

EXHIBIT A

AUTHORIZATION TO DISCHARGE UNDER THE
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

In compliance with the provisions of the Federal Clean Water Act as amended, (33 U.S.C. §§1251 et seq.; the "CWA"), and the Massachusetts Clean Waters Act, as amended, (M.G.L. Chap. 21, §§26-53),

Town of Northbridge

is authorized to discharge from the facility located at

**Wastewater Treatment Plant
644 Providence Road
Whitinsville, MA 01588**

to receiving water named

Unnamed Tributary to the Blackstone River

in accordance with effluent limitations, monitoring requirements and other conditions set forth herein.

This permit shall become effective on the first day of the calendar month following sixty (60) days after the date of signature.

This permit and the authorization to discharge expire at midnight, five (5) years from the last day of the month preceding the effective date.

This permit supersedes the permit issued September 30, 1999 and effective on October 30, 1999.

This permit consists of 11 pages in Part I including effluent limitations, monitoring requirements, Attachment A and 35 pages in Part II including General Conditions and Definitions.

Signed this ^{13th} day of September, 2006



Director
Office of Ecosystem Protection
Environmental Protection Agency
Boston, MA



Director
Division of Watershed Management
Department of Environmental Protection
Commonwealth of Massachusetts
Boston, MA

PART I

A.1. During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge from outfall serial number 001, treated effluent to an unnamed tributary to the Blackstone River. Such discharges shall be limited and monitored as specified below.

EFFLUENT CHARACTERISTIC				EFFLUENT LIMITS				MONITORING REQUIREMENTS			
PARAMETER	AVERAGE MONTHLY	AVERAGE WEEKLY	AVERAGE MONTHLY	AVERAGE WEEKLY	MAXIMUM DAILY	MEASUREMENT FREQUENCY	SAMPLE TYPE				
FLOW	*****	*****	2.0 MGD ^{2,3}	*****	Report MGD	Continuous	Recorder				
BOD ₅ ⁴	Report lbs/Day	Report lbs/Day	10 mg/l	10 mg/l	Report mg/l	3/WEEK	24-HOUR COMPOSITE ⁵				
TSS ⁴	Report lbs/Day	Report lbs/Day	10 mg/l	10 mg/l	Report mg/l ¹	3/WEEK	24-HOUR COMPOSITE ⁵				
pH RANGE ¹	6.5 - 8.3 SU - SEE PERMIT PAGE 6, PARAGRAPH I.A.1.b.								GRAB		
FECAL COLIFORM ^{2,6}	*****	*****	200 cfu per 100 ml	*****	400 cfu per 100 ml	3/WEEK	GRAB				
TOTAL COPPER	*****	*****	6.5 ug/l ⁷	*****	9.1 mg/l ⁷	1/MONTH	24-HOUR COMPOSITE ⁵				
TOTAL ZINC	*****	*****	82 ug/l	*****	82 ug/l	1/MONTH	24-HOUR COMPOSITE ⁵				
TOTAL LEAD	*****	*****	1.8 ug/l ⁷	*****	Report ⁷	1/MONTH	24-HOUR COMPOSITE ⁵				
DISSOLVED OXYGEN April 1- October 31	NOT LESS THAN 5.0 mg/l								GRAB		
WHOLE EFFLUENT TOXICITY SEE FOOTNOTES 8 through 11	Acute	LC ₅₀ ≥ 100% NOEC ≥ 83%								GRAB	24-HOUR COMPOSITE ⁴

Footnotes are listed on Pages 4, 5 and 6

Sampling for effluent parameters shall be conducted after ultraviolet disinfection and prior to discharge to the unnamed tributary to the Blackstone River.

CONTINUED FROM PREVIOUS PAGE

EFFLUENT CHARACTERISTIC		EFFLUENT LIMITS						MONITORING REQUIREMENTS	
		AVERAGE MONTHLY	AVERAGE WEEKLY	AVERAGE MONTHLY	AVERAGE WEEKLY	MAXIMUM DAILY	MEASUREMENT FREQUENCY	SAMPLE TYPE	
A.1. During the period beginning the effective date and lasting through expiration, the permittee is authorized to discharge from outfall serial number 001, treated effluent to an unnamed tributary to the Blackstone River. Such discharges shall be limited and monitored as specified below.									
AMMONIA-NITROGEN, TOTAL May 1 - October 31	*****	*****	*****	2.0 mg/l	4.0 mg/l	Report mg/l	1/WEEK	24-HOUR COMPOSITE ⁵	
AMMONIA-NITROGEN, TOTAL November 1 - April 30	*****	*****	*****	9.0 mg/l	18.0 mg/l	Report mg/l	1/WEEK	24-HOUR COMPOSITE ⁵	
TOTAL PHOSPHORUS April 1 - October 31	Report lbs/Day	*****	*****	0.2 mg/l ¹²	*****	Report mg/l	2/WEEK	24-HOUR COMPOSITE ⁵	
TOTAL PHOSPHORUS November 1 - March 31	Report lbs/Day	*****	*****	1.0 mg/l ¹²	*****	Report mg/l	2/MONTH	24-HOUR COMPOSITE ⁵	
PHOSPHORUS, ORTHO November 1 - March 31	*****	*****	*****	Report mg/l ¹²	*****	Report mg/l	2/MONTH	24-HOUR COMPOSITE ⁵	
TOTAL KJELDAHL NITROGEN	Report lbs/Day	*****	*****	Report mg/l ¹³	*****	Report mg/l	1/MONTH	24-HOUR COMPOSITE ⁵	
NITRATE + NITRITE NITROGEN	Report lbs/Day	*****	*****	Report mg/l ¹³	*****	Report mg/l	1/MONTH	24-HOUR COMPOSITE ⁵	

Footnotes are listed on Pages 4, 5 and 6

Sampling for effluent parameters shall be conducted after ultraviolet disinfection and prior to discharge to the unnamed tributary to the Blackstone River

Footnotes:

1. All required effluent samples shall be collected after the ultraviolet disinfection system and prior to discharge to the unnamed tributary to the Blackstone River. A routine sampling program shall be developed in which samples are taken at the same location, same time and same days of every month. Any deviations from the routine sampling program shall be documented in correspondence appended to the applicable discharge monitoring report that is submitted to EPA. All samples shall be tested using the analytical methods found in 40 CFR §136, or alternative methods approved by EPA in accordance with the procedures in 40 CFR §136. All samples shall be 24 hour composites unless specified as a grab sample in 40 CFR §136.
2. Required for State Certification.
3. For flow, report maximum and minimum daily rates and total flow for each operating date. This is a monthly average limit.
4. Sampling required for influent and effluent.
5. A 24-hour composite sample will consist of at least twenty four (24) grab samples taken during a consecutive 24 hour period (e.g. 7:00 A.M. Monday to 7:00 A.M. Tuesday).
6. This is also a State certification requirement, but only for the period of April 1 through October 31. The permit limit for the period of November 1 through March 31 is a requirement of the U. S. EPA permit and is not a requirement of the Massachusetts Department of Environmental Protection permit. Fecal coliform discharges shall not exceed a monthly geometric mean of 200 colony forming units (cfu) per 100 ml, nor shall they exceed 400 cfu per 100 ml as a daily maximum. These limits apply year round.
7. The minimum level (ML) for copper and lead is defined as 3 ug/l. This value is the minimum level for copper and lead using the Furnace Atomic Absorption analytical method (EPA Method 220.2). For effluent limitations of less than 3 ug/l. Compliance or non-compliance will be determined based on the ML from this method, or another approved method that has an equivalent or lower ML, one of which must be used. Sample results of 3 ug/l or less shall be reported as zero on the DMR.
8. The permittee shall conduct acute toxicity tests four times per year. The permittee shall test the fathead minnow, Pimephales promelas, only. Toxicity test samples shall be collected during the second week of the months of January, April, July and October. The test results shall be submitted by the last day of the month following the completion of the test. The results are due no later than February 28th, May 31st, August 31st and November 30th, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachment A** of this permit.

Test Dates Second Week of	Submit Results By:	Test Species	Acute Limit LC ₅₀	C-NOEC limit
January April July October	February 28 May 31 August 31 November 30	<u>Pimephales promelas</u> (Fathead Minnow)	≥ 100%	≥ 83%

After submitting **one year** and a **minimum** of four consecutive sets of WET test results, all of which demonstrate compliance with the WET permit limits, the permittee may request a reduction in the WET testing requirements. The permittee is required to continue testing at the frequency specified in the permit until notice is received by certified mail from the EPA that the WET testing requirement has been changed.

9. The permittee may use laboratory water as diluent and such diluent shall have characteristics such as hardness, pH, conductivity, alkalinity, organic carbon, and total suspended solids similar to those of the receiving water and shall not illicit a toxic response. Alternate dilution water tests must be run with a minimum of two controls: a receiving water (unnamed tributary to the Blackstone River) control and a toxic free alternate dilution water control. Chemical data of the receiving water and dilution water samples must be included in the whole effluent toxicity (WET) report. The analytical results from the WET tests for copper, lead and zinc may be used to satisfy this requirement for the months that WET testing is conducted.
10. The LC₅₀ is the concentration of effluent which causes mortality to 50% of the test organisms. Therefore, a 100% limit means that a sample of 100% effluent (no dilution) shall cause no more than a 50% mortality rate.
11. C-NOEC (chronic-no observed effect concentration) is defined as the highest concentration of toxicant or effluent to which organisms are exposed in a life cycle or partial life cycle test which causes no adverse effect on growth, survival, or reproduction at a specific time of observation as determined from hypothesis testing where the test results exhibit a linear dose-response relationship. However, where the test results do not exhibit a linear dose-response relationship, the permittee must report the lowest concentration where there is no observable effect. The final limit of "83% or greater" is defined as a sample which is composed of 83% (or greater) effluent, the remainder being dilution water. This is a maximum daily limit derived as a percentage of the inverse of the dilution factor of 1.2.
12. The permittee shall comply with the 0.2 mg/l and 1.0 mg/l total phosphorus limits upon the effective date of the permit. These limits are monthly average limits. The maximum daily value must be reported for each month. The monthly average mass loading shall also be reported. Consistent with Section B.1 of Part II of the Permit, the Permittee shall properly operate and maintain the phosphorus removal facilities in order to obtain the lowest effluent concentration possible. The maximum daily concentration values reported for ortho phosphorus shall be the values from the same day that the maximum daily total phosphorus concentration values were measured.

13. The permittee shall operate the treatment facility to reduce the discharge of total nitrogen to the maximum extent possible, using all existing available treatment equipment at the facility.

Within one (1) year after the effective date of the permit, the permittee shall submit a report to EPA and MassDEP that describes the measures it has taken to enhance the removal of nitrogen by its treatment facility and summarizes the effectiveness of these measures.

Part I.A.1. (Continued)

- a. The discharge shall not cause a violation of the water quality standards of the receiving waters.
- b. The pH of the effluent shall not be less than 6.5 nor greater than 8.3 at any time, and not more than 0.5 units outside of the background range. There shall be no change from background conditions that would impair any use assigned to this Class.
- c. The discharge shall not cause objectionable discoloration of the receiving waters.
- d. The effluent shall contain neither a visible oil sheen, foam, nor floating solids at any time.
- e. The permittee's treatment facility shall maintain a minimum of 85 percent removal of both total suspended solids and biochemical oxygen demand. The percent removal shall be based on monthly average values.
- f. The results of sampling for any parameter above its required frequency must also be reported.

