UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 1
1 CONGRESS STREET, SUITE 1100
BOSTON, MASSACHUSETTS 02114-2023

STATEMENT OF BASIS

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM PERMIT MODIFICATION TO DISCHARGE TO WATERS OF THE UNITED STATES

NPDES PERMIT NO.: **MA0100480**

NAME AND ADDRESS OF APPLICANT: **City of Marlborough**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Marlborough Westerly Waste Treatment Works
Boundary Street
Marlborough, MA 01752

RECEIVING WATER: **Assabet River**

CLASSIFICATION: **B (Warm Water Fishery)**

I. Proposed Action

The permittee has requested that EPA modify its permit to authorize an increase in the annual average flow limit from 2.89 MGD to 4.15 MGD. This draft permit modification authorizes the requested increase, provided specific conditions are first met. The permit modification also establishes effluent limitations and conditions to ensure that the authorized pollutant loadings do not increase as a result of the flow increase. These conditions are in accordance with the "*Assabet River Total Maximum Daily Load for Total Phosphorus*" (Report Number MA82B-01-2004-01; Control Number CN 201.0) and water quality standards requirements, including antidegradation provisions.

II. Permit Basis and Explanation of Effluent Limitation Derivation

Background

On September 23, 2004, EPA approved MassDEP's "*Assabet River Total Maximum Daily Load for Total Phosphorus*" (Report Number MA82B-01-2004-01; Control Number CN 201.0). The report included waste load allocations and effluent limitations for total phosphorus for the four wastewater treatment plants that discharge to the Assabet River, including the City of Marlborough West wastewater treatment plant. The TMDL included a seasonal (April - October) monthly average effluent phosphorus limitation of 0.1 mg/l for the City of Marlborough West wastewater treatment plant based on its design flow of 2.89 MGD.

The TMDL also required a 90% reduction in the phosphorus loadings from the internal recycling of phosphorus from the sediments in the receiving water. If the sediment loading reductions are not achieved, future permit limits for phosphorus may need to be made more stringent (see TMDL and April 28, 2006, EPA letter to Nancy Stevens). A current project being conducted by the Army Corps of Engineers on total phosphorus reductions in the Assabet River that may be achieved by sediment and/or dam removal may conclude that those reductions are not feasible or sufficient enough to attain water quality goals, in which case further reducing the total effluent phosphorus loads may be required. (Future permits, based on consideration of the sediment loading and dam removal study, are hereafter called Phase II permits)

The current NPDES permit was issued on May 21, 2005, and included the phosphorus limitations in the approved TMDL. Both the permittee and the Organization for the Assabet River filed petitions for review of the permit with EPA's Environmental Appeals Board (EAB). Pursuant to federal regulations found at 40 CFR Part 124.16, the entire permit was stayed until EPA identified the uncontested permit conditions that were severable from the contested conditions. On October 25 2005, EPA issued a letter to the permittee identifying the uncontested conditions and placing those conditions into effect on November 25, 2005. The phosphorus limits and condition went into effect on May 17, 2006, upon withdrawal of the permit appeals. The permit will expire November 25, 2010, five years from the date the uncontested and severable condition were put into effect.

The current permit includes an annual average flow limit of 2.89 MGD and a 54 month compliance schedule for meeting the April- October 0.1 mg/l monthly average total phosphorus limit. Because the compliance schedule for meeting the new phosphorus limit was a contested condition, the schedule did not become effective until May 17, 2006, making the final compliance date November 17, 2010. An interim total phosphorus limit of 0.75 mg/l average monthly is in effect for the months of April- October. The monthly average total phosphorus limit of 1.0 mg/l for the months of November- March was required to be met within one year of the issuance date of the permit.

In October 2007, the City completed a "Comprehensive Wastewater Management Plan and Environmental Impact Report- Final Report" (CWMP/EIR)(October 2007). The report projected flows of 4.15 MGD for the year 2025, with a flow of 2.89 MGD from the City of Marlborough and a flow of 1.26 MGD from the Town of Northborough. The CWMP/EIR report projected that the increase in flow would not have a measurable impact on the water quality of the Assabet River if the TMDL- required total phosphorus loadings of 2.4 lbs/day were maintained. The report evaluated alternatives to the flow increase, including a groundwater discharge alternative, but concluded, with MassDEP concurrence, that the ground water treatment plant alternative was not cost effective nor environmentally beneficial, thus making the expansion of the Marlborough West Wastewater Treatment Plant the preferred option.

