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

FACT SHEET

DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE TO WATERS OF THE UNITED STATES.

NPDES PERMIT NO.: **MA0100641**

PUBLIC NOTICE DATE:

NAME AND ADDRESS OF APPLICANT:

Board of Water and Sewer Commissioners
Town of Bridgewater Academy Building
Bridgewater, MA 02134

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Bridgewater Wastewater Treatment Facility
Morris Avenue
Bridgewater, Massachusetts 02134

RECEIVING WATER: **Town River**
Taunton Watershed (62)

CLASSIFICATION: **Class B**

I. Proposed Action, Type of Facility and Discharge Location.

The above named applicant has requested that the U.S. Environmental Protection Agency reissue its NPDES permit to discharge from Outfall 001 into the Town River. The facility is an advanced wastewater treatment plant engaged in the collection and treatment of sanitary wastewater.

The existing NPDES permit was issued on September 30, 1998 and expires on September 30, 2003. As of October 1, 2003 the expired permit (hereinafter referred to as the "existing permit") will be administratively extended because the applicant filed a complete application for permit reissuance as required by 40 Code of Federal Regulations (CFR) §122.6. The facility location is shown on Figure 1 of this fact sheet. The draft permit will be written to reflect the current operation and conditions at the facility.

II. Description of Discharge

A quantitative description of the discharge in terms of significant effluent parameters based on recent effluent monitoring data may be found in Table 1 of this fact sheet. Figure 2 of the fact sheet is a flow process diagram of the facility.

III. Limitations and Conditions

The effluent limitations and monitoring requirements may be found in the draft NPDES permit.

IV. Permit Basis and Explanation of Effluent Limitation Derivation

General Requirements

Under Section 301(b)(1)(B) of the CWA, POTW's must have achieved effluent limitations based upon secondary treatment by July 1, 1977. The secondary treatment requirements are set forth at 40 CFR Part 133. Effluent limitations for monthly and weekly average Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS) are based on requirements under Section 301(b)(1)(B) of the Clean Water Act and 40 CFR 133.102.

Fecal coliform bacteria and pH are based on State Certification requirements for Publicly Owned Treatment Works (POTW's) under Section 401(d) of the CWA, 40 CFR 124.53 and 124.55, and water quality considerations.

Under Section 301(b)(1)(C) of the Clean Water Act (CWA), discharges are subject to effluent limitations based on Water Quality Standards. The Massachusetts Surface Water Quality Standards include the requirements for the regulation and control of toxic constituents and also require that EPA criteria established pursuant to Section 304 (a) of the CWA shall be used unless site specific criteria are established. The State will limit or prohibit discharges of pollutants to surface water to assure that surface water quality standards of the receiving water are protected and maintained or attained.

According to 40 CFR 122.44(l), when a permit is reissued effluent limitations, standards or conditions must be at least as stringent as effluent limitations in the previous permit unless the circumstances on which the previous permit were based have materially and substantially changed since the time the permit was issued.

Facility

The Bridgewater Wastewater Treatment Plant was upgraded in 1987 and has an design flow of 1.44 MGD sanitary sewage, which includes 20,000 GPD of septage. The unit processes are comminutor, aerated grit chamber, two primary clarifiers, 14 rotating biological contractors (RBC), two secondary clarifiers, chlorination and dechlorination. Sludge is dewatered on two belt filter presses then composted for stabilization.

Waterbody Classification and Usage

The Town River, at the point of discharge, is classified as a Class B waterbody by the Massachusetts Department of Environmental Protection (MA DEP). Class B waters are designated as a habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. These waters shall have consistently good aesthetic value.

Where designated, Class B waters shall be suitable as a source of public water supply with appropriate treatment. They shall be suitable for irrigation and other agricultural uses and for compatible industrial cooling and process uses.

Available Dilution

The dilution factor, 2.2, will remain the same as is in the existing permit.

