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

MWRA BIANNUAL COMPLIANCE AND
PROGRESS REPORT AS OF DECEMBER 21, 2020

The Massachusetts Water Resources Authority (the "Authority" or "MWRA") submits the following biannual compliance report for the period from June 15, 2020 to December 21, 2020, and supplementary compliance

information in accordance with the Court's order of December 23, 1985, and subsequent orders of the Court.

I. Schedule Seven

There were no scheduled activities for the past six-month period on the Court's Schedule Seven.

A. Progress Report

1. Combined Sewer Overflow Program

a. Performance Assessment of Long-Term CSO Control Plan

On October 30, 2020, the Authority submitted to the United States Environmental Protection Agency ("EPA") and the Massachusetts Department of Environmental Protection ("DEP") the fifth of a series of planned semiannual progress reports ("Semiannual Report No. 5") on the performance assessment of its $912 million approved Long-Term Combined Sewer Overflow ("CSO") Control Plan (the "LTCP"). A copy of the report is attached as Exhibit A. The Authority also provided the report to the Boston Water and Sewer Commission ("BWSC") and the cities of Cambridge, Chelsea and Somerville (together, the "CSO communities"); the Charles River Watershed Association and the Mystic River Watershed Association; and posted it to the Authority's website. Semiannual Report No. 5 describes the progress of CSO Post-Construction Monitoring and highlights the potential for specific outfall locations to achieve or not achieve the LTCP activation and/or volume goals. Further, the report explains how receiving water quality models will distinguish CSO from non-CSO pollution sources.

The report also describes continuing data collection and CSO discharge investigations and analyses and summarizes remaining key efforts.

Since completing the recalibration of its hydraulic model earlier this year, the Authority has evaluated system performance and CSO activity compared with the baseline 1992 system conditions and the LTCP. The recalibrated model has improved the accuracy of this evaluation. With these updated model results, together with continuing data collection and the results to date of its site-specific investigations, the Authority has, to the extent possible, forecasted what is reasonable to expect for outfall performance at the conclusion of the performance assessment in December 2021. In its latest report, the Authority has grouped the outfalls into two categories. One category includes outfalls where LTCP volume and activation goals have already been achieved or it is reasonable to expect will be achieved. Included in this category are five outfalls that the Authority previously characterized as not achieving volume and/or activation goals but now characterizes as achieving the goals.[1] The other category of outfalls are those that, based on current conditions, are not likely to, or may not, achieve the LTCP activation and/or volume goals. The existence of outfalls in

[1] There are five outfalls (BOS057, BOS060, BOS064, CAM007, MWR023) at which CSO activity has significantly decreased since baseline 1992 system conditions to levels that the Authority believes achieves anticipated water quality improvement. While these locations were closer to established values under previous modeling scenarios, at this time, it seems likely that Typical Year activation frequency and/or volumes at these locations will numerically exceed the LTCP values. Given the significant reduction in CSO at these locations and improved water quality conditions, the Authority has included these five outfalls within the category of *achieve* LTCP volume and activation goals because it anticipates that, in light of all factors and considerations, it will request a determination that any inability to meet such goals at these locations is immaterial.

this latter category should not detract from the fact that substantial reductions in volumes and activations have occurred in many locations, as shown in Exhibit B (Table 1-2 in Semiannual Report No. 5), which compares 1992 system conditions with mid-2020 system conditions. As discussed later in this report, the receiving water models currently in development will improve the Authority's understanding of the relative impacts of CSO discharges to water quality in the variance waters. Lastly, as has been described in previous reports to the Court, water quality monitoring data collected over the last 30 years shows marked improvement in water quality in Boston Harbor and much of the surrounding watersheds. While this report includes forecasts on the potential for outfalls to achieve volume and activation goals, the complete performance assessment that will be presented in December 2021 will also describe overall improvements (i.e., reductions in discharges, reductions in impacts from CSOs and improvements in water quality), which are all significant components in the evaluation. These current performance forecasts are identified, outfall by outfall, in Exhibit B (Table 1-2 in Semiannual Report No. 5).[2] Of the 46 discharge locations that remain active, the Authority concludes from the Typical Year predictions of its hydraulic model that LTCP volume and activation goals are achieved at 26 locations;[3] and the Authority expects through ongoing investigations and

[2] The first category referenced above is identified as "Outfall likely to achieve LTCP activation and volume goals" in Table 1-2. The second category referenced above is identified as "Outfall not likely to achieve LTCP activation and/or volume goal" in Table 1-2.