2. All POTWs must provide adequate notice to the Director of the following:

- a. Any new introduction of pollutants into that POTW from an indirect discharger in a primary industry category discharging process water; and
- b. Any substantial change in the volume or character of pollutants being introduced into that POTW by a source introducing pollutants into the POTW at the time of issuance of the permit.
- c. For purposes of this paragraph, adequate notice shall include information on:
 - (1) the quantity and quality of effluent introduced into the POTW; and
 - (2) any anticipated impact of the change on the quantity or quality of effluent to be discharged from the POTW.

3. Prohibitions Concerning Interference and Pass Through:

- a. Pollutants introduced into POTW's by a non-domestic source (user) shall not pass through the POTW or interfere with the operation or performance of the works.

4. Toxics Control

- a. The permittee shall not discharge any pollutant or combination of pollutants in toxic amounts.
- b. Any toxic components of the effluent shall not result in any demonstrable harm to aquatic life or violate any state or federal water quality standard which has been or may be promulgated. Upon promulgation of any such standard, this permit may be revised or amended in accordance with such standards.

5. Numerical Effluent Limitations for Toxicants

EPA or MassDEP may use the results of the toxicity tests and chemical analyses conducted pursuant to this permit, as well as national water quality criteria developed pursuant to Section 304(a)(1) of the Clean Water Act (CWA), state water quality criteria, and any other appropriate information or data, to develop numerical effluent limitations for any pollutants, including but not limited to those pollutants listed in Appendix D of 40 CFR Part 122.

B. UNAUTHORIZED DISCHARGES

The permittee is authorized to discharge only in accordance with the terms and conditions of this permit and only from the outfalls listed in Part I A.1. of this permit. Discharges of wastewater from any other point sources, including sanitary sewer overflows (SSOs) are not authorized by this permit and shall be reported in accordance with Section D.1.e. (1) of the General Requirements of this permit (Twenty-four hour reporting).

C. OPERATION AND MAINTENANCE OF THE SEWER SYSTEM

Operation and maintenance of the sewer system shall be in compliance with the General Requirements of Part II and the following terms and conditions:

1. Maintenance Staff

The permittee shall provide an adequate staff to carry out the operation, maintenance, repair, and testing functions required to ensure compliance with the terms and conditions of this permit.

2. Preventative Maintenance Program

The permittee shall maintain an ongoing preventative maintenance program to prevent overflows and bypasses caused by malfunctions or failures of the sewer system infrastructure. The program shall include an inspection program designed to identify all potential and actual unauthorized discharges.

3. Infiltration/Inflow Control Plan:

The permittee shall continue to implement a plan to control infiltration and inflow (I/I) to the separate sewer system. This plan shall describe the permittee's program for preventing infiltration/inflow related effluent limit violations, and all unauthorized discharges of wastewater, including overflows and by-passes due to excessive infiltration/inflow.

The plan shall include:

- An ongoing program to identify and remove sources of infiltration and inflow. The program shall include the necessary funding level and the source(s) of funding.
- An inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts. Priority should be given to removal of public and private inflow sources that are upstream from, and potentially contribute to, known areas of sewer system backups and/or overflows.
- Identification and prioritization of areas that will provide increased aquifer recharge as the result of reduction/elimination of infiltration and inflow to the system.
- An educational public outreach program for all aspects of I/I control, particularly private inflow.

Reporting Requirements:

A summary report of all actions taken to minimize I/I during the previous calendar year shall be submitted to EPA and the MassDEP annually, **no later than April 1st**.

The summary report shall, at a minimum, include:

- A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year.
- Expenditures for any infiltration/inflow related maintenance activities and corrective actions taken during the previous year.

- A map with areas identified for I/I-related investigation/action in the coming year.
- A calculation of the annual average I/I, the maximum month I/I for the reporting year.
- A report of any infiltration/inflow related corrective actions taken as a result of unauthorized discharges reported pursuant to 314 CMR 3.19(20) and reported pursuant to the Unauthorized Discharges section of this permit.

4. Alternate Power Source

In order to maintain compliance with the terms and conditions of this permit, the permittee shall continue to provide an alternative power source with which to sufficiently operate its treatment works (as defined at 40 CFR §122.2).

D. SLUDGE CONDITIONS

1. The permittee shall comply with all existing federal and state laws and regulations that apply to sewage sludge use and disposal practices and with the CWA Section 405(d) technical standards.
2. The permittee shall comply with the more stringent of either the state or federal (40 CFR part 503), requirements.
3. The requirements and technical standards of 40 CFR part 503 apply to facilities which perform one or more of the following use or disposal practices.
 - a. Land application - the use of sewage sludge to condition or fertilize the soil
 - b. Surface disposal - the placement of sewage sludge in a sludge only landfill
 - c. Sewage sludge incineration in a sludge only incinerator
4. The 40 CFR part 503 conditions do not apply to facilities which place sludge within a municipal solid waste landfill. These conditions also do not apply to facilities which do not dispose of sewage sludge during the life of the permit but rather treat the sludge (e.g. lagoons- reed beds), or are otherwise excluded under 40 CFR 503.6.
5. The permittee shall use and comply with the attached compliance guidance document to determine appropriate conditions. Appropriate conditions contain the following elements.
 - General requirements
 - Pollutant limitations

- Operational Standards (pathogen reduction requirements and vector attraction reduction requirements)
- Management practices
- Record keeping
- Monitoring
- Reporting

Depending upon the quality of material produced by a facility, all conditions may not apply to the facility.

6. The permittee shall monitor the pollutant concentrations, pathogen reduction and vector attraction reduction at the following frequency. This frequency is based upon the volume of sewage sludge generated at the facility in dry metric tons per year

less than 290	1/ year
290 to less than 1500	1 /quarter
1500 to less than 15000	6 /year
15000 +	1 /month

7. The permittee shall sample the sewage sludge using the procedures detailed in 40 CFR 503.8.

8. The permittee shall submit an **annual report** containing the information specified in the guidance by **February 19**. Reports shall be submitted to the address contained in the reporting section of the permit. Sludge monitoring is not required by the permittee when the permittee is not responsible for the ultimate sludge disposal. The permittee must be assured that any third party contractor is in compliance with appropriate regulatory requirements. In such case, the permittee is required only to submit an annual report by February 19 containing the following information:

- Name and address of contractor responsible for sludge disposal
- Quantity of sludge in dry metric tons removed from the facility by the sludge contractor

E. MONITORING AND REPORTING

1. Reporting

Monitoring results obtained during each calendar month shall be summarized and reported on Discharge Monitoring Report Form(s) postmarked no later than the 15th day of the following month.

Signed and dated originals of these, and all other reports required herein, shall be submitted to the Director and the State at the following addresses:

Environmental Protection Agency
Water Technical Unit (SEW)
P.O. Box 8127
Boston, Massachusetts 02114

The State Agency is:

Massachusetts Department of Environmental Protection
Central Regional Office
Bureau of Resource Protection
627 Main Street
Worcester, MA 01608

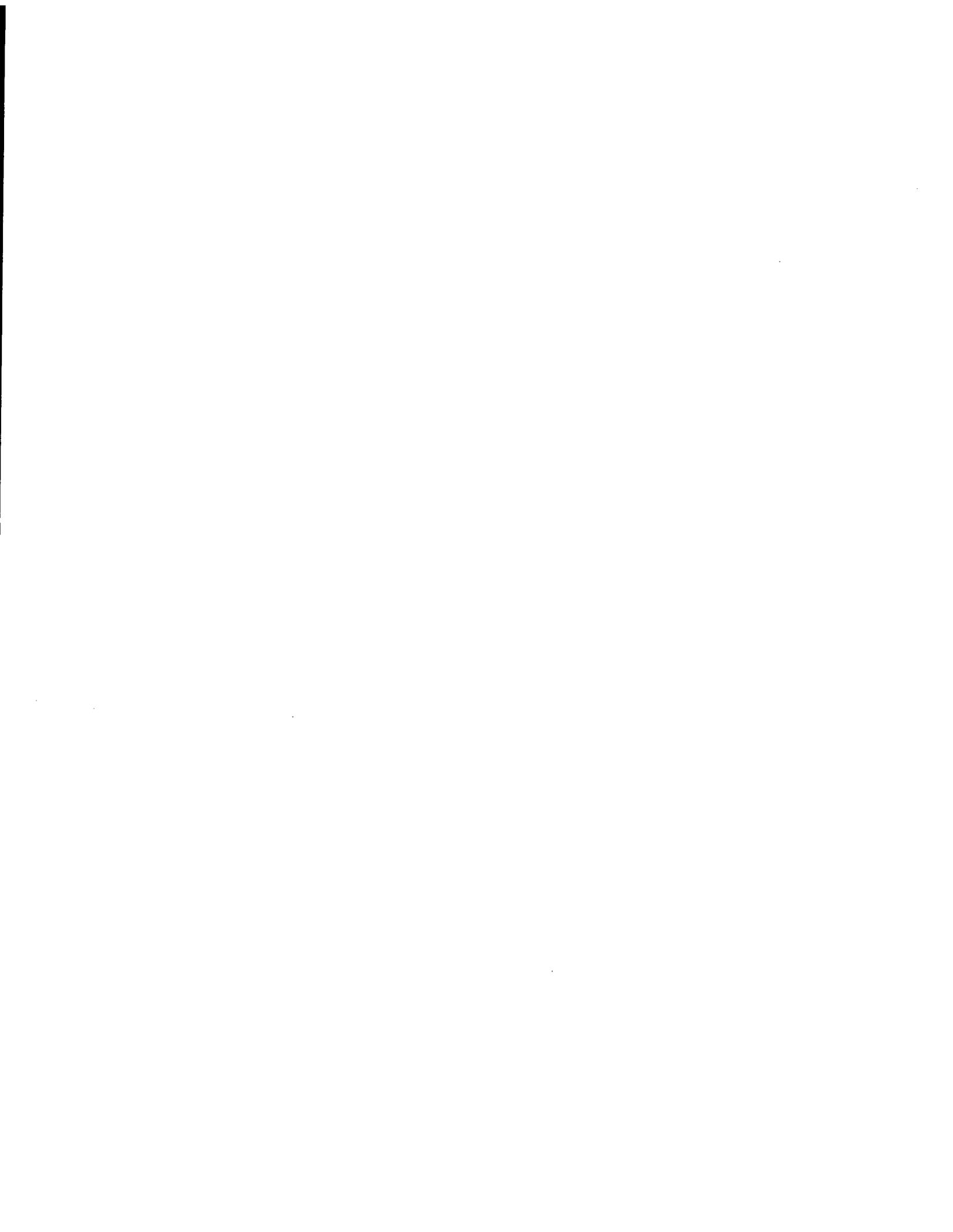
Signed and dated Discharge Monitoring Report Forms and toxicity test reports required by this permit shall also be submitted to the State at:

Massachusetts Department of Environmental Protection
Division of Watershed Management
Surface Water Discharge Permit Program
627 Main Street, 2nd Floor
Worcester, Massachusetts 01608

F. STATE PERMIT CONDITIONS

This discharge permit is issued jointly by the U. S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) under Federal and State law, respectively. As such, all the terms and conditions of this permit are hereby incorporated into and constitute a discharge permit issued by the Commissioner of the MA DEP pursuant to M.G.L. Chap.21, §43.

Each Agency shall have the independent right to enforce the terms and conditions of this permit. Any modification, suspension or revocation of this permit shall be effective only with respect to the Agency taking such action, and shall not affect the validity or status of this permit as issued by the other Agency, unless and until each Agency has concurred in writing with such modification, suspension or revocation. In the event any portion of this permit is declared, invalid, illegal or otherwise issued in violation of State law such permit shall remain in full force and effect under Federal law as an NPDES permit issued by the U.S. Environmental Protection Agency. In the event this permit is declared invalid, illegal or otherwise issued in violation of Federal law, this permit shall remain in full force and effect under State law as a permit issued by the Commonwealth of Massachusetts.