Treatment Plant Design Flow - 1.44 mgd = 2.23 cfs

Receiving Stream - Town River
7 day 10 year low flow (7Q10) - 2.65 cfs (1.713 mgd)

Dilution Factor

$$\frac{\text{plant flow + river flow}}{\text{plant flow}} \qquad \frac{2.23 + 2.65}{2.23} = 2.188$$

dilution factor = 2.2

Conventional Pollutants

Biological Oxygen Demand (BOD_5) - In accordance with the anti-backsliding rule found at 40 CFR 122.44(l) the average monthly and average weekly concentration and mass limits for BOD_5 in the draft permit are unchanged from the limits in the existing permit. The limits are water quality based on the requirements set forth at 40 CFR 122.45 (f), and are 20 mg/l and 240 lbs/day for average monthly BOD_5, and 30 mg/l and 360 mg/l for weekly average BOD_5.

Total Suspended Solids (TSS) - In accordance with the anti-backsliding rule found at 40 CFR 122.44(l) the average monthly and average weekly concentration and mass limits for TSS in the draft permit will be the same as in the existing permit. The limits are based on the requirements set forth at 40 CFR 122.45 (f), and are 20 mg/l and 240 lbs/day for average monthly TSS, and 30 mg/l and 360 mg/l for weekly average TSS.

There were no violations reported for BOD_5 or TSS for the reporting period of January 2002 through April 2003.

Eighty-Five Percent (85%) BOD_5 and TSS Removal Requirement - the provisions of 40 CFR §133.102(3) requires that the 30 day average percent removal for BOD_5 and TSS be not less than 85%. The facility has reported no violations for the secondary treatment removal requirement of 85% BOD_5 or TSS between January 2002 through April 2003.

pH - The draft permit includes proposed pH limitations which are required by state water quality standards, and are at least as stringent as pH limitations set forth at 40 CFR 133.102(c). Class B waters shall be in a range of 6.5 through 8.3 standard units and not more than 0.5 standard units outside of the background range. There shall be no change from background conditions that would impair any use assigned to this class. The facility has reported no pH violations between January 2002 through April 2003.

Fecal Coliform Bacteria - The draft permit carries forward the average monthly, average weekly, and maximum daily concentration for fecal coliform in the existing permit.

The numerical limitations for fecal coliform are based on state certification requirements under Section 401(a)(1) of the CWA, as described in 40 CFR 124.53 and 124.55. These limitations are also in accordance with the Massachusetts Surface Water Quality Standards 314 CMR 4.05 (4)(a)4.a.

The proposed limits in the draft permit are 200 colony forming units (cfu's)/100 ml average monthly, 400 cfu's/100 ml weekly average, and 400 cfu's/100 ml maximum daily. The monitoring frequency for fecal coliform has been continued at twice (2) per week, and must be collected concurrently with sampling for Total Residual Chlorine between the months of April1 through October 31. The facility reported two violations for fecal coliform between April 2002 through April 2003.

Dissolved Oxygen (DO) - The dissolved oxygen limit in the draft permit has been changed from what is in the

existing permit from 6.0 mg/l to 5.0 mg/l. The new limit is based on the Massachusetts Surface Water Quality Standards 314 CMR 4.05 (3)(b) for Class B warm water fisheries.

NON-CONVENTIONAL POLLUTANTS

Total Residual Chlorine (TRC) - Chlorine compounds produced by the chlorination of wastewater can be extremely toxic to aquatic life. The water quality standards for chlorine defined in the National Recommended Water Quality Criteria 2002 for freshwater are 19 ug/l daily maximum and 11 ug/l monthly average in the receiving water. Chlorine is a toxic chemical. DMRs show the monthly average chlorine residual range between 0 ug/l and 53 ug/l between January 2000 through October 2002. The effluent is disinfected from April1 through October 15 each year. There no reported TRC violations between April 2002 through October 2002, and April 2003.

The total residual chlorine limits in the draft permit will remain unchanged from those in the existing permit. The limits are based on state water quality standards [Title 314 CMR 4.05(5)(e)].