[3] Semiannual Report No. 5 reported that LTCP activation and volume goals are achieved at 25 locations, and are forecast not to be achieved at 17 locations. Recently, the City of Cambridge

projects that the goals will be achieved at an additional 4 locations. At the remaining 16 other locations, the Authority in coordination with the CSO communities continue to track outfall performance and identify and evaluate potential projects and system adjustments that may further mitigate CSO discharges to bring activations and/or volumes closer to the LTCP goal (described in Table 1-3 and Chapter 2 of Semiannual Report No. 5). This will include the specific project evaluations required by the CSO variances that are intended to identify system adjustments and projects that can reduce CSO discharges closer to or in line with the LTCP activation and volume goals.

Despite the ongoing efforts and decades of careful planning, engineering, and system management, it is currently reasonable to forecast that volume and/or activation goals will not be achieved by December 2021 at 16 locations, as shown in Exhibit B (Table 1-2 in Semiannual Report No. 5). Notwithstanding this prediction, the Authority and communities remain committed to continuing their work to reduce and mitigate impacts of overflows and, where the receiving water quality is being modeled, understand the relative impact of these overflows.

However, it is critical not to lose sight of the progress that has already been made. For example, in East Boston, system optimization including raising weirs

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completed sediment removal in the CAM401A system and confirmed the elimination of standing water that had compromised LTCP attainment at this outfall. MWRA's model results show that elimination of the standing water results in attainment of the LTCP activation and volume goals, reducing the locations forecast not to achieve goals to 16 locations.

and reconstructing regulators in the mid-1990s and completion of the East Boston Branch Relief in 2010 resulted in substantial decreases in CSO frequency and volumes from those estimated in 1992 (82% reduction in total volume). Ongoing BWSC sewer separation, to be completed by December 2021, will reduce CSOs further, resulting in only BOS003, BOS009 and BOS014 forecasted as likely not to achieve LTCP activation and/or volume goals in that area. Further sewer separation to begin in May 2021 is predicted to reduce those outfalls not meeting LTCP goals in that area to just BOS03 and BOS014 (For East Boston, there is an overall 91 percent reduction from 1992 conditions and achievement of LTCP volume goal.) Meanwhile, the Authority and BWSC continue to investigate possible weir raising and system adjustments to reduce CSOs further. Much has also been accomplished at MWR201, the Cottage Farm Facility, where treatment was upgraded and dechlorination was added in 2000. In addition, interconnecting upstream overflow structures and bringing a previously unused pipe crossing the Charles River "Brookline Connection" on-line improved the sewer system's capacity, and facility operations were further optimized in 2009. Brookline Sewer Separation was completed in 2013, and the completed partial sewer separation improvements conducted by Cambridge in 2020 are being evaluated. Volumes at this location have been reduced from 214 million gallons to 12.64 million gallons and activations reduced from 18 million gallons to 4 million gallons, with additional reductions anticipated as a result of the partial sewer separation work. Additional reductions in volumes and activations are

documented in Exhibit B (Table 1-2 in Semiannual Report No. 5), and additional mitigation efforts are described in Exhibit C attached (Table 1-3 in Semiannual Report No. 5).

Since the last update to the Court, substantial progress has been made not only in evaluating the feasibility and potential benefits of potential projects, system adjustments and other measures, but also in actually pursuing implementation at some locations. Exhibit C (Table 1-3 in Semiannual Report No. 5) is a detailed list of the status of these efforts, including forecasts of whether they will be completed prior to December 2021. System adjustments and projects that are already completed or are underway include the City of Cambridge's partial sewer separation improvements intended to reduce treated discharges at the Cottage Farm CSO Facility (MWR201), Cambridge's removal of sediments in the CAM401A system, the City of Chelsea's ongoing effort to raise the overflow weir at Outfall CHE004, and BWSC's sewer separation contracts in East Boston and South Boston (BOS013, BOS014, BOS009, BOS010, BOS012, BOS003). Also, the City of Somerville's ongoing construction of a major new storm drain through Union Square will provide for the removal of large volumes of stormwater from the sewer system, potentially reducing CSO discharges at the Prison Point CSO Facility and other hydraulically related outfalls. In addition, all of the CSO communities continue to pursue sewer separation work. Some of these projects will produce further CSO reductions by December 2021, while others, to be carried out by the communities, will produce benefits in later years. As the Authority continues to evaluate the merits of various system adjustments

and projects, it will also give consideration to whether further investments in CSO mitigation will result in meaningful water quality improvements, or whether emphasis on non-CSO contributions of pollution would be more cost effective and impactful to water quality.

