ATTACHMENT 3

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 Marion
Department of Public Works

is authorized to discharge from the facility located at

Marion Water Pollution Control Facility
50 Benson Brook Road
Marion, MA 02738

to receiving water named

Unnamed Brook to Aucoot Cove

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

This permit shall become effective on **(See * below)**

This permit expires at midnight, five (5) years from the last day of the month preceding the effective date.

This permit supersedes the permit issued on September 29, 2006 and modified on May 22, 2007.

This permit consists of 16 pages in Part I including effluent limitations and monitoring requirements, 25 pages in Part II including NPDES Part II Standard Conditions, Attachment A (USEPA Region 1 Freshwater Chronic Toxicity Test Procedure and Protocol, March 2013, 7 pages), Attachment B (USEPA Region 1 Freshwater Acute Toxicity Test Procedure and Protocol, February 2011, 8 pages), and Attachment C, Required Reports.

Signed this day of

_____
Ken Moraff, Director
Office of Ecosystem Protection
Environmental Protection Agency
Boston, MA

_____
David Ferris, Director
Massachusetts Wastewater Management Program
Department of Environmental Protection
Commonwealth of Massachusetts
Boston, MA

*Pursuant to 40 CFR 124.15(b)(3), if no comments requesting a change to the draft permit are received, the permit will become effective upon the date of signature

PART I

A.1. During the period beginning on the effective date and lasting through expiration, the permittee is authorized to discharge treated effluent from outfall serial number **001** to Aucoot Cove. Such discharges shall be limited and monitored as specified below.

EFFLUENT CHARACTERISTIC	**EFFLUENT LIMITS**					**MONITORING REQUIREMENTS** [3]	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**AVERAGE MONTHLY**	**AVERAGE WEEKLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE' TYPE**
FLOW[2]	********	********	0.588 MGD	********	Report MGD	CONTINUOUS	RECORDER
FLOW[2]	********	********	Report MGD	********	********	CONTINUOUS	RECORDER
BOD_5 [4]	42 lbs/Day	63 lbs/Day	9 mg/L	13 mg/L	Report mg/L	1/WEEK	24-HOUR COMPOSITE [5]
TSS [4]	42 lbs/Day	63 lbs/Day	9 mg/L	13 mg/L	Report mg/L	1/WEEK	24-HOUR COMPOSITE
pH RANGE[1]	6.5 - 8.3 SU (SEE PERMIT PARAGRAPH I.A.1.b.)					1/DAY	GRAB
FECAL COLIFORM [1,6]	********	**********	14 cfu/100 mL	********	28 cfu/100 mL	2/WEEK	GRAB
ENTEROCOCCI [1,6]			35 cfu/100 mL		276 cfu/100 mL	2/WEEK	GRAB
DISSOLVED OXYGEN (April 1st-October 31st)	NOT LESS THAN 5.0 mg/l					1/DAY	GRAB
WHOLE EFFLUENT TOXICITY [11, 12, 13, 14]	Acute $LC_{50} \geq 100\%$ Chronic C-NOEC $\geq 100\%$					4/YEAR	24-HOUR COMPOSITE
Total Cadmium	Report maximum daily, µg/L						
Total Lead	Report maximum daily, µg/L						
Total Copper	Report maximum daily, µg/L						
Total Zinc	Report maximum daily, µg/L						
Total Nickel	Report maximum daily, µg/L						
Total Aluminum	Report maximum daily, µg/L						

CONTINUED FROM PREVIOUS PAGE

EFFLUENT CHARACTERISTIC	EFFLUENT LIMITS			MONITORING REQUIREMENTS	
PARAMETER	**AVERAGE MONTHLY**	**AVERAGE MONTHLY**	**MAXIMUM DAILY**	**MEASUREMENT FREQUENCY**	**SAMPLE' TYPE**
AMMONIA-NITROGEN (May 1 – May 31)	12.75 lbs/day	2.6 mg/L	Report mg/L	1/WEEK	24-HOUR COMPOSITE
AMMONIA-NITROGEN (June 1 – October 31)	8.53 lbs/day	1.74 mg/L	Report mg/L	1/WEEK	24-HOUR COMPOSITE
AMMONIA-NITROGEN (November 1 – April 30)	Report lbs/day	Report mg/L	Report mg/L	1/MONTH	24-HOUR COMPOSITE
TOTAL NITROGEN[7] (April 1 – October 31) TOTAL KJELDAHL NITROGEN TOTAL NITRITE TOTAL NITRATE	14.7 lbs/day Report lbs/day Report lbs/day Report lbs/day	3.0 mg/L Report mg/L Report mg/L Report mg/L	Report mg/L Report mg/L Report mg/L Report mg/L	3/WEEK	24-HOUR COMPOSITE
TOTAL NITROGEN[8] (November 1 – March 31) TOTAL KJELDAHL NITROGEN TOTAL NITRITE TOTAL NITRATE	Report lbs/day Report lbs/day Report lbs/day Report lbs/day	Report lbs/day Report lbs/day Report lbs/day Report lbs/day	Report mg/L Report lbs/day Report lbs/day Report lbs/day	1/WEEK	24-HOUR COMPOSITE
TOTAL PHOSPHORUS[9] (April 1 – October 31) (November 1 – March 31)	0.98 lbs/day 4.9 lbs/day	200 µg/L 1.0 mg/L	Report µg/L Report mg/L	1/WEEK 1/MONTH	24-HOUR COMPOSITE
TOTAL COPPER[10]	0.018 lbs/day	3.73 µg/L	5.78 µg/L	1/WEEK	24-HOUR COMPOSITE

Sampling Location: Effluent samples are required to be collected following disinfection by the UV unit; dissolved oxygen samples must be taken at the point of entering the unnamed brook.

Footnotes:

1. Required for State Certification.

2. Report annual average, monthly average, and the maximum daily flow. The limit is an annual average, which shall be reported as a rolling average. The value will be calculated as the arithmetic mean of the monthly average flow for the reporting month and the monthly average flows of the previous eleven months.

3. Effluent sampling shall be of the discharge and shall be collected at the point specified on page 3. Any change in sampling location must be reviewed and approved in writing by EPA and MassDEP.

   A routine sampling program shall be developed in which samples are taken at the same location, same time and same days of the week each month. Occasional deviations from the routine sampling program are allowed, but the reason for the deviation shall be documented in correspondence appended to the applicable discharge monitoring report.

   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.

4. Sampling required for influent and effluent.

5. 24-hour composite samples will consist of at least twenty-four (24) grab samples taken during one consecutive 24-hour period, either collected at equal intervals and combined proportional to flow or continuously collected proportionally to flow.

6. The monthly average limits for fecal coliform and Enterococci are expressed as a geometric mean.

7. The permittee shall comply with the 3.0 mg/L total nitrogen limit in accordance with the schedule contained in Section F below. Upon the effective date of the permit, and until the date specified in Section F below for compliance with the total nitrogen final limit of 3.0 mg/l, the interim total nitrogen limit from April through October will be 5.0 mg/L.

8. The permittee shall operate the treatment facility to reduce the discharge of total nitrogen during the months of November to March to the maximum extent possible. All available treatment equipment in place at the facility shall be operated unless equal or better performance can be achieved in a reduced operational mode. The addition of a carbon source that may be necessary in order to meet the total nitrogen limit during the months of April to October is not required during the months of November to March.

9. The permittee shall comply with the 200 μg/L total phosphorus limit in accordance with the schedule contained in Section F below. Upon the effective date of the permit, and until the date specified in Section F below for compliance with the total phosphorus final limit of 200 μg/L, the interim limit from April through October will be 1 mg/L.

10. The minimum level (ML) for copper is defined as 3 µg/L. This value is the minimum level for copper using the Furnace Atomic Absorption analytical method (EPA Method 220.2). This method or other EPA-approved method with an equivalent or lower ML shall be used for effluent limitations less than 3 µg/L. Compliance/non-compliance will be determined based on the ML. Sampling results of 3 µg/L or less shall be reported as zero on the Discharge Monitoring Report.

11. The permittee shall conduct chronic (and modified acute) toxicity tests *four* times per year. The chronic test may be used to calculate the acute LC_{50} at the 48 hour exposure interval. The permittee shall test the daphnid, *Ceriodaphnia dubia* and the fathead minnow, *Pimiphales promelas.* Toxicity test samples shall be collected during the second week of the months of February, May, August and November. The test results shall be submitted by the last day of the month following the completion of the test. The results are due April 30th, July 31st, October 31st, and January 31st, respectively. The tests must be performed in accordance with test procedures and protocols specified in **Attachment A** of this permit.

Test Dates 2nd week of	**Submit Results By:**	**Test Species**	**Acute Limit LC_{50}**	**Chronic Limit C-NOEC**
March June September December	April 30th July 31st October 31st January 31st	Ceriodaphnia dubia (daphnid), Pimiphales promelas (minnow)	≥ 100%	≥ 100%

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.

12. The LC_{50} 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.

13. 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, based on a statistically significant difference from dilution control, at a specific time of observation as determined from hypothesis testing. As described in the EPA WET Method Manual EPA 821-R-02-013, Section 10.2.6.2, all test results are to be reviewed and reported in accordance with EPA guidance on the evaluation of the concentration-response relationship. The 100% or greater" limit is defined as a sample which is composed of 100% (or greater) effluent, the remainder being dilution water.

14. If toxicity test(s) using receiving water as diluent show the receiving water to be toxic or unreliable, the permittee shall either follow procedures outlined in **Attachment A (Toxicity Test**

Procedure and Protocol) **Section IV., DILUTION WATER** in order to obtain an individual approval for use of an alternate dilution water, or the permittee shall follow the Self-Implementing Alternative Dilution Water Guidance, which may be used to obtain automatic approval of an alternate dilution water, including the appropriate species for use with that water. This guidance is found in Attachment G of *NPDES Program Instructions for the Discharge Monitoring Report Forms (DMRs)*, which may be found on the EPA Region I web site at http://www.epa.gov/Region1/enforcementandassistance/dmr.html. If this guidance is revoked, the permittee shall revert to obtaining individual approval as outlined in **Attachment A**. Any modification or revocation to this guidance will be transmitted to the permittees. However, at any time, the permittee may choose to contact EPA-New England directly using the approach outlined in **Attachment A**.

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 or greater than 8.3 at any time.

c. The discharge shall not cause objectionable discoloration of the receiving waters.

d. The effluent shall not contain a visible oil sheen, foam, or 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 done in accordance with EPA approved methods above its required frequency must also be reported.

g. If the average annual flow in any calendar year exceeds 80 percent of the facility's design flow, the permittee shall submit a report to MassDEP by March 31 of the following calendar year describing its plans for further flow increases and describing how it will maintain compliance with the flow limit and all other effluent limitations and conditions.

h. Use of chlorine is prohibited.

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

a. Any new introduction of pollutants into the POTW from an indirect discharger which would be subject to section 301 or 306 of the Clean Water Act if it were directly discharging those pollutants; 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:

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 outfall(s) 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 to EPA and MassDEP in accordance with Section D.1.e. (1) of the General Requirements of this permit (Twenty-four hour reporting).

Notification of SSOs to MassDEP shall be made on its SSO Reporting Form (which includes DEP Regional Office telephone numbers). The reporting form and instruction for its completion may be found on-line at http://www.mass.gov/eea/agencies/massdep/service/approvals/sanitary-sewer-overflow-bypass-backup-notification.html.

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. The permittee is required to complete the following activities for the collection system which it owns:

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. Provisions to meet this requirement shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

2. Preventive Maintenance Program

   The permittee shall maintain an ongoing preventive 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. Plans and programs to meet this requirement shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

3. Infiltration/Inflow

   The permittee shall control infiltration and inflow (I/I) into the sewer system as necessary to prevent high flow related unauthorized discharges from their collection systems and high flow related violations of the wastewater treatment plant's effluent limitations. In addition to being required by federal regulations, this is also a state certification requirement. Plans and programs to control I/I shall be described in the Collection System O & M Plan required pursuant to Section C.5. below.

4. Collection System Mapping

   Within 30 months of the effective date of this permit, the permittee shall prepare a map of the sewer collection system it owns (see page 1 of this permit for the effective date). The map shall be on a street map of the community, with sufficient detail and at a scale to allow easy interpretation. The collection system information shown on the map shall be based on current conditions and shall be kept up to date and available for review by federal, state, or local agencies. Such map(s) shall include, but not be limited to the following:

   a. All sanitary sewer lines and related manholes;
   b. All combined sewer lines, related manholes, and catch basins;
   c. All combined sewer regulators and any known or suspected connections between the sanitary sewer and storm drain systems (e.g. combination manholes);
   d. All outfalls, including the treatment plant outfall(s), CSOs, and any known or suspected SSOs, including stormwater outfalls that are connected to combination manholes;
   e. All pump stations and force mains;
   f. The wastewater treatment facility(ies);
   g. All surface waters (labeled);
   h. Other major appurtenances such as inverted siphons and air release valves;
   i. A numbering system which uniquely identifies manholes, catch basins, overflow points, regulators and outfalls;

j. The scale and a north arrow; and
k. The pipe diameter, date of installation, type of material, distance between manholes, and the direction of flow.

5. Collection System Operation and Maintenance Plan

The permittee shall develop and implement a Collection System Operation and Maintenance Plan.

a. **Within six (6) months of the effective date of the permit**, the permittee shall submit to EPA and MassDEP

(1) A description of the collection system management goals, staffing, information management, and legal authorities;
(2) A description of the collection system and the overall condition of the collection system including a list of all pump stations and a description of recent studies and construction activities; and
(3) A schedule for the development and implementation of the full Collection System O & M Plan including the elements in paragraphs b.1. through b.8. below.

b. The full Collection System O & M Plan shall be completed, implemented and submitted to EPA and MassDEP **within twenty-four (24) months from the effective date of this permit**. The Plan shall include:

(1) The required submittal from paragraph 5.a. above, updated to reflect current information;
(2) A preventive maintenance and monitoring program for the collection system;
(3) Description of sufficient staffing necessary to properly operate and maintain the sanitary sewer collection system and how the operation and maintenance program is staffed;
(4) Description of funding, the source(s) of funding and provisions for funding sufficient for implementing the plan;
(5) Identification of known and suspected overflows and back-ups, including manholes. A description of the cause of the identified overflows and back-ups, corrective actions taken, and a plan for addressing the overflows and back-ups consistent with the requirements of this permit;
(6) A description of the permittee's programs for preventing I/I related effluent violations and all unauthorized discharges of wastewater, including overflows and by-passes and the ongoing program to identify and remove sources of I/I. The program shall include an inflow identification and control program that focuses on the disconnection and redirection of illegal sump pumps and roof down spouts; and
(7) An educational public outreach program for all aspects of I/I control, particularly private inflow.
(8) An Overflow Emergency Response Plan to protect public health from overflows and unanticipated bypasses or upsets that exceed any effluent limitation in the permit.

6. Annual Reporting Requirement

The permittee shall submit a summary report of activities related to the implementation of its Collection System O & M Plan during the previous calendar year. The report shall be submitted to EPA and MassDEP annually by **April 15**. The summary report shall, at a minimum, include:

a. A description of the staffing levels maintained during the year;
b. A map and a description of inspection and maintenance activities conducted and corrective actions taken during the previous year;
c. Expenditures for any collection system maintenance activities and corrective actions taken during the previous year;
d. A map with areas identified for investigation/action in the coming year;
e. If treatment plant flow has reached 80% of its design flow [0.47 MGD] based on the annual average flow during the reporting year, or there have been capacity related overflows, submit a calculation of the maximum daily, weekly, and monthly infiltration and the maximum daily, weekly, and monthly inflow for the reporting year; and
f. A summary of unauthorized discharges during the past year and their causes and a report of any corrective actions taken as a result of the unauthorized discharges reported pursuant to the Unauthorized Discharges section of this permit.

7. Alternate Power Source

In order to maintain compliance with the terms and conditions of this permit, the permittee shall provide an alternative power source(s) sufficient to operate the portion of the publicly owned treatment works[1] it owns and operates.

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, including EPA regulations promulgated at 40 CFR Part 503, which prescribe "Standards for the Use or Disposal of Sewage Sludge" pursuant to Section 405(d) of the CWA, 33 U.S.C. § 1345(d).

2. If both state and federal requirements apply to the permittee's sludge use and/or disposal practices, the permittee shall comply with the more stringent of the applicable requirements.

3. The requirements and technical standards of 40 CFR Part 503 apply to the following sludge 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

1 As defined at 40 CFR §122.2, which references the definition at 40 CFR §403.3

4. The requirements of 40 CFR Part 503 do not apply to facilities which dispose of sludge in a municipal solid waste landfill. 40 CFR § 503.4. These requirements also do not apply to facilities which do not use or 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. For the purposes of this permit, the placement of sludge in unlined lagoons constitutes sludge disposal and is therefore subject to the requirements of Part 503 for sludge disposal.

6. The 40 CFR § 503 requirements including the following elements:

    a. General requirements
    b. Pollutant limitations
    c. Operational Standards (pathogen reduction requirements and vector attraction reduction requirements)
    d. Management practices
    e. Record keeping
    f. Monitoring
    g. Reporting

    Which of the 40 C.F.R. § 503 requirements apply to the permittee will depend upon the use or disposal practice followed and upon the quality of material produced by a facility. The EPA Region 1 Guidance document, "EPA Region 1 - NPDES Permit Sludge Compliance Guidance" (November 4, 1999), may be used by the permittee to assist it in determining the applicable requirements.[2]

7. The sludge shall be monitored for pollutant concentrations (all Part 503 methods) and pathogen reduction and vector attraction reduction (land application and surface disposal) 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 1,500	1 /quarter
1,500 to less than 15,000	6 /year
15,000 +	1 /month

    Sampling of the sewage sludge shall use the procedures detailed in 40 CFR 503.8.

8. Under 40 CFR § 503.9(r), the permittee is a "person who prepares sewage sludge" because it "is … the person who generates sewage sludge during the treatment of domestic sewage in a treatment works …." If the permittee contracts with *another* "person who prepares sewage sludge" under 40 CFR § 503.9(r) – i.e., with "a person who derives a material from sewage sludge" – for use or disposal of the sludge, then compliance with Part 503 requirements is the responsibility of the contractor engaged for that purpose. If the permittee does not engage a "person who prepares sewage sludge," as defined in 40 CFR § 503.9(r), for use or disposal, then the permittee remains responsible to ensure that the applicable requirements in Part 503 are met.

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2 This guidance document is available upon request from EPA Region 1 and may also be found at: http://www.epa.gov/region1/npdes/permits/generic/sludgeguidance.pdf

40 CFR §503.7. If the ultimate use or disposal method is land application, the permittee is responsible for providing the person receiving the sludge with notice and necessary information to comply with the requirements of 40 CFR Part 503 Subpart B.

9. The permittee shall submit an annual report containing the information specified in the 40 CFR Part § 503 requirements (§ 503.18 (land application), § 503.28 (surface disposal), or § 503.48 (incineration)) by **March 15** (*see also* "EPA Region 1 - NPDES Permit Sludge Compliance Guidance"). Reports shall be submitted to the address contained in the reporting section of the permit. If the permittee engages a contractor or contractors for sludge preparation and ultimate use or disposal, the annual report need contain only the following information:

   a. Name and address of contractor(s) responsible for sludge preparation, use or disposal
   b. Quantity of sludge (in dry metric tons) from the POTW that is transferred to the sludge contractor(s), and the method(s) by which the contractor will prepare and use or dispose of the sewage sludge.

E. SPECIAL CONDITIONS RELATED TO LAGOON OPERATIONS

The following requirements pertain to the use and operation of the three unlined facultative sewage lagoons on the site for sludge disposal and storage of wastewater.

In accordance with federal regulations, the permittee shall cease the placement, storage, and disposal of sludge and other treatment related solids in unlined lagoons, cease the use of the unlined lagoons for storage of wastewater, and abate any ongoing contamination of groundwater occurring as a result of sludge and other wastewater solids that were deposited in the unlined lagoons. These requirements shall be met in accordance with the schedule in Section F below.

F. COMPLIANCE SCHEDULE

In order to comply with the total nitrogen permit limit and the Operation and Maintenance requirements relative to the unlined lagoons, as well as to ensure that the discharge from outfall 001 does not cause or contribute to exceedances of surface water quality standards, the Permittee shall take the following actions:

1. Within twelve (12) months of the effective date of the permit, the Permittee shall submit a plan for achieving compliance with the lagoon related permit requirements consistent with the schedule below. The plan must achieve compliance with the lagoon related permit requirements as soon as possible but no later than forty-eight (48) months from the effective date of the permit.

2. Should the permittee choose to supplement such reductions as part of this permit to demonstrate that a higher total nitrogen limit at Outfall 001 is sufficient to meet water quality standards, the plan shall also include any additional non-point source and stormwater related nitrogen reductions that the Permittee will implement. These may include documentation of the estimated nitrogen load reductions to Aucoot Cove that will result from such implementation, the estimated increases in nitrogen loads, and the net resultant change in nitrogen loading from the Aucoot Cove watershed, and controls, as

necessary, to ensure that sludge and other wastewater solids in the lagoon sediments are not an ongoing source of nitrogen contamination of groundwater.

3. Within twelve (12) months of the effective date of the permit, the Permittee shall submit an alternatives analysis/facilities plan to EPA for the treatment and/or pollution prevention improvements required to achieve the total nitrogen limit of 3.0 mg/L and the total phosphorus limits of 200 μg/L.

4. Within twenty-four (24) months of the effective date of the permit, the Permittee shall comply with the total phosphorus limit of 200 μg/L.

5. If the plan submitted under #1 above includes lining the lagoons in a manner that abates any continuing contamination of groundwater from sludge or other wastewater deposited in the lagoons and continued use of the lagoons, the Permittee shall:

    a. Within twenty-four (24) months of the effective date of the permit, submit a progress report relative to achieving compliance with the lagoon related requirements of the permit as well as any additional non-point source reduction efforts implemented.

    b. Within thirty-six (36) months of the effective date of the permit, complete construction of the lagoon liners.

6. If the plan submitted under #1 above includes implementing alternative methods for sludge disposal and/or wastewater storage than the Permittee shall:

    a. Within twenty-four (24) months of the effective date of the permit, submit a progress report relative to achieving compliance with the lagoon related requirements of the permit as well as any additional non-point source reduction efforts implemented.

    b. Within thirty-six (36) months of the effective date of the permit, complete construction of the necessary facilities and cease the disposal of sludge and other treatment related solids in unlined lagoons and cease the use of the unlined lagoons for storage of wastewater.

7. Within thirty-six (36) months of the effective date of the permit, the Permittee shall complete the design of the facility improvements required to meet the 3.0 mg/l total nitrogen seasonal limit as set out in Part I.

8. Within forty-eight (48) months of the effective date of the permit, the Permittee shall submit a progress report relative to construction of the facility improvements required to meet the 3.0 mg/l total nitrogen seasonal limit as set out in Part I.

9. Within sixty (60) months of the effective date of the permit, the Permittee shall complete construction of the facility improvements required to meet the 3.0 mg/l total nitrogen seasonal limits as set out in Part I.

