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**INDEPENDENT STATE AUDITOR'S REPORT ON
CERTAIN ACTIVITIES OF THE
DESIGN AND CONSTRUCTION OF THE
MASSACHUSETTS WATER RESOURCES
AUTHORITY'S
NORTH DORCHESTER BAY ODOR CONTROL
FACILITY**

APRIL 27, 2004 TO AUGUST 31, 2009

**OFFICIAL AUDIT
REPORT
FEBRUARY 4, 2010**

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The Massachusetts Water Resources Authority (MWRA) was established by Chapter 372 of the Acts of 1984 to assume the duties and responsibilities of the Metropolitan District Commission's Water and Sewer Division. These responsibilities include providing water and sewer services to 61 communities and approximately 2.5 million people in the Commonwealth.

On September 5, 1985, the Federal District Court in Massachusetts ruled that wastewater discharged into the Boston Harbor was in violation of the 1972 Federal Clean Water Act requirements, and the court ordered MWRA to develop and implement a program to provide treatment of its wastewater as required by that law. In accordance with the court-ordered schedule, MWRA undertook a program of improvements to the wastewater collection and treatment facilities serving the metropolitan Boston area. The court order is primarily composed of three major projects: the Deer Island Primary and Secondary Treatment Facilities, the Fore River Shipyard Residuals Pelletizing Plant, and the Combined Sewer Overflow Program (CSO). The first two projects have been reviewed by the State Auditor's Office, which has issued numerous reports on these activities. The component parts of the CSO program are currently under review by the Office of the State Auditor.

The North Dorchester Bay CSO Control Plan - one of the CSO program's components - is the subject of this report. The plan comprises four individual components: a storage tunnel, related facilities, Morrissey Boulevard storm drain, and Pleasure Bay storm drain improvements. Upon completion, the project will eliminate CSO discharges up to that of a 25-year storm and provide up to a five-year level of separate stormwater control for the North Dorchester Bay (South Boston) beaches. The design and construction of the project is currently estimated to be completed at a total cost of \$259.9 million. The Boston Water and Sewer Commission (BWSC) is responsible for the management, design, and construction of the \$36.4 million Morrissey Boulevard Storm Drain (which was not reviewed at this time), with funding provided by MWRA. The remainder of the project, which will be implemented by MWRA, deals with the design and construction of a 10,832-foot long, 17-foot diameter, soft ground storage tunnel; a pumping station and force main; an odor control facility; and Pleasure Bay storm drain improvements.

The objective of this review was to determine whether MWRA managed the design and construction of selected MWRA-implemented portions of the North Dorchester Bay CSO Control Plan in an efficient and effective manner.

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THE CONTROVERSIAL PLACEMENT OF AN ODOR CONTROL FACILITY WILL RESULT IN ADDITIONAL PROJECT COSTS OF ABOUT \$3.4 MILLION

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Due to the complexity in the placement of an odor control facility, MWRA's Board of Directors changed the configuration of the planned facility from an above-ground to a below-ground structure when MWRA and the developer of an abutting site could not timely resolve a controversy relating to alleged environmental issues associated with the

above-ground facility. Faced with threats from the abutter that permits would be contested and legal action taken, MWRA changed the facility configuration at an additional cost of an estimated \$3.4 million.

INTRODUCTION

Background

On September 5, 1985, the Federal District Court in Massachusetts ruled that wastewater discharged into the Boston Harbor was in violation of the 1972 Federal Clean Water Act requirements, and the court ordered MWRA to develop and implement a program to provide treatment of its wastewater as required by that law. In accordance with the court-ordered schedule, MWRA undertook a program of improvements to the wastewater collection and treatment facilities serving the metropolitan Boston area. The court order is primarily composed of three major projects: the Deer Island Primary and Secondary Treatment Facilities, the Fore River Shipyard Residuals Pelletizing Plant, and the Combined Sewer Overflow (CSO) Program. The first two projects have been reviewed by the State Auditor's Office, which has issued numerous reports on these activities. The component parts of the CSO program are currently under review by the Office of the State Auditor.