The Authority's understanding of the performance of all of the outfall locations and the likelihood of whether each location will meet the LTCP goals as to activations and/or volume in the Typical Year has evolved greatly with its investigations, hydraulic analyses, and mitigation evaluations, in coordination with and assistance from the CSO communities. The Authority is providing the same level of effort and rigor in its assessment of compliance with water quality standards and its development of receiving water quality models for the CSO variance waters: the Lower Charles River/Charles Basin and the Alewife Brook/Upper Mystic River ("Variance Waters"). For these waters, designated Class B by the Commonwealth of Massachusetts' Surface Water Quality Standards, limited CSO discharges are authorized for the period that variances to the water quality standards are in effect, currently through August 2024. An overview and update on compliance with variance conditions is provided below.

The receiving water quality models will be utilized to assess the water quality impacts of the remaining CSO discharges to these Variance Waters. The models will be utilized to assess the relative impact of CSO versus non-CSO bacteria sources on water quality in these waters, provide information about the impacts of stormwater and boundary conditions (the quality of upstream flows entering these waters), and predict resulting bacteria counts for the three-month

and one-year storms, as well as for the Typical Year. The model results may also inform and support a future use attainability analysis for revision of state water quality standards. Such an analysis may be necessary to assist in the evaluation of whether a Class B CSO designation should apply to these locations.

Given that meeting water quality objectives is of utmost importance, both for the performance assessment and for the health of the receiving waters, the Authority and the regulatory agencies took great care to establish a mutually agreeable work plan for the development and use of the receiving water quality models.[4] Consistent with that work plan, the Authority and its consultant prepared a model development and calibration report as its first major deliverable for this work. The report details how the models were built and calibrated. The outputs from the water quality models will provide information necessary to assess whether further CSO reductions would impact water quality and can also illuminate likely causes of any non-attainment. Consistent with the spirit of the work plan, the Authority shared the draft report with the CSO communities that are also operating under the water quality standards variances (Cambridge and Somerville) and with BWSC, which has separate stormwater discharges to the Charles Basin, as well as the regulatory agencies as required, for their review and comment. With the models now developed and calibrated and the model report reviewed and finalized, the Authority's consultant can proceed with the water quality assessments. The results of the preliminary

[4] July 18, 2019 Joint Report on Agreement Between MWRA, EPA and DEP.

model runs will be available to the Authority in late February 2021, and an updated status report on early model predictions of water quality and the relative impacts of CSO and non-CSO sources of bacteria will be included in the sixth semiannual report, scheduled to be published in April 2021. While the water quality assessments will provide an updated assessment of the impact of CSO and non-CSO sources on bacteria water quality in Variance Waters, the Authority expects that the outputs from the models will show that the impacts of remaining CSOs are relatively small. The water quality assessments will be factored into the overall CSO performance assessment along with the years of data collected by the Authority. As shown in Exhibit B, the Authority forecasts that many of the CSO discharge locations will achieve the LTCP activation and volume goals. In areas where the Authority ultimately concludes that the volume and activation goals will not be achieved, the water quality information will provide focus and perspective on the overall environmental gains and progress towards attainment of water quality standards.

As reported in Semiannual Report No. 5, the Authority has continued to collect and analyze rainfall and CSO data and quantify CSO activations and discharge volumes from meter data and from hydraulic model simulations. The Authority collected and analyzed rainfall data from January 1, 2020 through June 30, 2020. The rainfall characteristics support a comparison of the collection period storms to the Typical Year and the validation of measured CSO discharges. In addition, the rainfall data were input into the calibrated hydraulic model to produce storm-by-storm, model-predicted CSO discharges. The

Authority utilized data from temporary or permanent CSO meters at many discharge locations to inform the performance assessment and evaluations into mitigating CSO impacts. As mentioned in the June 2020 Compliance and Progress Report, the Authority removed its remaining temporary CSO meters on June 30, 2020, but continues to collect, analyze and use data from permanent Authority and community CSO meters, Authority interceptor meters, and rainfall gauges to support ongoing site-specific investigations and the evaluation of potential system modifications that may improve CSO performance.