If, at any time, the Permittee can make a demonstration that nonpoint source and stormwater nitrogen improvements are sufficient to achieve water quality standards without further point source nitrogen reductions, the Permittee may submit a request for a permit modification.

G. MONITORING AND REPORTING

The monitoring program in the permit specifies sampling and analysis, which will provide continuous information on compliance and the reliability and effectiveness of the installed pollution abatement equipment. The approved analytical procedures found in 40 CFR Part 136 are required unless other procedures are explicitly required in the permit. The Permittee is obligated to monitor and report sampling results to EPA and the MassDEP within the time specified within the permit.

Unless otherwise specified in this permit, the permittee shall submit reports, requests, and information and provide notices in the manner described in this section.

1. Submittal of DMRs Using NetDMR

The permittee shall continue to submit its monthly monitoring data in discharge monitoring reports (DMRs) to EPA and MassDEP no later than the 15th day of the month electronically using NetDMR. When the permittee submits DMRs using NetDMR, it is not required to submit hard copies of DMRs to EPA or MassDEP.

2. Submittal of Reports as NetDMR Attachments

Unless otherwise specified in this permit, the permittee shall electronically submit all reports to EPA as NetDMR attachments rather than as hard copies. Permittees shall continue to send hard copies of reports other than DMRs to MassDEP until further notice from MassDEP. (See Part I.G.6. for more information on state reporting.) Because the due dates for reports described in this permit may not coincide with the due date for submitting DMRs (which is no later than the 15th day of the month), a report submitted electronically as a NetDMR attachment shall be considered timely if it is electronically submitted to EPA using NetDMR with the next DMR due following the particular report due date specified in this permit.

3. Submittal of Pre-treatment Related Reports

All reports and information required of the permittee in the Industrial Users and Pretreatment Program section of this permit shall be submitted to the Office of Ecosystem Protection's Pretreatment Coordinator in Region 1 EPA's Office of Ecosystem Protection (OEP). These requests, reports and notices include:

A. Annual Pretreatment Reports,
B. Pretreatment Reports Reassessment of Technically Based Industrial Discharge Limits Form,
C. Revisions to Industrial Discharge Limits,
D. Report describing Pretreatment Program activities, and
E. Proposed changes to a Pretreatment Program

This information shall be submitted to EPA/OEP as a hard copy at the following address:

U.S. Environmental Protection Agency
Office of Ecosystem Protection
Regional Pretreatment Coordinator
5 Post Office Square - Suite 100 (OEP06-03)
Boston, MA 02109-3912

4. Submittal of Requests and Reports to EPA/OEP

The following requests, reports, and information described in this permit shall be submitted to the EPA/OEP NPDES Applications Coordinator in the EPA Office Ecosystem Protection (OEP).

A. Transfer of Permit notice
B. Request for changes in sampling location
C. Request for reduction in testing frequency
D. Request for Reduction in WET Testing Requirement
E. Report on unacceptable dilution water / request for alternative dilution water for WET testing
F. Notification of proposal to add or replace chemicals and bio-remedial agents including microbes

These reports, information, and requests shall be submitted to EPA/OEP electronically at R1NPDES.Notices.OEP@epa.gov or by hard copy mail to the following address:

U.S. Environmental Protection Agency
Office of Ecosystem Protection
EPA/OEP NPDES Applications Coordinator
5 Post Office Square - Suite 100 (OEP06-03)
Boston, MA 02109-3912

5. Submittal of Reports in Hard Copy Form

The following notifications and reports shall be submitted as hard copy with a cover letter describing the submission. These reports shall be signed and dated originals submitted to EPA.

A. Written notifications required under Part II
B. Notice of unauthorized discharges, including Sanitary Sewer Overflow (SSO) reporting

This information shall be submitted to EPA/OES at the following address:

U.S. Environmental Protection Agency
Office or Environmental Stewardship (OES)
Water Technical Unit
5 Post Office Square, Suite 100 (OES04-4)
Boston, MA 02109-3912

6. State Reporting

Unless otherwise specified in this permit, duplicate signed copies of all reports, information, requests or notifications described in this permit, including the reports, information, requests or notifications described in Parts I.G.3, I.G.4, and I.G.5 also shall be submitted to the State at the following addresses:

MassDEP – Southeast Region
Bureau of Resource Protection (Municipal)
20 Riverside Drive
Lakeville, MA 02347

Copies of toxicity tests only shall be submitted to:

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

7. Verbal Reports and Verbal Notifications

Any verbal reports or verbal notifications, if required in Parts I and/or II of this permit, shall be made to both EPA and to MassDEP. This includes verbal reports and notifications which require reporting within 24 hours. (As examples, see Part II.B.4.c. (2), Part II.B.5.c. (3), and Part II.D.1.e.) Verbal reports and verbal notifications shall be made to EPA's Office of Environmental Stewardship at:

U.S. Environmental Protection Agency
Office of Environmental Stewardship
5 Post Office Square, Suite 100 (OES04-4)
Boston, MA 02109-3912
617-918-1510

H. STATE PERMIT CONDITIONS

1. This authorization to discharge includes two separate and independent permit authorizations. The two permit authorizations are (i) a federal National Pollutant Discharge Elimination System permit issued by the U.S. Environmental Protection Agency (EPA) pursuant to the Federal Clean Water Act, 33 U.S.C. §§1251 et seq.; and (ii) an identical state surface water discharge permit issued by the Commissioner of the Massachusetts Department of Environmental Protection (MassDEP) pursuant to the Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53, and 314 C.M.R. 3.00. All of the requirements contained in this authorization, as well as the standard conditions contained in 314 CMR 3.19, are hereby incorporated by reference into this state surface water discharge permit.

2. This authorization also incorporates the state water quality certification issued by MassDEP under § 401(a) of the Federal Clean Water Act, 40 C.F.R. 124.53, M.G.L. c. 21, § 27 and 314 CMR 3.07. All of the requirements (if any) contained in MassDEP's water quality certification for the permit are hereby incorporated by reference into this state surface water discharge permit as special conditions pursuant to 314 CMR 3.11.

3. 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 a 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.

FRESHWATER CHRONIC TOXICITY TEST PROCEDURE AND PROTOCOL

USEPA Region 1

I. GENERAL REQUIREMENTS

The permittee shall be responsible for the conduct of acceptable chronic toxicity tests using three fresh samples collected during each test period. The following tests shall be performed as prescribed in Part 1 of the NPDES discharge permit in accordance with the appropriate test protocols described below. (Note: the permittee and testing laboratory should review the applicable permit to determine whether testing of one or both species is required).

- **Daphnid (Ceriodaphnia dubia) Survival and Reproduction Test.**
- **Fathead Minnow (Pimephales promelas) Larval Growth and Survival Test.**

Chronic toxicity data shall be reported as outlined in Section VIII.

II. METHODS

Methods to follow are those recommended by EPA in: Short Term Methods For Estimating The Chronic Toxicity of Effluents and Receiving Water to Freshwater Organisms, Fourth Edition. October 2002. United States Environmental Protection Agency. Office of Water, Washington, D.C., EPA 821-R-02-013. The methods are available on-line at http://www.epa.gov/waterscience/WET/ . Exceptions and clarification are stated herein.

III. SAMPLE COLLECTION AND USE

A total of three fresh samples of effluent and receiving water are required for initiation and subsequent renewals of a freshwater, chronic, toxicity test. The receiving water control sample must be collected immediately upstream of the permitted discharge's zone of influence. Fresh samples are recommended for use on test days 1, 3, and 5. However, provided a total of three samples are used for testing over the test period, an alternate sampling schedule is acceptable. The acceptable holding times until initial use of a sample are 24 and 36 hours for on-site and off-site testing, respectively. A written waiver is required from the regulating authority for any hold time extension. All test samples collected may be used for 24, 48 and 72 hour renewals after initial use. All samples held for use beyond the day of sampling shall be refrigerated and maintained at a temperature range of 0-6^{o} C.

All samples submitted for chemical and physical analyses will be analyzed according to Section VI of this protocol.

Sampling guidance dictates that, where appropriate, aliquots for the analysis required in this protocol shall be split from the samples, containerized and immediately preserved, or analyzed as per 40 CFR Part 136. EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection. Testing for the presence of total residual chlorine (TRC) must be analyzed immediately or as soon as possible, for all effluent samples, prior to WET testing. TRC analysis may be performed on-site or by the toxicity testing laboratory and the samples must be dechlorinated, as necessary, using sodium thiosulfate prior to sample use for toxicity testing.

If any of the renewal samples are of sufficient potency to cause lethality to 50 percent or more of the test organisms in any of the test treatments for either species or, if the test fails to meet its permit limits, then chemical analysis for total metals (originally required for the initial sample only in Section VI) will be required on the renewal sample(s) as well.

IV. DILUTION WATER

Samples of receiving water must be collected from a location in the receiving water body immediately upstream of the permitted discharge's zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. EPA strongly urges that screening for toxicity be performed prior to the set up of a full, definitive toxicity test any time there is a question about the test dilution water's ability to achieve test acceptability criteria (TAC) as indicated in Section V of this protocol. The test dilution water control response will be used in the statistical analysis of the toxicity test data. All other control(s) required to be run in the test will be reported as specified in the Discharge Monitoring Report (DMR) Instructions, Attachment F, page 2,Test Results & Permit Limits.

The test dilution water must be used to determine whether the test met the applicable TAC. When receiving water is used for test dilution, an additional control made up of standard laboratory water (0% effluent) is required. This control will be used to verify the health of the test organisms and evaluate to what extent, if any, the receiving water itself is responsible for any toxic response observed.

If dechlorination of a sample by the toxicity testing laboratory is necessary a "sodium thiosulfate" control, representing the concentration of sodium thiosulfate used to adequately dechlorinate the sample prior to toxicity testing, must be included in the test.

If the use of an alternate dilution water (ADW) is authorized, in addition to the ADW test control, the testing laboratory must, for the purpose of monitoring the receiving water, also run a receiving water control.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable an ADW of known quality with hardness similar to that of the receiving water may be substituted. Substitution is species specific meaning that the decision to use ADW is made for each species and is based on the toxic response of that particular species. Substitution to an ADW is authorized in two cases. The first is the case where repeating a test due to toxicity in the site dilution water requires an **immediate decision** for ADW use be made by the permittee and toxicity testing laboratory. The second is in the case where two of the most recent documented incidents of unacceptable site dilution water toxicity requires ADW use in future WET testing.

For the second case, written notification from the permittee requesting ADW use **and** written authorization from the permit issuing agency(s) is required **prior to** switching to a long-term use of ADW for the duration of the permit.

Written requests for use of ADW must be mailed with supporting documentation to the following addresses:

Director
Office of Ecosystem Protection (CAA)
U.S. Environmental Protection Agency, Region 1
Five Post Office Square, Suite 100
Mail Code OEP06-5
Boston, MA 02109-3912

and

Manager
Water Technical Unit (SEW)
U.S. Environmental Protection Agency
Five Post Office Square, Suite 100
Mail Code OES04-4
Boston, MA 02109-3912

Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the most current annual DMR instructions which can be found on the EPA Region 1 website at http://www.epa.gov/region1/enforcementandassistance/dmr.html for further important details on alternate dilution water substitution requests.

V. TEST CONDITIONS AND TEST ACCEPTABILITY CRITERIA

Method specific test conditions and TAC are to be followed and adhered to as specified in the method guidance document, EPA 821-R-02-013. If a test does not meet TAC the test must be repeated with fresh samples within 30 days of the initial test completion date.

V.1. Use of Reference Toxicity Testing

Reference toxicity test results and applicable control charts must be included in the toxicity testing report.

If reference toxicity test results fall outside the control limits established by the laboratory for a specific test endpoint, a reason or reasons for this excursion must be evaluated, correction made and reference toxicity tests rerun as necessary.

If a test endpoint value exceeds the control limits at a frequency of more than one out of twenty then causes for the reference toxicity test failure must be examined and if problems are identified corrective action taken. The reference toxicity test must be repeated during the same month in which the exceedance occurred.

If two consecutive reference toxicity tests fall outside control limits, the possible cause(s) for the exceedance must be examined, corrective actions taken and a repeat of the reference toxicity test must take place immediately. Actions taken to resolve the problem must be reported.

V.1.a. Use of Concurrent Reference Toxicity Testing

In the case where concurrent reference toxicity testing is required due to a low frequency of testing with a particular method, if the reference toxicity test results fall slightly outside of laboratory established control limits, but the primary test met the TAC, the results of the primary test will be considered acceptable. However, if the results of the concurrent test fall well outside the established **upper** control limits i.e. ≥3 standard deviations for IC25 values and ≥ two concentration intervals for NOECs, and even though the primary test meets TAC, the primary test will be considered unacceptable and must be repeated.

V.2. For the *C. dubia* test, the determination of TAC and formal statistical analyses must be performed using only the first three broods produced.

V.3. Test treatments must include 5 effluent concentrations and a dilution water control. An additional test treatment, at the permitted effluent concentration (% effluent), is required if it is not included in the dilution series.

VI. CHEMICAL ANALYSIS

As part of each toxicity test's daily renewal procedure, pH, specific conductance, dissolved oxygen (DO) and temperature must be measured at the beginning and end of each 24-hour period in each test treatment and the control(s).

The additional analysis that must be performed under this protocol is as specified and noted in the table below.

Parameter	Effluent	Receiving Water	ML (mg/l)
Hardness[1, 4]	x	x	0.5
Total Residual Chlorine (TRC)[2, 3, 4]	x		0.02
Alkalinity[4]	x	x	2.0
pH[4]	x	x	--
Specific Conductance[4]	x	x	--
Total Solids[6]	x		--
Total Dissolved Solids[6]	x		--
Ammonia[4]	x	x	0.1
Total Organic Carbon[6]	x	x	0.5
Total Metals[5]			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005
Al	x	x	0.02
Other as permit requires			

Notes:

1. Hardness may be determined by:

- APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
  -Method 2340B (hardness by calculation)
  -Method 2340C (titration)

2. Total Residual Chlorine may be performed using any of the following methods provided the required minimum limit (ML) is met.

- APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
  -Method 4500-CL E Low Level Amperometric Titration
  -Method 4500-CL G DPD Colorimetric Method
- USEPA 1983. Manual of Methods Analysis of Water and Wastes
  -Method 330.5

3. Required to be performed on the sample used for WET testing prior to its use for toxicity testing
4. Analysis is to be performed on samples and/or receiving water, as designated in the table above, from all three sampling events.
5. Analysis is to be performed on the initial sample(s) only unless the situation arises as stated in Section III, paragraph 4
6. Analysis to be performed on initial samples only

VII. TOXICITY TEST DATA ANALYSIS AND REVIEW

A. Test Review

1. Concentration / Response Relationship

A concentration/response relationship evaluation is required for test endpoint determinations from both Hypothesis Testing and Point Estimate techniques. The test report is to include documentation of this evaluation in support of the endpoint values reported. The dose-response review must be performed as required in Section 10.2.6 of EPA-821-R-02-013. Guidance for this review can be found at http://water.epa.gov/scitech/methods/cwa/ . In most cases, the review will result in one of the following three conclusions: (1) Results are reliable and reportable; (2) Results are anomalous and require explanation; or (3) Results are inconclusive and a retest with fresh samples is required.

2. Test Variability (Test Sensitivity)

This review step is separate from the determination of whether a test meets or does not meet TAC. Within test variability is to be examined for the purpose of evaluating test sensitivity. This evaluation is to be performed for the sub-lethal hypothesis testing endpoints reproduction and growth as required by the permit. The test report is to include documentation of this evaluation to support that the endpoint values reported resulted from a toxicity test of adequate sensitivity. This evaluation must be performed as required in Section 10.2.8 of EPA-821-R-02-013.

To determine the adequacy of test sensitivity, USEPA requires the calculation of test percent minimum significant difference (PMSD) values. In cases where NOEC determinations are made based on a non-parametric technique, calculation of a test PMSD value**,** for the sole purpose of assessing test sensitivity, shall be calculated using a comparable parametric statistical analysis technique. The calculated test PMSD is then compared to the upper and lower PMSD bounds shown for freshwater tests in Section 10.2.8.3, p. 52, Table 6 of EPA-821-R-02-013. The comparison will yield one of the following determinations.

- The test PMSD exceeds the PMSD upper bound test variability criterion in Table 6, the test results are considered highly variable and the test may not be sensitive enough to determine the presence of toxicity at the permit limit concentration (PLC). If the test results indicate that the discharge is not toxic at the PLC, then the test is considered insufficiently sensitive and must be repeated within 30 days of the initial test completion using fresh samples. If the test results indicate that the discharge is toxic at the PLC, the test is considered acceptable and does not have to be repeated.

- The test PMSD falls below the PMSD lower bound test variability criterion in Table 6, the test is determined to be very sensitive. In order to determine which treatment(s) are statistically significant and which are not, for the purpose of reporting a NOEC, the relative percent difference (RPD) between the control and each treatment must be calculated and compared to the lower PMSD boundary. See *Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program*, EPA 833-R-00-003, June 2002, Section 6.4.2. The following link: Understanding and Accounting for Method Variability in Whole Effluent Toxicity Applications Under the NPDES Program can be used to locate the USEPA website containing this document. If the RPD for a treatment falls below the PMSD lower bound, the difference is considered statistically insignificant. If the RPD for a treatment is greater that the PMSD lower bound, then the treatment is considered statistically significant.

- The test PMSD falls within the PMSD upper and lower bounds in Table 6, the sub-lethal test endpoint values shall be reported as is.

B. Statistical Analysis

1. General - Recommended Statistical Analysis Method

Refer to general data analysis flowchart, EPA 821-R-02-013, page 43

For discussion on Hypothesis Testing, refer to EPA 821-R-02-013, Section 9.6

For discussion on Point Estimation Techniques, refer to EPA 821-R-02-013, Section 9.7

2. *Pimephales promelas*

Refer to survival hypothesis testing analysis flowchart, EPA 821-R-02-013, page 79

Refer to survival point estimate techniques flowchart, EPA 821-R-02-013, page 80

Refer to growth data statistical analysis flowchart, EPA 821-R-02-013, page 92

3. *Ceriodaphnia dubia*

Refer to survival data testing flowchart, EPA 821-R-02-013, page 168

Refer to reproduction data testing flowchart, EPA 821-R-02-013, page 173

VIII. TOXICITY TEST REPORTING

A report of results must include the following:

- Test summary sheets (2007 DMR Attachment F) which includes:
  - Facility name
  - NPDES permit number
  - Outfall number
  - Sample type
  - Sampling method
  - Effluent TRC concentration
  - Dilution water used
  - Receiving water name and sampling location
  - Test type and species
  - Test start date
  - Effluent concentrations tested (%) and permit limit concentration
  - Applicable reference toxicity test date and whether acceptable or not
  - Age, age range and source of test organisms used for testing
  - Results of TAC review for all applicable controls
  - Test sensitivity evaluation results (test PMSD for growth and reproduction)
  - Permit limit and toxicity test results
  - Summary of test sensitivity and concentration response evaluation

In addition to the summary sheets the report must include:

- A brief description of sample collection procedures
- Chain of custody documentation including names of individuals collecting samples, times and dates of sample collection, sample locations, requested analysis and lab receipt with time and date received, lab receipt personnel and condition of samples upon receipt at the lab(s)
- Reference toxicity test control charts
- All sample chemical/physical data generated, including minimum limits (MLs) and analytical methods used
- All toxicity test raw data including daily ambient test conditions, toxicity test chemistry, sample dechlorination details as necessary, bench sheets and statistical analysis
- A discussion of any deviations from test conditions
- Any further discussion of reported test results, statistical analysis and concentration-response relationship and test sensitivity review per species per endpoint

ATTACHMENT B

USEPA REGION 1 FRESHWATER ACUTE TOXICITY TEST PROCEDURE AND PROTOCOL

I. GENERAL REQUIREMENTS

The permittee shall conduct acceptable acute toxicity tests in accordance with the appropriate test protocols described below:

- **Daphnid (Ceriodaphnia dubia) definitive 48 hour test.**
- **Fathead Minnow (Pimephales promelas) definitive 48 hour test.**

Acute toxicity test data shall be reported as outlined in Section VIII.

II. METHODS

The permittee shall use 40 CFR Part 136 methods. Methods and guidance may be found at:

http://water.epa.gov/scitech/methods/cwa/wet/disk2_index.cfm

The permittee shall also meet the sampling, analysis and reporting requirements included in this protocol. This protocol defines more specific requirements while still being consistent with the Part 136 methods. If, due to modifications of Part 136, there are conflicting requirements between the Part 136 method and this protocol, the permittee shall comply with the requirements of the Part 136 method.

III. SAMPLE COLLECTION

A discharge sample shall be collected. Aliquots shall be split from the sample, containerized and preserved (as per 40 CFR Part 136) for chemical and physical analyses required. The remaining sample shall be measured for total residual chlorine and dechlorinated (if detected) in the laboratory using sodium thiosulfate for subsequent toxicity testing. (Note that EPA approved test methods require that samples collected for metals analyses be preserved immediately after collection.) Grab samples must be used for pH, temperature, and total residual chlorine (as per 40 CFR Part 122.21).

Standard Methods for the Examination of Water and Wastewater describes dechlorination of samples (APHA, 1992). Dechlorination can be achieved using a ratio of 6.7 mg/L anhydrous sodium thiosulfate to reduce 1.0 mg/L chlorine. If dechlorination is necessary, a thiosulfate control (maximum amount of thiosulfate in lab control or receiving water) must also be run in the WET test.

All samples held overnight shall be refrigerated at 1- 6^{o}C.

IV. DILUTION WATER

A grab sample of dilution water used for acute toxicity testing shall be collected from the receiving water at a point immediately upstream of the permitted discharge's zone of influence at a reasonably accessible location. Avoid collection near areas of obvious road or agricultural runoff, storm sewers or other point source discharges and areas where stagnant conditions exist. In the case where an alternate dilution water has been agreed upon an additional receiving water control (0% effluent) must also be tested.

If the receiving water diluent is found to be, or suspected to be toxic or unreliable, an alternate standard dilution water of known quality with a hardness, pH, conductivity, alkalinity, organic carbon, and total suspended solids similar to that of the receiving water may be substituted **AFTER RECEIVING WRITTEN APPROVAL FROM THE PERMIT ISSUING AGENCY(S)**. Written requests for use of an alternate dilution water should be mailed with supporting documentation to the following address:

Director
Office of Ecosystem Protection (CAA)
U.S. Environmental Protection Agency-New England
5 Post Office Sq., Suite 100 (OEP06-5)
Boston, MA 02109-3912

and

Manager
Water Technical Unit (SEW)
U.S. Environmental Protection Agency
5 Post Office Sq., Suite 100 (OES04-4)
Boston, MA 02109-3912

Note: USEPA Region 1 retains the right to modify any part of the alternate dilution water policy stated in this protocol at any time. Any changes to this policy will be documented in the annual DMR posting.

See the most current annual DMR instructions which can be found on the EPA Region 1 website at http://www.epa.gov/region1/enforcement/water/dmr.html *for further important details on alternate dilution water substitution requests.*

It may prove beneficial to have the proposed dilution water source screened for suitability prior to toxicity testing. EPA strongly urges that screening be done prior to set up of a full definitive toxicity test any time there is question about the dilution water's ability to support acceptable performance as outlined in the 'test acceptability' section of the protocol.