Many older areas of cities across the country have combined sewer systems. These systems merge stormwater drainage and sewer discharges in a single pipe. In wet weather, these combined sewers can fill with more stormwater and sewage than can be adequately transported to the treatment plant. As a result, these overflows are often discharged into local waters to avoid backing up into homes and streets. These discharges pose a potential health threat to swimmers, boaters, and marine life.

Under the Federal Court Order that directed the Boston Harbor Clean-Up Project, the MWRA initiated plans to control or treat combined sewer overflows beginning in 1987. The first step was to improve pumping capability to the Deer Island Treatment Plant and to implement effective sewerage maintenance practices. Next, the MWRA evaluated potential long-term approaches to improve CSO control throughout the system.

The Long-Term Control Plan was recommended in the Final CSO Facilities Plan and Environmental Impact Report (the "1997 Facilities Plan/EIR"), which MWRA filed with federal and state regulatory agencies in August 1997. The 1997 Facilities Plan/EIR contained 25 CSO projects. Currently, the Long-Term Control Plan comprises 35 wastewater system improvement projects bringing CSO discharges at 84 outfalls in the metropolitan Boston area into compliance with the Federal Clean Water Act and Massachusetts Water Quality Standards. Design and construction milestones for each of the 35 projects are mandated by the Federal District Court

Order in the Boston Harbor Case (U.S. v. M.D.C, et al., No. 85-0489-RGS) and are set forth in Schedule Seven of the Federal Court Order.

The total cost of the CSO plan (planning, design, and construction) has risen from \$389 million, when MWRA issued the Final CSO Conceptual Plan in 1994, to \$487 million when EPA and DEP approved the Final CSO Facilities Plan and Environmental Impact Report in 1997, to \$878 million today, as reflected in MWRA's Proposed FY10 Capital Improvement Program. The following is a listing of the estimated costs of the projects comprising the \$878 million CSO fiscal year 2010 Approved Capital Improvement Program Budget.

	In Millions
North Dorchester Bay Storage Tunnel and Related Facilities	\$259.9
South Dorchester Bay	125.9
Reserved Channel	78.6
Charles River	90.8
Mystic River/Chelsea Creek Confluence	9.2
Alewife Brook/Upper Mystic River	64.5
Inner Harbor	130.1
Fort Point Channel	62.6
Regional (Planning, Technical Support, Land/Easements)	50.2
Constitution Beach	3.8
Neponset River	<u>2.4</u>
Total Estimated CSO Costs	<u>\$878.0</u>

The North Dorchester Bay CSO Control Plan, which is the subject of this report, is made up of the following four components: North Dorchester Bay Storage Tunnel, North Dorchester Bay Related Facilities, Pleasure Bay Storm Drain Improvements, and Morrissey Boulevard Storm Drain. The focus of this report is the management of the design and construction of the storage tunnel and an odor control facility.

Once completed, the North Dorchester Bay CSO Control project is expected to virtually eliminate beach closings resulting from pollution sources associated with North Dorchester Bay outfalls. The project will eliminate CSO discharges except in catastrophic storms (greater than 25-year storm), compared to 16 discharges per year on average today, and separate stormwater discharges from

stormwater drainage systems owned and operated by the Boston Water and Sewer Commission (BWSC) and the Department of Conservation and Recreation (DCR) that will occur on average only once every five years, as compared to current discharges that occur on average about 100 times per year. Stormwater now discharging to the beaches will be redirected into the CSO tunnel in most storms. Stormwater control was added to the North Dorchester Bay CSO control plan to optimize the water quality benefits of the CSO project by taking advantage of the otherwise unused portion of storage volume in the large North Dorchester Bay tunnel in storms smaller than the 25-year design storm.