Total Residual Chlorine Limitations:

(acute criteria * dilution factor) = Acute (Maximum Daily)
(19 ug/l x 2.2)= 42 ug/l

(chronic criteria * dilution factor) = Chronic (Monthly Average)
(11 ug/l x 2.2) = 24 ug/l

Ammonia Nitrogen
Limits for total ammonia will remain the same in the draft permit as in the existing permit from the months of May 1 through October 31. Ammonia can impact the receiving stream's dissolved oxygen concentration and can be toxic at elevated levels. Ammonia limits during the warm weather season are necessary to maintain the dissolved oxygen levels of 5 mg/l in the receiving stream as required by the State's Water Quality Standards for Class B waters. Dissolved oxygen (D.O.) levels downstream of the discharge were below water quality criteria in the months of July and August 2000, see Taunton River Watershed Association (TRWA) 2001 Water Quality Monitoring Report.

Total Phosphorus
The Massachusetts Surface Water Quality Standards (314 CMR 4.00) do not contain numerical criteria for total phosphorus. The criteria for nutrients are found at 314 CMR 4.05(5)(c), which states that nutrients "shall not exceed the site specific limits necessary to control accelerated or cultural eutrophication". The Water Quality Standards also require that "any existing point source discharges containing nutrients in concentrations which encourage eutrophication or growth of weeds or algae shall be provided with the highest and best practicable treatment to remove such nutrients (314 CMR 4.04). MADEP has established that a monthly average total phosphorus limit of 0.2 mg/l represents highest and best practical treatment for POTWs.

EPA has produced several guidance documents which contain recommended total phosphorus criteria for receiving waters. The 1986 Quality Criteria of Water (Gold Book) recommends in-stream phosphorus concentrations of 0.05 mg/l in any stream entering a lake or reservoir, 0.1 mg/l for any stream not discharging directly to lakes or impoundments, and 0.025 mg/l within the lake or reservoir.

More recently, EPA has released "Ecoregional Nutrient Criteria", established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country. The published criteria represent conditions in waters in that ecoregion minimally impacted by human activities, and thus

representative of water without cultural eutrophication. Bridgewater is within Ecoregion XIV, Eastern Coastal Plains. The total phosphorus criteria for this ecoregion, found in Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV, published in the December, 2000 is 24 ug/l (0.024 mg/l).

In February 2001, the Taunton River Watershed Association published, TRWA Water Quality Monitoring Report 1999-2000. The report includes data on dissolved oxygen, total phosphorus, and nitrogen from monitoring upstream and downstream of the Bridgewater Wastewater Treatment facility. Phosphorus data recorded for the months of June, July, August, September and October show an increase in phosphorus levels between the two monitoring sites. See table below.

	June 2000 Total P	July 2000 Total P	August 2000 Total P	September 2000 Total P	October 2000 Total P
Town River at Broad Street (upstream from wwtp)	0.03 mg/l	0.09 mg/l	0.03 mg/l	0.01 mg/l	0.08 mg/l
Town River at Haywood Street (downstream of wwtp)	0.04 mg/l	0.19 mg/l	0.045 mg/l	0.145 mg/l	0.35 mg/l

These values exceed recommended phosphorus criteria published by EPA. In July 2003, EPA conducted a site visit to observe water quality conditions at the point of discharge, and at the downstream of the discharge. Based on observation, the Town River at this location did not appear to be highly eutrophied. This may be due partly to the natural dark color of the river which prevents sunlight from contributing to algae growth.

Consequently, the draft permit will not establish limits based on the EPA ecoregion guidance but, will instead establish a monthly average total phosphorus limit of 1.0 mg/l to prevent eutrophication problems. This limit will be in effect seasonally, from April 1 to October 31. The draft permit also contains total phosphorus monitoring requirements from November 1 to March 31.

When, in the future MADEP adopts nutrient criteria, a TMDL is completed, or additional water quality information shows that the phosphorus limit is not stringent enough to meet water quality standards, a more stringent limit may be imposed.