V. TEST CONDITIONS

The following tables summarize the accepted daphnid and fathead minnow toxicity test conditions and test acceptability criteria:

EPA NEW ENGLAND EFFLUENT TOXICITY TEST CONDITIONS FOR THE DAPHNID, CERIODAPHNIA DUBIA 48 HOUR ACUTE TESTS[1]

1.	Test type	Static, non-renewal
2.	Temperature (^{o}C)	20 $\pm$ 1^{o}C or 25 $\pm$ 1^{o}C
3.	Light quality	Ambient laboratory illumination
4.	Photoperiod	16 hour light, 8 hour dark
5.	Test chamber size	Minimum 30 ml
6.	Test solution volume	Minimum 15 ml
7.	Age of test organisms	1-24 hours (neonates)
8.	No. of daphnids per test chamber	5
9.	No. of replicate test chambers per treatment	4
10.	Total no. daphnids per test concentration	20
11.	Feeding regime	As per manual, lightly feed YCT and Selenastrum to newly released organisms while holding prior to initiating test
12.	Aeration	None
13.	Dilution water[2]	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q^{R} or equivalent deionized water and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14.	Dilution series	$\geq$ 0.5, must bracket the permitted RWC
15.	Number of dilutions	5 plus receiving water and laboratory water control and thiosulfate control, as necessary. An additional dilution at the permitted effluent concentration (% effluent) is required if it is not included in the dilution

		series.
16.	Effect measured	Mortality-no movement of body or appendages on gentle prodding
17.	Test acceptability	90% or greater survival of test organisms in dilution water control solution
18.	Sampling requirements	For on-site tests, samples must be used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples must first be used within 36 hours of collection.
19.	Sample volume required	Minimum 1 liter

Footnotes:

1. Adapted from EPA-821-R-02-012.
2. Standard prepared dilution water must have hardness requirements to generally reflect the characteristics of the receiving water.

EPA NEW ENGLAND TEST CONDITIONS FOR THE FATHEAD MINNOW (PIMEPHALES PROMELAS) 48 HOUR ACUTE TEST[1]

1.	Test Type	Static, non-renewal
2.	Temperature (^{o}C)	20 $\pm$ 1 ^{o} C or 25 $\pm$ 1^{o}C
3.	Light quality	Ambient laboratory illumination
4.	Photoperiod	16 hr light, 8 hr dark
5.	Size of test vessels	250 mL minimum
6.	Volume of test solution	Minimum 200 mL/replicate
7.	Age of fish	1-14 days old and age within 24 hrs of each other
8.	No. of fish per chamber	10
9.	No. of replicate test vessels per treatment	4
10.	Total no. organisms per concentration	40
11.	Feeding regime	As per manual, lightly feed test age larvae using concentrated brine shrimp nauplii while holding prior to initiating test
12.	Aeration	None, unless dissolved oxygen (D.O.) concentration falls below 4.0 mg/L, at which time gentle single bubble aeration should be started at a rate of less than 100 bubbles/min. (Routine D.O. check is recommended.)
13.	dilution water[2]	Receiving water, other surface water, synthetic water adjusted to the hardness and alkalinity of the receiving water (prepared using either Millipore Milli-Q^{R} or equivalent deionized and reagent grade chemicals according to EPA acute toxicity test manual) or deionized water combined with mineral water to appropriate hardness.
14.	Dilution series	$\geq$ 0.5, must bracket the permitted RWC

15.	Number of dilutions	5 plus receiving water and laboratory water control and thiosulfate control, as necessary. An additional dilution at the permitted effluent concentration (% effluent) is required if it is not included in the dilution series.
16.	Effect measured	Mortality-no movement on gentle prodding
17.	Test acceptability	90% or greater survival of test organisms in dilution water control solution
18.	Sampling requirements	For on-site tests, samples must be used within 24 hours of the time that they are removed from the sampling device. For off-site tests, samples are used within 36 hours of collection.
19.	Sample volume required	Minimum 2 liters

Footnotes:

1. Adapted from EPA-821-R-02-012
2. Standard dilution water must have hardness requirements to generally reflect characteristics of the receiving water.

VI. CHEMICAL ANALYSIS

At the beginning of a static acute toxicity test, pH, conductivity, total residual chlorine, oxygen, hardness, alkalinity and temperature must be measured in the highest effluent concentration and the dilution water. Dissolved oxygen, pH and temperature are also measured at 24 and 48 hour intervals in all dilutions. The following chemical analyses shall be performed on the 100 percent effluent sample and the upstream water sample for each sampling event.

Parameter	Effluent	Receiving Water	ML (mg/l)
Hardness[1]	x	x	0.5
Total Residual Chlorine (TRC)[2, 3]	x		0.02
Alkalinity	x	x	2.0
pH	x	x	--
Specific Conductance	x	x	--
Total Solids	x		--
Total Dissolved Solids	x		--
Ammonia	x	x	0.1
Total Organic Carbon	x	x	0.5
Total Metals			
Cd	x	x	0.0005
Pb	x	x	0.0005
Cu	x	x	0.003
Zn	x	x	0.005
Ni	x	x	0.005
Al	x	x	0.02
Other as permit requires			

Notes:

1. Hardness may be determined by:
   - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
     - Method 2340B (hardness by calculation)
     - Method 2340C (titration)
2. Total Residual Chlorine may be performed using any of the following methods provided the required minimum limit (ML) is met.
   - APHA Standard Methods for the Examination of Water and Wastewater , 21st Edition
     - Method 4500-CL E Low Level Amperometric Titration
     - Method 4500-CL G DPD Colorimetric Method
3. Required to be performed on the sample used for WET testing prior to its use for toxicity testing.

VII. TOXICITY TEST DATA ANALYSIS

LC50 Median Lethal Concentration (Determined at 48 Hours)

Methods of Estimation:

- Probit Method
- Spearman-Karber
- Trimmed Spearman-Karber
- Graphical

See the flow chart in Figure 6 on p. 73 of EPA-821-R-02-012 for appropriate method to use on a given data set.

No Observed Acute Effect Level (NOAEL)

See the flow chart in Figure 13 on p. 87 of EPA-821-R-02-012.

VIII. TOXICITY TEST REPORTING

A report of the results will include the following:

- Description of sample collection procedures, site description
- Names of individuals collecting and transporting samples, times and dates of sample collection and analysis on chain-of-custody
- General description of tests: age of test organisms, origin, dates and results of standard toxicant tests; light and temperature regime; other information on test conditions if different than procedures recommended. Reference toxicant test data should be included.
- All chemical/physical data generated. (Include minimum detection levels and minimum quantification levels.)
- Raw data and bench sheets.
- Provide a description of dechlorination procedures (as applicable).
- Any other observations or test conditions affecting test outcome.

Attachment C
Summary of Required Report Submittals*

Required Report	Date Due	Submitted to:
Whole Effluent Toxicity Test Report (Part I.A.1)	April 30, July 31, October 31, and January 31 of each year	1,2,3
Initial Collection System Operation and Maintenance Plan (Part I.C.5.a.)	Within 6 months of effective date	1,2
Full Collection System Operations and Maintenance Plan (Part I.C.5.b.)	Two years from the effective date of the permit	1,2
Collection System Annual Report (Part I.C.6.)	Annually by April 15	1,2
Notification of Sanitary Sewer Overflows (Part I.B.)	Oral Report -Within 24 hours of discovery of event (contact: David Turin, 617-918-1598) Written Report – Within 5 calendar days of discovery of event	1,2
Annual Sludge Report (Part I.D.9)	Annually by March 15	1,2
Lagoon Compliance Plan (I.F.1.)	One year from the effective date of the permit.	1,2
Alternatives Analysis/Facilities Plan for Point Source Improvements (I.E.2.)	One year from the effective date of the permit	1,2
Nitrogen Progress Report (I.E.4.)	Two years from the effective date of the permit	1,2
Nitrogen Progress Report (I.E.6)	Three years from the effective date of the permit	1,2
Nitrogen Progress Report (I.E.8.)	Four years from the effective date of the permit	1,2

* This table is a summary of the reports required to be submitted under this NPDES permit as an aid to the permittee(s). If there are any discrepancies between the permit and this summary, the permittee(s) shall follow the permit requirements.

1. EPA New England - Via NetDMR

2. MassDEP
   Bureau of Resource Protection
   Southeast Regional Office
   20 Riverside Drive
   Lakeville, MA 02347

3. MassDEP
   Division of Watershed Management
   Surface Water Discharge Permit Program
   627 Main Street, 2nd Floor
   Worcester, MA 01608

NPDES PART II STANDARD CONDITIONS
(January, 2007)

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PART II. A. GENERAL REQUIREMENTS

1. Duty to Comply

The permittee must comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the Clean Water Act (CWA) and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

a. The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the sludge use or disposal established under Section 405(d) of the CWA within the time provided in the regulations that establish these standards or prohibitions, even if the permit has not yet been modified to incorporate the requirements.

b. The CWA provides that any person who violates Section 301, 302, 306, 307, 308, 318, or 405 of the CWA or any permit condition or limitation implementing any of such sections in a permit issued under Section 402, or any requirement imposed in a pretreatment program approved under Section 402 (a)(3) or 402 (b)(8) of the CWA is subject to a civil penalty not to exceed $25,000 per day for each violation. Any person who negligently violates such requirements is subject to a fine of not less than $2,500 nor more than $25,000 per day of violation, or by imprisonment for not more than 1 year, or both. Any person who knowingly violates such requirements is subject to a fine of not less than $5,000 nor more than $50,000 per day of violation, or by imprisonment for not more than 3 years, or both.

c. Any person may be assessed an administrative penalty by the Administrator for violating Section 301, 302, 306, 307, 308, 318, or 405 of the CWA, or any permit condition or limitation implementing any of such sections in a permit issued under Section 402 of the CWA. Administrative penalties for Class I violations are not to exceed $10,000 per violation, with the maximum amount of any Class I penalty assessed not to exceed $25,000. Penalties for Class II violations are not to exceed $10,000 per day for each day during which the violation continues, with the maximum amount of any Class II penalty not to exceed $125,000.

Note: See 40 CFR §122.41(a)(2) for complete "Duty to Comply" regulations.

2. Permit Actions

This permit may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or notifications of planned changes or anticipated noncompliance does not stay any permit condition.

3. Duty to Provide Information

The permittee shall furnish to the Regional Administrator, within a reasonable time, any information which the Regional Administrator may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit, or to determine compliance with this permit. The permittee shall also furnish to the Regional Administrator, upon request, copies of records required to be kept by this permit.

4. Reopener Clause

The Regional Administrator reserves the right to make appropriate revisions to this permit in order to establish any appropriate effluent limitations, schedules of compliance, or other provisions which may be authorized under the CWA in order to bring all discharges into compliance with the CWA.

For any permit issued to a treatment works treating domestic sewage (including "sludge-only facilities"), the Regional Administrator or Director shall include a reopener clause to incorporate any applicable standard for sewage sludge use or disposal promulgated under Section 405 (d) of the CWA. The Regional Administrator or Director may promptly modify or revoke and reissue any permit containing the reopener clause required by this paragraph if the standard for sewage sludge use or disposal is more stringent than any requirements for sludge use or disposal in the permit, or contains a pollutant or practice not limited in the permit.

Federal regulations pertaining to permit modification, revocation and reissuance, and termination are found at 40 CFR §122.62, 122.63, 122.64, and 124.5.

5. Oil and Hazardous Substance Liability

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from responsibilities, liabilities or penalties to which the permittee is or may be subject under Section 311 of the CWA, or Section 106 of the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA).

6. Property Rights

The issuance of this permit does not convey any property rights of any sort, nor any exclusive privileges.

7. Confidentiality of Information

a. In accordance with 40 CFR Part 2, any information submitted to EPA pursuant to these regulations may be claimed as confidential by the submitter. Any such claim must be asserted at the time of submission in the manner prescribed on the application form or instructions or, in the case of other submissions, by stamping the words "confidential business information" on each page containing such information. If no claim is made at the time of submission, EPA may make the information available to the public without further notice. If a claim is asserted, the information will be treated in accordance with the procedures in 40 CFR Part 2 (Public Information).

b. Claims of confidentiality for the following information will be denied:

(1) The name and address of any permit applicant or permittee;
(2) Permit applications, permits, and effluent data as defined in 40 CFR §2.302(a)(2).

c. Information required by NPDES application forms provided by the Regional Administrator under 40 CFR §122.21 may not be claimed confidential. This includes information submitted on the forms themselves and any attachments used to supply information required by the forms.

8. Duty to Reapply

If the permittee wishes to continue an activity regulated by this permit after its expiration date, the permittee must apply for and obtain a new permit. The permittee shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Regional Administrator. (The Regional Administrator shall not grant permission for applications to be submitted later than the expiration date of the existing permit.)

9. State Authorities

Nothing in Part 122, 123, or 124 precludes more stringent State regulation of any activity covered by these regulations, whether or not under an approved State program.

10. Other Laws

The issuance of a permit does not authorize any injury to persons or property or invasion of other private rights, nor does it relieve the permittee of its obligation to comply with any other applicable Federal, State, or local laws and regulations.

PART II. B. OPERATION AND MAINTENANCE OF POLLUTION CONTROLS

1. Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans. Proper operation and maintenance also includes adequate laboratory controls and appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when the operation is necessary to achieve compliance with the conditions of the permit.

2. Need to Halt or Reduce Not a Defense

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

3. Duty to Mitigate

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

4. Bypass

a. Definitions

(1) *Bypass* means the intentional diversion of waste streams from any portion of a treatment facility.

(2) *Severe property damage* means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can be reasonably expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

b. Bypass not exceeding limitations

The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provision of Paragraphs B.4.c. and 4.d. of this section.

c. Notice

(1) Anticipated bypass. If the permittee knows in advance of the need for a bypass, it shall submit prior notice, if possible at least ten days before the date of the bypass.
(2) Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in paragraph D.1.e. of this part (Twenty-four hour reporting).

d. Prohibition of bypass

Bypass is prohibited, and the Regional Administrator may take enforcement action against a permittee for bypass, unless:

(1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
(2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventative maintenance; and
(3) i) The permittee submitted notices as required under Paragraph 4.c. of this section.
ii) The Regional Administrator may approve an anticipated bypass, after considering its adverse effects, if the Regional Administrator determines that it will meet the three conditions listed above in paragraph 4.d. of this section.

5. Upset

a. Definition. *Upset* means an exceptional incident in which there is an unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

b. Effect of an upset. An upset constitutes an affirmative defense to an action brought for noncompliance with such technology-based permit effluent limitations if the requirements of paragraph B.5.c. of this section are met. No determination made during

administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is final administrative action subject to judicial review.

c. Conditions necessary for a demonstration of upset. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

(1) An upset occurred and that the permittee can identify the cause(s) of the upset;
(2) The permitted facility was at the time being properly operated;
(3) The permittee submitted notice of the upset as required in paragraphs D.1.a. and 1.e. (Twenty-four hour notice); and
(4) The permittee complied with any remedial measures required under B.3. above.

d. Burden of proof. In any enforcement proceeding the permittee seeking to establish the occurrence of an upset has the burden of proof.

PART II. C. MONITORING REQUIREMENTS

1. Monitoring and Records

a. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity.

b. Except for records for monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years (or longer as required by 40 CFR Part 503), the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application except for the information concerning storm water discharges which must be retained for a total of 6 years. This retention period may be extended by request of the Regional Administrator at any time.

c. Records of monitoring information shall include:

(1) The date, exact place, and time of sampling or measurements;
(2) The individual(s) who performed the sampling or measurements;
(3) The date(s) analyses were performed;
(4) The individual(s) who performed the analyses;
(5) The analytical techniques or methods used; and
(6) The results of such analyses.

d. Monitoring results must be conducted according to test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, unless other test procedures have been specified in the permit.

e. The CWA provides that any person who falsifies, tampers with, or knowingly renders inaccurate any monitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000, or by

imprisonment for not more than 2 years, or both. If a conviction of a person is for a violation committed after a first conviction of such person under this paragraph, punishment is a fine of not more than $20,000 per day of violation, or by imprisonment of not more than 4 years, or both.

2. Inspection and Entry

The permittee shall allow the Regional Administrator or an authorized representative (including an authorized contractor acting as a representative of the Administrator), upon presentation of credentials and other documents as may be required by law, to:

a. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

d. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the CWA, any substances or parameters at any location.

PART II. D. REPORTING REQUIREMENTS

1. Reporting Requirements

a. Planned Changes. The permittee shall give notice to the Regional Administrator as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is only required when:

(1) The alteration or addition to a permitted facility may meet one of the criteria for determining whether a facility is a new source in 40 CFR§122.29(b); or
(2) The alteration or addition could significantly change the nature or increase the quantities of the pollutants discharged. This notification applies to pollutants which are subject neither to the effluent limitations in the permit, nor to the notification requirements at 40 CFR§122.42(a)(1).
(3) The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition or change may justify the application of permit conditions different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

b. Anticipated noncompliance. The permittee shall give advance notice to the Regional Administrator of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

c. Transfers. This permit is not transferable to any person except after notice to the Regional Administrator. The Regional Administrator may require modification or revocation and reissuance of the permit to change the name of the permittee and

incorporate such other requirements as may be necessary under the CWA. (See 40 CFR Part 122.61; in some cases, modification or revocation and reissuance is mandatory.)

d. Monitoring reports. Monitoring results shall be reported at the intervals specified elsewhere in this permit.

(1) Monitoring results must be reported on a Discharge Monitoring Report (DMR) or forms provided or specified by the Director for reporting results of monitoring of sludge use or disposal practices.

(2) If the permittee monitors any pollutant more frequently than required by the permit using test procedures approved under 40 CFR Part 136 or, in the case of sludge use or disposal, approved under 40 CFR Part 136 unless otherwise specified in 40 CFR Part 503, or as specified in the permit, the results of the monitoring shall be included in the calculation and reporting of the data submitted in the DMR or sludge reporting form specified by the Director.

(3) Calculations for all limitations which require averaging or measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

e. Twenty-four hour reporting.

(1) The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally within 24 hours from the time the permittee becomes aware of the circumstances.

A written submission shall also be provided within 5 days of the time the permittee becomes aware of the circumstances. The written submission shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

(2) The following shall be included as information which must be reported within 24 hours under this paragraph.

(a) Any unanticipated bypass which exceeds any effluent limitation in the permit. (See 40 CFR §122.41(g).)
(b) Any upset which exceeds any effluent limitation in the permit.
(c) Violation of a maximum daily discharge limitation for any of the pollutants listed by the Regional Administrator in the permit to be reported within 24 hours. (See 40 CFR §122.44(g).)

(3) The Regional Administrator may waive the written report on a case-by-case basis for reports under Paragraph D.1.e. if the oral report has been received within 24 hours.

f. Compliance Schedules. Reports of compliance or noncompliance with, any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

g. Other noncompliance. The permittee shall report all instances of noncompliance not reported under Paragraphs D.1.d., D.1.e., and D.1.f. of this section, at the time monitoring reports are submitted. The reports shall contain the information listed in Paragraph D.1.e. of this section.

h. Other information. Where the permittee becomes aware that it failed to submit any relevant facts in a permit application, or submitted incorrect information in a permit application or in any report to the Regional Administrator, it shall promptly submit such facts or information.

2. Signatory Requirement

a. All applications, reports, or information submitted to the Regional Administrator shall be signed and certified. (See 40 CFR §122.22)

b. The CWA provides that any person who knowingly makes any false statement, representation, or certification in any record or other document submitted or required to be maintained under this permit, including monitoring reports or reports of compliance or noncompliance shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than 2 years per violation, or by both.

3. Availability of Reports.

Except for data determined to be confidential under Paragraph A.8. above, all reports prepared in accordance with the terms of this permit shall be available for public inspection at the offices of the State water pollution control agency and the Regional Administrator. As required by the CWA, effluent data shall not be considered confidential. Knowingly making any false statements on any such report may result in the imposition of criminal penalties as provided for in Section 309 of the CWA.

PART II. E. DEFINITIONS AND ABBREVIATIONS

1. Definitions for Individual NPDES Permits including Storm Water Requirements

Administrator means the Administrator of the United States Environmental Protection Agency, or an authorized representative.

Applicable standards and limitations means all, State, interstate, and Federal standards and limitations to which a "discharge", a "sewage sludge use or disposal practice", or a related activity is subject to, including "effluent limitations", water quality standards, standards of performance, toxic effluent standards or prohibitions, "best management practices", pretreatment standards, and "standards for sewage sludge use and disposal" under Sections 301, 302, 303, 304, 306, 307, 308, 403, and 405 of the CWA.

Application means the EPA standard national forms for applying for a permit, including any additions, revisions, or modifications to the forms; or forms approved by EPA for use in "approved States", including any approved modifications or revisions.

Average means the arithmetic mean of values taken at the frequency required for each parameter over the specified period. For total and/or fecal coliforms and Escherichia coli, the average shall be the geometric mean.

Average monthly discharge limitation means the highest allowable average of "daily discharges" over a calendar month calculated as the sum of all "daily discharges" measured during a calendar month divided by the number of "daily discharges" measured during that month.

Average weekly discharge limitation means the highest allowable average of "daily discharges" measured during the calendar week divided by the number of "daily discharges" measured during the week.

Best Management Practices (BMPs) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

Best Professional Judgment (BPJ) means a case-by-case determination of Best Practicable Treatment (BPT), Best Available Treatment (BAT), or other appropriate technology-based standard based on an evaluation of the available technology to achieve a particular pollutant reduction and other factors set forth in 40 CFR §125.3 (d).

Coal Pile Runoff means the rainfall runoff from or through any coal storage pile.

Composite Sample means a sample consisting of a minimum of eight grab samples of equal volume collected at equal intervals during a 24-hour period (or lesser period as specified in the section on Monitoring and Reporting) and combined proportional to flow, or a sample consisting of the same number of grab samples, or greater, collected proportionally to flow over that same time period.

Construction Activities - The following definitions apply to construction activities:

(a) Commencement of Construction is the initial disturbance of soils associated with clearing, grading, or excavating activities or other construction activities.

(b) Dedicated portable asphalt plant is a portable asphalt plant located on or contiguous to a construction site and that provides asphalt only to the construction site that the plant is located on or adjacent to. The term dedicated portable asphalt plant does not include facilities that are subject to the asphalt emulsion effluent limitation guideline at 40 CFR Part 443.

(c) Dedicated portable concrete plant is a portable concrete plant located on or contiguous to a construction site and that provides concrete only to the construction site that the plant is located on or adjacent to.

(d) Final Stabilization means that all soil disturbing activities at the site have been complete, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

(e) Runoff coefficient means the fraction of total rainfall that will appear at the conveyance as runoff.

Contiguous zone means the entire zone established by the United States under Article 24 of the Convention on the Territorial Sea and the Contiguous Zone.

Continuous discharge means a "discharge" which occurs without interruption throughout the operating hours of the facility except for infrequent shutdowns for maintenance, process changes, or similar activities.

CWA means the Clean Water Act (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Pub. L. 92-500, as amended by Pub. L. 95-217, Pub. L. 95-576, Pub. L. 96-483, and Pub. L. 97-117; 33 USC §§1251 et seq.