On October 18, 2007, the City requested that its permit be modified to include the increased flow limit. Accordingly, the draft permit modification includes a flow limit of 4.15 MGD, consistent with the CWMP/EIR. However, to account for the current uncertainty regarding future permit limits and the potential that future phosphorus limits may be more stringent (reference the Army Corps of Engineers study on sediment and/or dam removal discussed previously), the permittee

is required to meet the following conditions:

a. The permittee agrees to participate in a comprehensive evaluation of conservation/reuse opportunities (Conservation/Reuse Study). The evaluation will be conducted by and under the auspices of the Massachusetts Office of Technical Assistance. The Conservation/Reuse Study will include detailed audits for significant water users in Marlborough and Northborough and will identify and recommend specific conservation and reuse opportunities.

b. Work with the MassDEP and EPA in cooperation with the Army Corps of Engineers to further understanding and implementation of the recommendations that come out of the on-going work regarding specific sediment and/or dam removal and/or modifications that could result in significant water quality improvements to the Assabet River.

Because of the flow increase, EPA made changes to the effluent limitations to ensure that the discharge does not exceed the wasteload imposed by the TMDL nor exceed applicable water quality standards. The specific changes are described below.

CBOD and TSS

Maximum daily CBOD and TSS mass limits have been included to ensure that the permit does not allow an increase in the permitted maximum daily loadings.

Total Phosphorus

The total phosphorus concentration limits in the permit modification have not been changed, but mass limits have been added, calculated using the concentration limits and a flow of 2.89 MGD. In order to achieve these mass limits as the discharge flow increases, the facility must achieve ever-lower concentrations of total phosphorus, down to 0.07 mg/l to achieve the summer limits at the new design flow and 0.7 mg/l to achieve the winter limits at the new design flow.

Ammonia Nitrogen

Mass reporting limits have been added to complement the authorized concentration limits.

Metals

A review of quarterly effluent data from 2005 - 2007 indicates that lead and cadmium effluent values have been consistently below detection levels (detection level = 1 ug/l) and zinc effluent values (range = 20 - 64 ug/l) have been consistently less than the instream chronic criterion value (68 ug/l). Therefore, permit limits have not been included for these three metals since there is no reasonable potential to cause or contribute to an excursion of the instream criteria.

aluminum:

To ensure that the instream criteria for aluminum is not exceeded and that increased loadings do

not occur as a result of the flow increase, a monthly average mass limit has been incorporated in the permit in accordance with the following calculation:

monthly average mass limit = 2.89 MGD x current effluent limit (mg/l) x 8.34
= 2.89 MGD x 0.218 mg/l x 8.34 = 5.3 lbs/day

nickel:

A total recoverable nickel limit has been included in the permit based on the water quality criteria and the current dilution factor of 2.5 due to the reasonable potential for the discharge to cause or contribute to an exceedance of the criteria. Quarterly effluent data from 2005 - 2007 indicate that nickel effluent values range from18 - 234 ug/l. The limit is based on the following calculation:

monthly average total recoverable limit = chronic criteria (hardness = 50 mg/l) x 2.5
= 29 ug/l x 2.5 = 73 ug/l

A monthly average mass limit has also been included to ensure that the instream criteria is not exceeded and that the mass loading does not increase when the discharge flow increases.

monthly average mass limit = 0.073 mg/l x 2.89 MGD x 8.34 = 1.8 lbs/day

copper:

The Massachusetts Surface Water Quality Standards were revised in December 2006 and included site-specific criteria for copper that were developed for specific receiving waters where national criteria are invalid due to site-specific physical, chemical, or biological considerations, and do not exceed the safe exposure levels determined by toxicity testing [314 CMR 4.05(5)(e) Table 28]. EPA approved these criteria on March 26, 2007, which include dissolved copper chronic criteria of 18.1 ug/l and dissolved copper acute criteria of 25.7 ug/l for the Assabet River.