Semiannual Report No. 5 presents a comparison of measured CSO activations and/or volumes with the predictions of its mid-2020 System Conditions model for all storms in the period January 1, 2020 through June 30, 2020, at all CSO regulators where meter data were available. The total volume of discharge predicted by the mid-2020 System Conditions model for storms in the first half of 2020 is 87.27 million gallons. The same model predicts a discharge of 213 million gallons in half of the Typical Year. In comparing the first half of 2020 to half of the Typical Year, there is similarity in the number of storms, depth of rainfall and rainfall characteristics. But the first half of 2020 saw fewer storms of greater than 2.0 inches of rainfall and fewer storms of greater than 0.4 inch/hour peak intensity compared with half of the Typical Year. Semiannual Report No. 5 also summarizes and updates the results of the Authority's efforts over the years of LTCP implementation and assessment to achieve the activation and volume goals. All outfalls required to be closed by the LTCP and the Court's order are confirmed closed, permanently. Several

additional outfalls are permanently closed. A recent assessment of the South Boston CSO Storage Tunnel's successful and consistent performance since the Authority brought it into operation nearly a decade ago provides assurance that it is capable of preventing CSO discharges to the beaches in up to a 25-year storm.

b. CSO Water Quality Standards Variances

As previously reported, DEP issued CSO variances to Massachusetts Surface Water Quality Standards for the Lower Charles River/Charles Basin and the Alewife Brook/Upper Mystic River on August 30, 2019. Both variances have a term of five years to August 31, 2024.[5] US EPA Region 1 approved these variances on May 29, 2020. The Authority has been meeting the conditions in the variances, including collection system maintenance, water quality sampling, and reporting requirements carried over from earlier variances, as well as newly added conditions requiring receiving water quality modeling, public notification of CSO discharges, performance assessment reporting, and the evaluation of specific CSO mitigation projects. In addition to what is described above regarding the receiving water quality models, the following summarizes the Authority's recent efforts to comply with variance condition milestones.

The variances require the Authority to implement, by December 31, 2020, a subscriber and web-based system to alert the public of CSO discharges from

[5] DEP issued the Charles River variance to the Authority and the City of Cambridge and issued the Alewife Brook/Upper Mystic River variance to the Authority and the cities of Cambridge and Somerville.

its permitted outfalls. The Authority launched the public notification system in July and has since been issuing and posting notices of CSO activations for its outfalls. The subscriber notices include links to the website (https://www.mwra.com/harbor/html/cso_reporting.htm), which the Authority has updated to include detailed information on discharge locations, affected water body segments, and recent CSO activation history. The Authority has been developing procedures for estimating and reporting discharge volume, as required within 5 days of an activation, and will implement volume reporting by the end of this month.

The variances also require the Authority to evaluate specific CSO mitigation projects in accordance with schedule milestones. The Authority timely commenced an evaluation in April 2020 of the feasibility of further optimizing the operation of its recently rehabilitated Alewife Brook Pumping Station and of potentially reducing upstream CSO discharges to Alewife Brook. The Authority has since completed pump inspections, pump performance evaluations, and dry weather and wet weather pump testing. The Authority plans to conduct a further wet weather test utilizing a preliminarily recommended set of modified pump control settings intended to keep the pump station wet well at a lower elevation during storms. Preliminary hydraulic modeling has shown little upstream CSO reduction from maintaining a lower wet well elevation, but the Authority plans to reevaluate the benefits of the pumping modifications when joined with potential upstream CSO optimization measures (discussed below). The Authority also intends to issue a report on pumping station optimization and

associated CSO control benefit by April 2021, in compliance with the Alewife Brook/Upper Mystic variance.

The variances require the Authority to conduct CSO optimization evaluations for outfalls and their associated CSO regulators along the Alewife Brook and the Charles River. For both receiving waters, the Authority commenced these investigations in August 2020, ahead of the variances' December 2020 milestone. The Authority is coordinating these efforts with Cambridge, Somerville, and BWSC. The Authority's consultant is reviewing CSO regulator configurations and modeled hydraulic performance. The effort is intended to identify regulator modifications or upstream flow controls that may further reduce CSO activations and/or volume. As an initial pilot effort, the Authority's consultant has performed preliminary modeling of potential regulator modifications at Outfall SOM001A on Alewife Brook. The variances require the Authority to complete and report on these evaluations by December 2021.

