy J, Petitpas C, and Hickey M. August 14, 2022. <i>Massachusetts Marine Biotoxin Management and Contingency Plan, 2022 Update</i> .
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Libby PS, Whiffen-Mansfield AD, Nichols KB, Lescarbeau GR, Borkman DG, Turner JT. 2023. <i>Quality assurance project plan (QAPP) for water column monitoring 2020-2023: Tasks 4-7 and 10, Revision 2</i> . Boston: Massachusetts Water Resources Authority. Report 2023-02.
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Schedule Seven Compliance Order Number 252, dated May 11, 2023

EPA and MassDEP

Attachment 6: Citations for the Administrative Record for NPDES permit MA0103284

November 28, 2023

Page 3 of 3

September 19, 2022 letter from B. Reilley, MWRA to M. Barden, EPA, re: Renewal of NPDES Permit #: MA0103284, Request for Alternate Dilution Water (ADW) for Whole Effluent Toxicity Tests for the Deer Island Wastewater Treatment Plant

Tang and Gobler. 2009 Characterization of the toxicity of *Cochlodinium polykrikoides* isolates from Northeast US estuaries to finfish and shellfish. *Harmful Algae* 8: 454-462.

Thronsdon J. 1978. Chapter 4. Preservation and storage. In: Sournia A (ed.): Phytoplankton manual. *UNESCO Monogr. Oceanogr. Method.* UNESCO 6: 69-74