Daily Discharge means the discharge of a pollutant measured during the calendar day or any other 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurements, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Director normally means the person authorized to sign NPDES permits by EPA or the State or an authorized representative. Conversely, it also could mean the Regional Administrator or the State Director as the context requires.

Discharge Monitoring Report Form (DMR) means the EPA standard national form, including any subsequent additions, revisions, or modifications for the reporting of self-monitoring results by permittees. DMRs must be used by "approved States" as well as by EPA. EPA will supply DMRs to any approved State upon request. The EPA national forms may be modified to substitute the State Agency name, address, logo, and other similar information, as appropriate, in place of EPA's.

Discharge of a pollutant means:

(a) Any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source", or

(b) Any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean from any point source other than a vessel or other floating craft which is being used as a means of transportation (See "Point Source" definition).

This definition includes additions of pollutants into waters of the United States from: surface runoff which is collected or channeled by man; discharges through pipes, sewers, or other conveyances owned by a State, municipality, or other person which do not lead

to a treatment works; and discharges through pipes, sewers, or other conveyances leading into privately owned treatment works.

This term does not include an addition of pollutants by any "indirect discharger."

Effluent limitation means any restriction imposed by the Regional Administrator on quantities, discharge rates, and concentrations of "pollutants" which are "discharged" from "point sources" into "waters of the United States", the waters of the "contiguous zone", or the ocean.

Effluent limitation guidelines means a regulation published by the Administrator under Section 304(b) of CWA to adopt or revise "effluent limitations".

EPA means the United States "Environmental Protection Agency".

Flow-weighted composite sample means a composite sample consisting of a mixture of aliquots where the volume of each aliquot is proportional to the flow rate of the discharge.

Grab Sample – An individual sample collected in a period of less than 15 minutes.

Hazardous Substance means any substance designated under 40 CFR Part 116 pursuant to Section 311 of the CWA.

Indirect Discharger means a non-domestic discharger introducing pollutants to a publicly owned treatment works.

Interference means a discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

(a) Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

(b) Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act (CWA), the Solid Waste Disposal Act (SWDA) (including Title II, more commonly referred to as the Resources Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SDWA), the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection Research and Sanctuaries Act.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and which is not a land application unit, surface impoundment, injection well, or waste pile.

Land application unit means an area where wastes are applied onto or incorporated into the soil surface (excluding manure spreading operations) for treatment or disposal.

Large and Medium municipal separate storm sewer system means all municipal separate storm sewers that are either: (i) located in an incorporated place (city) with a population of 100,000 or more as determined by the latest Decennial Census by the Bureau of Census (these cities are listed in Appendices F and 40 CFR Part 122); or (ii) located in the counties with unincorporated urbanized

populations of 100,000 or more, except municipal separate storm sewers that are located in the incorporated places, townships, or towns within such counties (these counties are listed in Appendices H and I of 40 CFR 122); or (iii) owned or operated by a municipality other than those described in Paragraph (i) or (ii) and that are designated by the Regional Administrator as part of the large or medium municipal separate storm sewer system.

Maximum daily discharge limitation means the highest allowable "daily discharge" concentration that occurs only during a normal day (24-hour duration).

Maximum daily discharge limitation (as defined for the Steam Electric Power Plants only) when applied to Total Residual Chlorine (TRC) or Total Residual Oxidant (TRO) is defined as "maximum concentration" or "Instantaneous Maximum Concentration" during the two hours of a chlorination cycle (or fraction thereof) prescribed in the Steam Electric Guidelines, 40 CFR Part 423. These three synonymous terms all mean "a value that shall not be exceeded" during the two-hour chlorination cycle. This interpretation differs from the specified NPDES Permit requirement, 40 CFR § 122.2, where the two terms of "Maximum Daily Discharge" and "Average Daily Discharge" concentrations are specifically limited to the daily (24-hour duration) values.

Municipality means a city, town, borough, county, parish, district, association, or other public body created by or under State law and having jurisdiction over disposal of sewage, industrial wastes, or other wastes, or an Indian tribe or an authorized Indian tribe organization, or a designated and approved management agency under Section 208 of the CWA.

National Pollutant Discharge Elimination System means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under Sections 307, 402, 318, and 405 of the CWA. The term includes an "approved program".

New Discharger means any building, structure, facility, or installation:

(a) From which there is or may be a "discharge of pollutants";

(b) That did not commence the "discharge of pollutants" at a particular "site" prior to August 13, 1979;

(c) Which is not a "new source"; and

(d) Which has never received a finally effective NPDES permit for discharges at that "site".

This definition includes an "indirect discharger" which commences discharging into "waters of the United States" after August 13, 1979. It also includes any existing mobile point source (other than an offshore or coastal oil and gas exploratory drilling rig or a coastal oil and gas exploratory drilling rig or a coastal oil and gas developmental drilling rig) such as a seafood processing rig, seafood processing vessel, or aggregate plant, that begins discharging at a "site" for which it does not have a permit; and any offshore rig or coastal mobile oil and gas exploratory drilling rig or coastal mobile oil and gas developmental drilling rig that commences the discharge of pollutants after August 13, 1979, at a "site" under EPA's permitting jurisdiction for which it is not covered by an individual or general permit and which is located in an area determined by the Regional Administrator in the issuance of a final permit to be in an area of biological concern. In determining whether an area is an area of biological concern, the Regional Administrator shall consider the factors specified in 40 CFR §§125.122 (a) (1) through (10).

An offshore or coastal mobile exploratory drilling rig or coastal mobile developmental drilling rig will be considered a "new discharger" only for the duration of its discharge in an area of biological concern.

New source means any building, structure, facility, or installation from which there is or may be a "discharge of pollutants", the construction of which commenced:

(a) After promulgation of standards of performance under Section 306 of CWA which are applicable to such source, or

(b) After proposal of standards of performance in accordance with Section 306 of CWA which are applicable to such source, but only if the standards are promulgated in accordance with Section 306 within 120 days of their proposal.

NPDES means "National Pollutant Discharge Elimination System".

Owner or operator means the owner or operator of any "facility or activity" subject to regulation under the NPDES programs.

Pass through means a Discharge which exits the POTW into waters of the United States in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation).

Permit means an authorization, license, or equivalent control document issued by EPA or an "approved" State.

Person means an individual, association, partnership, corporation, municipality, State or Federal agency, or an agent or employee thereof.

Point Source means any discernible, confined, and discrete conveyance, including but not limited to any pipe ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel, or other floating craft, from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff (see 40 CFR §122.2).

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials (except those regulated under the Atomic Energy Act of 1954, as amended (42 U.S.C. §§2011 et seq.)), heat, wrecked or discarded equipment, rock, sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water. It does not mean:

(a) Sewage from vessels; or

(b) Water, gas, or other material which is injected into a well to facilitate production of oil or gas, or water derived in association with oil and gas production and disposed of in a well, if the well is used either to facilitate production or for disposal purposes is approved by the authority of the State in which the well is located, and if the State determines that the injection or disposal will not result in the degradation of ground or surface water resources.

Primary industry category means any industry category listed in the NRDC settlement agreement (Natural Resources Defense Council et al. v. Train, 8 E.R.C. 2120 (D.D.C. 1976), modified 12 E.R.C. 1833 (D. D.C. 1979)); also listed in Appendix A of 40 CFR Part 122.

Privately owned treatment works means any device or system which is (a) used to treat wastes from any facility whose operation is not the operator of the treatment works or (b) not a "POTW".

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

Publicly Owned Treatment Works (POTW) means any facility or system used in the treatment (including recycling and reclamation) of municipal sewage or industrial wastes of a liquid nature which is owned by a "State" or "municipality".

This definition includes sewers, pipes, or other conveyances only if they convey wastewater to a POTW providing treatment.

Regional Administrator means the Regional Administrator, EPA, Region I, Boston, Massachusetts.

Secondary Industry Category means any industry which is not a "primary industry category".

Section 313 water priority chemical means a chemical or chemical category which:

(1) is listed at 40 CFR §372.65 pursuant to Section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA) of 1986);

(2) is present at or above threshold levels at a facility subject to EPCRA Section 313 reporting requirements; and

(3) satisfies at least one of the following criteria:

(i) are listed in Appendix D of 40 CFR Part 122 on either Table II (organic priority pollutants), Table III (certain metals, cyanides, and phenols), or Table V (certain toxic pollutants and hazardous substances);
(ii) are listed as a hazardous substance pursuant to Section 311(b)(2)(A) of the CWA at 40 CFR §116.4; or
(iii) are pollutants for which EPA has published acute or chronic water quality criteria.

Septage means the liquid and solid material pumped from a septic tank, cesspool, or similar domestic sewage treatment system, or a holding tank when the system is cleaned or maintained.

Sewage Sludge means any solid, semisolid, or liquid residue removed during the treatment of municipal wastewater or domestic sewage. Sewage sludge includes, but is not limited to, solids removed during primary, secondary, or advanced wastewater treatment, scum, septage, portable toilet pumpings, Type III Marine Sanitation Device pumpings (33 CFR Part 159), and sewage sludge products. Sewage sludge does not include grit or screenings, or ash generated during the incineration of sewage sludge.

Sewage sludge use or disposal practice means the collection, storage, treatment, transportation, processing, monitoring, use, or disposal of sewage sludge.

Significant materials includes, but is not limited to: raw materials, fuels, materials such as solvents, detergents, and plastic pellets, raw materials used in food processing or production, hazardous substance designated under section 101(14) of CERCLA, any chemical the facility is required to report pursuant to EPCRA Section 313, fertilizers, pesticides, and waste products such as ashes, slag, and sludge that have the potential to be released with storm water discharges.

Significant spills includes, but is not limited to, releases of oil or hazardous substances in excess of reportable quantities under Section 311 of the CWA (see 40 CFR §110.10 and §117.21) or Section 102 of CERCLA (see 40 CFR § 302.4).

Sludge-only facility means any "treatment works treating domestic sewage" whose methods of sewage sludge use or disposal are subject to regulations promulgated pursuant to Section 405(d) of the CWA, and is required to obtain a permit under 40 CFR §122.1(b)(3).

State means any of the 50 States, the District of Columbia, Guam, the Commonwealth of Puerto Rico, the Virgin Islands, American Samoa, the Trust Territory of the Pacific Islands.

Storm Water means storm water runoff, snow melt runoff, and surface runoff and drainage.

Storm water discharge associated with industrial activity means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing, or raw materials storage areas at an industrial plant. (See 40 CFR §122.26 (b)(14) for specifics of this definition.

Time-weighted composite means a composite sample consisting of a mixture of equal volume aliquots collected at a constant time interval.

Toxic pollutants means any pollutant listed as toxic under Section 307 (a)(1) or, in the case of "sludge use or disposal practices" any pollutant identified in regulations implementing Section 405(d) of the CWA.

Treatment works treating domestic sewage means a POTW or any other sewage sludge or wastewater treatment devices or systems, regardless of ownership (including federal facilities), used in the storage, treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated for the disposal of sewage sludge. This definition does not include septic tanks or similar devices.

For purposes of this definition, "domestic sewage" includes waste and wastewater from humans or household operations that are discharged to or otherwise enter a treatment works. In States where there is no approved State sludge management program under Section 405(f) of the CWA, the Regional Administrator may designate any person subject to the standards for sewage sludge use and disposal in 40 CFR Part 503 as a "treatment works treating domestic sewage", where he or she finds that there is a potential for adverse effects on public health and the environment from poor sludge quality or poor sludge handling, use or disposal practices, or where he or she finds that such designation is necessary to ensure that such person is in compliance with 40 CFR Part 503.

Waste Pile means any non-containerized accumulation of solid, non-flowing waste that is used for treatment or storage.

Waters of the United States means:

(a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of tide;

(b) All interstate waters, including interstate "wetlands";

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, "wetlands", sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

(1) Which are or could be used by interstate or foreign travelers for recreational or other purpose;

(2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in Paragraphs (a) through (d) of this definition;

(f) The territorial sea; and

(g) "Wetlands" adjacent to waters (other than waters that are themselves wetlands) identified in Paragraphs (a) through (f) of this definition.

Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA (other than cooling ponds as defined in 40 CFR §423.11(m) which also meet the criteria of this definition) are not waters of the United States.

Wetlands means those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Whole Effluent Toxicity (WET) means the aggregate toxic effect of an effluent measured directly by a toxicity test. (See Abbreviations Section, following, for additional information.)

2. Definitions for NPDES Permit Sludge Use and Disposal Requirements.

Active sewage sludge unit is a sewage sludge unit that has not closed.

Aerobic Digestion is the biochemical decomposition of organic matter in sewage sludge into carbon dioxide and water by microorganisms in the presence of air.

Agricultural Land is land on which a food crop, a feed crop, or a fiber crop is grown. This includes range land and land used as pasture.

Agronomic rate is the whole sludge application rate (dry weight basis) designed:

(1) To provide the amount of nitrogen needed by the food crop, feed crop, fiber crop, cover crop, or vegetation grown on the land; and

(2) To minimize the amount of nitrogen in the sewage sludge that passes below the root zone of the crop or vegetation grown on the land to the ground water.

Air pollution control device is one or more processes used to treat the exit gas from a sewage sludge incinerator stack.

Anaerobic digestion is the biochemical decomposition of organic matter in sewage sludge into methane gas and carbon dioxide by microorganisms in the absence of air.

Annual pollutant loading rate is the maximum amount of a pollutant that can be applied to a unit area of land during a 365 day period.

Annual whole sludge application rate is the maximum amount of sewage sludge (dry weight basis) that can be applied to a unit area of land during a 365 day period.

Apply sewage sludge or sewage sludge applied to the land means land application of sewage sludge.

Aquifer is a geologic formation, group of geologic formations, or a portion of a geologic formation capable of yielding ground water to wells or springs.

Auxiliary fuel is fuel used to augment the fuel value of sewage sludge. This includes, but is not limited to, natural gas, fuel oil, coal, gas generated during anaerobic digestion of sewage sludge, and municipal solid waste (not to exceed 30 percent of the dry weight of the sewage sludge and auxiliary fuel together). Hazardous wastes are not auxiliary fuel.

Base flood is a flood that has a one percent chance of occurring in any given year (i.e. a flood with a magnitude equaled once in 100 years).

Bulk sewage sludge is sewage sludge that is not sold or given away in a bag or other container for application to the land.

Contaminate an aquifer means to introduce a substance that causes the maximum contaminant level for nitrate in 40 CFR §141.11 to be exceeded in ground water or that causes the existing concentration of nitrate in the ground water to increase when the existing concentration of nitrate in the ground water exceeds the maximum contaminant level for nitrate in 40 CFR §141.11.

Class I sludge management facility is any publicly owned treatment works (POTW), as defined in 40 CFR §501.2, required to have an approved pretreatment program under 40 CFR §403.8 (a) (including any POTW located in a state that has elected to assume local program responsibilities pursuant to 40 CFR §403.10 (e) and any treatment works treating domestic sewage, as defined in 40 CFR § 122.2,

classified as a Class I sludge management facility by the EPA Regional Administrator, or, in the case of approved state programs, the Regional Administrator in conjunction with the State Director, because of the potential for sewage sludge use or disposal practice to affect public health and the environment adversely.

Control efficiency is the mass of a pollutant in the sewage sludge fed to an incinerator minus the mass of that pollutant in the exit gas from the incinerator stack divided by the mass of the pollutant in the sewage sludge fed to the incinerator.

Cover is soil or other material used to cover sewage sludge placed on an active sewage sludge unit.

Cover crop is a small grain crop, such as oats, wheat, or barley, not grown for harvest.

Cumulative pollutant loading rate is the maximum amount of inorganic pollutant that can be applied to an area of land.

Density of microorganisms is the number of microorganisms per unit mass of total solids (dry weight) in the sewage sludge.

Dispersion factor is the ratio of the increase in the ground level ambient air concentration for a pollutant at or beyond the property line of the site where the sewage sludge incinerator is located to the mass emission rate for the pollutant from the incinerator stack.

Displacement is the relative movement of any two sides of a fault measured in any direction.

Domestic septage is either liquid or solid material removed from a septic tank, cesspool, portable toilet, Type III marine sanitation device, or similar treatment works that receives only domestic sewage. Domestic septage does not include liquid or solid material removed from a septic tank, cesspool, or similar treatment works that receives either commercial wastewater or industrial wastewater and does not include grease removed from a grease trap at a restaurant.

Domestic sewage is waste and wastewater from humans or household operations that is discharged to or otherwise enters a treatment works.

Dry weight basis means calculated on the basis of having been dried at 105 degrees Celsius (°C) until reaching a constant mass (i.e. essentially 100 percent solids content).

Fault is a fracture or zone of fractures in any materials along which strata on one side are displaced with respect to the strata on the other side.

Feed crops are crops produced primarily for consumption by animals.

Fiber crops are crops such as flax and cotton.

Final cover is the last layer of soil or other material placed on a sewage sludge unit at closure.

Fluidized bed incinerator is an enclosed device in which organic matter and inorganic matter in sewage sludge are combusted in a bed of particles suspended in the combustion chamber gas.

Food crops are crops consumed by humans. These include, but are not limited to, fruits, vegetables, and tobacco.

Forest is a tract of land thick with trees and underbrush.

Ground water is water below the land surface in the saturated zone.

Holocene time is the most recent epoch of the Quaternary period, extending from the end of the Pleistocene epoch to the present.

Hourly average is the arithmetic mean of all the measurements taken during an hour. At least two measurements must be taken during the hour.

Incineration is the combustion of organic matter and inorganic matter in sewage sludge by high temperatures in an enclosed device.

Industrial wastewater is wastewater generated in a commercial or industrial process.

Land application is the spraying or spreading of sewage sludge onto the land surface; the injection of sewage sludge below the land surface; or the incorporation of sewage sludge into the soil so that the sewage sludge can either condition the soil or fertilize crops or vegetation grown in the soil.

Land with a high potential for public exposure is land that the public uses frequently. This includes, but is not limited to, a public contact site and reclamation site located in a populated area (e.g., a construction site located in a city).

Land with low potential for public exposure is land that the public uses infrequently. This includes, but is not limited to, agricultural land, forest and a reclamation site located in an unpopulated area (e.g., a strip mine located in a rural area).

Leachate collection system is a system or device installed immediately above a liner that is designed, constructed, maintained, and operated to collect and remove leachate from a sewage sludge unit.

Liner is soil or synthetic material that has a hydraulic conductivity of 1×10^{-7} centimeters per second or less.

Lower explosive limit for methane gas is the lowest percentage of methane gas in air, by volume, that propagates a flame at 25 degrees Celsius and atmospheric pressure.

Monthly average (Incineration) is the arithmetic mean of the hourly averages for the hours a sewage sludge incinerator operates during the month.

Monthly average (Land Application) is the arithmetic mean of all measurements taken during the month.

Municipality means a city, town, borough, county, parish, district, association, or other public body (including an intermunicipal agency of two or more of the foregoing entities) created by or under State law; an Indian tribe or an authorized Indian tribal organization having jurisdiction over sewage sludge management; or a designated and approved management agency under section 208 of the CWA, as amended. The definition includes a special district created under state law, such as a water district, sewer district, sanitary district, utility district, drainage district, or similar entity, or an integrated waste management facility as defined in section 201 (e) of the CWA, as amended, that has as one of its principal responsibilities the treatment, transport, use or disposal of sewage sludge.

Other container is either an open or closed receptacle. This includes, but is not limited to, a bucket, a box, a carton, and a vehicle or trailer with a load capacity of one metric ton or less.

Pasture is land on which animals feed directly on feed crops such as legumes, grasses, grain stubble, or stover.

Pathogenic organisms are disease-causing organisms. These include, but are not limited to, certain bacteria, protozoa, viruses, and viable helminth ova.

Permitting authority is either EPA or a State with an EPA-approved sludge management program.

Person is an individual, association, partnership, corporation, municipality, State or Federal Agency, or an agent or employee thereof.

Person who prepares sewage sludge is either the person who generates sewage sludge during the treatment of domestic sewage in a treatment works or the person who derives a material from sewage sludge.

pH means the logarithm of the reciprocal of the hydrogen ion concentration; a measure of the acidity or alkalinity of a liquid or solid material.

Place sewage sludge or sewage sludge placed means disposal of sewage sludge on a surface disposal site.

Pollutant (as defined in sludge disposal requirements) is an organic substance, an inorganic substance, a combination or organic and inorganic substances, or pathogenic organism that, after discharge and upon exposure, ingestion, inhalation, or assimilation into an organism either directly from the environment or indirectly by ingestion through the food chain, could on the basis on information available to the Administrator of EPA, cause death, disease, behavioral abnormalities, cancer, genetic mutations, physiological malfunctions (including malfunction in reproduction) or physical deformations in either organisms or offspring of the organisms.

Pollutant limit (for sludge disposal requirements) is a numerical value that describes the amount of a pollutant allowed per unit amount of sewage sludge (e.g., milligrams per kilogram of total solids); the amount of pollutant that can be applied to a unit of land (e.g., kilograms per hectare); or the volume of the material that can be applied to the land (e.g., gallons per acre).

Public contact site is a land with a high potential for contact by the public. This includes, but is not limited to, public parks, ball fields, cemeteries, plant nurseries, turf farms, and golf courses.

Qualified ground water scientist is an individual with a baccalaureate or post-graduate degree in the natural sciences or engineering who has sufficient training and experience in ground water hydrology and related fields, as may be demonstrated by State registration, professional certification, or completion of accredited university programs, to make sound professional judgments regarding ground water monitoring, pollutant fate and transport, and corrective action.

Range land is open land with indigenous vegetation.

Reclamation site is drastically disturbed land that is reclaimed using sewage sludge. This includes, but is not limited to, strip mines and construction sites.

Risk specific concentration is the allowable increase in the average daily ground level ambient air concentration for a pollutant from the incineration of sewage sludge at or beyond the property line of a site where the sewage sludge incinerator is located.

Runoff is rainwater, leachate, or other liquid that drains overland on any part of a land surface and runs off the land surface.

Seismic impact zone is an area that has 10 percent or greater probability that the horizontal ground level acceleration to the rock in the area exceeds 0.10 gravity once in 250 years.

Sewage sludge is a solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to:, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incinerator or grit and screening generated during preliminary treatment of domestic sewage in treatment works.

Sewage sludge feed rate is either the average daily amount of sewage sludge fired in all sewage sludge incinerators within the property line of the site where the sewage sludge incinerators are located for the number of days in a 365 day period that each sewage sludge incinerator operates, or the average daily design capacity for all sewage sludge incinerators within the property line of the site where the sewage sludge incinerators are located.

Sewage sludge incinerator is an enclosed device in which only sewage sludge and auxiliary fuel are fired.

Sewage sludge unit is land on which only sewage sludge is placed for final disposal. This does not include land on which sewage sludge is either stored or treated. Land does not include waters of the United States, as defined in 40 CFR §122.2.

Sewage sludge unit boundary is the outermost perimeter of an active sewage sludge unit.

Specific oxygen uptake rate (SOUR) is the mass of oxygen consumed per unit time per unit mass of total solids (dry weight basis) in sewage sludge.