Metals

Certain metals in water can be toxic to aquatic life. There is a need to limit toxic metal concentrations in the effluent where aquatic life may be impacted. An evaluation of the reasonable potential of toxicity on the concentration of metals in the effluent shows there is a reasonable potential of toxicity for copper.

EPA is required to limit any pollutant or pollutant parameter that is or may be discharged at a level that caused, has reasonable potential to cause, or contributes to an excursion above any water quality criterion.

Calculation of reasonable potential for copper:

National Recommended Water Quality Criteria 2002 is used in this calculation, a hardness of fifty

(50) is assumed.

Allowable Receiving Water Concentration, C = Criteria (Total Recoverable) x Dilution Factor

Copper: Acute C = 7.3 ug/l x 2.2 = 16.06 ug/l which is less than the effluent concentrations for copper recorded in recent toxicity tests and the October 2002 permit application (36ug/l). Therefore, a reasonable potential exist that copper being discharged in the effluent will exceed the water quality criteria.

Chronic C = 5.16 ug/l x 2.2 = 11.35 ug/l which is less than the effluent concentrations for copper recorded in recent toxicity test and the October 2002 permit application, (19ug/l). Therefore, a reasonable potential exist that copper being discharged in the effluent will exceed the water quality criteria.

Water Quality Criteria for hardness-dependent metals:

Acute criteria (dissolved) = $\exp\{m_a [\ln(h)] + b_a\}$ (CF)
m_a = pollutant specific coefficient
b_a = pollutant specific coefficient
h = hardness
ln = natural logarithm
CF = pollutant-specific conversion factor used to convert total recoverable to dissolved metal
Chronic criteria (dissolved) = $\exp\{m_c [\ln(h)] + b_c\}$ (CF)

m_c = pollutant specific coefficient
b_c = pollutant specific coefficient
h = hardness
ln = natural logarithm
CF = pollutant-specific conversion factor used to convert total recoverable to dissolved metal

Reasonable potential calculation of acute limit for copper:

m_a = 0.9422 b_a = -1.7 CF = 0.96
Acute criteria (dissolved) = $\exp\{0.9422 [\ln(50)] + -1.7\}$ (0.96) = 6.99 ug/l
Acute criteria (total) = $\exp\{0.9422 [\ln(50)] + -1.7\}$ = 7.28 ug/l
Dilution Factor = 2.2
Effluent limitation for dissolved copper = 6.99 ug/l x 2.2 = 13.98 ug/l
Maximum daily effluent limitation for total recoverable copper = 13.98/0.96 = 14.56 ug/l*

Reasonable potential calculation for chronic limit for copper:

m_a = 0.8545 b_a = -1.7 CF = 0.96
Chronic criteria (dissolved) = $\exp\{0.8545 [\ln(50)] + -1.7\}$ (0.96) = 4.96 ug/l
Chronic criteria (total) = $\exp\{0.8545 [\ln(50)] + -1.7\}$ = 5.16 ug/l
Dilution Factor = 2.2
Effluent limitation for dissolved copper = 4.96 x 2.2 ug/l = 10.91 ug/l
Monthly average effluent limitation for total recoverable copper = 10.91/0.96 = 11.36 ug/l*

*The conversion factor is used to determine total recoverable metal. EPA Metal Translator Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion (EPA-823-B-96-007) is used as the basis for using the criteria conversion factor. National guidance requires that permit limits be based on total recoverable metals and not dissolved metals. Consequently, it is necessary to apply a translator in order to develop a total recoverable permit limit from a dissolved criteria. The translator reflects how a discharge partitions between the particulate and dissolved phases after mixing with the receiving water. In the absence of site specific data on how a particular discharge partitions in the receiving water, a default assumption is equivalent to the criteria conversion factor used in accordance with the Translator Guidance.