The variances also require the Authority to evaluate two specific CSO mitigation measures that may reduce treated discharges to the Mystic River from the Somerville-Marginal CSO facility (outfalls MWR205 and SOM007A/ MWR205A). One measure involves increasing the hydraulic capacity of the connection from the City of Somerville combined sewer system to the Authority's Somerville-Medford Branch Sewer, located just upstream of the CSO facility. The other measure involves redirecting separate stormwater flows that enter the sewer system at a 72-inch MassDOT connection, also located just upstream of the CSO facility, to the downstream side of the facility or directly to the Mystic

River. Investigations into both of these measures began in June 2020, ahead of the variance's December 2020 milestone.

Preliminary model results show that increasing the size of the combined sewer connection can lower activations and treated discharge volumes at the Somerville-Marginal CSO facility (both outfalls). As reported in Semiannual Report No. 5, model predictions indicated that increasing the connection size from the current 18-inch diameter to 24-inch diameter would bring treated discharges at both outfalls close to their LTCP goals. Additional investigations and model runs are underway to identify, and potentially mitigate, any adverse hydraulic impacts to the Authority's interceptor system, including any higher CSO discharges at other outfalls. Constructability must also be evaluated.

Recently, the Authority and the City of Somerville determined that portions of the piping system upstream of the 72-inch MassDOT connection collect sanitary flow and stormwater from combined sewer areas. Redirecting all stormwater entering the 72-inch MassDOT connection is thus not an appropriate solution. Therefore, the Authority and the City of Somerville are now conducting investigations into whether separate stormwater segments tributary to the 72-inch connection can be redirected away from the sewer system and the Somerville-Marginal CSO facility. These evaluations are currently focusing on a separate storm drain that serves a portion of Somerville's Ten Hills neighborhood and a 36-inch MassDOT storm drain that serves portions of I-93 and Mystic Avenue. Both of these storm drains currently convey stormwater to the 72-inch MassDOT connection.

In the year that remains, strategic and responsive efforts to complete the CSO performance assessment will include:

- Continued coordination of CSO performance assessment activities with the CSO communities, including updates to the MWRA hydraulic model with any new system information that becomes available; review of MWRA and community measured and modeled CSO discharges; and evaluation of CSO mitigation alternatives.
- Continued collection and analysis of data from rainfall gauges, remaining MWRA CSO and sewer system meters, and MWRA facility operational records.
- Continued monitoring of receiving water quality in waters potentially impacted by CSOs, with special attention to the variance waterbodies.
- Use of receiving water quality models of the variance waterbodies to assess current water quality conditions and the relative impacts of CSO and non-CSO sources of bacteria.
- Continued site-specific investigations and potential recommendations of short-term and/or long-term operational adjustments and system modifications that may further lower CSO discharges toward attainment of LTCP frequency and volume goals.

Looking ahead, the Authority appreciates the significance of the fact that there are only two biannual reports remaining and the final CSO assessment report is a year away. The Authority is keenly aware that the time has come to

begin bringing the performance assessment to a successful conclusion. With that in mind, the Authority has forecasted, based on current information and to the extent possible, whether LTCP activation frequency and volume goals will be achieved by December 2021, or beyond. At the same time, the pursuit of water quality impact information necessary to determine if water quality goals have been met, and to support regulatory agencies as they endeavor to make appropriate Water Quality Standards determinations, is also at the forefront of the Authority's efforts. The Authority underscores the importance of the hydraulic model calibration that was done in the last year, which further refined modeling results and brought them closer to measured overflows. Some of the LTCP's activation and/or volume goals, which were developed through past modeling assessments conducted at different times over many years, may not be met, and the previous versions of the model and modeled system conditions at those times could be a factor in that outcome; however, significant improvements in water quality overall have been achieved. The Authority, with the cooperation and assistance of its CSO communities, continues to strive to further improve CSO performance at these locations and expects that longer-term community-planned improvements, including sewer separation projects, will continue to reduce CSOs.

Lastly, a word about the pandemic. The Authority's operations have changed and adapted as a result of COVID-19, with nearly one-third of its employees continuing to work remotely, while its field and operations staff function in full force, on site, taking appropriate safety precautions. The

Authority's service to its member communities and customers, and commitment to environmental quality, is unwavering and continues, uninterrupted, despite the challenges presented over the last nine months.

Respectfully submitted,

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December 21, 2020

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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, and Lawrence Liebesman and Joseph McGovern, who no longer work at the U.S. Department of Justice) on December 21, 2020.

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Dated: December 21, 2020