Response to Public Comments

From November 16, 2005 to December 15, 2005, the United States Environmental Protection Agency (“EPA”) and the Massachusetts Department of Environmental Protection (“MassDEP”) (together, the “Agencies”) solicited public comments on a draft NPDES permit developed pursuant to a permit renewal application from the Town of Northbridge, Massachusetts (“Permittee”) for the reissuance of a National Pollutant Discharge Elimination System (“NPDES”) permit to discharge treated domestic sewerage effluent from Outfall 001 to an unnamed tributary to the Blackstone River.

This response to comments briefly describes and responds to the comments received by the Agencies during the public comment period and describes the changes that have been made to this permit from the draft upon consideration of the comments. Copies of the final permit (“Permit”) may be obtained by writing or calling EPA’s NPDES Municipal Permits Branch (CMP), Office of Ecosystem Protection, 1 Congress Street, Suite 1100, Boston, MA 02114-2023; Telephone: (617) 918-1579.

A) Comments submitted by Camp, Dresser & McKee for the Town of Northbridge:

Comment A1: The Town has determined that compliance with the new phosphorus limits of 0.2 mg/l in the summer and 1.0 mg/l in the winter could require as much as a \$3 million investment and have a significant increase in the Town’s annual operating costs to reduce the amount of phosphorus in its effluent by a tiny amount. The Town has recently completed a \$9 million upgrade to its wastewater facility and a review of this draft permit suggests that there is no new information presented to justify the more stringent limitations. Water Quality data as far back as the early 1990’s is being used in conjunction with literature references from the mid 1980’s and early 1990’s about the possible effects of different levels of phosphorus on receiving streams. These data were available at the time of the last permit.

Response A1: The original phosphorus limit of 1.0 mg/l was based on meeting the minimum dissolved oxygen criteria but it is insufficient to control cultural eutrophication. The criteria for nutrients are found at 314 CMR § 4.04(5) of the Massachusetts Surface Water Quality Standards (MA SWQS), as part of the state’s antidegradation provisions. This section requires that “any existing point source discharge 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”. After the 1999 permit was issued, the MADEP established that a monthly average total phosphorus limit of 0.2 mg/l represents highest and best practical treatment (HBPT) for POTWs. As noted in the fact sheet, it has been documented that most reaches of the Blackstone River suffer from eutrophication. This phosphorus-driven eutrophication of the Blackstone River prevents attainment of the designated uses as defined in the MASWQS. These uses include habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation.

Comment A2: This WLA study also establishes post implementation activities, when it says: Post implementation monitoring should focus on evaluating sediment oxygen demand (SOD) reduction levels at key locations and the effect of any changes made to Fisherville Dam, as well as how treatment improvements at the WWTF are being translated into water quality improvements in the River. Thus, the Town would have thought that this permit would continue with the 1.0 mg/l limit and would have incorporated more stringent limits only after the recommendations of the WLA had been followed.

Response A2: The WLA was based on meeting minimum DO criteria and not eutrophication criteria. The WLA made some assumptions relative to changes in SOD rates and recommended some follow up monitoring to verify those assumptions. The new permit limit is based on controlling cultural eutrophication and is not dependent on SOD rates.

Comment A3: This permit ignores the work on phosphorus control done by EPA, MassDEP, RIDEM and others to develop the 1.0 mg/l permit limit contained in the Town's current permit. The existing limit of 1.0 mg/l was established using a wasteload allocation (WLA) study and mathematical model of the River and was shown to be protective of the WQS in the receiving water.

Response A3: See response to Comments A1 and A2.

Comment A4: The fact sheet claims that RIDEM conducted modeling to estimate nitrogen loads from Massachusetts sources. In fact, RIDEM conducted no such modeling. RIDEM did analyze data from various sources to reach some general conclusions concerning the sources of nitrogen discharged to RI waters. These conclusions are considered faulty by some, including dischargers in RI who are appealing RIDEM's permit modifications and by the MassDEP, among others.

Response A4: RIDEM used a physical model to evaluate the water quality impairment associated with nitrogen loads. It is clear that the majority of nitrogen loading at the MA/RI state line on the Blackstone River is from POTW effluents and that water quality in Upper Narragansett Bay is impaired by nitrogen.

Comment A5: The discussion on Page 6 of the FS concerning the applicability of 314 CMR 4.04(5) is incorrect. According to the MADEP that section applies only to lakes and ponds. While proceedings are underway to possibly expand the applicability of this section to all waters, such expansion is now only proposed.

Response A5: Part 314 CMR 4.04(5) of the MASQWS cites discharges to lakes and ponds early in this paragraph. However, the sentence that begins, "Any existing point

source discharge containing nutrients in concentrations which encourage eutrophication", applies to all surface waters and not only to lakes and ponds. Therefore, it is appropriate to apply this standard to this discharge.

Comment A6: The last paragraph on Page 6 of the FS recites information concerning EPA's ecoregional nutrient criteria and then claims that limits based on those criteria are *not* being established at this time. If the permit writer believes this to be true, then either the discussion does not belong here, or an expanded discussion should be included that would explain why such steps are not now being taken. Such discussion should include information concerning the Commonwealth's programs for the development of Massachusetts specific nutrient criterion presently being developed and the schedule for completion of this work.

Response A6: The ecoregion criteria were discussed in the fact sheet to establish the range of recommended criteria. We did not use these criteria to establish the effluent limit for this permit because the MassDEP has not yet adopted these as numeric criteria. The MassDEP will be proposing numeric criteria in the future which may be as low as the ecoregion criteria recommendation.

Comment A7: The second paragraph on Page 7 of the FS suggests that EPA has produced a total phosphorus criterion for receiving waters. This is incorrect as the Gold Book referenced here clearly indicates that there is no such criterion. The discussion on phosphate phosphorus concludes with the following, "No national criterion is presented for phosphate phosphorus for the control of eutrophication". The Gold Book can generally be said to endorse an approach similar to that embodied in the Blackstone River Initiative, which was the basis for the existing 1.0 mg/l summer limit.

Response A7: Although the Gold Book did not establish a national criterion for phosphorus, it did establish guidance which included instream phosphorus levels. The 2002 ecoregion criteria document established recommended national criteria. Both documents are useful for interpreting the narrative criteria for the control of cultural eutrophication that are in the MASWQS. The EPA Gold Book does not endorse controlling cultural eutrophication by focusing solely on achieving minimum DO criteria.

Comment A8: Contrary to the discussion presented on Page 6 of the FS, the top of Page 7 states that the summer time phosphorus limit is based on the State's HBPT standard. As mentioned above, this is not now a water quality standard in Massachusetts applicable to streams and thus cannot be used as a rationale for a permit limit.

Response A8: See response to Comment A5.

Comment A9: Page 8 of the FS indicates that the purpose for the 1.0 mg/l winter time phosphorus limit is to prevent higher levels of phosphorus that would otherwise be discharged in the winter from accumulating in the sediments. However, the logic presented in the paragraph clearly supports the conclusion that no winter time limit is warranted: it claims that the vast majority of the phosphorus discharged from the WWTP would be in the form of dissolved, which will pass through the system given the lack of plant growth in the water. Thus, contrary to the assertions of the paragraph, there would be no need for winter time phosphorus control. If the Agency believes that other phosphorus fractions are a water quality problem, it should present calculations showing that these fractions do cause problems, and should compare that to the phosphorus load from all other sources in the same time frame to validate their conclusions.

Response A9: The higher winter time limit is a less stringent alternative to applying the 0.2 mg/l limit year round. Without any treatment during the winter, effluent phosphorus loads can contain a significant quantity of particulate phosphorus. Particulate phosphorus is more likely to settle in downstream impoundments and then recycle into the water column, contributing to algae blooms. The treatment required to meet the 1.0 mg/l limit will primarily remove particulate phosphorus leaving predominantly dissolved phosphorus in the effluent. The winter limit is intended to protect the water quality gains associated with the summer limit. Additional sources may also need to be controlled to prevent accumulation of phosphorus in the river sediments.

Comment A10: The Town has had exemplary compliance with the coliform standard, with only one violation in the last 2 years. Thus, we think that the additional sampling for coliform called for in this permit is an unwarranted expense. Accordingly, it is requested that the testing level be maintained at twice per week, consistent with the existing permit.

Response A10: The test for fecal coliform is inexpensive and we have determined that more frequent sampling is required due to the variability of fecal coliform in the discharge. Although there was only one violation in the 2 year period reviewed for the draft permit, the rest of the data was quite variable. The primary focus of monitoring requirements is to ensure that the treatment system is capable of maintaining compliance with permit limits at all times. To this end, increased monitoring frequency can be useful and can serve as an early indicator to the POTW personnel of any decreased effectiveness of its UV disinfection system that may require corrective measures.

B) Comments by Cindy Delpapa of the Riverways Program of the Massachusetts Department of Fisheries, Wildlife and Environmental Law Enforcement:

Comment B1: We would like to recommend an addition to the permit that requires the permittee to maximize phosphorus removal at all times to further strengthen the permit requirements.

Response B1: Language in Part 1.A.12 of the permit states, "Consistent with Section B.1 of Part II of the Permit, the Permittee shall properly operate and maintain the phosphorus removal facilities in order to obtain the lowest effluent concentration possible." We believe that this is consistent with the commenter's request. Also refer to the response to Comment A9 which discusses the establishment of a winter phosphorus limit of 1.0 mg/l.

Comment B2: While it is likely the dissolved oxygen (DO) in the effluent fluctuates markedly through the day it still would be preferable to coordinate the DO sampling with the most stressed time in the receiving water and require a morning grab sample. We would like to see continued monitoring of the effluent should the routine grab sample show DO concentrations below the permit limitation. Ideally, monitoring would be required until such time as the effluent reaches acceptable DO concentrations.

Response B2: We believe that the once per week DO monitoring requirement with a minimum level of 5.0 mg/l is sufficient. A requirement to monitor effluent DO at a particular time or to conduct instream DO monitoring is not required at this time. The permittee has exhibited acceptable compliance history for DO, with only 2 minor violations in the 2 year period analyzed for the draft permit. Although the receiving water may exhibit daily fluctuations in DO, we do not expect there to be significant variability in effluent DO.

Comment B3: While Northbridge may have a relatively small percent contribution of nitrogen loading to the overall Narragansett Bay loadings, it is important to control all sources to the extent possible. Any reduction in nitrogen loading can only help to bring about improvements to the Bay. We hope the permittee will, at a minimum, be asked to maximize nitrogen removal at all times to the extent feasible.

Response B3: Based on water quality studies conducted in the Blackstone River basin, it has been found that nitrogen loading associated with this discharge is small relative to other nitrogen loadings from POTWs. Therefore, EPA has determined that nitrogen limits are not appropriate for this facility at this time. However, monthly monitoring for nitrate and nitrite nitrogen and total Kjeldahl nitrogen is required and we believe this monitoring is adequate given the available data outlined in the fact sheet. The Agencies have also determined that optimization for treatment of nitrogen is appropriate during this permit term and specific optimization language has been included in footnote 13 on Page 6 of the final permit. The Agencies also encourage the Town to consider treatment for nitrogen for any future upgrade that it plans and implements.

Comment B4: There have been many instances of extremely elevated copper in the effluent which can adversely affect aquatic organisms in a wastewater dominated brook. Has consideration been given to requiring toxic identification or some other strategy that would address the metals problem in the discharge? Has there been any effort to investigate the impacts that metals may be having on the receiving brook and wetlands?