Stack height is the difference between the elevation of the top of a sewage sludge incinerator stack and the elevation of the ground at the base of the stack when the difference is equal to or less than 65 meters. When the difference is greater than 65 meters, stack height is the creditable stack height determined in accordance with 40 CFR §51.100 (ii).

State is one of the United States of America, the District of Columbia, the Commonwealth of Puerto Rico, the Virgin Islands, Guam, American Samoa, the Trust Territory of the Pacific Islands, the Commonwealth of the Northern Mariana Islands, and an Indian tribe eligible for treatment as a State pursuant to regulations promulgated under the authority of section 518(e) of the CWA.

Store or storage of sewage sludge is the placement of sewage sludge on land on which the sewage sludge remains for two years or less. This does not include the placement of sewage sludge on land for treatment.

Surface disposal site is an area of land that contains one or more active sewage sludge units.

Total hydrocarbons means the organic compounds in the exit gas from a sewage sludge incinerator stack measured using a flame ionization detection instrument referenced to propane.

Total solids are the materials in sewage sludge that remain as residue when the sewage sludge is dried at 103 to 105 degrees Celsius.

Treat or treatment of sewage sludge is the preparation of sewage sludge for final use or disposal. This includes, but is not limited to, thickening, stabilization, and dewatering of sewage sludge. This does not include storage of sewage sludge.

Treatment works is either a federally owned, publicly owned, or privately owned device or system used to treat (including recycle and reclaim) either domestic sewage or a combination of domestic sewage and industrial waste of a liquid nature.

Unstable area is land subject to natural or human-induced forces that may damage the structural components of an active sewage sludge unit. This includes, but is not limited to, land on which the soils are subject to mass movement.

Unstabilized solids are organic materials in sewage sludge that have not been treated in either an aerobic or anaerobic treatment process.

Vector attraction is the characteristic of sewage sludge that attracts rodents, flies, mosquitoes, or other organisms capable of transporting infectious agents.

Volatile solids is the amount of the total solids in sewage sludge lost when the sewage sludge is combusted at 550 degrees Celsius in the presence of excess air.

Wet electrostatic precipitator is an air pollution control device that uses both electrical forces and water to remove pollutants in the exit gas from a sewage sludge incinerator stack.

Wet scrubber is an air pollution control device that uses water to remove pollutants in the exit gas from a sewage sludge incinerator stack.

3. Commonly Used Abbreviations

BOD	Five-day biochemical oxygen demand unless otherwise specified
CBOD	Carbonaceous BOD
CFS	Cubic feet per second
COD	Chemical oxygen demand
Chlorine	
Cl_2	Total residual chlorine
TRC	Total residual chlorine which is a combination of free available chlorine (FAC, see below) and combined chlorine (chloramines, etc.)

TRO	Total residual chlorine in marine waters where halogen compounds are present
FAC	Free available chlorine (aqueous molecular chlorine, hypochlorous acid, and hypochlorite ion)
Coliform	
Coliform, Fecal	Total fecal coliform bacteria
Coliform, Total	Total coliform bacteria
Cont. (Continuous)	Continuous recording of the parameter being monitored, i.e. flow, temperature, pH, etc.
Cu. M/day or M^3/day	Cubic meters per day
DO	Dissolved oxygen
kg/day	Kilograms per day
lbs/day	Pounds per day
mg/l	Milligram(s) per liter
ml/l	Milliliters per liter
MGD	Million gallons per day
Nitrogen	
Total N	Total nitrogen
NH_3-N	Ammonia nitrogen as nitrogen
NO_3-N	Nitrate as nitrogen
NO_2-N	Nitrite as nitrogen
NO_3-NO_2	Combined nitrate and nitrite nitrogen as nitrogen
TKN	Total Kjeldahl nitrogen as nitrogen
Oil & Grease	Freon extractable material
PCB	Polychlorinated biphenyl
pH	A measure of the hydrogen ion concentration. A measure of the acidity or alkalinity of a liquid or material
Surfactant	Surface-active agent

Temp. °C	Temperature in degrees Centigrade
Temp. °F	Temperature in degrees Fahrenheit
TOC	Total organic carbon
Total P	Total phosphorus
TSS or NFR	Total suspended solids or total nonfilterable residue
Turb. or Turbidity	Turbidity measured by the Nephelometric Method (NTU)
ug/l	Microgram(s) per liter
WET	"Whole effluent toxicity" is the total effect of an effluent measured directly with a toxicity test.
C-NOEC	"Chronic (Long-term Exposure Test) – No Observed Effect Concentration". The highest tested concentration of an effluent or a toxicant at which no adverse effects are observed on the aquatic test organisms at a specified time of observation.
A-NOEC	"Acute (Short-term Exposure Test) – No Observed Effect Concentration" (see C-NOEC definition).
LC_{50}	LC_{50} is the concentration of a sample that causes mortality of 50% of the test population at a specific time of observation. The LC_{50} = 100% is defined as a sample of undiluted effluent.
ZID	Zone of Initial Dilution means the region of initial mixing surrounding or adjacent to the end of the outfall pipe or diffuser ports.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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FACT SHEET

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

NPDES PERMIT NO.: MA0100030

PUBLIC COMMENT PERIOD: December 3, 2014 – January 2, 2015

NAME AND ADDRESS OF APPLICANT:

Paul Dawson
Town of Marion
50 Benson Brook Road
Marion, MA 02738

NAME AND ADDRESS OF FACILITY WHERE DISCHARGE OCCURS:

Marion Water Pollution Control Facility (WPCF)
50 Benson Brook Road
Marion, Massachusetts 02738

RECEIVING WATER: Unnamed Brook to Aucoot Cove (Buzzards Bay – 95)
HUC12: 010900020305

CLASSIFICATION: Class B (Unnamed Brook), Class SA & Shellfishing (Aucoot Cove)

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

The above-named applicant has requested that the U.S. Environmental Protection Agency Region 1 reissue its NPDES permit to discharge into the designated receiving water. The facility is engaged in collection and treatment of domestic wastewater. See **Figures 1 and 2** for facility location and treatment process diagrams, respectively. The outfall discharges to an unnamed brook (sometimes called Effluent Brook) that flows into Aucoot Cove.

Table 1. General Discharge Information

Outfall	Description of Discharge	Receiving Water	Outfall Location
001	Treated Effluent	Unnamed Brook to Aucoot Cove	41º, 42', 09" N 70º, 46', 39" W

The collection system is 100% separate sanitary sewers. There have been no reported sanitary sewer overflows (SSOs) during the current permit term.

II. Recent Permit History

EPA and MassDEP issued the existing permit on September 29, 2006. On October 31, 2006, the Town of Marion (Town) filed a petition for review with the EPA Environmental Appeals Board (EAB) appealing certain conditions in the Final Permit. The contested portions of the permit were stayed, while the uncontested conditions went into effect on March 1, 2007. EPA and the Town reached a settlement in which EPA modified certain conditions of the permit, and the Town withdrew its appeal. The final modified permit became effective August 1, 2007.

The changes made to the existing permit as a result of the settlement were as follows:

- A requirement for the Town to conduct receiving water monitoring to evaluate the effects of the effluent on the biota of the unnamed brook was transferred to MassDEP.
- A requirement to sample fecal coliform 3 times per week was changed to a 3 times/week requirement for the first year of the permit, then 2/week if monitoring data showed that Marion Water Pollution Control Facility (WPCF) was consistently meeting its fecal coliform limit.
- A 6-month compliance schedule was established for the Town to procure and install flow-proportional sampling equipment so that it could take 24-hour composite samples, as required by the permit.

In 2007, MassDEP completed the biological evaluation of the unnamed brook, which included macroinvertebrate and algal community identification (see Appendix A). Aquatic invertebrates have specific habitat needs, and the presence or absence of certain sensitive groups can be an indicator of ecosystem health.

Overall, the study results indicated nutrient enrichment at all sampling stations in the unnamed brook, including the one upstream station. The study found that the macroinvertebrate community upstream of the discharge was similar to that 1 km downstream of the discharge, but that both communities were dominated by organisms tolerant of organic pollution. Stoneflies (Plecoptera), a pollution-intolerant group, were absent after being found at the upstream location in 2000. Algal coverage was higher at the downstream stations than at the upstream station. The

report cited nearby residential development as a possible cause for the change in species assemblage.

III. Description of Discharge and Receiving Water

Quantitative descriptions of the discharge in terms of significant effluent parameters, based on discharge monitoring reports (DMRs) submitted from September 2010 through August 2014, are shown in Appendix B of this fact sheet.

The water quality classification of the unnamed brook receiving the Marion WPCF discharge is not specifically listed in the Buzzards Bay table of the MA Surface Water Quality Standards (SWQS) (see 314 CMR 4.06(5), Table 25), nor does the map of the Buzzards Bay watershed (see 314 CMR 4.06(5) Figure 25) show the water quality classification for this water. Therefore, pursuant to 314 CMR 4.06(4), the brook is a Class B High Quality Water. Under MA SWQS, such waters must have consistently good aesthetic value and, where designated, must be suitable as a source of public water supply with appropriate treatment, as well as for irrigation and other agricultural uses. *Id.* at 314 CMR 4.05(3)(b). They must also be free of floating, suspended or settleable solids that are aesthetically objectionable or could impair uses. *Id*. at 314 CMR 4.05(3)(b)(5). Changes to color or turbidity of the waters that are aesthetically objectionable or use-impairing are also prohibited. *Id*. at 314 CMR 4.05(3)(b)(6). Dissolved oxygen levels in Class B waters must not be less than 5.0 mg/L. *Id*. at 314 CMR 4.05(3)(b)(1).

Aucoot Cove is classified in the tables of the MA SWQS (314 CMR 4.06 (5), Table 25) as Class SA and for shellfishing (the listing is under the heading "Sippican River"). Class SA waters are designated as excellent habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. In certain waters, excellent habitat for fish, other aquatic life and wildlife may include, but is not limited to, sea grass. Where designated in the tables to 314 CMR 4.00 for shellfishing, these waters shall be suitable for shellfish harvesting without depuration (Approved and Conditionally Approved Shellfish Areas). These waters shall have excellent aesthetic value.

In addition to criteria specific to Class SA and B waters, Massachusetts imposes minimum narrative criteria applicable to all surface waters, including aesthetics ("free from pollutants in concentrations or combinations that settle to form objectionable deposits; float as debris, scum or other matter to form nuisances; produce objectionable odor, color, taste or turbidity; or produce undesirable or nuisance species of aquatic life"); bottom pollutants and alterations ("free from pollutants in concentrations or combinations or from alterations that adversely affect the physical or chemical nature of the bottom, interfere with the propagation of fish or shellfish, or adversely affect populations of non-mobile or sessile benthic organisms"); nutrients[1] ("unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses…"); and toxics ("free from pollutants in concentrations that are toxic to humans, aquatic life or wildlife"). *See* 314 CMR 4.05(5)(a),(b), (c) and (e).

The Commonwealth implements its narrative toxics standard at 314 CMR 4.05 (5)(e) by specifying that, "[f]or pollutants not otherwise listed in 314 CMR § 4.00, the *National Recommended Water Quality Criteria: 2002, EPA 822R-02-047, November 2002* ["Recommended Criteria"] published by EPA pursuant to Section 304(a) of the [CWA], are the allowable receiving water concentrations for the affected waters, unless the Department

[1] Massachusetts Standards do not establish a numeric criterion for total phosphorus or for nitrogen.

…establishes a site specific criterion or determines that naturally occurring background conditions are higher[.]"

Section 303(d) of the CWA requires states to identify those waterbodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and, as such, require the development of total maximum daily loads (TMDL). Inner Aucoot Cove (MA95-71)[2] is listed in the Massachusetts 2012 Integrated List of Waters (303d) (2012 Integrated List) as Category 5: Waters Requiring a TMDL. Inner Aucoot Cove is listed as impaired and requiring a TMDL for total nitrogen, dissolved oxygen, fecal coliform and nutrient/eutrophication biological indicators. A Final Pathogen TMDL has been approved for all waters in the Buzzards Bay watershed. The draft permit is consistent with the assumptions and requirements of the WLA for the discharge.

IV. Limitations and Conditions

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

V. Permit Basis and Explanation of Effluent Limitation Derivation

A. Process Description

The Marion WCPF, located in Marion, Massachusetts, is a 0.588-MGD wastewater treatment facility. Treatment units include inlet aerated chamber with air handling and odor control, mechanical bar screens, vortex grit chamber with classifier, sequencing batch reactors (SBRs), equalization tank, disc filters, and ultraviolet (UV) disinfection. Treated effluent is discharged to an unnamed brook that discharges to Aucoot Cove. Scum, waste activated sludge from the SBRs, and filter backwash are discharged to onsite aerated lagoons. The lagoons are also used for equalization and storage of wastewater during high flows exceeding SBR capacity and when one of the SBRs is down for service.

B. Effluent Limitations and Monitoring Requirements

1. Overview of Federal and State Regulations

EPA is issuing this permit pursuant to Section 402(a) of the Clean Water Act. The Commonwealth of Massachusetts is also issuing this permit pursuant to Massachusetts General Laws ch. 21, § 43 (2004).

Under Clean Water Act ("CWA" or "Act") section 402, 33 U.S.C. § 1342, EPA may issue National Pollutant Discharge Elimination System ("NPDES") permits "for the discharge of any pollutant, or combination of pollutants" if the permit conditions assure that the discharge complies with certain requirements, including those of section 301 of the CWA, 33 U.S.C. § 1311.

CWA section 303 requires each State to adopt water quality standards for its waters. *See* 33 U.S.C. § 1313(a)-(c). Water quality standards consist of (1) designated "uses" of the water, such as propagation of fish, aquatic life, and wildlife, recreation and aesthetics; (2) "criteria," expressed either in numeric or narrative form, which, *inter alia*, specify the amounts of various pollutants that may be present in those waters without impairing the designated uses; and (3) an

[2] Impaired area defined as "From the confluence with Aucoot Creek, Marion to the boundary of Division of Marine Fisheries designated shellfishing growing area BB31.1, north and southwest from Haskell Island, Marion (formerly part of segment 95-09).

antidegradation policy to maintain and protect existing uses and high quality waters. *See id.* § 1313(c)(2)(A); *see also* 40 CFR §§ 131.2, 131.3, 131.6, 131.10, 131.11, 131.12.

The Massachusetts Surface Water Quality Standards at 314 Commonwealth of Massachusetts Regulation (CMR) 4.00 (MA SWQS) establish designated uses of the State's waters, criteria to protect those uses, and an antidegradation provision to ensure that existing uses and high quality waters are protected and maintained. They also include requirements for the regulation and control of toxic constituents and specify that EPA's recommended water quality criteria, established pursuant to Section 304(a) of the CWA, shall be used unless a site-specific criterion is established.

Section 301 of the CWA provides for two types of effluent limitations to be included in NPDES permits: "technology-based" limitations and "water quality-based" limitations. *See* 33 U.S.C. §§ 1311, 1313, 1314(b); 40 CFR Parts 122, 125, 131 and 133. As a class, Publicly Owned Treatment Works ("POTWs") must meet technology-based requirements based on "secondary treatment." *See id.* § 1311(b)(1)(B). Section 301(b)(1)(C), 33 U.S.C. § 1311(b)(1)(C), of the Act requires that NPDES permits include effluent limits more stringent than technology-based limits whenever necessary to meet water quality standards, treatment standards, or schedules of compliance, established pursuant to any State law or regulations…or any other Federal law or regulation, or required to implement any applicable water quality standard established pursuant to [the CWA].

NPDES permits must contain effluent limitations necessary to attain and maintain water quality standards, without consideration of the cost, availability or effectiveness of treatment technologies. *See Upper Blackstone Water Pollution Abatement Dist. v. U.S. EPA*, 690 F.3d 9, 33 (1st Cir. 2012), *cert. denied*, 133 S. Ct. 2282 (2013); *In re City of Moscow*, 10 E.A.D. 135, 168 (EAB 2001); *In re City of Fayetteville, Ark.*, 2 E.A.D. 594, 600-601 (CJO 1988) (Section 301(b)(1)(C) "requires unequivocal compliance with applicable water quality standards, and does not make any exceptions for cost or technological feasibility.").

EPA has implemented its Sections 301(b)(1)(C) and 402 of the Act through numerous regulations, which specify when the Region must include permit conditions, water quality-based effluent limitations or other requirements in NPDES permits.[3] For example, 40 CFR § 122.4(d) *prohibits* issuance of an NPDES permit "[w]hen the imposition of conditions cannot *ensure* [emphasis added] compliance with the applicable water quality requirements of all affected States." Section 122.44(d)(1) is similarly broad in scope and obligates the Region to include in NPDES permits "any requirements…necessary to: (1) Achieve water quality standards established under section 303 of the CWA, including State narrative criteria for water quality."

"Congress has vested in the Administrator [of EPA] broad discretion to establish conditions for NPDES permits" in order to achieve the statutory mandates of Section 301 and 402. *Arkansas v. Oklahoma*, 503 U.S. 91, 105 (1992).

Section 401(a)(1) of the CWA forbids the issuance of a federal license for a discharge to waters of the United States unless the state where the discharge originates either certifies that the discharge will comply with, among other things, state water quality standards, or waives certification. EPA's regulations at 40 CFR §122.44(d)(3), §124.53 and §124.55 describe the manner in which NPDES permits must conform to conditions contained in state certifications.

[3] Effluent limits are restrictions on the quantities, rates, and concentrations of pollutants that may be discharged from point sources. 33 U.S.C. § 1362(11).

Section 402(o) of the CWA provides, generally, that the effluent limitations of a renewed, reissued, or modified permit must be at least as stringent as the comparable effluent limitations in the previous permit. Unless certain limited exceptions are met, "backsliding" from effluent limitations contained in previously issued permits that were based on CWA §§ 301(b)(1)(C) or 303 is prohibited. EPA has also promulgated anti-backsliding regulations, which are found at 40 CFR §122.44(l). Unless statutory and regulatory backsliding requirements are met, the limits in the reissued permit must be at least as stringent as those in the previous permit.

When technology-based effluent limits are included in a permit, compliance with those limitations is from the date the issued permit becomes effective. *See* 40 CFR §125.3(a)(1). Compliance schedules and deadlines not in accordance with the statutory provisions of the CWA cannot be authorized by an NPDES permit. Compliance schedules to meet water quality based effluent limits may be included in permits only when the state's water quality standards clearly authorize such schedules and where the limits are established to meet a water quality standard that is either newly adopted, revised, or interpreted after July 1, 1977. Finally, the permitting authority must make a reasonable determination that a compliance schedule is "appropriate" and that compliance is required "as soon as possible." *See* 40 CFR §122.47(a), §122.47(a)(1).

2. Development of Water Quality-based Limits

Receiving stream requirements are established according to numerical and narrative standards adopted under state law for each stream classification. When using chemical-specific numeric criteria from the state's water quality standards to develop permit limits, both the acute and chronic aquatic life criteria are used and expressed in terms of maximum allowable in-stream pollutant concentration. Maximum daily limits are generally derived from the acute aquatic life criteria, and the average monthly limit is generally derived from the chronic aquatic life criteria. Chemical specific limits are established in accordance with 40 CFR §122.44(d) and §122.45(d).

EPA's regulations set out the process for the Region to determine whether permit limits are "necessary" to achieve state water quality standards and for the formulation of these requirements. *See* 40 CFR § 122.44(d). Permit writers are first required to determine whether pollutants "are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion" of the narrative or numeric criteria set forth in state water quality standards. *Id.* § 122.44(d)(1)(i). EPA guidance directs that this "reasonable potential" analysis be based on "worst-case" conditions. *In re Washington Aqueduct Water Supply Sys*., 11 E.A.D. 565, 584 (EAB 2004); *Am. Iron & Steel Inst. v. EPA*, 115 F.3d 979, 1001 (D.C. Cir. 1997) (discussing EPA's policy that reasonable potential analysis be based on the worst case scenario). If a discharge is found to cause, have the reasonable potential to cause, or contribute to an excursion of a state water quality criterion, then a permit *must* contain effluent limits as stringent as necessary to achieve state water quality standards; see 40 CFR § 122.44(d)(1), (5). An excursion occurs if the projected or actual instream concentration resulting from the discharge exceeds the applicable 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 application, monthly discharge monitoring reports (DMRs), and State and Federal water quality reports; (3) sensitivity of the species to toxicity testing; (4) statistical approach outlined in *Technical Support Document for Water Quality-based Toxics Controls,* March 1991, EPA/505/2-90-001 in Section 3; and, where appropriate, (5) dilution of the effluent in the receiving water. In accordance with the MA SWQS at 314 CMR 4.03(3), available dilution for rivers and streams is based on a known or estimated value of the lowest

mean flow which occurs for seven (7) consecutive days with a recurrence interval of once in ten (10) years (7Q10).

Establishing water quality-based effluent limitations that are sufficiently protective to meet in-stream water quality criteria requires the Region to account for both effluent and receiving water flows. When deriving permit effluent limits, EPA accounts for the effluent wastewater flow under POTW design flow conditions (40 CFR § 122.45(b)(1)); the concentration of a given pollutant in the effluent (discharge concentration); the percentage of effluent in the receiving water immediately downstream of the discharge under the critical low flow conditions identified in the state water quality standards (available dilution); and the concentration of pollutants upstream of the discharge (background) to determine how much the discharge can contribute such that the resulting mix downstream does not exceed the criterion. Where the discharge concentration exceeds the criterion, and the receiving water has no available dilution or remaining assimilative capacity for the pollutant, then the permit writer may establish the permit limit at the criterion level, to ensure the resulting discharge will not cause or contribute to an exceedance of the numeric criterion in-stream.

Narrative standards have the same force and effect as other state water quality standards; unlike numeric criteria, however, narrative water quality standards are necessarily subject to translation prior to their application. *See American Paper Inst. v. United States EPA*, 996 F.2d 346, 351 (D.C. Cir. 1993).

EPA in issuing an NPDES permit must, by necessity, also translate existing narrative criteria into instream numeric threshold concentrations over the course of developing water quality-based numeric effluent limitations. As explained by the D.C. Circuit:

> "As long as narrative criteria are permissible…and must be enforced through limitations in particular permits, a permit writer will inevitably have some discretion in applying the criteria to a particular case. The general language of narrative criteria can only take the permit writer so far in her task. Of course, that does not mean that the language of a narrative criterion does not cabin the permit writer's authority at all; rather, it is an acknowledgement that the writer will have to engage in some kind of interpretation to determine what chemical-specific numeric criteria--and thus what effluent limitations--are most consistent with the state's intent as evinced in its generic standard."

See American Paper Inst., 996 F.2d at 351 (citations omitted). This process of translating a narrative criterion is governed under EPA regulations by 40 CFR § 122.44(d)(1)(vi), which implements Sections 301 and 402 of the Act. Subsection (A) of that provision mandates at the outset a calculation of a protective ambient threshold concentration for the pollutant:

> "Where a State has not established a water quality criterion for a specific chemical pollutant that is present in an effluent at a concentration that causes, has the reasonable potential to cause, or contributes to an excursion above a narrative criterion within an applicable State water quality standard, the permitting authority must establish effluent limits using one or more of the following options:
>
> (A) Establish effluent limits *using a calculated numeric water quality criterion* [emphasis added] for the pollutant which the permitting authority demonstrates will attain and maintain applicable narrative water quality criteria and will fully protect the designated use."