The 10,832-foot long, 17-foot diameter, soft ground tunnel has the storage capacity of approximately 18 million gallons to provide storage of CSO flows of up to that of a 25-year storm. The tunnel alignment approximately follows the route of South Boston's Day Boulevard beginning from the main mining shaft located at the Massachusetts Port Authority's Conley Terminal and ending at the exit shaft in the State Police barracks parking lot on Day Boulevard adjacent to the Bayside Exposition Center. A 15 million gallon per day (mgd) dewatering pump station with a 24-inch diameter, 4,000-foot long dewatering force main, connecting to the South Boston Interceptor, will be constructed adjacent to the mining shaft at Conley Terminal, and the force main will be aligned along East Broadway. The pump station will pump the stored storm flows from the tunnel into the force main to the existing combined sewer system, and ultimately end up at the Deer Island Treatment Facility. In addition, the pump station will dewater infiltration in the tunnel between storm events. A remote odor control facility, which is the subject of this report, will be constructed at the exit shaft at the State Police barracks on Day Boulevard. This facility will provide treatment and ventilation for the air in the storage tunnel.

Audit Scope, Objectives, and Methodology

The purpose of our review was to determine whether MWRA managed the design and construction of the North Dorchester Bay Odor Control Facility in an efficient and effective manner.

The audit, which covered the period April 27, 2004 to August 31, 2009, included a review of the various design and construction contracts, two Notices of Project Change, the 2004 Supplemental Environmental Impact Report (SEIR), and public comments associated with the design and construction of the North Dorchester Bay Odor Control Facility. We met with MWRA senior management, including the Chief Operating Officer, the Director of Construction, the Construction

Coordinator for the storage tunnel, and the Executive Director of the MWRA Advisory Board, on several occasions. We also toured the North Dorchester Bay storage tunnel and related facilities.

Our audit was conducted in accordance with applicable generally accepted government auditing standards and included such audit tests and procedures as we considered necessary under the circumstances.

At the conclusion of our review, we provided MWRA with a draft report for comment, and considered their responses in the preparation of this final report.

AUDIT RESULTS

THE CONTROVERSIAL PLACEMENT OF AN ODOR CONTROL FACILITY WILL RESULT IN ADDITIONAL PROJECT COSTS OF ABOUT \$3.4 MILLION

Due to the complexity in the placement of an odor control facility, the Massachusetts Water Resources Authority (MWRA's) Board of Directors changed the configuration of the planned facility from an above-ground to a below-ground structure when MWRA and the developer of an abutting site could not timely resolve a controversy relating to alleged environmental issues associated with the above-ground facility. Faced with threats from the abutter that permits would be contested and legal action taken, MWRA changed the facility configuration at an additional cost of an estimated \$3.4 million.

Original Plan

The original North Dorchester Bay/Reserved Channel Combined Sewer Overflow (CSO) project comprised three of the 25 projects in MWRA's long-term plan for CSO control, as recommended in the 1997 Final CSO Facilities Plan and Environmental Impact Report. The three projects were: (1) a 13-foot diameter tunnel to consolidate and relocate CSO flows from South Boston beaches to the Reserved Channel; (2) another 13-foot diameter tunnel to consolidate CSO flows along the Reserved Channel; and (3) a 600 million gallon per day (mgd) CSO pumping and treatment facility to be located in South Boston next to the Massachusetts Bay Transportation Authority's electric generating plant ("Site J"). The plan also included ancillary piping to divert CSO and stormwater flows to the tunnels, and two odor control facilities at the upstream ends of the tunnels. The project was intended to eliminate CSO discharges to South Boston beaches and greatly reduce CSO impacts to the Reserved Channel, in compliance with state water quality standards.

Early technical evaluations and community input led to several proposed changes to that plan, and after extensive design work was completed, a Notice of Project Change (NPC) was filed in June 1999 that outlined details to achieve the plan's objectives. The NPC primarily dealt with changes to the levels of CSO and stormwater control to be provided by the project, some minor pipe alignment modifications, and a revised site recommendation for the small odor control facility proposed at the upstream end of the Reserved Channel tunnel, moving it further away from the residences and closer to the channel.