Since there have been 44 violations of the copper limit in the last 2 years some action is warranted and it would be wise to increase monitoring frequency to better understand the metal loadings released from this facility.

Response B4: The EPA has taken enforcement actions against the Town of Northbridge for its permit violations and with the upgrade that was recently completed, the frequency of these violations has decreased. In the meantime, these metals limits have been maintained in the permit. For the period that was analyzed in the fact sheet, the permittee had only one violation of the no observed effect concentration (NOEC) limit for one test specie's toxicity testing. This toxicity testing compliance was ongoing as copper and zinc limits were consistently being exceeded, indicating that these metals were apparently not exhibiting chronic toxic effects in the discharge.

C) Comments submitted by Angelo Liberti of the Rhode Island Department of Environmental Management (RIDEM):

Comment C1: RIDEM requests that EPA add a condition to the draft permit that requires the Town to develop and implement a plan to reduce nitrogen.

Response C1: See response to Comment B3.

Comment C2: The draft permit does not require monitoring or impose an effluent limitation on fecal coliform concentrations during the period of November 1 through March 31. DEM has determined that the discharge of effluent that has not been disinfected from the Northbridge WWTF would result in instream fecal coliform bacteria concentration of approximately 20,000 colony forming units (cfu)/100 ml at the Woonsocket gage in Woonsocket, RI, well in excess of the 200 cfu/ml RI water quality standard. This assumes no background levels of bacteria in the Blackstone River, undisinfected effluent concentration of 1,000,000 cfu/100 ml. No instream bacteria decay and a 7Q10 low flow computed using data during that period. EPA must require compliance with the effluent limit of 200 cfu/100 ml year round or develop alternative limits that will ensure compliance with the RI WQS.

Response C2: In the draft permit, EPA required seasonal disinfection of this discharge consistent with Massachusetts water quality standards, which allow seasonal disinfection for discharges to Class B waters, and MassDEP's "Implementation Policy for the Control of Toxic Pollutants in Surface Waters" which establishes seasonal disinfection from April 1 through October 15 for segments designated for primary contact.

As RIDEM has asserted, EPA is obligated to ensure that this discharge does not cause or contribute to violations of RI water quality standards, and so must evaluate whether winter limits for bacteria are necessary for this discharge. The applicable RI water quality criteria for bacteria are a geometric mean fecal coliform value not to exceed 200

MPN/100 ml and that 20 % of values are not to exceed 500 MPN/100 ml. RI criteria are in effect year-round.

The analysis provided by RIDEM in its comments, which estimated a fecal coliform count of 20,000 cfu at the Woonsocket gaging station due to the Northbridge WTP discharge is based on very conservative assumptions regarding dilution and bacterial die-off. To confirm whether water quality standards are in fact violated at the state line, EPA reviewed the most recent water quality data collected from the Blackstone River at the state line during months when the MA POTWs were not disinfecting.

The Louis Berger Group conducted water quality sampling for RIDEM in the Blackstone River in 2005 and 2006. The sampling station for this data was in Millville, MA, upstream of the Tupperware Dam. This station was chosen as the last accessible point on the main stem of the Blackstone River prior to its crossing the MA-RI border. This sampling included monthly samples collected during dry weather from November 2005 through February 2006, a period during which the upstream MA POTWs were not disinfecting. Fecal coliform counts of 1700, 1300, 700, and 1700 MPN/100 ml were the highest counts recorded during this period. The geometric mean of these samples is 1273 mpn/100 ml, and all of the samples exceed 500 MPN/100 ml, therefore violating RI water quality standards. During dry weather, the only significant source of fecal coliform bacteria in the river is the upstream POTWs. Therefore, EPA believes that the discharge from the MA POTWs has the reasonable potential to cause or contribute to violations of RI water quality standards, and winter limitations must be included for these NPDES permits.

Based on this information, EPA has determined that winter bacteria limitations are required. Therefore, the fecal coliform limits in the final permit have been extended to be year-round limits.

The Rhode Island comments also included a few suggested minor clarifications to language contained in the fact sheet. These are:

Comment C3: The fact sheet states, "it was found that the nitrogen input from the Northbridge WWTP to the mainstem of the Blackstone River was negligible". It should be clarified that the monitoring data was actually the more detailed sampling along the Massachusetts portion of the Blackstone River that was conducted by URI on behalf of the Army Corps found in the document entitled: "DRAFT Dry Weather Water Quality Sampling and Modeling Blackstone River Feasibility Study Phase 1: Water Quality Evaluation and Modeling of the MA Blackstone River".

Response C3: Although the fact sheet cannot be changed after the public comment period, this clarification is noted for the record.

Comment C4: The fact sheet states, "In its Section 305(b) report, the State of RI assessed the health of its receiving waters. Significant nutrient impairments to shellfish harvesting

and swimming, due to nitrogen, were noted in the Providence River, Seekonk River and Upper Narragansett Bay. These waters were given the highest priority consistent with the State of RI's goal of restoring such waters."

These particular impairments are not due to nitrogen. Page III.F-3 of the RI Section 305(b) report states: "The major impacts on designated uses for the estuarine waters of RI are due to bacterial contamination, low DO, and nutrient enrichment. The major sources of bacterial contamination are due to combined sewer overflows (CSOs). CSOs, urban runoff and point source discharges are sources of the nutrient enrichment and low DO problem in the Upper Bay and its coves". Other statements in the fact sheet correctly identify the impact from excessive nitrogen loadings.

Response C4: We agree that we misstated the specific impairments associated with nitrogen loadings. This clarification is noted for the record.

Comment C5: The fact sheet states, "The State of Rhode Island conducted water quality modeling to estimate the nitrogen loading that was being contributed to Upper Narragansett Bay from Massachusetts sources. It was found that WWTFs contributed over 90% of the nitrogen loading to the MA/RI state line". While the above statement is true, perhaps even more compelling is that modeling has shown that MA WWTFs contribute 80% of the loading at the mouth of the Blackstone River (under low flow, design WWTF flows and currently required permit limits for ammonia and phosphorus).

Response C5: We acknowledge this for the record.

D) Comments submitted by Marci Cole of Save the Bay:

Comment D1: The State of Rhode Island is working hard to improve water quality by reducing its nitrogen load to Narragansett Bay. In order to achieve water quality goals in Narragansett Bay, Massachusetts must also reduce its nitrogen loads to the Bay's tributaries. In the case of this permit, while we support the limits on ammonia release and continued monitoring of all nitrogen species, we recommend that the Northbridge WWTF maximize facility operations to reduce the discharge of total nitrogen to the best of their ability. To achieve water quality goals in Narragansett Bay, both RI and MA must continue to enforce strict nitrogen limits at all major WWTFs.

Response D1: See response to Comment B3.

9/5/06



COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

MITT ROMNEY
Governor

STEPHEN R. PRITCHARD
Secretary

KERRY HEALEY
Lieutenant Governor

ROBERT W. GOLLEDGE, Jr.
Commissioner

September 6, 2006

Brian Pitt, Chief
Massachusetts NPDES Permit Program Unit
USEPA – New England
1 Congress Street, Suite 1100
Boston, MA 02114-2023

**Re: Water Quality Certification
NPDES Permit MA0100722
Town of Northbridge Wastewater Treatment Plant**

Dear Mr. Pitt:

Your office has requested the Massachusetts Department of Environmental Protection to issue a water quality certification pursuant to Section 401(a) of the Federal Clean Water Act ("the Act") and 40 CFR 124.53 for the above referenced NPDES permit. The Department has reviewed the proposed permit and has determined that the conditions of the permit will achieve compliance with sections 208(e), 301, 302, 303, 306, and 307 of the Federal Act, and with the provisions of the Massachusetts Clean Waters Act, M.G.L. c. 21, ss. 26-53, and regulations promulgated thereunder. The permit conditions are sufficient to comply with the antidegradation provisions of the Massachusetts Surface Water Quality Standards [314 CMR 4.04] and the policy [October 6, 1993] implementing those provisions.

The Department notes that the permittee will require schedule of compliance to meet the total phosphorus effluent limit contained in this permit.

The Department hereby certifies the referenced permit.

Sincerely,

A handwritten signature in black ink, appearing to read "Glenn Haas".

Glenn Haas, Director
Division of Watershed Management
Bureau of Resource Protection

cc: Paul Hogan
file

This information is available in alternate format by calling our ADA Coordinator at (617) 574-6872.

DEP on the World Wide Web: <http://www.state.ma/dep>

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**TOWN OF NORTHBRIDGE
DEPARTMENT OF PUBLIC WORKS**

Sewer Division
7 Main Street
Whitinsville, MA 01588

Phone (508) 234-2154
FAX: (508) 234-0809

**From the Desk of:
Laureen A. Menard
Northbridge DPW-Sewer Division
Administrative Assistant
lmenard@northbridgemass.org**

Name: Ed Nazaretian
Company Name: CDM
Phone Number:
Fax Number: (617) 452-8535
Date: 12/2/05

XX As Requested
 Please Review
 Reply ASAP
 Please Comment

Number of Pages: 19 (including cover)

Ed,

I'm not sure if this is the what you were looking for? If you have any questions or if you require further information please contact me at the above number.

Laureen A. Menard ☺

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
EPA NEW ENGLAND
ONE CONGRESS STREET
BOSTON, MASSACHUSETTS 02114

FACT SHEET

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

NPDES PERMIT NO.: MA0100722

NAME AND ADDRESS OF APPLICANT:

**Town of Northbridge
Department of Public Works
7 Main Street
Whitinsville, MA 01588**

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

**Northbridge Wastewater Treatment Plant
644 Providence Road
Whitinsville, MA 01588**

RECEIVING WATERS: **Unnamed tributary to the Blackstone River** (Blackstone River Basin)
(USGS Code #01090003)

CLASSIFICATION: **Class B - warm water fishery**

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

The above named applicant has applied to the U.S. Environmental Protection Agency ("EPA") for the reissuance of its NPDES permit to discharge into the designated receiving water. The facility is engaged in the collection and treatment of domestic wastewater. The discharge from this advanced secondary wastewater treatment facility is via Outfall 001 to an unnamed tributary to the Blackstone River.

II. Description of Treatment System and Discharges

A quantitative description of the wastewater treatment plant discharge in terms of significant effluent parameters based on recent monitoring data is shown on Table 1. Figure 1 shows the facility location.

The Northbridge WTP operates a 2.0 million gallon per day (MGD) advanced secondary wastewater treatment facility and serves a population of about 10,000. There is currently one industrial user, Riverdale Mills, which discharges to the WTP and no Combined Sewer Overflows (CSOs).

The EPA filed an Administrative Order with the Town of Northbridge on January 2, 1998. This (AO) resulted from ongoing permit violations and required a major upgrade of the facility to be undertaken, including the installation of an ultraviolet (UV) disinfection system and the design and construction of advanced wastewater treatment. Interim effluent limits were put in place through December 2003. In 2003, the Town completed the construction of a sequencing batch reactor (SBR) type treatment system, replacing the old, trickling filter style treatment system. See Figure 2 for a schematic of this new treatment system.