Toxicity

National studies conducted by the EPA have demonstrated that industrial and domestic sources contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents, aromatic hydrocarbons and others. Based on the potential for toxicity from domestic and industrial contributions, the state water quality criterion, the level of dilution at the discharge location and in accordance with EPA national and regional policy and 40 CFR 122.44(d), the draft permit includes a whole effluent chronic toxicity limitation (LC50) and monitoring requirements. (See "Policy for the Development of Water Quality Based Permit Limitations for Toxic Pollutants", 50 Federal Register 30748, July 24, 1985, and EPA's Technical Support Document for Water Quality Based Toxics Control", September, 1985, and the "Implementation Policy for the Control of Toxic Pollutants on Surface Waters", February 23, 1990.)

The principal advantages of biological techniques are: (1) the effects of complex discharges of many known and unknown constituents can be measured only by biological analyses; (2) bioavailability of pollutants after discharge is measured by toxicity testing including any synergistics effects of pollutants; and (3) pollutants for which there are inadequate analytical methods or criteria can be addressed. Therefore, toxicity testing is being used in conjunction with pollutant specific control procedures to control the discharge of toxic pollutants.

The results of the chronic whole effluent toxicity tests have been in compliance with the limits in the existing permit for the period of February 2000 through November 2001, however, the LC_{50} in the January 2003 tests did not meet the permit limit of 100%. The number of whole effluent toxicity tests remain the same as the requirement in the existing permit. The draft permit includes a limit of 45% based on the inverse of the dilution factor for the NOEC parameter of the toxicity tests.

C-NOEC

1/dilution factor *100 = C-NOEC
Dilution Factor = 2.2
1/2.2 * 100 = 45%.

VII. Sludge

The permit prohibits any discharge of sludge. Section 405(d) of the Clean Water Act (CWA) requires that sludge conditions be included in all POTW permits. Technical sludge standards required by Section 405 of the CWA were finalized on November 25, 1992 and published on February 19, 1993. The regulations went into effect on March 21, 1993.

Sludge is composted for stabilization using the aerated static pile method. Composted sludge was designated Type 1 by MA DEP in September 1999, and is suitable for use on lawns, shrubs, and trees without further monitoring. The permit further requires that the Town of Bridgewater give prior notice to the Director of any

planned changes in its sludge use or disposal practice.

VI. State Certification Requirements

EPA may not issue a permit unless the State Water Pollution Control Agency with jurisdiction over the receiving waters certifies that the effluent limitations contained in the permit are stringent enough to assure that the discharge will not cause the receiving water to violate State Water Quality Standards. The staff of the Massachusetts Department of Environmental Protection has reviewed the draft permit and advised EPA that the limitations are adequate to protect water quality. EPA has requested permit certification by the State pursuant to 40 CFR 124.53 and expects that the draft permit will be certified.

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

All persons, including applicants, who believe any condition of the draft permit is inappropriate must raise all issues and submit all available arguments and all supporting material for their arguments in full by the close of the public comment period, to the U.S. EPA, Massachusetts Office of Ecosystem Protection (CMA), 1 Congress Street, Suite 1100, Boston, Massachusetts 02114-2023. Any person, prior to such date, may submit a request in writing for a public hearing to consider the draft permit to EPA and the State Agency. 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. Within 30 days following the notice of the final permit decision, any interested person may submit a request for a formal hearing to reconsider or contest the final decision. Requests for formal hearings must satisfy the requirements of 40 CFR 124.74, 48 Fed. Reg. 14279-14280 (April 1, 1983).