See also Upper Blackstone Water Pollution Abatement Dist. v. United States EPA, 690 F.3d 9, 23 (1st Cir. 2012) ("Because both Massachusetts and Rhode Island employ narrative water quality criteria for the relevant pollutants, the EPA translated these into numeric limits under its procedures set out in 40 CFR § 122.44(d)(1)(vi).").

3. Conventional Pollutants

A) Biochemical Oxygen Demand (BOD_5) and Total Suspended Solids (TSS)

The current permit contains BOD_5/TSS average weekly and average monthly limits of 13 mg/L and 9 mg/L, respectively. The mass limits are 63 lbs/day average weekly and 42 lbs/day average monthly. Though the effluent flow limit was increased in the current permit, pollutant loads stayed the same, consistent with antidegradation provisions in the MA SWQS (314 CMR 4.04). Thus, the 13 mg/L and 9 mg/L limits were calculated to maintain load levels from the previous 15 mg/L and 10 mg/L limits, respectively. From September 2010 through August 2014, there were no violations of the BOD_5 or TSS limits.

The effluent limitations and monitoring requirements for BOD_5 and TSS in the draft permit are the same as those in the current permit. These limits are sufficient to ensure attainment of water quality standards and have been carried forward from the current permit in accordance with antibacksliding requirements. The monitoring frequency remains once per week.

B) Bacteria

The current permit limits fecal coliform to 14 cfu/100 mL (colony forming units per 100 mL water) monthly geometric mean and 43 cfu/100 mL maximum daily. These limits were based on state certification requirements. Sampling frequency was 3/week for the first year of the permit, then 2/week for the remainder of the permit term. There were no violations of this limit from September 2010 through August 2014, with values considerably lower than the permit limit. The range of reported fecal coliform values was 1-8 cfu/100 mL.

There have been two key developments concerning bacteria limits since the issuance of the existing permit. First, MassDEP has revised the criteria for bacteria in the MA SWQS for protecting shellfishing and recreational uses. The metric for recreational uses has changed from fecal coliform to *enterococci*, and the single sample maximum for shellfishing was revised from 43 cfu/100 mL to 28 cfu/100 mL. Second, MassDEP finalized a TMDL for bacteria in Buzzards Bay. Because of the lack of dilution and the short travel time to Aucoot Cove, limits have been established in accordance with the SWQS to prevent impairment to Aucoot Cove. For point sources discharging to Class SA waters, the SWQS fecal coliform criteria are 14 mpn/100 mL monthly geometric mean and that no more than 10% of samples exceed 28 cfu/100 mL.

Fecal Coliform Bacteria - The MA SWQS (314 CMR § 4.05(4)(a)4) require that in SA waters designated for shellfishing: "fecal coliform shall not exceed a geometric mean Most Probable Number (MPNc) of 14 organisms per 100 mL, nor shall more than 10% of the samples exceed a MPN of 28 per 100 mL, or other values of equivalent protection based on sampling and analytical methods used by the Massachusetts Division of Marine Fisheries and approved by the National Shellfish Sanitation Program in the latest revision of the Guide for the Control of Molluscan Shellfish." The monthly average limit in the current permit (14 cfu/100 mL) is consistent with the current MA SWQS and has been retained in the draft permit. The maximum daily limit in the current permit is 43 cfu/100 mL, which was based on previous Massachusetts Surface Water Quality Standards for waters designated for shellfishing, and are less stringent than the criteria in the current Massachusetts water Quality Standards (28 MPN/100 mL). Accordingly, the maximum daily limit in the draft permit has been lowered to 28 cfu/100 mL. These limits are in

accordance with the Buzzards Bay Pathogen TMDL. The monitoring frequency (twice per week) proposed in the draft permit is the same as in the current permit.

Enterococci Bacteria - MassDEP added new criteria to its surface water quality standards for bacteria in a revision to the MA SWQS (314 CMR 4.00) on December 29, 2006. EPA approved the changes to the bacteria criteria on September 19, 2007. The criteria require that, to preserve recreational uses, no single Enterococci sample exceed 104 colonies per 100 mL and that the geometric mean of all samples taken within the most recent six months based on a minimum of five samples shall not exceed 35 Enterococci colonies per 100 mL. MassDEP views the use of the 90% upper confidence level of 276 cfu/100mL as appropriate for setting the maximum daily limit for Enterococci. Thus, in the draft permit, EPA has established a monthly average (geometric mean) effluent limit of 35 cfu/100mL and a daily maximum effluent limit of 276 cfu/100mL for Enterococci to ensure that the discharge does not cause or contribute to exceedances of MA SWQS. The draft permit requires sampling twice per week.

pH
Due to the lack of information on receiving water pH levels and the variability and complexity of pH chemistry, EPA and the state have determined that establishing limits equal to the criteria range will be protective of designated uses. Where the receiving water has sufficient dilution and buffering capacity, EPA will consider limits outside of this range. Because that is not the case here, limits have been established equal to the criteria range.

The current permit limits effluent pH to a minimum of 6.5 and a maximum of 8.3 at any time. These limits are based on the MA SWQS. Sampling frequency is daily. There have been no violations of the pH limits during the September 2010 through August 2014 review period. The lowest minimum daily pH was 6.7 Standard Units (S.U.), and the highest daily maximum pH was 7.7 S.U.

The limits in the existing permit will be carried forward to the draft permit. Monitoring frequency remains daily.

C) Dissolved Oxygen

The draft permit includes a seasonal (June – October) limitation of not less than 5.0 mg/L for dissolved oxygen (DO). The limit has been established equal to the criteria to ensure that low DO discharge does not cause instream oxygen levels to fall below the criteria values. From September 2010 through August 2014, there were no violations of the minimum dissolved oxygen limit. The monitoring frequency remains once per day.

4. Non-Conventional Pollutants

A) Effluent Flow and Available Dilution

Sewage treatment plant discharge is encompassed within the definition of "pollutant" and is subject to regulation under the CWA. The CWA defines "pollutant" to mean, *inter alia*, "municipal . . . waste" and "sewage…discharged into water." 33 U.S.C. § 1362(6).

EPA may use design flow of effluent to both determine the necessity for effluent limitations in the permit that comply with the Act, and to calculate the limits themselves. EPA practice is to use design flow as a reasonable and important worst-case condition in EPA's reasonable potential and water quality-based effluent limitation (WQBEL) calculations to ensure compliance with water quality standards under Section 301(b)(1)(C). Should the effluent discharge flow exceed

the flow assumed in these calculations, the instream dilution would decrease and the calculated effluent limits would not be protective of WQS. Further, pollutants that did not have the reasonable potential to exceed WQS at the lower discharge flow may have reasonable potential at a higher flow due to the decreased dilution. In order to ensure that the assumptions underlying the Region's reasonable potential analyses and derivation of permit effluent limitations remain sound for the duration of the permit, the Region may ensure its "worst-case" effluent wastewater flow assumption through imposition of permit conditions for effluent flow. Thus, the effluent flow limit is a component of WQBELs because the WQBELs are premised on a maximum level of flow. In addition, the flow limit is necessary to ensure that other pollutants remain at levels that do not have a reasonable potential to exceed WQS.

Using a facility's design flow in the derivation of pollutant effluent limitations, including conditions to limit wastewater effluent flow, is fully consistent with, and anticipated by NPDES permit regulations. Regarding the calculation of effluent limitations for POTWs, 40 CFR § 122.45(b)(1) provides, "permit effluent limitations…shall be calculated based on design flow." POTW permit applications are required to include the design flow of the treatment facility. *Id.* § 122.21(j)(1)(vi).

Similarly, EPA's reasonable potential regulations require EPA to consider "where appropriate, the dilution of the effluent in the receiving water," 40 CFR § 122.44(d)(1)(ii), which is a function of *both* the wastewater effluent flow and receiving water flow. EPA guidance directs that this "reasonable potential" analysis be based on "worst-case" conditions. EPA accordingly is authorized to carry out its reasonable potential calculations by presuming that a plant is operating at its design flow when assessing reasonable potential.

The limitation on sewage effluent flow is within EPA's authority to condition a permit in order to carry out the objectives of the Act. *See* CWA §§ 402(a)(2) and 301(b)(1)(C); 40 CFR §§ 122.4(a) and (d); 122.43 and 122.44(d). A condition on the discharge designed to protect EPA's WQBEL and reasonable calculations is encompassed by the references to "condition" and "limitations" in 402 and 301 and implementing regulations, as they are designed to assure compliance with applicable water quality regulations, including antidegradation. Regulating the quantity of pollutants in the discharge through a restriction on the quantity of wastewater effluent is consistent with the overall structure and purposes of the CWA.

In addition, as provided in Part II.B.1 and 40 CFR § 122.41(e), the permittee is required to properly operate and maintain all facilities and systems of treatment and control. Operating the facilities wastewater treatment systems as designed includes operating within the facility's design effluent flow. Thus, the permit's effluent flow limitation is necessary to ensure proper facility operation, which in turn is a requirement applicable to all NPDES permits. *See* 40 CFR § 122.41.

Review of facility flow between December 2011 and November 2013 shows that the average flow was 0.51 MGD. During this period, the range of monthly average effluent flows was between 0.245 and 0.845 MGD.

The existing permit limits the 12-month rolling average flow to 0.588 MGD. From December 2011 through November 2013, the range of 12-month rolling average flows was 0.407 MGD to 0.555 MGD. The draft permit carries forward the flow limit, expressed as a 12-month rolling average.

Water quality-based limits are established with the use of a calculated available dilution. As previously stated, 314 CMR 4.03(3)(a) requires that effluent dilution be calculated based on the

receiving water 7Q10. The 7Q10 is the lowest observed mean river flow for 7 consecutive days, occurring over a 10-year recurrence interval. Additionally, the facility design flow is used to calculate available effluent dilution.

Because the unnamed brook to which Marion WPCF discharges has minimal or no flow of its own during dry periods, the 7Q10 is considered zero.

$$\text{Dilution Factor} = \frac{7Q10 + \text{facility flow}}{\text{facility flow}} = \frac{0 + 0.588}{0.588} = 1$$

Thus, the dilution factor is 1.

B) Ammonia Nitrogen

Ammonia is a toxic pollutant which may be harmful to aquatic organisms, and nitrogen is a nutrient that can contribute to excessive plant growth in receiving waters, thus depleting dissolved oxygen in the water column necessary for aquatic life. The ammonia limitations in the permit are water quality-based effluent limitations necessary to prevent toxicity in the receiving water.

The existing permit contains monthly average ammonia limits of 1.74 mg/L from June 15 to October 15 and 2.6 mg/L from May 1 to June 14. The current limits were calculated using recommended 1994 water quality criteria for ammonia at a pH of 6.75 S.U. and 25 degrees Celsius (C) for the period from June 15 to October 1, and at a pH of 6.75 S.U. and 15 degrees C for the period of May 1 to June 14.

There was one violation of the ammonia limit in May 2012, when the reported concentration was 6.75 mg/L, higher than the limit of 2.6 mg/L.

The most current recommended ammonia criteria are found in the 1999 Update of Ambient Water Quality Criteria for Ammonia (EPA-822-R-99-014). The recommended chronic criteria for total ammonia, at a pH of 6.75 and 25 degrees C, is 3.24; and at a pH of 6.75 and 15 degrees C is 6.15 mg/L.

The draft permit retains the limits that were established to ensure attainment of the 1994 ammonia criteria, and these limits have been retained to ensure consistency with antibacksliding requirements. The facility has been able to consistently attain these limits. The draft permit proposes an average monthly ammonia limit of 2.6 mg/L during May, and 1.74 mg/L from June 1st through October 31st.

The ammonia discharges during the winter have been far below the criteria; hence the draft permit does not propose winter ammonia limits. The permittee must report average monthly ammonia from November 1st through April 30th, and must report the maximum daily ammonia discharge concentration year-round. The monitoring frequency remains once per week from May 1 through October 31 and monthly for the remainder of the year.

The proposed draft permit also contains ammonia loading limits of 12.8 lbs/day in May, and 8.53 lbs/day from June through October.

Loading (lbs/day) = Design flow (MGD) x Limit (mg/L) x 8.34 (conversion factor)

Monthly Average Load - May (lbs/day) =
0.588 MGD x 2.6 mg/L x 8.34 = **12.75 lbs/day**

Monthly Average Load – June-October (lbs/day) =
0.588 MGD x 1.74 mg/L x 8.34 = **8.53 lbs/day**

C) Total Nitrogen

The basic cause of nutrient problems in estuaries and nearshore coastal waters is the enrichment of freshwater with nitrogen (N) on its way to the sea and by direct inputs within tidal systems. EPA defines nutrient overenrichment as the anthropogenic addition of nutrients, in addition to any natural processes, causing adverse effects or impairments to beneficial uses of a waterbody. Eutrophication is an aspect of nutrient overenrichment and is defined as an increase in the rate of supply of organic matter to a waterbody. Cultural eutrophication has been defined as the human-induced addition of wastes containing nutrients to surface waters that results in excessive plant growth and/or a decrease in dissolved oxygen.

Estuaries, especially large, productive ones like Buzzards Bay, are extremely significant aquatic resources. An estuary is a partially enclosed coastal body of water located between freshwater ecosystems (lakes, rivers, and streams; freshwater and coastal wetlands; and groundwater systems) and coastal shelf systems where freshwater from the land measurably dilutes saltwater from the ocean. This mixture of water types creates a unique transitional environment that is critical for the survival of many species of fish, birds, and other wildlife. Estuarine environments are among the most productive on earth, creating more organic matter each year than comparably sized areas of forest, grassland, or agricultural land (EPA, 2001).

Maintaining water quality within an estuary is important for many reasons. Estuaries provide a variety of habitats such as shallow open waters, freshwater and saltwater marshes, sandy beaches, mud and sand flats, rocky shores, oyster reefs, tidal pools, and seagrass beds. Tens of thousands of birds, mammals, fish, and other wildlife depend on estuarine habitats as places to live, feed, and reproduce. Many species of fish and shellfish rely on the sheltered waters of estuaries as protected places to spawn. Moreover, estuaries also provide a number of recreational values such as swimming, boating, fishing, and bird watching. Estuaries in addition have an important commercial value since they serve as nursery grounds for two thirds of the nation's commercial fish and shellfish, and support tourism drawing on the natural resources that estuaries supply. (EPA, 1998). Consequently, EPA believes sound environmental policy reasons favor a pollution control approach that is both protective and undertaken expeditiously to prevent degradation of these critical natural resources.

Because estuaries are the intermediary between oceans and land, both these geographic features influence their physical, chemical, and biological properties. In the course of flowing downstream through a watershed to an estuary, tributaries pick up materials that wash off the land or are discharged directly into the water by land-based activities. Eventually, the materials that accumulate in the tributaries are delivered to estuaries. The types of materials that eventually enter an estuary largely depend on how the land is used. Undisturbed land, for example, will discharge considerably fewer pollutants than an urban center or areas with large amounts of impervious cover. Accordingly, an estuary's overall health can be heavily impacted by surrounding land uses.

Unlike free-flowing rivers, which tend to flush out sediments and pollutants relatively quickly, an estuary will often have a lengthy retention period as up-estuary saltwater movement interacts with down-estuary freshwater flow (EPA, 2001). Estuaries are particle-rich relative to coastal systems and have physical mechanisms that tend to retain particles. These suspended particles mediate a number of activities (e.g., absorbing and scattering light, or absorbing hydroscopic materials such as phosphate and toxic contaminants). New particles enter with river flow and may be re-

suspended from the bottom by tidal currents and wind-wave activity. Many estuaries are naturally nutrient-rich because of inputs from the land surface and geochemical and biological processes that act as "filters" to retain nutrients within estuaries (EPA, 2001). Consequently, waterborne pollutants, along with contaminated sediment, may remain in the estuary for a long time, magnifying their potential to adversely affect the estuary's plants and animals.

Increased nutrient inputs promote a progression of symptoms beginning with excessive growth of phytoplankton and macroalgae to the point where grazers cannot control growth (NOAA, 2007). Phytoplankton is microscopic algae growing in the water column and is measured by chlorophyll *a*. Macroalgae are large algae, commonly referred to as "seaweed." The primary symptoms of nutrient overenrichment include an increase in the rate of organic matter supply, changes in algal dominance, and loss of water clarity and are followed by one or more secondary symptoms such as loss of submerged aquatic vegetation, nuisance/toxic algal blooms and low dissolved oxygen. (EPA, 2001). In U.S. coastal waters, nutrient overenrichment is a common thread that ties together a diverse suite of coastal problems such as red tides, fish kills, some marine mammal deaths, outbreaks of shellfish poisonings, loss of seagrass and bottom shellfish habitats, coral reef destruction, and hypoxia and anoxia now experienced as the Gulf of Mexico's "dead zone." (EPA, 2001). **Figure 3** shows the progression of nutrient impacts on a water body.

Estuarine nutrient dynamics are complex and are influenced by flushing time, freshwater inflow and stratification, among other factors. The deleterious physical, chemical, and biological responses in surface water resulting from excessive plant growth impair designated used in both receiving and downstream waterbodies. Excessive plant growth can result in a loss of diversity and other changes in the aquatic plant, invertebrate, and fish community structure and habitat. For example, losses of submerged aquatic vegetation (SAV), such as eelgrass, occur when light is decreased due to turbid water associated with overgrowth of algae or as a result of epiphyte growth on leaves (NOAA, 2007 and EPA, 2001). Excess nitrogen and phosphorus cause an increased growth of phytoplankton and epiphytes (plants that grow on other plants). Phytoplankton growth leads to increased turbidity, blocking light attenuation, and epiphytic growth further blocks sunlight from reaching the SAV surface. When sunlight cannot reach SAV, photosynthesis decreases and eventually the submerged plants die. (State-EPA Nutrient Innovations Task Group, 2009). The loss of SAV can have negative effects on the ecological functioning of an estuary and may impact some fisheries because the SAV beds serve as important habitat. Because SAV responds rapidly to water quality changes, its health can be an indicator of the overall health of the coastal ecosystem.

Nutrient-driven impacts on aquatic life and habitat are felt throughout the eutrophic cycle of plant growth and decomposition. Nutrient-laden plant detritus can settle to the bottom of a water body. In addition to physically altering the benthic environment and aquatic habitat, organic materials (*i.e.*, nutrients) in the sediments can become available for future uptake by aquatic plant growth, further perpetuating and potentially intensifying the eutrophic cycle.

Excessive aquatic plant growth, in addition, degrades aesthetic and recreational uses. Unsightly algal growth is unappealing to swimmers and other stream users and reduces water clarity. Decomposing plant matter also produces unpleasant sights and strong odors. Heavy growths of algae on rocks can make streambeds slippery and difficult or dangerous to walk on. Algae and macrophytes can interfere with angling by fouling fishing lures and equipment. Boat propellers and oars may also get tangled by aquatic vegetation.

When nutrients exceed the assimilative capacity of a water body, the ensuing eutrophic cycle can negatively impact in-stream dissolved oxygen levels. Through respiration, and the decomposition

of dead plant matter, excessive algae and plant growth can reduce in-stream dissolved oxygen concentrations to levels that could negatively impact aquatic life. During the day, primary producers (*e.g.*, algae, plants) provide oxygen to the water as a by-product of photosynthesis. At night, however, when photosynthesis ceases but respiration continues, dissolved oxygen concentrations decline. Furthermore, as primary producers die, they are decomposed by bacteria that consume oxygen, and large populations of decomposers can consume large amounts of dissolved oxygen. Many aquatic insects, fish, and other organisms become stressed and may even die when dissolved oxygen levels drop below a particular threshold level.

Nutrient overenrichment of estuaries and nearshore coastal waters from human-based causes is now recognized as a national problem on the basis of CWA Section 305(b) reports from coastal States (EPA, 2001). Most of the nation's estuarine and coastal waters are moderately to severely polluted by excessive nutrients, especially nitrogen and phosphorus (NOAA, 2007; NOAA, 1999; EPA, 2006; EPA, 2004; and EPA, 2001).

When permitting nutrient discharges, the Region analyzes available record materials from a reasonably conservative standpoint, as it regards one key function of a nutrient limit as preventative. This protective approach is appropriate because, once begun, the cycle of eutrophication can be difficult to reverse due to the tendency of nutrients to be retained in the sediments. Nutrients can be re-introduced into a waterbody from the sediment, or by microbial transformation, potentially resulting in a long recovery period even after pollutant sources have been reduced. Eutrophic conditions are often exacerbated around impoundments and in other slow moving reaches of rivers, where detention times increase relative to free flowing segments of rivers and streams. In addition, in flowing systems, nutrients may be rapidly transported downstream and the effects of nutrient inputs may be uncoupled from the nutrient source, which complicates source control. Thus, a second key function of a nutrient limit is to protect downstream receiving waters regardless of their proximity in linear distance.

Facility Performance

The existing permit requires Marion to operate the treatment facility within the design "target effluent quality" of 7-10 mg/L and report effluent total nitrogen on the monthly DMR. The Marion WPCF has achieved a high level of nitrogen removal during the current permit term, resulting in an average effluent concentration of 3.46 mg/L from September 2010 through August 2014. The May through October average effluent total nitrogen concentration was 3.8 mg/L during this period. However, impairments for nutrient enrichment and low DO persist, as evidenced by the information presented below. Inner Aucoot Cove is listed on the 2012 Integrated List of waters, and total nitrogen concentrations in Aucoot Cove exceed threshold targets identified by MassDEP for similar waters above which adverse nutrient-related impacts are expected to occur.

Reasonable Potential Analysis

The reasonable potential analysis examines the effects of nitrogen on water quality in Aucoot Cove rather than the unnamed brook. In freshwater systems, such as the unnamed brook, aquatic plant growth is typically limited by phosphorus, meaning that excess nitrogen does not increase plant growth. Please see page 25 of this fact sheet for a reasonable potential analysis of phosphorus in the unnamed brook.

Aucoot Cove is a deep, well flushed embayment of approximately 0.5 square miles area. The water quality classification of Aucoot Cove is SA, the most protective classification for saline waters. It is also a designated shellfishery. Inner Aucoot Cove is listed as impaired for total nitrogen, dissolved oxygen, and nutrients/eutrophication biological indicators. To interpret the

narrative nutrient criteria, consistent with 122.44 (d)(1)(vi), and determine the appropriate threshold concentration, EPA reviewed nitrogen, dissolved oxygen and algal data collected by the Buzzards Bay Coalition at various locations in Aucoot Cove.

The water quality criterion for dissolved oxygen is 6.0 mg/L in Class SA Waters, such as Aucoot Cove. Aquatic plants and algae give off oxygen from photosynthesis during the day, but absorb oxygen during the night for respiration. Therefore, low dissolved oxygen (DO) in the early morning hours is one indication of eutrophication. Low DO events cause fish kills, noxious odors, and dead zones in estuaries.

Data collected by the Buzzards Bay Coalition indicates that the monitoring sites closest to the discharge have the highest likelihood for DO violations. Monitoring station AC7, at the mouth of the unnamed brook to Aucoot Cove, violated the DO criterion in 71% of monitoring events. Other monitoring stations in Aucoot Cove also frequently violate the DO criterion, with AC2 violating 45% of events, AC4 56%, and AC5a 45%.