The Northbridge WTP utilizes a comminutor to shred any coarse sewage solids and other materials. The influent water then passes through a gravel trap. Influent composite sampling occurs at this point for applicable parameters. The influent then passes through a bar screen, which is manually cleaned. Flows are then pumped to two rectangular primary clarifiers which settle out sludge and remove floating scum. See sludge information later. Flows from these clarifiers are then pumped to the SBRs, where a batch process is used to remove BOD, TSS and nitrogen loadings. Flow is then sent to another tank to settle the activated sludge or biomass. The supernatant from this tank is then sent by gravity to the equalization tank. If there is a facility upset of some kind at this point, the permittee has the option of pumping the SBR effluent to the on-site sand bed distribution box for final settling. Normally, this bypass line is closed and all decanted SBR effluent is pumped to the equalization tank. From here, the treated wastewater flows to the UV system for disinfection. Flow at this point is measured by a magnetic flow meter. A flow control valve is used to assure that there is sufficient detention time for the effluent that passes through the UV system. The treated effluent is then discharged to an unnamed tributary, which flows through a wetland area and eventually to the Blackstone River.

III. Permit Basis and Explanation of Effluent Limitation Derivation

Technology-Based Requirements

Under Section 301(b)(1)(B) of the CWA, POTWs 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, and include biochemical oxygen demand (BOD) and total suspended solids (TSS) monthly average and weekly average limits of 30 mg/l and 45 mg/l respectively, a monthly average limit of 85 percent removal for BOD and TSS, and pH limits of 6- 9 standard units (SU). In the absence of published technology-based effluent guidelines, the permit writer is authorized under

Section 402(a)(1) of the CWA to establish effluent limitations on a case-by-case basis using best professional judgement (BPJ). See 40 CFR §§125.3 (c)(2) and (c)(3).

Water Quality-Based Requirements

Under Section 301(b)(1)(C) of the CWA and EPA regulations NPDES permits must contain effluent limits more stringent than technology-based limits where more stringent limits are necessary to maintain or achieve state or federal water quality standards or other applicable requirements of State law.

Water quality standards consist of three parts: (1) beneficial designated uses for a water-body or a segment of a water-body; (2) numeric and/or narrative water quality criteria sufficient to protect the assigned designated use(s); and (3) antidegradation requirements to ensure that once a use is attained it will not be degraded. The Massachusetts Surface Water Quality Standards, found at 314 CMR 4.00, include these elements. The state will limit or prohibit discharges of pollutants to surface waters to assure that surface water quality standards of the receiving waters are protected and maintained or attained. These standards also include requirements for the regulation and control of toxic constituents and require that EPA criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site specific criteria is established.

The permit must limit any pollutant or pollutant parameter (conventional, non-conventional, toxic, and whole effluent toxicity) that is or may be discharged at a level that causes or has the "reasonable potential" to cause or contribute to an excursion above any water quality standard. An excursion occurs if, for example, the projected or actual in-stream concentration exceeds an applicable water quality criterion. In determining "reasonable potential", EPA considers: (1) existing controls on point and non-point sources of pollution; (2) pollutant concentration and variability in the effluent and receiving water as determined from the permit's reissuance application, monthly discharge monitoring reports (DMRs), and State and Federal Water Quality Reports; (3) sensitivity of the indicator species used in toxicity testing; (4) known water quality impacts of processes on waste waters; and (5) where appropriate, dilution of the effluent in the receiving water.

Antibacksliding

A permit may not be renewed, reissued or modified with less stringent limitations or conditions than those contained in the previous permit unless in compliance with the anti-backsliding requirements of the CWA [see Sections 402(o) and 303(d)(4) of the CWA and 40 CFR §122.44(l)(1 and 2)]. EPA's antibacksliding provisions prohibit the relaxation of permit limits, standards, and conditions except under certain circumstances. Effluent limits based on BPJ, water quality, and state certification requirements must also meet the antibacksliding provisions found at Section 402(o) and 303(d)(4) of the CWA. In this permit, there have been limits that have been revised slightly upward, or less stringent, for total copper, total zinc and chronic NOEC. These adjustments are based on new information, as there has been a revised 7Q10 calculation used to calculate these permit limits.

The total residual chlorine (TRC) limits have also been removed from this permit, because the permittee has installed an ultraviolet (UV) disinfection system for disinfection and no longer uses sodium hypochlorite for this purpose.

Antidegradation

Federal regulations found at 40 CFR Section 131.12 require states to develop and adopt a statewide antidegradation policy which maintains and protects existing instream water uses and the level of water quality necessary to protect the existing uses, and maintains the quality of waters which exceed levels necessary to support propagation of fish, shellfish, and wildlife and to support recreation in and on the water. The Massachusetts Antidegradation Policy is found at Title 314 CMR 4.04. This draft permit is being reissued with allowable discharge limits as stringent or more stringent than the current permit.

Waterbody Classification and Usage

The unnamed tributary at the point of discharge is classified as a Class B waterbody by the Massachusetts Department of Environmental Protection (MA DEP). Class B waters shall be of such quality that they are suitable for the designated uses of protection and propagation of fish, other aquatic life and wildlife; and for primary and secondary contact recreation. The segment of the Blackstone River that the Town discharges to, designated by the State as Segment MA51-05, is on the Massachusetts DEP's 2002 303(d) list of impaired waters for metals, nutrients, pathogens, suspended solids and turbidity.

Conventional Pollutants

Under Section 301(b)(1)(B) of the CWA, POTWs 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. For the period of November through May, effluent limitations for monthly and weekly average Biochemical Oxygen Demand (BOD₅) and Total Suspended Solids (TSS) are based on requirements under Section 301(b)(1)(B) of the Clean Water Act (CWA) and 40 CFR 133.102. Limitations for Fecal coliform bacteria as well as the range in pH are based upon State Certification requirements for Publicly Owned Treatment Works (POTW) under Section 401(d) of the CWA, 40 CFR 124.53 and 124.55, and water quality standards.

Outfall 001 has discharged in the range of 0.6 - 1.9 MGD to a tributary to the Blackstone River during the period of January 2003 to January 2005. This time period was also used below in discussion of historical parameter values.

Waste Load Allocation

There was a waste load allocation (WLA) performed for the Blackstone River which was completed in November of 1997 on some of the limits in the 1999 permit were based. WLAs are required by Section 303(d) of the Clean Water Act (CWA) and their purpose is to establish effluent discharge

limits for all point sources in a given watershed that will ensure compliance with water quality standards. This WLA was based on a dissolved oxygen (DO) model developed by the University of Rhode Island and funded by the EPA, the Massachusetts Department of Environmental Protection (MADEP) and the Rhode Island Department of Environmental Management (RIDEM). This WLA used low flow, dry weather ambient and discharge data collected in July and August of 1991. The WLA established limits that were necessary to achieve the minimum dissolved oxygen criteria of 5.0 mg/l for the Blackstone River. The WLA utilized a mathematical water quality simulation model (QUAL2E) which was calibrated and verified using water quality survey data collected in 1991. The water quality data and modeling report can be found in the Blackstone River Initiative document dated February 1998. Modeling results formed the basis for limits on BOD, CBOD, TSS, phosphorus and ammonia nitrogen.

The year round BOD and TSS draft permit limits of 10 mg/l monthly and weekly average which were previously based on water quality considerations, have been maintained. There have been thirteen violations of BOD and six violations of TSS during the past two years. The monitoring frequency for BOD and TSS has been changed from one per week to three per week, which is more typical frequency for facilities of this capacity.

The BOD and TSS removal percentages have both averaged over 96% with only one violation of the 85% or better requirement for BOD removal in the past two years.

Nutrients

Nutrients, such as phosphorus and nitrogen, are necessary for the growth of aquatic plants and animals to support a healthy ecosystem. In excess, however, nutrients can contribute to fish disease, brown tide, algae blooms and low dissolved oxygen (DO). Excessive nutrients, generally phosphorus in freshwater and nitrogen in salt water, stimulate the growth of algae, which could start a chain of events detrimental to the health of the aquatic ecosystem. The algae prevent sunlight from penetrating through the water column. As the algae decay, they depress the DO levels in the water. Fish are in turn deprived of oxygen. Excessive algae may also cause foul smells and decreased aesthetic value, which could affect swimming and recreational uses.

It has been documented that the Providence and Seekonk Rivers (in Rhode Island) are impacted by low DO levels and high phytoplankton concentrations that stem from excessive nitrogen loadings. Significant areas of these rivers suffer from hypoxic (low DO) and anoxic (no DO) conditions and violate water quality Federal and State (Rhode Island) water quality standards.

In its Section 305(b) report, the State of RI assessed the health of its receiving waters. Significant nutrient impairments to shellfish harvesting and swimming, due to nitrogen, were noted in the Providence River, Seekonk River and Upper Narragansett Bay. These waters were given the highest priority consistent with the State of RI's goal of restoring such waters.

The State of Rhode Island conducted water quality modeling to estimate the nitrogen loading that was being contributed to Upper Narragansett Bay from Massachusetts sources. It was found that

WWTFs contributed over 90% of the nitrogen loading to the MA/RI state line. Since it has been demonstrated that a significant portion of the overall nitrogen loading that discharges to Narragansett Bay originates from WWTF effluents in Massachusetts, we believe that limits on total nitrogen must be considered at the Massachusetts WWTFs to protect the downstream uses in Rhode Island.

According to 40 CFR 122.44(d)(4)), EPA should include any requirements in permits to "conform to applicable water quality requirements under Section 401(a)(2) of the CWA when the discharge

affects a State other than the certifying State. Based on monitoring conducted in the Blackstone River in support of the State of Rhode Island's assessment efforts, it was found that the nitrogen input from the Northbridge WTP to the main stem of the Blackstone River was negligible. Therefore, since there appears to be an insignificant nitrogen loading to the Blackstone River (and eventually to Upper Narragansett Bay) from this facility, EPA does not believe that nitrogen limits are appropriate at this time. However, monitoring for nitrate and nitrite nitrogen and total Kjeldahl nitrogen will be continued in this permit.

Phosphorus

These current effluent phosphorus limit of 1.0 mg/l as a monthly average between April and October was established in the 1999 permit and was based on recommendations from the wasteload allocation (WLA) mentioned earlier. This limit was based on meeting the minimum dissolved oxygen criteria but it is insufficient to control cultural eutrophication. During the past 2 years, the permittee has had 10 violations of its seasonal phosphorus limit and has averaged 1.4 mg/l during this seasonal period.

The Massachusetts Surface Water Quality Standards (MA SWQS) at 314 CMR § 4.00 do not contain numerical criteria for total phosphorus. The criteria for nutrients are found at 314 CMR § 4.04(5), as part of the state's antidegradation provisions. This section requires that "any existing point source discharge 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". MADEP has established that a monthly average total phosphorus limit of 0.2 mg/l represents highest and best practical treatment (HBPT) for POTWs.

There are several applicable water quality criteria which are not being met in the Blackstone River due to phosphorus discharges and resulting eutrophication. They include numeric water quality criteria (e.g., dissolved oxygen), and narrative water quality criteria including aesthetics (314 C.M.R. § 4.05(5)(a)), bottom pollutants and alterations (314 C.M.R. § 4.05(5)(b)), and nutrients 314 C.M.R. § 4.05(5)(c)).

EPA has released "Ecoregional Nutrient Criteria", which were 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. Northbridge, MA 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 December, 2000 is 24 ug/l (0.024 mg/l). Limits based on the State's HBPT limit and EPA's ecoregion criteria are not being established at this time.

EPA has produced several other guidance documents which contain recommended total phosphorus criteria for receiving waters. The EPA Quality Criteria of Water, 1986 (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. In the case of this facility, the 0.1 mg/l target is the one suggested by this criterion.