MWRA believed at the time they filed the 1999 NPC that the project could be implemented at Site J (the site identified in the 1997 Final FP/EIR and affirmed in the 1999 NPC). However, local opposition intensified. Elected officials representing South Boston stated to MWRA on a number of occasions, as well as informed the MWRA Board of Directors at a meeting in December 1999, that the project would be blocked because the legislators would not support Article 97¹ legislation needed for the project to go forward at that location.

MWRA suspended design work on that project in January 2000, which meant it would be unable to commence project construction by September 2000 as required by court order. In April 2001, MWRA filed a second NPC with the Massachusetts Environmental Policy Act (MEPA) office, recommending a reassessment of the overall CSO control approach for North Dorchester Bay and the Reserved Channel areas. The reassessment was finalized three years later, in April 2004, when MWRA filed its Supplemental Environmental Impact Report recommending a new plan.

Revised Plan

As a result of the reevaluation of the project, MWRA reported that it was able to develop broad support for an alternative plan that eliminated the 600-mgd pump station. The new plan consists of a 17-foot-diameter, 10,832-foot long, storage tunnel; a 15-mgd dewatering pump station at the Massachusetts Port Authority (MassPort) Conley Terminal; a 4,000-foot force main; and a remote odor control facility at the opposite end of the tunnel near the Bayside Exposition Center.

On November 15, 2006, the MWRA Board of Directors approved the award of Design Contract 7013 to Fay, Spofford & Thorndike, LLC (FS&T) in the amount of \$3,385,224. FS&T's scope of services included final design and construction administration services for the dewatering pump station, the force main, and the remote odor control facility in one set of biddable contract documents.

The remote odor control facility was to be designed as an above-ground structure, and was included with the pump station and force main in one design package. However, because of

¹ Article 97 is the legislation required to obtain the needed easements to construct all types of projects within designated parklands. Article 97 requires 2/3 vote of approval of the Massachusetts Legislature, as well as approval of the Governor.

strong opposition from an abutter, Corcoran Jennison Companies (CJC), the owners of the Bayside Exposition and Office Center, including the threat of litigation against the odor control facility's location and effectiveness, the design of the odor control facility was separated from the pump station and force main contract package. CJC was in the process of developing a large retail/residential development at the Bayside Exposition site adjacent to MWRA's proposed odor control facility. In the early spring of 2007, CJC alleged that the current MWRA design of an above-ground odor control facility created the potential for nuisance odors due to "downwash conditions" created by the odor control building and stacks.

On August 25, 2008, although design of all three components was almost complete, MWRA determined that the cost and feasibility of constructing the odor control facility under ground should be examined. To ensure that this could be accomplished without substantially impacting the overall progress of the design effort, thus potentially impacting construction completion, FS&T's contract was amended so that design of the above-ground remote odor control facility was separated from the dewatering pump station and the force main at an additional cost of \$20,700. This enabled FS&T to complete 100% design of the dewatering pump station and force main, and provided it the opportunity to separately consider the cost and feasibility associated with the option of submerging the odor control facility.

On September 17, 2008, MWRA's preliminary cost estimate for the underground odor control facility was \$7.28 million (design: \$580,000, construction: \$6.7 million), while the cost of the above-ground facility has been estimated at \$4 million (construction and final design). Accordingly, the estimated net increase to construct the facility below ground is approximately \$3.28 million.

On November 12, 2008, MWRA's Board of Directors voted to proceed to 100% design of the above-ground odor control facility as approved by the Federal District Court for the District of Massachusetts and the MEPA process for the Commonwealth of Massachusetts. On January 14, 2009 the MWRA Board voted to provide an additional \$100,000 to complete the final design and contract documents for the above-ground odor control facility and an additional \$42,000 for administration and management for an extended final design phase.