Results from monitoring sites in Hiller's Cove, located adjacent to Aucoot Cove, show much lower violation frequencies. HL2 violated the 6.0 mg/L DO standard in 12% of sampling events, and HL1 violated the standard in only 7% of events. Hiller Cove, like Aucoot Cove, receives stormwater pollution from a developed area; but unlike Aucoot Cove has no POTW point sources.

The Massachusetts Department of Environmental Protection (MassDEP) has identified total nitrogen levels believed to be protective of eelgrass habitats as less than 0.39 mg/L and ideally less than 0.3 mg/L and *chlorophyll a* levels as 3-5 µg/L and ideally less than 3 µg/L (MADEP/SMAST, 2003))[4]. Monitoring station AC2, located in inner Aucoot Cove, has a median nitrogen concentration of 0.47 mg/L. In contrast, AC3, which currently supports eelgrass, has a median total nitrogen concentration of 0.35 mg/L[5].

To determine an appropriate threshold concentration, EPA considered the procedure developed by the Massachusetts Estuaries Project (MEP). This procedure identifies a target nitrogen concentration threshold based on a location within the estuary where water quality standards are not violated, in order to identify a nitrogen concentration consistent with unimpaired conditions. This approach is consistent with EPA guidance regarding the use of reference conditions for the purposes of developing nutrient water quality criteria.

EPA generally recommends three types of scientifically defensible empirical approaches for setting numeric criteria to address nitrogen/phosphorus pollution.[6] They are a reference condition

[4] Massachusetts Department of Environmental Protection, UMASS-Dartmouth School for Marine Science and Technology. 2003. Massachusetts Estuaries Project: Site-Specific Nitrogen Thresholds for Southeastern Massachusetts Embayments: Critical Indicators Interim Report. Massachusetts Department of Environmental Protection. July 21, 2003. Revised September 16, 2003 and December 22, 2003.

[5] Data available at http://www.savebuzzardsbay.org/ProtectBay/CleanWater/SoundScience/BayHealthMap

[6] Environmental Protection Agency. 2001. Nutrient Criteria Technical Guidance Manual: Estuarine and Coastal Marine Waters. U.S. Environmental Protection Agency, Office of Water, EPA-822-B-01-001. October 2001. Published Online:
http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/marine/index.cfm

approach, mechanistic modeling, and stressor-response analysis. The reference condition approach derives criteria from observations collected in reference waterbodies. Reference waterbodies represent least disturbed and/or minimally disturbed conditions within a region (Stoddard et al., 2006) that support designated uses (EPA, 2000a). Therefore, the range of conditions observed within reference waterbodies provides appropriate values upon which criteria can be based. The reference condition approach requires the ability to define and identify reference waterbodies, and relies on the availability of sufficient data from these reference waterbodies to characterize the distributions of different nutrient variables. Aucoot Cove is classified as an SA water and currently supports eelgrass in the middle cove, but not the inner cove. Based on its depth, strata, and other characteristics the inner cove would be expected to support eelgrass. Therefore, the primary water quality parameter considered in determining a reference location is eelgrass.

Eelgrass continues to grow in middle Aucoot Cove, but is receding from inner Aucoot Cove. This is a predictable result of the inner cove receiving nutrient inputs from point and non-point sources without the same degree of tidal flushing that characterizes the middle cove. GIS data collected by MassDEP and analyzed by EPA indicate that eelgrass coverage in Aucoot Cove has retreated from its historical extent. (see **Figure 5**). During a site visit on September 10, 2014, EPA staff observed eelgrass beds in Aucoot Cove that appeared patchy, yellowed, and shaded by attached algae. Some die-off may be expected late in the growing season. However, the thick algal cover seems to be the immediate cause of the poor condition of the eelgrass beds.

For this analysis, EPA is using monitoring station AC3 as the reference location. As shown in **Figure 4**, this location is in a current eelgrass bed. The median total nitrogen concentration at AC3 between 2007 and 2012 was 0.35 mg/L, which will be the target concentration for this analysis. EPA notes that this value is consistent with TN concentration thresholds to protect eelgrass beds identified in other estuaries. Moreover, AC3 has the lowest *chlorophyll a* levels of any monitoring station in Aucoot Cove for which these data are available. The average *chlorophyll a* level at AC3 between 2007 and 2012 was 7.0 µg/L, which is still higher than the MassDEP/SMAST protective level of 3-5 µg/L.

EPA has concluded that at existing levels, nitrogen in the Marion WPCF discharge has the reasonable potential to cause or contribute to water quality violations in Inner Aucoot Cove. as discussed in Section IV.B.3., Inner Aucoot Cove is listed as impaired and requiring a TMDL for total nitrogen, dissolved oxygen, and nutrient/eutrophication biological indicators. Monitoring stations closest to the discharge, such as AC2 and AC7, are more impaired than stations further out in the cove. While the Marion WPCF has attained an impressive level of nitrogen removal from its discharge, its average effluent nitrogen concentration of 3.46 mg/l is still ten times higher than the concentration needed to support eelgrass in the cove.

Environmental Protection Agency. 2000a. Nutrient Criteria Technical Guidance Manual: Rivers and Streams. U.S. Environmental Protection Agency, Office of Water and Office of Science and Technology, EPA-822-B-00-002. July 2000. Published Online: http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/rivers/index.cfm

Environmental Protection Agency. 2000b. Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs. U.S. Environmental Protection Agency, Office of Water and Office of Science and Technology, EPA-822-B00-001. April 2000. Published Online: http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/lakes/index.cfm

Contribution from Lagoons

The Marion WPCF deposits sludge from its treatment processes in the sewage lagoons. EPA has determined that the lagoons are functioning as sludge disposal rather than treatment or storage sites under 40 CFR Part 503 regulations. The Marion WPCF has deposited sludge in its unlined sewage lagoons for many years without any plan for removal and disposal. According to 40 CFR Part 503 Subpart C, EPA considers land that contains sewage sludge for more than two years to be a disposal site. Because the sludge storage practices constitute disposal, the draft permit contains sludge-related requirements in Sections D, E and F.

The Buzzard's Bay Coalition commissioned a study by Horsley Witten (HW) that estimated the lagoons were leaching 33,400 lbs of nitrogen per year into the groundwater, including 16,700 lbs/year to groundwater that flows in a diffuse circuitous path and ultimately discharges to Aucoot Cove. The Town of Marion and its consultant CDM Smith dispute this result, asserting that the infiltration rate and nitrogen concentration of water exiting the lagoons were overestimated, and that there may be other sources of nitrogen in the groundwater, such as the landfill, a transfer station, and a composting site.[7] The CDM analysis represents a general critique of the HW report, and no effort is made to quantify lagoon loadings or loadings from the other non-point sources referenced. EPA also notes that the sources the Town has stated may be significant are under the Town's control. Furthermore, the results of the loading analysis would be similar if the actual lagoon loading were one half of the Horsley Witten estimate.

EPA believes that like the nitrogen contributed from the surface water discharge portion of the treatment works, nitrogen from the lagoons is also contributing to nutrient impairments in Aucoot Cove and Sippican Harbor. Disposal of nitrogen rich sludge and untreated wastewater in unlined lagoons is not proper operations and maintenance of the treatment plant. Being unlined, the lagoons have the potential to leach significant amounts of nitrogen into the groundwater, which would not occur if the lagoon portion of the treatment works were being properly operated and maintained. Federal regulations require all NPDES to include certain standard conditions, including with respect to proper operation and maintenance of the treatment works:

> "The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit and with the requirements of storm water pollution prevention plans." 40 CFR § 122.41(e).

The lagoon system at the Marion WPCF is covered by this provision.[8] EPA has determined that the use of unlined lagoons for flow equalization and sludge disposal is not in compliance with the operation and maintenance requirements of 40 CFR § 122.41(e).

Furthermore, the regulations pertaining to sludge disposal (40 CFR 503.5) indicate that "on a case-by case basis, the permitting authority may impose requirements for the use or disposal of sewage sludge in addition to or more stringent than the requirements in this part when necessary to protect public health and the environment from any adverse effect of a pollutant in the sewage sludge."

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[7] http://www.marionma.gov/pages/selectmenpresent%2015NOV11.pdf

[8] The lagoon system subject to NPDES regulation as part of the "treatment works." Section 212(2)(A) of the Act defines treatment works to mean, *inter alia*, "intercepting sewers, outfall sewers, sewage collection systems, pumping, power and other equipment, and their appurtenances." POTW also "includes *any* devices and systems used in the *storage*, treatment, recycling and reclamation of municipal sewage or industrial wastes of a liquid nature." 40 CFR § 403.3(q) (emphasis added).

The EPA May 1990 document, "Guidance For Writing Case-by Case Permit Requirements For Municipal Sewage Sludge", indicates that "…many of the standard permit conditions that apply to effluent discharge activities will also apply to sludge use and disposal activities (e.g., duty to mitigate, duty of proper operation and maintenance,…" Chapter 9 of this document indicates that "Because most surface disposal sites were developed as a temporary or stop-gap sludge storage/disposal facility, EPA does not consider them to be environmentally acceptable solutions for ultimate disposal."

The EPA November 1991 document, "Guidance For NPDES Inspectors: Verifying Compliance With Sludge Requirements" indicates that, "When conducting the walk-through visual inspection of the facility, the inspector should be aware of, and look for, physical conditions that are indicative of potential or existing problems. Some of the more common indicators of potential problems are listed in Table 3-1." Table 3-1 includes "unlined sludge lagoons."

The regulations pertaining to sludge at 40 CFR Part 503.24 indicate that, "Sewage sludge placed on an active sewage sludge unit shall not contaminate an aquifer." The EPA September 1995 document, "Process Design Manual, Surface Disposal of Sewage Sludge and Domestic Septage", indicates that this management practice requires that proof be obtained that ground water is not contaminated. "This proof must be either (1) the results of a ground-water monitoring program developed by a qualified ground-water scientist, or (2) certification by a ground-water scientist that ground water will not be contaminated by the placement of sewage sludge on an active sewage sludge unit." The document further indicates that "The certification option is usually obtainable only if the active sewage sludge unit has a liner and leachate collection system. It is generally infeasible for a ground-water scientist to certify that ground water will not be contaminated in the absence of a liner unless ground water is very deep and there is a natural clay layer or unless the amount of material placed on the site is quite low."

For the above reasons, EPA has formulated special conditions relative to operation and maintenance of the lagoon system, and disposal of sludge, to assure compliance with all applicable requirements of the CWA and regulations. *See* CWA §§ 301(b)(1)(C), 402(a)(2); 40 CFR §§ 122.4(a), (d); 122.43. "Permit writers are…encouraged to be specific in formulating proper O&M requirements in the permit, especially where poor or inadequate O&M practices have caused problems in the past." 49 FR 38039 (September 26, 1984).[9] The special conditions in the permit require discontinuation of use of the unlined lagoons for equalization and disposal of sludge, and abatement of any ongoing adverse effects to the environment, including nitrogen contamination of the aquifer, resulting from the accumulated sludge and wastewater solids in the lagoons.

Effluent Limitation Calculation

A planned nitrogen loading study under Massachusetts Estuary Project (MEP) for Aucoot Cove has not been completed, nor is it expected in the near future. In the absence of such a modeling study or TMDL, EPA is required to use available information to establish water quality limits when issuing NPDES permits to impaired waters.

EPA's calculation of an effluent limitation for nitrogen consists of several steps. First, EPA determined a threshold nitrogen concentration in the water body that is consistent with

[9] *See also* NPDES Permit Writer's Manual (Chapter 9-21) ("Permits should clarify requirements for proper operation and maintenance of the collection system.")

unimpaired conditions. As discussed in the reasonable potential analysis, this concentration is 0.35 mg/L.

EPA next determined an allowable total nitrogen load from the watershed that would result in TN concentrations at or below the 0.35 mg/L TN threshold for Inner Aucoot Cove. EPA delineated a 0.1 square-mile portion of Aucoot Cove that includes both the inner harbor and the healthy eelgrass beds in middle harbor. This "reference area" is able to assimilate the existing nitrogen inputs and still supports eelgrass because it is larger and better flushed than the impaired area. EPA calculated the current TN loading per square mile of water area in Aucoot Cove for the reference area, then calculated the total watershed load that would meet that loading rate in the impaired area. To determine the allowable TN load from Outfall 001, EPA assumed that the sum of the watershed loads from various sources, including those beyond the purview of this permit, plus the load from Outfall 001, was equal to the total watershed load.

Thus, the watershed TN load is considered to have three components: (1) nonpoint sources (NPS) and stormwater point sources, (2) the discharge from the Marion WWTF Outfall 001, and (3) the exfiltration to groundwater from the Marion WWTF lagoons. The assumptions behind the calculation of each TN source are explained below.

In the absence of a detailed NPS and stormwater point sources loading analysis for the Aucoot Cove watershed, EPA used the nonpoint source and stormwater point source areal loading rate calculated for the Segreganset River watershed, which has similar land use patterns as Marion.[10] This rate, 2.32 lbs/day/sq.mi, was multiplied by the watershed area for Aucoot Cove, 4.06 square miles (from the Buzzards Bay Project), to yield a nonpoint source and stormwater point sources load of 9.40 lbs/day. This number represents stormwater runoff and nonpoint sources, including septic systems.

EPA calculated the Marion WPCF nitrogen load by multiplying the reported total nitrogen concentration for May through October 2011 through 2013 by the monthly average flow for the same time period and then multiplying by a conversion factor. The calculated WPCF nitrogen load is 13.75 lbs/day.

Finally, EPA added the nitrogen exfiltration from the Marion WPCF sludge lagoons. The best available estimate of the nitrogen loading to Aucoot Cove from the lagoons is 16,700 lbs/year, from the April 2011 Horsley Witten lagoon study,[11] which translates to 45.753 lbs/day.

Based on these three estimated loads, the total watershed nitrogen load from all three sources was calculated as 68.90 lbs/day (9.4 lbs/day + 13.75 lbs/day + 45.753 lbs/day).

EPA delineated the impaired area of Aucoot Cove as the inner half of the reference area where the nitrogen contributions from the watershed first enter the cove without the volume of water or mixing that occurs further out in the cove. As shown in Figure 6, the impaired area is 0.05 square miles, while the reference area, which includes the impaired area, is 0.1 square miles and extends outward from the unnamed brook to reference point AC3. EPA then determined the level of

[10] Calculated from the Taunton WWTP fact sheet. Drainage Area for Segreganset River = 14.9 sq. mi, total nitrogen loading = 34.5 lbs/day (see page 31 of fact sheet and Attachment A to fact sheet, respectively). http://epa.gov/region1/npdes/permits/draft/2013/draftma0100897permit.pdf

[11] Horsley & Whitten, 2011. Environmental Assessment of the Marion Wastewater Treatment Plant Sewage Lagoons. Prepared for Coalition for Buzzards Bay.

nitrogen contributions in Inner Aucoot Cove that would result in the same loading rate per unit area as currently exists for the larger area that encompasses the reference site, where it appears that nitrogen loading is not causing an impairment. **Figure 6** shows a map of the impaired and reference areas.

By dividing the loading rate by the surface area of the reference area, as shown below, EPA determined that the areal loading rate for the reference area is 689.0 lbs/day/sq.mi.

$$\frac{68.90 \text{ lbs/day}}{0.10 \text{ sq. mi.}} = 689.0 \text{ lbs/day/sq. mi.}$$

This is assumed to be an acceptable areal loading rate since the reference area extends outward to reference point AC3. To calculate the allowable daily load for the impaired area, EPA multiplied this loading rate by the area of the impaired area.

689.0 lbs/day/sq.mi. x 0.05 sq. mi. = 34.45 lbs/day total nitrogen <= Target Loading Rate for the impaired area

EPA believes that watershed loads need to be reduced to 34.45 lbs/day for the impaired area to meet water quality standards. EPA's calculations assume no reduction of nonpoint source and stormwater nitrogen. Therefore, the full nonpoint and stormwater source total was subtracted from the total loading to yield 25.05 lbs/day. This is the remaining nitrogen load allocated to the Marion WPCF outfall and lagoons combined. Because the estimated loading from the lagoons (45.753 lbs/day) exceeds the total load allocated for the Marion WPCF (25.05 lbs/day), point source reductions from the WPCF alone cannot achieve water quality standards in Aucoot Cove. If the lagoons were to continue their current mode of operation, the nitrogen allocation to the discharge would be negative.

In a scenario where the lagoon nitrogen source has been reduced to zero, the allocation to the Marion WPCF outfall would be 25.05 lbs/day TN. If the facility were running at design flow of 0.588 MGD, this flow would correlate to a TN concentration of 5.11 mg/L. However, because the lag time for groundwater to travel from the lagoons to Aucoot Cove is at least 20 years[12], nitrogen from the lagoons will continue to migrate to Aucoot Cove past the term of the next permit. WPCF effluent nitrogen concentrations need to be reduced well below 5 mg/L to achieve water quality standards in Aucoot Cove during the permit term.

The permit includes a total nitrogen limit of 3.0 mg/L, which is considered the limit of technology for nitrogen treatment, and this translates to a mass loading of 14.71 lbs/day. One permitting option considered by EPA was establishment of a limit equal to the instream target determined by EPA to implement narrative nutrient criteria. However, EPA determined that, as a first step, imposing a limit of 3 mg/L, which is consistent with maximizing nitrogen reductions based on available technology, is a reasonable at this time in order to allow the Town the opportunity to take steps to control nitrogen exfiltration from the lagoons.

[12] The distance from the lagoons to Aucoot Cove is approximately 1.5 miles. Assuming a high rate of hydraulic conductivity (ki = 1 foot/day), a hydraulic gradient of 0.006, and soil porosity of 30%, it would take the groundwater approximately 20 years to travel from the lagoons to Aucoot Cove. At lower rates of hydraulic conductivity, the groundwater would take longer to migrate to Aucoot Cove. Hydraulic rate, hydraulic gradient, and soil porosity numbers were taken from Horsley & Whitten, 2011 (Environmental Assessment of the Marion Wastewater Treatment Plant Sewage Lagoons. Prepared for Coalition for Buzzards Bay)

The Horsley Witten estimate of nitrogen discharged to Aucoot Cove via groundwater is more than three times the load discharge to the unnamed brook through the Marion treatment plant outfall (current WPCF TN load = 5,019 lbs/year). This suggests that controlling exfiltration from the lagoons may be a more significant benefit to Aucoot Cove than further control of nitrogen in the treatment plant discharge. Because alterations to the Marion lagoon system are required under the permit, and these operational changes will sharply reduce the nitrogen exfiltration from the lagoons going forward, EPA has determined this step-wise approach to restoring water quality in the receiving waters is reasonable. Furthermore, the compliance schedule to meet the 3 mg/L is also designed to allow the Town to pursue other watershed load reductions, which could lead to a limit less stringent than 3 mg/L, as explained below.

Design Flow (mgd) x Permit Limit (mg/L) x 8.34 (conversion factor) = Loading limit (lbs/day)

0.588 mgd x 3.0 mg/L x 8.34 = 14.71 lbs/day

The draft permit includes an interim limit of 5 mg/L and a 48-month compliance schedule for achieving the more stringent limit of 3 mg/L. Additionally, the permit provides a schedule, should the permittee choose to address stormwater and nonpoint sources of nitrogen identified above to attempt offset and WPCF reductions and document that WPCF nitrogen limits need not be reduced to 3.0 mg/L. If other nitrogen reductions obviate the need to go to 3.0 mg/L, the Town can request a permit modification. The schedule requires a plan evaluating, among other things, alternatives for removing the lagoons as a source of nitrogen through lining of the lagoons and/or abandonment and cleaning of the lagoons; alternatives for controlling other significant sources of nitrogen as necessary; and alternatives for achieving the 3.0 mg/L total nitrogen limit for the wastewater discharge. The schedule also requires implementation of lagoon controls and design and construction of WPCF improvements to achieve 3.0 mg/L. If, at any time, the Permittee can make a demonstration that stormwater and nonpoint source nitrogen improvements are sufficient to achieve water quality standards without further point source nitrogen reductions, the Permittee may submit a request for a permit modification. EPA will consider *net* nonpoint source and stormwater reductions in evaluating a modification request; i.e. any additional stormwater and nonpoint sources added in the interim, such as, but not limited to, new impervious area or septic systems, must be accounted for in the analysis.

The draft permit proposes a monitoring frequency of twice per week. The proposed draft permit also contains a loading limit of 14.7 lbs/day for total nitrogen.

The compliance schedule for achieving the total nitrogen limit incorporates reporting requirements relative to progress made in achieving the necessary net stormwater and nonpoint source reductions. Following issuance of the final permit, EPA will review the status of the stormwater and nonpoint source controls at 12 month intervals from the date of issuance.

In summary, the decision over how to frame the permit and its effluent limitations to achieve a protective in-stream nitrogen threshold is a difficult one given the overall environmental context. A variety of sources contribute to the nitrogen load in Aucoot Cove, including Outfall 001 of the publicly owned treatment work, the lagoons of the POTW, stormwater regulated as a point source, and nonpoint sources such as septic systems and unpermitted storm water. Nonpoint sources of nitrogen, particularly the lagoons, are the dominant contributors to Aucoot Cove's nitrogen pollution problem but, at this time, are neither subject to any effective treatment or control nor accounted for through a Total Maximum Daily Load. Given this, and in the absence of any TMDL, existing or planned, or other meaningful nonpoint source controls, EPA

deems it necessary to maximize point source reductions as a pragmatic matter, while at the same time to provide a framework to address other sources of nitrogen in the watershed.

EPA recognizes the challenges associated with controlling nitrogen through nonpoint source controls. However, these challenges do not obviate the need to carry out substantial nonpoint controls in concert with strong controls on point sources. The upcoming reissuance of the Massachusetts Small MS4 (municipal separate storm sewer) General Permit will require stronger control of municipal stormwater sources, especially when stormwater is contributing to nutrient impairments. The draft permit recognizes that there may be an appropriate pause point in the future when stormwater and nonpoint sources of nitrogen are adequately accounted for and remedied and field data indicates that all of the Aucoot Cove ecosystem has recovered to a healthy state free of cultural eutrophication.

EPA also weighed the possibility that immediate default to a more stringent effluent limitation would not give sufficient opportunity, nor incentive, for Marion to pursue necessary nonpoint source controls. Accordingly, EPA determined that, as an initial matter, a limit of 3.0 mg/l TN is adequate to comply with Section 301 of the CWA if imposed in conjunction with other efforts to address the nonpoint source component of the nitrogen pollution problem afflicting the receiving waters.[13] In an effort to effect this more comprehensive environmental objective, which is in keeping with the overall objectives of the Clean Water Act "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters" by a date long since passed, EPA is setting permit limits to require "a gross reduction in pollutant discharges" because "this ambitious statute is not hospitable to the concept that the appropriate response to a difficult pollution problem is not to try at all." NRDC v. Costle, 568 F.2d 1369, 1380 (D.C. Cir. 1977).

D) Total Phosphorus

State water quality standards require any point source discharge containing nutrients in concentrations that encourage eutrophication or growth of weeds or algae be provided with the highest and best practicable treatment to remove such nutrients. 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.