It has been documented that most reaches of the Blackstone River suffer from eutrophication, a condition caused primarily by excessive nutrients entering the river. Phosphorus and other nutrients promote the growth of nuisance algae and aquatic plants. When these plants and algae undergo their decay processes, they generate strong odors, result in lower dissolved oxygen levels in the river, and impair the benthic habitat. This phosphorus-driven eutrophication of the Blackstone River prevents attainment of the designated uses as defined in the MASWQS. These uses include habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation. Although some phosphorus is introduced into the river from storm water runoff, the majority of phosphorus entering the river is from the POTWs discharging to the Blackstone River, including this facility as well as the Upper Blackstone Water Pollution Abatement District (UBWPAD), the Grafton WWTP and the Uxbridge WWTP.

According to the "Massachusetts Year 2002 Integrated List of Waters (MA DEP)", this segment of the Blackstone River has "abundant instream vegetation consisting of dense beds of rooted submergents (*Sagittaria subulata*) and the streaming green alga *Ulothrix zonata*. In sampling conducted by the MADEP in 2004, upstream values for total phosphorus in Northbridge ranged from 0.13 to 0.69 mg/l and downstream values for total phosphorus in Millville and Blackstone ranged from 0.11 to 0.37 mg/l. These levels are consistently higher than guidance numbers mentioned earlier and EPA believes that these levels encourage continued eutrophication and will therefore continue to result in impairments in the Blackstone River. EPA believes that more stringent total phosphorus limits are necessary to satisfy the MADEP's SWQS relative to eutrophication.

In March 2004, the U.S. Army Corps of Engineers published a draft report entitled "Dry Weather Water Quality Sampling and Modeling Blackstone River Feasibility Study". Figure 28 of this report displays chlorophyll *a* levels in the Blackstone River from 1991 and 2001 assessment efforts. In August of both years, chlorophyll *a* concentrations peaked at between 17 and 19 mg/l just downstream from the Northbridge discharge. These levels are conducive to algal growth and are another factor which could accelerate eutrophication in the river.

EPA and MADEP have concluded that the technology-based requirement of "highest and best practical treatment," which the state has determined to be "0.2 mg/l", is appropriate at this time for this Permittee to address the ongoing impairments in the Blackstone River due primarily to phosphorus and since there is very little dilution available to this discharge in the unnamed tributary.

Thus, EPA has established a 0.2 mg/l effluent phosphorus limit for this facility, based on the State's HBPT standard.

In addition to the seasonal total phosphorus limit of 0.2 mg/l, the permit contains a winter period total phosphorus limit of 1.0 mg/l and an ortho-phosphorus monitoring requirement during November through March. These requirements are necessary to ensure that the higher levels of phosphorus discharged in the winter period do not result in the accumulation of phosphorus in the sediments. EPA expects the vast majority of the phosphorus discharged during this period would be in the form of ortho-phosphorus, or dissolved fraction of phosphorus. The dissolved fraction of phosphorus is believed to pass through the system given the lack of plant growth during the winter period, whereas the particulate phosphorus, or the fraction which is remaining after subtracting out the dissolved fraction from the total phosphorus concentration, would tend to stay in the system and be taken up when water temperatures warm up in the spring.

Ammonia Nitrogen and Dissolved Oxygen

The 1999 permit's ammonia nitrogen limits were based on the WLA and modeling efforts discussed earlier. The dissolved oxygen based limits for the May to October period will also ensure compliance with the applicable instream total ammonia criteria for protection of aquatic from chronic toxicity. The applicable total instream ammonia criteria for this period is 3.0 mg N/l at a pH of 7.0. For May to October, the monthly average limit was established at 2.0 mg N/l to ensure that DO criteria are met in the small tributary. We continue to believe that a 3.0 mg/l limit will not be protective of the DO criteria and thus we are maintaining the limit of 2.0 mg/l for this period. The weekly average limit was set at twice the monthly average, or 4 mg/l, to be protective of acute effects. For this time period over the last 2 calendar years, the permittee has had four (4) violations of the permit limits, with an average of 1.9 mg/l and a high value of 9.9 mg/l.

The November to April limits of 9 mg/l for a monthly average and 18 mg/l for a weekly average are based on DO and toxicity concerns. The WLA predicted that these limits would result in a slight dissolved oxygen criteria violation during the month of April but utilized an instream flow that didn't fully reflect the high seasonal flows that consistently occur in April. The instream ammonia criteria is based on a factor of 3 times the summer criteria of 3 mg/l reflecting the absence of the early life stages of the most sensitive species during this period. The criteria adjustment is based on the 1998 Update of Ambient Water Quality Criteria for Ammonia published by USEPA. For this time period over the last 2 calendar years, the permittee has had two (2) violations of the permit limits, with an average of 4.2 mg/l and a high value of 17.1 mg/l.

The minimum DO requirement of 5.0 mg/l has been maintained in this permit with weekly monitoring, consistent with the State WQS for Class B waters.

Bacteria Limitations

To reflect the seasonal period of chlorination, the current permit included bacteria limits for the period between April 1st and October 31st to ensure that the water quality standards are met

instream. The Fecal Coliform limits of 200 colony forming units (cfu) per 100ml and 400 cfu per 100 ml are consistent with Class B water requirements of the MA DEP. The previous weekly average limit of 400 cfu/ml has been removed since it is not a State Certification requirement and is believed to be redundant. Instead, the monitoring frequency has been increased from 2 per week to 3 per week, which is more typical of the monitoring frequency for facilities of this capacity. There has been one violation in the past two years and a monthly average of 38 cfu per 100 ml and a high reading of 602.

Total Residual Chlorine

The 1999 permit established permit limits for TRC due to the chlorination occurring at the plant for bacterial control. In 2003, the Town installed an ultraviolet (UV) disinfection system and no longer uses any chlorine compound for bacterial control. Small amounts of sodium hypochlorite are still used for odor control in the sludge gravity thickeners, but these levels are not believed to result in any detectable levels in the effluent.

Change in dilution factor

To calculate certain permit limits, the 7Q10 flow is required, which represents the statistical 7 day low flow over a 10 year period. The existing permit limits are based on the previously calculated dilution factor of 1.14. In a letter of February 19, 1999, the permittee's consultant, Camp Dresser and McKee, submitted documentation disputing EPA's calculation of the previous dilution factor of 1.14, which was used in the Town's 1992 permit. The consultant believes that a drainage area of 1.42 square miles should be used in the 7Q10 calculation instead of the previously used value of 1.09 square miles. EPA agrees with this calculation and has based the following metals limits and chronic NOEC limit on this revised 7Q10 dilution. The revised flow dilution is 1.2:1. See **Attachment B** which has recalculated the metals limits and the chronic NOEC limit based on this revised flow dilution.

Metals

The 1999 permit established effluent limits for total zinc, total copper and total lead, because it was determined that there was a reasonable potential to violate the instream water quality standards for these metals. For the calendar years of 2003 and 2004, there were 44 permit violations for total copper and 25 violations for total zinc. Total lead was often not detected in the effluent, with two violations in the period. However, it is not clear that the most sensitive testing method for lead was used in these analyses. Therefore, this permit requires the permittee to use a specific testing method for lead which has a method detection level of 3 ug/l. In other words, this method is believed to reliably detect lead down to this level, so this will be the level that compliance will be judged against, even though it is slightly higher than the permit limit. The maximum daily limit for lead has been removed and replaced with a reporting requirement, since we do not believe that there is a reasonable potential to violate the calculated limit of 46 ug/l based on past effluent data. Although the limits for total lead and zinc have been adjusted slightly upward as mentioned earlier based on the revised 7Q10 value, the total copper limits have been slightly reduced, or made more stringent,

because the factors used to calculate these limits have been changed. The factors involved in these calculations may be found in "National Recommended Water Quality Criteria, December 10, 1998, FR Vol. 63, No.237". See **Attachment B** for these calculations.

Whole Effluent Toxicity

National studies conducted by the Environmental Protection Agency have demonstrated that domestic sources contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents and aromatic hydrocarbons among others. The Region's current policy is to include toxicity testing requirements in all municipal permits, while Section 101(a)(3) of the CWA specifically prohibits the discharge of toxic pollutants in toxic amounts.

Based on the potential for toxicity resulting from domestic and industrial contributions, the low level of dilution at the discharge location, water quality standards, and in accordance with EPA regulation and policy, the draft permit includes acute toxicity limitations and monitoring requirements. (See, e.g., "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants", 50 Fed. Reg. 30,784 (July 24, 1985); see also, EPA's Technical Support Document for Water Quality-Based Toxics Control). EPA Region I has developed a toxicity control policy. The policy requires wastewater treatment facilities to perform toxicity bioassays on their effluents. The Commonwealth of MA DEP requires bioassay toxicity testing for state certification.

Pursuant to EPA Region I policy, discharges having a dilution ratio of between 20:1 and 100:1 are required to perform acute toxicity testing. 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 best measured by toxicity testing including any synergistic effects of pollutants; and (3) pollutants for which there are inadequate chemical 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.

Quarterly WET testing has been conducted during the past five years. The results of the past two years have consistently shown an LC50 of 100%. The C-NOEC is the highest effluent concentration at which No Observed Chronic Effect (e.g. growth, reproduction, mortality) will occur at continuous exposure to test organisms in a life-cycle or partial life-cycle test. Over the past 2 years, the NOEC values have often been at 100%, with a few values below this and one violation of the 88% or greater limit for the fathead minnow. The revised C-NOEC limit of "83% or greater" is defined as a sample which is composed of 83% (or greater) effluent, the remainder being dilution water. This is a maximum daily limit based on the inverse of the dilution factor of 1.2. The draft permit requires that the company continue to conduct WET testing for Outfall 001 effluent four times per year and that each test include the use of the fathead minnow, *Pimephales promelas*, only, in accordance with EPA Region I protocol found in Attachment A. This specie was found to be the more sensitive of the two species used in previous WET testing.

Inflow and Infiltration

The draft permit contains detailed requirements for the permittee to eliminate excessive infiltration and inflow ("I/I") to its sewer system. These measures are appropriate because the reduction of I/I can abate sanitary sewer overflows ("SSOs"), as well as prevent violations of permit requirements at the facility. EPA expects MADEP to require the I/I conditions as a condition for obtaining State certification.

IV. Sewage Sludge Information and Requirements

The Northbridge WTP generates about 284 dry metric tons per year. Sludge from the treatment system is sent through two (2) gravity thickeners and this sludge is trucked to the Synagro facility in Woonsocket, Rhode Island for incineration and disposal. This is sent to the disposal site three days per week at about 9000 gallons per delivery.

In February 1993, the Environmental Protection Agency (EPA) promulgated standards for the use and disposal of sewage sludge. The regulations were promulgated under the authority of §405(d) of the Clean Water Act (CWA). Section §405(f) of the CWA requires that these regulations be implemented through permits. This permit is intended to implement the requirements set forth in the technical standards for the use and disposal of sewage sludge, commonly referred to as the Part 503 regulations.

Section 405(d) of the CWA requires that sludge conditions be included in all municipal permits. The sludge conditions in the draft permit satisfy this requirement and are taken from EPA's proposed Standards for the Disposal of Sewage Sludge to be codified at 40 CFR Part 503 (February 19, 1993 - Volume 58, pp 9248 - 9415). These conditions are outlined in the draft permit.