MWRA stated that after several meetings, CJC conceded that it was not practical to move the facility, and that with a few tweaks, the technology was acceptable. CJC did, however, demand that the odor control facility be placed below ground. The pros and cons of submerging the odor control facility were subsequently debated in both public and private forums, with no resolution. It should be noted that the Environmental Protection Agency and the state's Department of Environmental Protection had approved the above-ground facility as being in compliance with environmental guidelines and that, according to MWRA, 13 existing above-ground facilities were operating in close proximity to residential and commercial neighborhoods without incident.

On September 30, 2008 the Executive Director of the MWRA Advisory Board² wrote to the Secretary of the Executive Office of Energy and Environmental Affairs, who also serves as the Chairman of MWRA's Board of Directors, regarding the dispute with the developer over the odor control facility. The letter stated, in part:

Last week I had the privilege of speaking with the Honorable Richard G. Stearns, US District Court Judge, when he accepted my telephone call. In our telephone conversation, I specifically reinforced the commitment ratepayers have made and continue to make to work with the MWRA to move forward on CSO projects. However, there is a point that we reach "the straw that breaks the camel's back." The "straw" in this case is the additional cost to move the odor control facility associated with the North Dorchester Bay Combined Sewer Overflow Facilities project from the previously approved above ground facility to an under ground facility.

I noted to the Judge that there was a full multi-year, fully-vetted, fully-approved process regarding the siting of this facility. There was also legislative action, which included a two-thirds vote of the Legislature to grant article 97 authorization. A single abutter, now that it behooves him, has challenged the Authority and its entire process and ultimately expects ratepayers to pay twice for the design, along with significant increases to construction costs.

In our conversation, I emphasized that these are difficult fiscal times for the Authority, for our communities and, most importantly, for our ratepayers. Judge Stearns suggested that the Authority file a Supplemental Report regarding this issue, which would provide the court an opportunity to weigh in. At this time, the Authority's intentions are not clear. Frankly, the Judge's involvement can be a valuable tool in eliminating this unnecessary and unwarranted expense.

² The MWRA Advisory Board was established by MWRA's Enabling Act (Chapter 372 of the Acts of 1984) and consists of members from MWRA's 61 member cities and towns, a voting representative of the Metropolitan Area Planning Council, and six persons appointed by the Governor of the Commonwealth. The purpose of the Advisory Board is to approve extension of service to additional communities; to make recommendations to MWRA on annual expense budgets, capital facility programs, and expenditure budget and user charges; to review and comment on MWRA's annual report; to hold hearings on other matters relating to MWRA; and to make recommendations to the Governor and the Legislature regarding MWRA.

The Advisory Board respectfully request that the Authority file a Supplemental Report with all pertinent information requesting that the court reaffirm its support for the permitted odor control facility and acknowledge if the facility were to be redesigned that the MWRA be held financially harmless for the redesign and additional construction costs of siting the facility under ground. If for some reason this is disagreeable, I request that the Authority provide the Advisory Board with a complete package and we will submit it.

Although a Supplemental Report was not filed, MWRA did provide the Advisory Board with supplemental data that the Advisory Board used to keep the judge apprised of the issue. In commenting on MWRA's January 8, 2009 compliance Report to the Court for the last quarter of 2008, the judge concluded his comments by stating: "The court is pleased that the MWRA is sensitive to the need to complete construction of the disputed odor control facility in compliance with Schedule Seven [of the federal court order]. The MWRA has an excellent record in addressing odor control, and the court is confident that experience with the above ground facility will be no different."