VIII. EPA Contact

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:

Betsy Davis
Massachusetts NPDES Permit Program Unit (CPE)
1 Congress Street - Suite 1100
Boston, MA 02114-2023
Telephone: (617) 918-1576 FAX : (617) 918-0576

Linda M. Murphy, Director
Office of Ecosystem Protection
2003 U.S. Environmental Protection Agency

Table 1

Discharge Monitoring Report Data Summary for Outfall 001: Average monthly discharge results

Date	Flow MGD	BOD_5 mg/l	TSS mg/l	pH S.U.	Fecal Coliform	TRC* mg/l	Dissolved Oxygen mg/l	Ammonia Nitrogen mg/l	Copper ug/l
4/02	0.845	9	4	6.5 - 6.8	25	0	7.0	3.21	19
5/02	0.811	7	5	6.5 - 6.8	21	0	7.6	1.06	22
6/02	0.740	6	5	6.5 - 6.8	33	0	7.5	0.24	23
7/02	0.658	4	5	6.6 - 7.0	2	0	7.0	0.25	20
8/02	0.621	9	12	6.5 - 6.9	36	0	6.9	0.38	23
9/02	0.790	10	10	6.5 - 6.9	51	0	6.4	2.50	31
10/02	0.780	8	7	6.6 - 7.4	141	0	6.7	2.81	20
11/02	0.883	8	7	6.5 - 7.2	*****	0	6.8	1.88	18
12/02	1.018	10	8	6.6 - 7.1	*****	0	7.1	1.64	33
1/03	1.078	10	9	6.7 - 7.0	*****	0	7.5	0.94	25
2/03	1.020	10	9	6.7 - 7.0	*****	0	7.1	0.63	20
3/03	1.190	10	9	6.6 - 7.1	*****	0	7.0	1.58	25
4/03	1.293	9	9	6.5 - 6.7	53	0	6.9	2.13	25

* TRC - Total Residual Chlorine

Toxicity Results for Bridgewater Wastewater Treatment Facility

Ceriodaphnia dubia	Sample Date	LC50	C-NOEC
	January 2003	89.1%	50.0%
	April 2002	>100%	100%
	January 2002	>100%	100%
	October 2001	>100%	100%
	July 2001	>100%	100%
	April 2001	>100%	50%
	January 2001	>100%	100%
	October 2000	>100%	100%
	July 2000	>100%	100%
	April 2000	>100%	50%
	January 2000	>100%	100%

Bridgewater Wastewater Treatment Facility
Summary of NPDES Permit Reporting Requirements Dates

Permit Page	Requirement and Dates	Submit to:
5.	Whole Effluent Toxicity Tests results are due March 31, June 30, September 31, December 31 of each year.	EPA/MA DEP
8	The permittee shall develop and implement a plan to control I/I to the separate sewer system. The plan shall be available to EPA and submitted to MA DEP six months of the effective date of the permit.	MA DEP
8	A summary report of all actions taken to minimize I/I during the previous calendar year shall be submitted to EPA and the MA DEP annually,	EPA/MA DEP
9	The permittee shall submit an annual report containing the information specified in the sludge section of the permit by February 19.	EPA/MA DEP
10	Monitoring results obtained during the previous month shall be summarized for each month and reported on separate Discharge Monitoring Report Form(s) postmarked no later than the 15th day of the month following the effective date of the permit.	EPA/MA DEP

Fact Sheet Attachment C
Bridgewater Wastewater Treatment Plant (MA0100641)
Summary of NPDES Permit Reporting

Permit Page	Requirements and Dates	Submit To:
	Whole Effluent Toxicity Test results are due, February 28th, May 31th, August 31th, November 30th.	EPA and DEP
	The permittee shall develop and implement a plan to control (I/I) infiltration/inflow to the separate sewer system. The plan shall be developed and implemented six months from the effective date of the permit. The plan shall be available to EPA for review on request.	DEP
	A summary report of all actions taken to minimize I/I during the previous calendar year shall be available to EPA annually, by the anniversary of the date of the effective date of this permit.	DEP
	The permittee shall submit an annual report containing the information specified in the sludge guidance on or before February 19.	EPA and DEP
	Monitoring results obtained during the previous month shall be summarized for each month and reported on separate Discharge Monitoring Reports Forms (DMRs) postmarked no later than the 15th day of the month following the effective date of the permit.	EPA and DEP
	Copies of the chlorine continuous recording charts (1/week for each analyzer) will be submitted with the monthly DMRs.	EPA and DEP