MassDEP prepared *PROTOCOL FOR AND DETERMINATION OF SITE SPECIFIC COPPER CRITERIA FOR AMBIENT WATERS IN MASSACHUSETTS* (the Site Specific Copper Protocol) in conjunction with the new criteria. In this document DEP states that "While site-specific copper criteria are being established, prudence dictates that loads of copper and other metals be minimized. This, in part, is because possible impacts on sediment quality and toxicity remain an open question. Therefore, as part of the site-specific criteria, all reasonable efforts to minimize the loads of metals, and copper in this case, are part of the criteria revision protocol. So, the Department on a case-by-case basis will develop permit copper limits. Each determination will be based not only on the adjusted concentration resulting from the appropriate multiplier but will reflect the demonstrated level of copper reduction routinely achievable at the facility in order to minimize copper loads and thereby reduce its accumulation in the sediment."

Antibacksliding requirements found at Clean Water Act (CWA) 402(o) and 40 CFR 122.44(l) generally prohibit relaxation of effluent limits. Water quality-based limits can only be relaxed if

one of the exceptions found at CWA 402(o)(2) is met or if the requirements of CWA 303(d)(4) are met. In this case, none of the exceptions listed in 402(o)(2) apply. It may appear that the exception found at 402(o)(2)(B)(i) would apply. This exception is for a situation where "information 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 limitations at the time of permit issuance". However, new water quality criteria are "revised regulations" and are therefore specifically excluded as "new information".

CWA 303(d)(4) requires that a determination be made whether the receiving water is attaining the applicable water quality standard. If the water is in attainment of the standard, a relaxation of
the limit would be allowed subject to the state antidegradation policy. If the receiving water is not in attainment of the applicable standard, the existing limit must be based on a wasteload allocation or a total maximum daily load (TMDL) and the relaxed limit is only allowed if attainment of water quality standards is ensured.

First, we calculated the limits that would be necessary to ensure that the receiving water would be in attainment of the new criteria. These limits were calculated based on the recently established site specific dissolved copper criteria of 18 ug/l chronic and 25.7 ug/l acute and the current dilution factor of 2.5. In establishing effluent limits based on site specific metals criteria, upstream concentrations are accounted for in order to ensure that instream values downstream of the discharge do not exceed the site specific criteria. Consistent with national criteria recommendations, a conversion factor (CF) of 0.96 has been used to convert copper limits based on dissolved criteria to copper limits based on total recoverable criteria. Monthly average and maximum daily effluent limits have been established in accordance with the following calculations:

average upstream copper concentration x 7Q10 flow + monthly average dissolved copper limit x design flow = chronic criteria x (7Q10 flow + design flow)

monthly average dissolved copper limit = {chronic criteria (7Q10 flow + design flow) - average upstream copper concentration (7Q10 flow)}/design flow

monthly average dissolved copper limit = {18.1 ug/l x 7.19 MGD - 4.3 ug/l (4.3 MGD}/2.89 MGD = 38.6 ug/l

monthly average total recoverable copper limit = 38.6 ug/l/CF = 38.6 ug/l/0.96 = 40 ug/l

maximum upstream copper concentration (7Q10 flow) + maximum daily dissolved copper limit (design flow) = acute criteria (7Q10 flow + design flow)

maximum daily dissolved copper limit = {acute criteria (7Q10 flow + design flow) - maximum upstream copper concentration (7Q10 flow)}/design flow

maximum daily dissolved copper limit = {25.7 ug/l x 7.19 MGD - 8.0 ug/l (4.3 MGD)}/2.89 MGD = 52 ug/l

maximum daily total recoverable copper limit = 52 ug/l/CF = 52 ug/l/.96 = 54 ug/l

In each case, the calculated limit was greater than the limit in the current permit. However, pursuant to the State's antidegradation policy and the Site Specific Protocol, the new limit will not be based entirely on these calculations, but must also reflect the demonstrated level of reduction routinely achievable at the facility in order to minimize copper loads and thereby reduce its accumulation in the sediment. Therefore, the effluent copper data from the facility for the years of 2005-2007 was reviewed to characterize the performance of the facility. The monthly average and maximum daily effluent copper concentrations are shown on Attachment 1. In order to capture the statistical variation in the data, the 99th percentile for maximum daily data and the 95th percentile for the average monthly concentration were calculated (see Attachment 1 for calculations). Based on these calculations, the monthly average limit would be 30 ug/l and the maximum daily limit would be 44 ug/l.