On March 11, 2009 (four months after giving approval for 100% design), the MWRA Board of Directors voted, in Executive Session, to change the odor control facility from an above-ground facility to a below-ground facility. Executive Session meeting minutes provided to us did not reflect any discussion or explanation to justify the reversal. MWRA management stated that they believe the following factors came into play in the board's decision: continued compliance with Schedule Seven of the Federal Court Order; the potential for permit appeals due to continued resistance to the above-ground facility; evidence that the original concerns raised by CJC about potential odor control problems were also being raised by residents in the Columbus Point housing development; and the board's consideration of and comparison with past construction mitigation measures taken by MWRA on other projects.

By having the design team work extended hours and weekends and using portions of the existing design of the above-ground odor control facility in the design of the below-ground facility, MWRA believes that it will be able to complete design and construction of the facility on time. MWRA estimated that the additional design and construction costs associated with the disputed change will amount to approximately \$3.4 million.

As an update to this issue, MWRA officials recently informed us that, subsequent to their decision to build the odor control facility underground, the CJC venture failed due to bank foreclosure of the CJC property.

Conclusion

MWRA's long planned resolution to address CSO discharge in the North Dorchester Bay area was originally contained in the 1997 Final CSO Facilities Plan and Environmental Impact Report. Due to local opposition, the MWRA agreed to significant site and design changes culminating in a new plan filed in April 2004.

Since 2004 the MWRA expended millions of dollars to design the component parts of the tunnel, which included the pumping station, force main and the odor control facility. At all times the odor control facility was to be above-ground and design was completed despite the known concerns of the abutter and neighborhood to potential nuisance odors from the facility. The MWRA had the approval of EPA, DEP, and Federal Court and the full support of its Advisory Board and MWRA's Board of Directors to build the above-ground facility. The MWRA currently maintains several successful above-ground odor control facilities and, in response to Corcoran Jennison Companies (CJC) concerns, expended significant efforts to have its expert demonstrate the effectiveness of the plan and to refute the contentions of CJC's expert.

Notwithstanding all of the foregoing, on March 11, 2009 the MWRA Board of Directors reversed itself and voted to construct the facility underground. Executive Session meeting minutes provided to us did not reflect any discussion or explanation to justify the reversal.

Furthermore, despite extensive communications, the MWRA secured no contribution from the protesting abutter, CJC, for the estimated additional costs of \$3.4 million for the underground odor control facility. Rather, the MWRA indicated it would attempt to utilize federal stimulus funds available for statewide projects of this nature. The use of federal stimulus money to fund the project does not erase the fact that an additional \$3.4 million of ratepayers money will be spent unnecessarily to move the facility underground.

Auditee's Response

The Executive Director provided us with the following response after reviewing a draft of this report:

The North Dorchester Bay tunnel in South Boston is the largest and most costly of MWRA's CSO control projects mandated under a federal court order. The project had

been delayed for many years due to the difficulties of siting a large sewerage facility in an urban neighborhood. Although the approved plan included much smaller facilities, the North Dorchester odor control facility faced stiff opposition from the abutter, charges of environmental injustice from nearby tenants, and the potential of extended and expensive litigation and administrative appeals. In the face of a looming federal court deadline to finish the project, a decision was made to place the facility underground.

The Auditor's finding rightfully states that the action of putting the odor control facility underground added cost to the project; however, a broader look at the matter shows that it was a good business decision that in the long run probably saved the MWRA substantial time and money.

There was a substantial, although unknown, cost savings from the avoidance of protracted legal and administrative delays and appeals, as well as, avoiding penalties that could be imposed by the federal court if and when those delays caused MWRA to miss the court imposed May 2011 deadline.

The construction contract for the odor control facility has now been awarded and the contractor is currently mobilizing and is on schedule to meet the May 2011 deadline. It is important to note that because of the favorable bidding climate the winning bid of \$5.1 million is nearly \$1 million below estimates. In addition, this project is eligible for federal stimulus funding, which will go a long way toward mitigating costs to MWRA's ratepayers.

Auditor's Reply

The OSA recognizes the MWRA's challenges relative to constructing facilities in urban neighborhoods, as well as the possibility of incurring additional legal expenses.