V. 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.

VI. 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 (CIP), 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).

VII. EPA and MA DEP 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 the EPA and DEP contacts below:

George Papadopoulos, Massachusetts Office of Ecosystem Protection
One Congress Street Suite 1100 - Mailcode CIP
Boston, MA 02114-2023
Telephone: (617) 918-1579 FAX: (617) 918-1505

Paul Hogan, Massachusetts Department of Environmental Protection
Division of Watershed Management, Surface Water Discharge Permit Program
627 Main Street, 2nd Floor Worcester, Massachusetts 01608
Telephone: (508) 767-2796 FAX: (508) 791-4131

November 7, 2005
Date

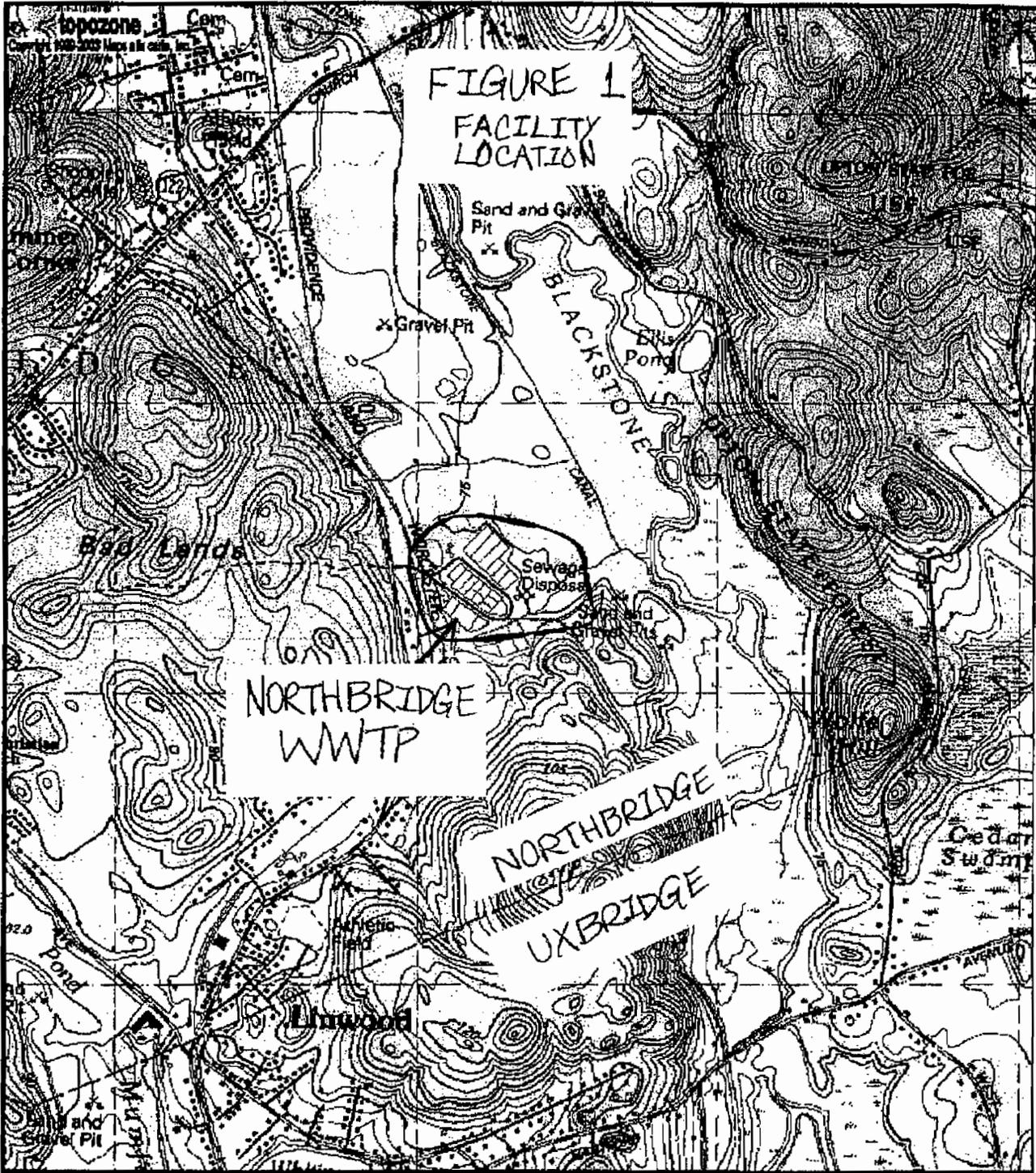
Linda M. Murphy, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency

TABLE 1 - OUTFALL 001 CHARACTERISTICS

<u>Parameter</u>	<u>Monthly Average</u>	<u>High Daily Maximums</u>	<u>Permit Violations</u>
Flow, MGD	Range:	0.6 - 1.9	0
BOD ₅ , mg/l	6.7	25, 26	13
TSS, mg/l	4.1	26, 27	6
pH, standard units	Range:	6.0 - 7.6	19
Fecal Coliform, cfu/100 ml	38	302, 602	1
Total Residual Chlorine, mg/l,	0.17	0.49, 0.77	8
Dissolved Oxygen, mg/l	Range:	4.4 - 9.0	2
Phosphorus, mg/l (Nov - Mar)	2.3	3.1, 3.9	---
Phosphorus, mg/l (Apr - Oct)	1.4	2.3, 3.4	10
Ammonia Nitrogen, mg/l (Nov - Apr)	4.2	12.4, 17.1	2
Ammonia Nitrogen, mg/l (May - Oct)	1.9	8.9, 9.9	6
Ammonia Nitrogen, mg/l (Jun - Oct)	0.20	1.4, 5.7	0
Nitrite + Nitrate Nitrogen, mg/l	Range:	1.1 - 8.6	---
BOD Removal, %	96.5	83.5, 91.3 ²	1
TSS Removal, %	96.6	91.6, 92 ²	0
Copper, Total, ug/l	25	53, 110	44
Lead, Total, ug/l	ND ³	2	1
Zinc, Total, ug/l	107	200, 600	25

<u>Parameter</u>	<u>Monthly Average</u>	<u>High Daily Maximums</u>	<u>Permit Violations</u>
LC50, daphnid,%	100	100 ²	0
LC50, minnow,%	100	100 ²	0
NOEC, daphnid,%	98.5	88 ²	0
NOEC, minnow,%	86	6.25, 88 ²	1

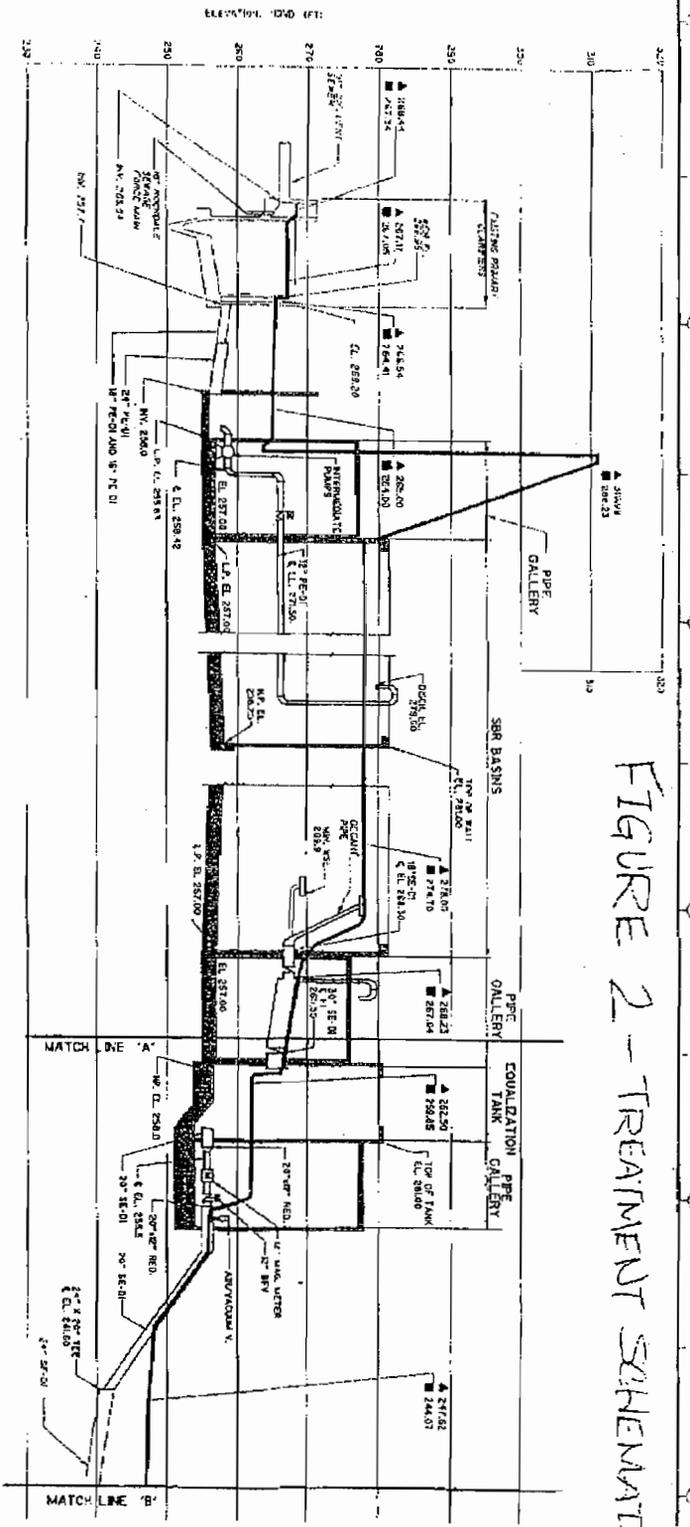
1. Data is from Discharge Monitoring Reports for the period of January 2003 to January 2005.
2. These are the low values for the period.
3. Not detected



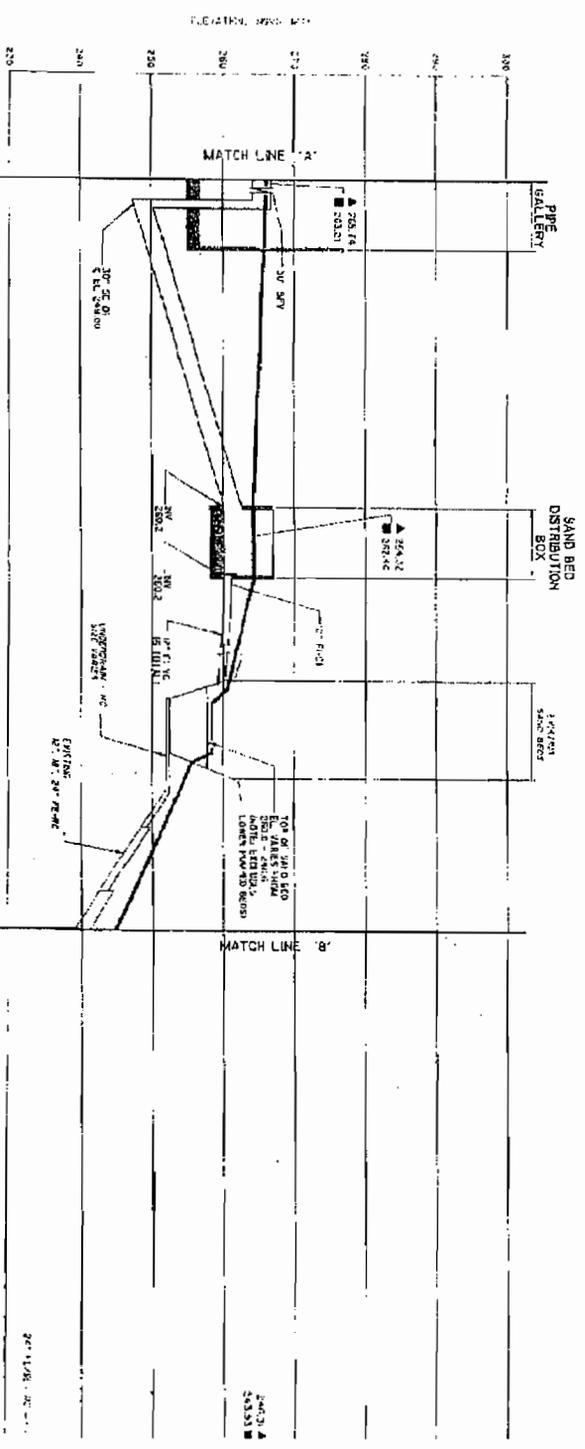
0.3 0.6 0.9 1.2 1.5 km

M*
G
M=-15.263
G=-1.766

FIGURE 2 - TREATMENT SCHEMATIC



HYDRAULIC PROFILE
 SCALES
 VERTICAL: 1" = 2'-0"
 HORIZONTAL: 1" = 10'-0"