A description of the lognormal distribution is provided in the Technical Support Document for Water Quality-based Toxics Control, March 1991, EPA/505/2-90-001 (TSD), Appendix E, Lognormal Distribution and Permit Limit Derivations. The available copper data were fitted to a lognormal distribution using the equations provided in the TSD to determine the average monthly and maximum daily copper limits. The 95th and 99th percentiles of the lognormal distribution provide the average monthly and maximum daily limits, respectively.

In the event that there are nondetect values in the copper data set, the data is fitted to a delta-lognormal distribution. In delta-lognormal distributions, nondetect values are weighted in proportion to their occurrence in the data. The values above the detection limit are assumed to be lognormally distributed values.

Accordingly, the limitations in the draft permit are established at the more stringent of the limits calculated to achieve the new water quality criteria and those based on demonstrated performance of the facility. In this case, a monthly average limit of 30 ug/l and a maximum daily limit of 44 ug/l have been included in the permit.

Monthly average and maximum daily mass limits for copper have been included to ensure that the instream criteria is not exceeded and that the mass loading does not increase when the discharge flow increases.

monthly average mass limit = 2.89 MGD x monthly average effluent limit (mg/l) x 8.34
= 2.89 MGD x .030 mg/l x 8.34 = 0.7 lbs/day

maximum daily mass limit = 2.89 MGD x maximum daily effluent limit (mg/l) x 8.34
= 2.89 MGD x 0.044 mg/l x 8.34 = 1.1 lbs/day

Total Residual Chlorine (TRC) and Whole Effluent Toxicity (WET)

Reduced concentration limits for chlorine and whole effluent toxicity that will apply if the annual average effluent flow increase goes into effect have been included in the permit modification in accordance with the following calculations:

$$\text{Dilution Factor at 4.15 MGD} = \frac{\text{4.15 MGD + 7Q10 flow}}{\text{4.15 MGD}} = \frac{\text{4.15 MGD + 4.3 MGD}}{\text{4.15 MGD}} = 2.04$$

monthly average TRC limit = chronic criterion x dilution factor = 11 ug/l x 2.04 = 22 ug/l

maximum daily TRC limit = acute criterion x dilution factor = 19 ug/l x 2.04 = 39 ug/l

WET NOEC Limit = design flow/(design flow + 7Q10 flow)
= 4.15 MGD/(4.15 MGD + 4.3 MGD) = 49%

III. State Certification Requirements

The staff of the Massachusetts Department of Environmental Protection has reviewed this draft permit modification. EPA has requested permit certification by the State pursuant to CWA § 401(a)(1) and 40 C.F.R. § 124.53 and expects that the draft permit modification will be certified.

IV. Public Comment Period, Public Hearing, and Procedures for Final Decision

All persons, including applicants, who believe the limits of the draft permit modification is inappropriate must raise all issues and submit all reasonably available arguments and all supporting material for their arguments in full before the close of the public comment period, to the U.S. EPA, Office of Ecosystem Protection (CMP), Region 1, 1 Congress Street, Suite 1100, Boston, MA 02114-2023. Any person, prior to such date, may submit a request in writing to EPA and the state agency for a public hearing to consider the draft permit modification. Such requests shall state the nature of the issues proposed to be raised in the hearing.

A public hearing may be held after at least thirty days public notice whenever the Regional Administrator finds that response to this notice indicates significant public interest. In reaching a final decision on the draft permit, the Regional Administrator will respond to all significant comments and make these responses available to the public at EPA's Boston office. Following the close of the comment period, and after a public hearing, if such hearing is held, the Regional Administrator will issue a final permit decision and forward a copy of the final decision to the applicant and each person who has submitted written comments or requested notice. Permits may be appealed to the Environmental Appeals Board in the manner described at 40 C.F.R. § 124.19.

V. EPA and MassDEP Contacts

Additional information concerning the draft permit may be obtained between the hours of 9:00 a.m. and 5:00 p.m., Monday through Friday, excluding holidays from:

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