HYDRAULIC PROFILE
 SCALES

ATTACHMENT B

METALS and C-NOEC LIMITS CALCULATIONS

Parameters: Copper, Zinc and Lead

Water Quality Criteria: Hardness dependent; Equation: $e^{(X \ln(h) + Y)}$

Where X and Y are chronic and acute coefficients for dissolved fractions of metals¹

	<u>Copper</u>		<u>Zinc</u>		<u>Lead</u>	
	<u>Chronic</u>	<u>Acute</u>	<u>Chronic</u>	<u>Acute</u>	<u>Chronic</u>	<u>Acute</u>
Where: X =	0.8545	0.9422	0.8473	0.8473	1.273	1.273
Y =	-1.702	-1.70	0.884	0.884	-4.705	-1.46

h = Hardness = 50 mg/l as CaCO₃² ; ln = natural logarithm

Thus; $e^{(0.8545 \ln(50) - 1.702)}$ $e^{(0.9422 \ln(50) - 1.70)}$ $e^{(1.273 \ln(50) - 4.705)}$ $e^{(1.273 \ln(50) - 1.46)}$
 $e^{(0.8473 \ln(50) + 0.884)}$ $e^{(0.8473 \ln(50) + 0.884)}$

<u>Copper</u>	<u>Zinc</u>	<u>Lead</u>
5.2 ug/l ; 7.3 ug/l	67 ug/l ; 67 ug/l	1.3 ug/l ; 34 ug/l

To establish limits, these criteria values must be multiplied by the dilution factor and then a conversion factor must be used to attain the total metal value:

Flow Dilution @ Design Flow: $\frac{2.0 \text{ MGD} + 0.36 \text{ MGD}}{2.0 \text{ MGD}} = 1.2$

1. National Recommended Water Quality Criteria, December 10, 1998, FR Vol. 63, No.237.
2. This is a representative value of the effluent from the WET testing results over the last 2 years, which is appropriate to use since the effluent often comprises the majority of this tributary.

Effluent Limitations:

<u>Copper</u>		<u>Zinc</u>	
<u>Chronic</u>	<u>Acute</u>	<u>Chronic</u>	<u>Acute</u>
1.2 (5.2 ug/l)/0.96	1.2 (7.3 ug/l)/0.96	1.2 (67 ug/l)/0.978	1.2 (67 ug/l)/0.986
6.5 ug/l	9.1 ug/l	82 ug/l	82 ug/l

The conversion factors of 0.96 and 0.978 are used to convert from the dissolved metal criteria limit to obtain the total metal limit. The chronic value corresponds to a monthly average limit and the acute to a daily maximum limit.

For lead, there is a different formula required to convert from the dissolved metal to the total metal as follows:

<u>Lead</u>	
<u>Chronic</u>	<u>Acute</u>
1.2 (1.3 ug/l) = 1.6 ug/l	1.2 (34 ug/l) = 41 ug/l

Chronic limit : $1.6 \text{ ug/l} (1.46203 - [\ln(50)(0.145712)]) = 1.6/0.89 = 1.8 \text{ ug/l}$

Acute limit: $41 \text{ ug/l} (1.46203 - [\ln(50)(0.145712)]) = 41/0.89 = 46 \text{ ug/l}$

C-NOEC Limit Calculation

The C-NOEC limit is equal to the receiving water concentration, which is the inverse of the dilution factor:

$$1 / 1.2 = 83 \%$$



One Cambridge Place, 50 Hampshire Street
Cambridge, Massachusetts 02139
tel: 617 452-6000
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December 15, 2005

US EPA
Massachusetts Office of Ecosystem Protection (CIP)
Suite 1100
1 Congress Street
Boston, MA 02114-2023

Sirs:

On behalf of the Town of Northbridge, Camp Dresser & McKee welcomes the opportunity to comment on the draft NPDES permit recently issued by your office. Having reviewed the permit, the Town has determined that compliance with the new phosphorus limits of 0.2 mg/l in the summer and 1.0 mg/l in the winter could require the investment of as much as \$3 million, and have a significant increase in its annual operating costs to reduce the amount of phosphorus in its effluent by a tiny amount. Under current flow conditions, the daily reduction in phosphorus achieved by the new limit is about the same as the amount of phosphorus found in a 50 pound bag of commonly used lawn fertilizer.

Because the Town has recently completed a \$9 million upgrade to its wastewater facility, the new permit was carefully reviewed to see how these new and more stringent limits were justified. This review suggests that there is no new information presented to justify the more stringent limitations. More importantly, the permit appears to have abandoned the results of the Blackstone River Initiative studies, which has been consistently described as a trend-setting attempt at watershed level pollution control.

The major problem with this permit is that it ignores the work on phosphorus control done by EPA, DEP, RIDEM and others to develop the 1.0 mg/l permit limit contained in the Town's current permit. The existing 1.0 mg/l permit limit was established using a wasteload allocation study and mathematical model of the River developed under the Blackstone River Initiative, and was shown to be protective of the water quality standards in the receiving water¹. The wasteload allocation study evaluated 11 control strategies in order to select the strategy upon which the current 1.0 mg/l permit limit is based. The wasteload allocation study also establishes post implementation activities, when it says:

Post implementation monitoring should focus on evaluating SOD reduction levels at key locations and the effect of any changes made to Fisherville Dam, as well as how treatment improvements at the WWTF are being translated into water quality improvements in the River².

¹ Blackstone River Watershed Dissolved Oxygen Wasteload Allocation for Massachusetts and Rhode Island, November 1997, USEPA, MADEP and RIDEM

² IBID, page 23



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Northbridge has undertaken improvements at its treatment plant to conform to the limits established in its current permit, and understands that other communities along the River either have also done so, or are in the process of so doing. Thus, they would have thought that this permit would continue with the 1.0 mg/l permit limit, and would have incorporated more stringent limits only after the recommendations of the wasteload allocation had been followed.

It is understood that new limits might be appropriate if new information were presented to justify the more stringent limit. However, we note that there is no new information presented; river water quality data from as far back as the early 1990's is being used, in conjunction with literature references from the mid 1980's and early 1990's about the possible effects of different levels of phosphorus on receiving streams. These data and references were both available at the time of the last permit, so it surprises us that they show up now, rather than in the last permit. We would think that the Blackstone-specific analyses conducted as part of the Blackstone River Initiative would be a far more appropriate approach to solving the River's problems. On this basis, the draft permit should be modified to reflect a 1 mg/l permit limit in the summer and a monitor only requirement in the winter, consistent with the current permit and the wasteload analyses conducted as a result of the Blackstone River Initiative.

More specific comments on the permit are as follows:

The discussion on the bottom of page 5 of the Fact Sheet concerning RIDEM's analysis of nutrients is incorrect and misleading. The Fact Sheet claims that RIDEM conducted modeling to estimate nitrogen loads from Massachusetts sources. In fact, RIDEM conducted no such modeling. RIDEM did analyze data from various sources to reach some general conclusions concerning the sources of nitrogen discharged to Rhode Island Waters. These conclusions are considered faulty by some, including dischargers in Rhode Island who are appealing RIDEM's permit modifications, and by the Massachusetts Department of Environmental Protection, amongst others.

The discussion on page 6 of the document concerning the applicability of 314 CMR 4.04(5) is incorrect. According to The Massachusetts Department of Environmental Protection that section applies only to lakes and ponds. While proceedings are underway to possibly expand the applicability of this section to all waters, such expansion is now only proposed, and hearings will not be held on this matter until 2006. See <http://www.mass.gov/dep/water/laws/wqssum.htm> , which states in part that

Nutrients/Control of Eutrophication 314 CMR 4.05(5)(c): Cultural eutrophication now is addressed in the narrative nutrient criteria. The resulting *provision is expanded to ensure that all surface waters, not just lakes and ponds*, are protected from excessive nutrients.



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The last paragraph on page 6 recites information concerning the EPA's ecoregional nutrient criteria, and then claims that limits based on those criteria (as well as limits based on the State's HBPT) are not being established at this time. If the permit writer believes this to be true, then either the discussion does not belong in the document, or an expanded discussion should be included that would explain why such steps are not now being taken. Such discussion should include information concerning the Commonwealth's programs for the development of Massachusetts specific nutrient criterion presently being developed, and the schedule for completion of this work.

The first sentence of the second paragraph on Page 7 suggests that EPA has produced a total phosphorus criterion for receiving waters. This is incorrect; the Gold Book referenced in this paragraph clearly indicates that there is no such criterion. See <http://www.epa.gov/waterscience/criteria/goldbook.pdf> , specifically the discussion on Phosphate Phosphorus, which concludes with the following:

“No national criterion is presented for phosphate phosphorus for the control of eutrophication”

While the Gold Book does describe a variety of approaches that should be considered, including concentration values, Vollenweider loading rates, and a generic description of the factors influencing eutrophication induced by phosphorus, none of the approaches are criterion in the context of the EPA's Quality Criteria for Water. Indeed, the document can generally be said to endorse an approach similar to that embodied in the Blackstone River Initiative, which was the basis for the 1.0 mg/l summer limit now found in the existing permit.

Contrary to the discussion presented in the last paragraph of page 6, the Fact Sheet says, at the top of page 7 that the summertime phosphorus limitation is based upon the State's Highest and Best Practicable Treatment standard. As mentioned above, this is not now a water quality standard in Massachusetts applicable to streams, and thus cannot be used as a rationale for including the limit in the permit.

The first full paragraph on page 8 presents the basis for the 1 mg/l winter time phosphorus limit. The section indicates that the purpose of the limit is to prevent higher levels of phosphorus that would otherwise be discharged in the winter from accumulating in the sediments. However, the logic presented in the paragraph clearly supports the conclusion that no winter time limit is warranted: it claims that the vast majority of the phosphorus discharged from the treatment plant would be in the form of dissolved phosphorus, which will pass through the system given the lack of plant growth in the winter. This being the case,



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and contrary to the assertions of the paragraph, there would be no need for winter time phosphorus control. If the Agency believes that other phosphorus fractions are a water quality problem, it should present calculations showing that these fractions do cause problems, and should compare that to the phosphorus load from all other sources in the same time frame to validate their conclusions.

The last paragraph on page 8 discusses limits and sampling requirements for coliform bacteria. As is mentioned in the Fact Sheet, the Town has had exemplary compliance with the coliform standard, with only one violation in the past two years. Thus, we think that the additional sampling for coliform called for in this permit is an unwarranted expense: had the Town shown a history of non-compliance, then it would make sense to increase the frequency of testing, but the performance of the system argues otherwise. Accordingly, it is requested that the testing level be maintained at twice per week, consistent with the existing permit.

Should you have any questions on these matters, please do not hesitate to contact us at 617-452-6000.

Very truly yours,

John J Gall, Jr.
Vice President
Camp Dresser & McKee Inc.

cc: Paul Hogan, MADEP, Worcester, MA
Richard Sasseville, Town of Northbridge
James Madigan, Town of Northbridge