The MA SWQS (314 CMR 4.00) do not contain numerical criteria for total phosphorus. The narrative criteria for nutrients is found at 314 CMR 4.05(5)(c), which states that nutrients "shall not exceed the site specific limits necessary to control accelerated or cultural eutrophication." The Standards also require that "any existing point source discharge containing nutrients in concentrations that would cause or contribute to cultural eutrophication, including the excessive growth of aquatic plants or algae in any surface water, shall be provided with the most appropriate treatment as determined by the department, including, where necessary, highest and best practicable treatment" (314 CMR 4.05).

EPA has published national guidance documents that contain recommended total phosphorus criteria and other indicators of eutrophication. EPA's Quality Criteria for Water 1986 (the Gold Book) recommends, to control eutrophication, that in-stream phosphorus concentrations should

[13] This choice was consistent with EPA policy to address the complex nutrient pollution problems confronting the Nation's waterways. See Memorandum from Nancy K. Stoner, "Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions," March 16, 2011 ("While EPA has a number of regulatory tools at its disposal, our resources can best be employed by catalyzing and supporting action by states that want to protect their waters from nitrogen and phosphorus pollution.").

be less than 100 µg/l (0.100 mg/L) in streams or other flowing waters not discharging directly to lakes or impoundments and less than 50 µg/l in flowing waters discharging to lakes or impoundments.

More recently, EPA released Ecoregional Nutrient Criteria, established as part of an effort to reduce problems associated with excess nutrients in water bodies in specific areas of the country. The ecoregion-specific criteria represent conditions in waters minimally impacted by human activities, and thus representative of water without cultural eutrophication. The Marion WPCF is within Ecoregion XIV, Eastern Coastal Plain, Northeastern Coastal Zone. Recommended criteria for this Ecoregion[14] includes a total phosphorus criteria of 23.75 µg/l (0.024 mg/L).

EPA has typically applied the Gold Book criterion because it was developed from an effects-based approach versus the reference conditions-based approach used to develop the ecoregion criteria. The effects-based approach is taken because it is more directly associated with an impairment to a designated use (e.g. fishing). The effects-based approach provides a threshold value above which water quality impairments are likely to occur. It applies empirical observations of a causal variable (i.e. phosphorus) and a response variable (i.e. algal growth) associated with designated use impairments. Referenced-base values are statistically derived from a comparison within a population of rivers in the same ecoregional class. They are a quantitative set of river characteristics (physical, chemical, and biological) that represent minimally impacted conditions.

The effects-based Gold Book threshold is a general target applicable in free-flowing streams. As the Gold Book notes, natural conditions of a water body can lead to an either increased or reduced eutrophication response to phosphorus inputs; in some waters more stringent phosphorus reductions may be needed, while in some others a higher total phosphorus threshold could be assimilated without inducing a eutrophic response. In this case EPA believes that a phosphorus target higher than 100 µg/L is justified due to the relatively short distance of the freshwater portion of the receiving water, the sandy substrate that predominates in the freshwater reach, and the near 100 percent canopy cover that blocks sunlight from reaching the stream. In site visits conducted on August 27, 2014 and September 10, 2014, EPA visually surveyed the receiving stream downstream of the discharge and noted the presence of only minor amounts of aquatic plant and algae growth, possibly due to a heavily shaded stream corridor.

Reasonable Potential Analysis for Phosphorus

The existing permit requires Marion to monitor effluent phosphorus but does not include a limit. From September 2010 through August 2014, the average phosphorus concentration was 1.60 mg/L, with a range of 0.54 mg/L to 3.79 mg/L. Because no dilution of the discharge occurs in the unnamed brook, the concentration of phosphorus in the brook equals that of the effluent during low flow conditions. While EPA concludes that instream concentrations of total phosphorus ranging from 0.54 mg/L to 3.79 mg/L clearly represent a reasonable potential to cause or contribute to an exceedance of the narrative nutrient criteria, we do not believe, for the reasons cited above, that an instream target of 100 µg/L is necessary in this particular stream. Consequently, EPA is establishing a technology based total phosphorus limit of 0.2 mg/L (200 µg/L) based on the Highest and Best Practical Treatment requirement of the Massachusetts Surface Water Quality Standards. Highest and Best Practical Treatment has been consistently defined by EPA and MassDEP in municipal permits as 0.2 mg/L. EPA believes that this limit will ensure attainment of the narrative nutrient criteria applicable to this particular receiving stream. However, if water quality monitoring indicates that excessive plant and algae growth is occurring

[14] Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Ecoregion XIV, published in December, 2001

downstream of the discharge, the permit may be modified in order to incorporate a more stringent total phosphorus limit.

The draft permit contains a monthly average limit of 200 µg/L for the growing season months of April through October and a monthly average limit of 1 mg/L from November through March. The monitoring frequency is twice per week from April through October, and once per month from November through March.

In the event of increased effluent flow, the concentration limit may not protect water quality in Aucoot Cove. Hence, the proposed draft permit also contains phosphorus loading limits of 0.98 lbs/day for total phosphorus in April through October and 4.9 lbs/day from November through March.

Loading (lbs/day) = Design flow (MGD) x Limit (mg/L) x 8.34 (conversion factor)

Monthly Average Load: May - October (lbs/day)
= 0.588 MGD x 0.2 mg/L x 8.34 = **0.98 lbs/day**

Monthly Average Load: November - March (lbs/day)
= 0.588 MGD x 1.0 mg/L x 8.34 = **4.9 lbs/day**

Because it is likely to take time for the permittee to meet a total phosphorus limit of 200 µg/L, EPA has included a 24-month compliance schedule, with a progress report due after 12 months. Given that the existing treatment facility is capable of meeting a total phosphorus limit of 200 µg/L with the addition of chemical precipitation capabilities, 24 months allows sufficient time for evaluating/piloting chemical addition and construction of chemical storage and dosing facilities. During this period, the interim year round limit will be 1 mg/L.

E) Metals

Certain metals in water can be toxic to aquatic life. It is necessary to limit effluent toxic metal concentrations where the discharge has the reasonable potential to cause or contribute to water quality standards violations, including aquatic life impairment. An evaluation of the facility's effluent metals concentration from September 2011 to September 2013 (n=8) was used to determine reasonable potential for toxicity caused by aluminum, cadmium, chromium, copper, lead, nickel and zinc.

Metals may be present in both dissolved and particulate forms in the water column. However, extensive studies suggest that it is the dissolved fraction that is biologically available, and therefore, presents the greatest risk of toxicity to aquatic life inhabiting the water column. Water Quality Standards Handbook: Second Edition, Chapter 3.6 and Appendix J (EPA 823-B-94-005a) (EPA 1994). Also see http://water.epa.gov/scitech/swguidance/standards/handbook/chapter03.cfm#section6.
As a result, water quality criteria are established in terms of dissolved metals.

However, regulations at 40 CFR § 122.45(c) require, with limited exceptions, that metals limits in NPDES permits be expressed as total recoverable metals. This accounts for the potential for a transition from the particulate to dissolved form as the effluent mixes with the receiving water (*The Metals Translator: Guidance for Calculating a Total Recoverable Permit Limit from a Dissolved Criterion)* (EPA-823-B96-007) (EPA 1996).

For metals with hardness-based water quality criteria, the criteria were determined using the equations in the MA SWQS (314 CMR 4.00), using the appropriate factors for the individual metals found in the MA SWQS (see table below). Because the unnamed brook has no natural streamflow at the discharge location during 7Q10 conditions, the discharge concentration equals the downstream concentration. Hence, EPA used the median hardness of the effluent to calculate hardness-dependent metals criteria[15]. Table 2, below, presents the factors used to determine the acute and chronic total recoverable criteria for each metal.

Q_d = facility's design flow (0.588 mgd = 0.910 cfs)
C_d = maximum effluent concentration
Q_s = natural 7Q10 flow (0 cfs)
C_s = median upstream concentration
Q_r = downstream 7Q10 flow (0.910 cfs)
C_r = resultant downstream concentration

Because the 7Q10 at the discharge location equals zero, the unnamed brook provides no dilution. Reasonable potential occurs when the discharge concentration exceeds the applicable criteria. To assure compliance with water quality criteria, and to prevent instream toxicity to aquatic life in this situation, EPA must impose a limit equal to criteria at the end of the pipe.

Table 2. Hardness Dependent Metals Criteria (hardness = 98.5)

Metal	Parameters				Total Recoverable Criteria	
	ma	Ba	mc	bc	Acute Criteria (CMC) (µg/L)	Chronic Criteria (CCC) (µg/L)
Aluminum	—	—	—	—	750	87
Cadmium	1.0166	-3.9240	0.7409	-4.7190	2.57	0.309763
Copper	N/A	N/A	N/A	N/A	5.78	3.73
Lead	1.273	-1.46	1.273	-4.705	102.97	4.01
Nickel	0.846	2.255	0.846	0.0584	547.42	60.86

Acute Criteria (CMC) = exp{ma*ln(hardness)+ba}
Chronic Criteria (CCC) = exp{mc*ln(hardness)+bc}
Marine copper criteria are 4.8 µg/L and 3.1 µg/L, expressed as the dissolved fraction. They were converted to total recoverable using the conversion factor 0.83 (dissolved = total recoverable x 0.83).

As indicated in Table 3, based on the 95th percentile projected effluent concentrations, no reasonable potential exists (for either acute or chronic conditions) that the discharge of cadmium, nickel, lead or zinc will cause or contribute to an exceedance of the applicable water quality criteria. However, the discharge does have reasonable potential to cause or contribute to an excursion from the marine chronic and/or acute water quality criteria for copper.

[15] The median is used for hardness calculations and upstream pollutants because it is less sensitive to extreme values that may be caused by measurement error. Also, the median is considered a better statistic for small sample sizes.

Although discharges of aluminum from the Marion WPCF have no reasonable potential to cause an excursion from water quality standards, this situation may change if Marion opts to use aluminum-based chemicals for phosphorus removal. Because the unnamed brook provides no dilution to the Marion discharge, the facility must ensure that its aluminum discharges stay below the chronic aquatic life water quality criterion of 87 µg/L to avoid an aluminum effluent limit in future permits. EPA will be monitoring aluminum data from WET test reports to ensure that aluminum levels do not cause or contribute to an excursion from water quality standards in the unnamed brook.

Table 3. Metals Reasonable Potential Analysis.

Metal	Cd (Max observed)	Cr = Cd	Criteria (expressed as total recoverable)		Reasonable Potential	Limit = Criteria (if needed) (total recoverable)	
	µg/L	µg/L	Acute (µg/L)	Chronic (µg/L)	Cr > Criteria	Acute (µg/L)	Chronic (µg/L)
Aluminum	21	21	750	87	N	N/A	N/A
Cadmium	<4	<4	2.10	0.268	N	N/A	N/A
Copper	63	63	5.78	3.73	Y	5.78	3.73
Lead	<1	<1	80.09	3.12	N	N/A	N/A
Nickel	1	1.0	463.21	51.50	N	N/A	N/A
Zinc	54	54	95.14	85.62	N	N/A	N/A

*In shaded cells, marine water quality criteria were used because they were more stringent than the freshwater criteria.

Copper

Copper is toxic to aquatic life at low concentrations. The current permit includes a monthly average limit of 7.7 µg/L and a maximum daily limit of 13.1 µg/L. These limits were calculated using a hardness value of 80 mg/L for the receiving water and a dilution factor of 1. After the Marion WPCF failed to meet the limits, EPA issued an Administrative Order with an interim maximum daily limit of 20 µg/L on October 22, 2007. An examination of the DMR and WET test data from September 2010 through August 2014 indicates that the monthly average effluent copper ranged from non-detect to 63 µg/L, and the maximum daily copper ranged from 0 µg/L to 71 µg/L. There have been 13 violations of the 20 µg/L interim limit between September 2010 and August 2014.

In the National Recommended Water Quality Criteria: 2002, EPA updated its national recommended water quality criteria for toxic metals such as copper. 314 CMR 4.05(5)(e) Toxic Pollutants of the State water quality standards specifies, "[t]he Department shall use the water quality criteria for the protection of aquatic life expressed in terms of the dissolved fraction of metals." EPA has used conversion factors provided by the National Recommended Water Quality Criteria: 2002 to translate criteria expressed as total dissolved to total recoverable for reasonable potential analysis and effluent limit derivation.

In December 2006, the MA SWQS were revised to include site-specific copper criteria that were developed for certain water bodies in the State where national criteria are overly protective due to

site-specific physical, chemical, or biological considerations, and do not exceed the safe exposure levels determined by toxicity testing [314 CMR 4.05(5)(e) Table 28]. MassDEP adopted an acute dissolved copper criterion of 25.7 µg/L and a chronic dissolved criterion of 18.1 µg/L for the unnamed brook that drains to Aucoot Cove. The total recoverable acute copper criterion is 26.8 µg/L and the total recoverable chronic copper criteria is 18.9 µg/L. EPA approved these criteria on March 26, 2007. However, the marine chronic copper criterion is 3.1 µg/L, and the marine acute copper criterion is 4.8 µg/L, both expressed as dissolved copper. These criteria are not hardness dependent. These criteria apply in Aucoot Cove.

Because the unnamed brook provides no dilution, a limit equal to the freshwater copper criteria at the end of the pipe would assure compliance with water quality standards for the unnamed brook. Therefore, the limits to protect the freshwater brook would be a maximum daily limit of 26.8 µg/L and a monthly average limit of 18.9 µg/L.

However, marine water quality criteria must be met where the unnamed brook flows into Aucoot Cove. To determine if the limits above are protective of Aucoot Cove, EPA must first determine the copper concentration at the mouth of the unnamed brook, where marine criteria apply. According to USGS Streamstats, the natural (i.e. absent WWTF effluent) 7Q10 of the unnamed brook is 0.0213 cfs.

Table 4. Marion WPCF WET Test Background Copper

Date	Copper conc., µg/L
9/1/11	64
12/5/11	42
3/5/12	20
7/1012	15
9/19/12	12
12/10/12	14
6/1013	6
9/9/13	5
median	14.5

Because, as shown in Table 4 above, the copper concentration of the unnamed brook (14.5 µg/L) exceeds the acute and chronic copper marine criteria, it does not provide dilution to the effluent. EPA has imposed a limit equal to the criteria to protect the shellfishing uses and SA designation of Aucoot Cove. Therefore, the draft permit proposes a monthly average limit of 3.73 µg/L and a maximum daily limit of 5.78 µg/L (expressed as total recoverable). The monitoring frequency will be once per week.

The proposed draft permit also contains loading limit of 0.045 lbs/day for copper.

Loading (lbs/day) = Design flow (MGD) x Limit (mg/L) x 8.34 (conversion factor)
Monthly Average Load (lbs/day) = 0.588 MGD x 0.00373 mg/L x 8.34
Monthly Average Load (lbs/day) = 0.018 lbs/day

F) Whole Effluent Toxicity

National studies conducted by the EPA have demonstrated that domestic sources contribute toxic constituents to POTWs. These constituents include metals, chlorinated solvents, aromatic hydrocarbons and others.

Therefore, based on the potential for toxicity from domestic contributions, water quality standards and in accordance with EPA regional policy, the draft permit includes acute and chronic effluent toxicity limitations and monitoring requirements (LC50). (See, e.g., "Policy for the Development of Water Quality-Based Permit Limitations for Toxic Pollutants": 50 Fed. Reg. 30, 784 (July 24, 1985).

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.

The toxicity limits in the current permit were established using the Massachusetts Toxics Policy. The Policy requires that for discharges with dilution factors of 10 and under, the C-NOEC must equal or exceed the receiving water concentration (RWC) of the effluent, which is the inverse of the dilution factor.

From September 2010 through August 2014, there were three violations of the daphnid chronic limit, the most recent being in June 2012. There was also one violation each of the daphnid acute limit and the minnow chronic limit. There were no violations of the minnow acute limit during this time period.

C-NOEC $\geq$ RWC = 1/dilution factor
= 1/1
= 1 (100%)

The draft permit carries forward the requirements for quarterly chronic and acute toxicity tests using the species *Pimiphales promelas* and *Ceriodaphnia dubia*. The acute toxicity endpoint, expressed as LC50, must equal or exceed 100% effluent. The chronic toxicity endpoint, expressed as C-NOEC (no effect concentration), must also equal or exceed 100% effluent. The tests must be performed in accordance with the test procedures and protocols specified in **Permit Attachment A**. The tests will be conducted four times a year, during the following months: March, June, September and December.

The requirements for WET testing recently changed such that the modified acute toxicity test in the current permit, which is conducted as part of the chronic toxicity test, is no longer used for compliance. Thus, the modified acute testing requirement is being replaced by a standalone acute toxicity test. The acute toxicity testing protocol is **Permit Attachment B**.

VI. Operations and Maintenance

EPA regulations set forth a standard condition for "Proper Operation and Maintenance" that is included in all NPDES permits. *See* 40 CFR § 122.41(e). This condition is specified in Part II.B.1 (Standard Conditions) of the draft permit and it requires the proper operation and maintenance of

all wastewater treatment systems and related facilities installed or used to achieve permit conditions.

EPA regulations also specify a standard condition to be included in all NPDES permits that specifically imposes on permittees a "duty to mitigate." *See* 40 CFR § 122.41(d). This condition is specified in Part II.B.3 of the draft permit and it requires permittees to take all reasonable steps – which in some cases may include operations and maintenance work - to minimize or prevent any discharge in violation of the permit which has the reasonable likelihood of adversely affecting human health or the environment.

Proper operation of collection systems is critical to prevent blockages and equipment failures that would cause overflows of the collection system (sanitary sewer overflows, or SSOs), and to limit the amount of non-wastewater flow entering the collection system (inflow and infiltration or I/I). I/I in a collection system can pose a significant environmental problem because it may displace wastewater flow and thereby cause, or contribute to causing, SSOs. Moreover, I/I could reduce the capacity and efficiency of the treatment plant and cause bypasses of secondary treatment. Therefore, reducing I/I will help to minimize any SSOs and maximize the flow receiving proper treatment at the treatment plant. The permittee reports that approximately 220,400 gallons per day of (I/I) enters the sewer system. MassDEP has stated that the inclusion in NPDES permits of I/I control conditions is a standard State Certification requirement under Section 401 of the CWA and 40 CFR § 124.55(b).

Therefore, specific permit conditions have been included in Part I.B., and I.C. and I.D. of the draft permit. These requirements include mapping of the wastewater collection system, preparing and implementing a collection system operation and maintenance plan, reporting unauthorized discharges including SSOs, maintaining an adequate maintenance staff, performing preventative maintenance, controlling infiltration and inflow to the extent necessary to prevent SSOs and I/I related-effluent violations at the wastewater treatment plant, and maintaining alternate power where necessary. These requirements are intended to minimize the occurrence of permit violations that have a reasonable likelihood of adversely affecting human health or the environment, such as SSOs.

Several of the requirements in the draft permit are not included in the existing permit, including collection system mapping, and preparation of a collection system operation and maintenance plan. EPA has determined that these additional requirements, such as collection system mapping and preparing an Operations and Maintenance Plan, are necessary to ensure the proper operation and maintenance of the collection system to prevent SSO and treatment upsets. The draft permit includes schedules for completing these requirements.

VII. Sludge

The permit prohibits any discharge of sludge to waters of the U.S. Section 405(d) of the Clean Water Act requires that sludge conditions be included in all NPDES permits.

Currently, the Marion WPCF deposits sludge from its treatment processes in the sewage lagoons. EPA has determined that the lagoons are, in effect, sludge disposal sites under 40 CFR Part 503 regulations. The Marion WPCF has deposited sludge in its unlined sewage lagoons for over 30 years without any apparent plan for removal and disposal. According to 40 CFR Part 503 Subpart C, EPA considers land that contains sewage sludge for more than two years to be a disposal site.

Because the sludge storage practices constitute disposal, the draft permit contains standard sludge requirements in Section D. A description of further permit conditions related to sludge disposal and the lagoons can be found in the "Contribution of Lagoons" section of V.4.(C) of this fact sheet and Parts I.D. and I.E. of the draft permit.

VIII. Pretreatment

The permittee does not have any major industries contributing industrial wastewater to the WWTF, and thus is not required to have a pretreatment program. Pollutants introduced into POTWs by a non-domestic source shall not pass through the POTW or interfere with the operation or performance of the treatment works.

IX. Antidegradation

This draft permit is being reissued with an allowable wasteload identical to the current permit and no change in outfall location. The State of Massachusetts has indicated that there will be no lowering of water quality and no loss of existing water uses and that no additional anti-degradation review is warranted.

X. Essential Fish Habitat (EFH)

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. § 1801 et seq.(1998)), EPA is required to consult with National Marine Fisheries Service (NMFS) if EPA's action or proposed actions that it funds, permits, or undertakes, may adversely impact any essential fish habitat.16 U.S.C. § 1855(b). The Amendments broadly define essential fish habitat as: waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. 16 U.S.C. § 1802(10). Adversely impact means any impact which reduces the quality and/or quantity of EFH. 50CFR.§ 600.910(a). Adverse effects may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions.

Essential fish habitat is only designated for fish species for which federal Fisheries Management Plans exist. 16 U.S.C. § 1855(b)(1)(A). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999.

EPA has determined that direct and indirect impacts associated with the proposed draft permit to the EFH species, their habitat and forage, have been minimized to the extent that no significant adverse impacts are expected. Further mitigation is not warranted. An EFH analysis containing information that supports EPA's determination is included in Appendix D of this fact sheet. NMFS Habitat Division will be notified if adverse impacts to EFH are detected as a result of this permit action or if new information becomes available that changes the basis for these conclusions.

XI. Endangered Species

The Endangered Species Act of 1973, as amended (ESA), imposes requirements on Federal agencies related to the potential effects of their actions on endangered or threatened species of fish, wildlife, or plants (listed species) and their designated "critical habitat."

Section 7 of the ESA requires, in general, that Federal agencies insure that any actions they authorize, fund, or carry out, in the United States or upon the high seas, are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated "critical habitat" for those species. Federal agencies carry out their

responsibilities under the ESA in consultation with, and assisted by, the Departments of Interior (DOI) and/or Commerce (DOC), depending on the species involved. The United States Fish & Wildlife Service (USFWS) of the DOI administers Section 7 consultations for freshwater species, while the National Oceanic and Atmospheric Administration (NOAA) of DOC does so for marine species and anadromous fish.

The federal action being considered in this case is EPA's proposed draft NPDES permit to the Marion Water Pollution Control Facility. The draft permit is intended to replace the existing NPDES permit in regulating wastewater discharges from the Town's WPCF, as discussed above. The single outfall discharges into an unnamed brook (locally known as Effluent Brook) that travels about a mile before entering Aucoot Cove (Buzzards Bay – 95; HUC12: 010900020305). The brook and the inner Aucoot cove are considered the action area of this draft permit.

Coastal areas of Massachusetts provide habitat for a number of federally protected marine species, including: mammals (whales: North Atlantic Right, Humpback, Fin, Sei, Sperm, Blue – all endangered); reptiles (sea turtles: Kemp's Ridley, Leatherback, Green – all endangered; Loggerhead – Threatened but proposed for listing as endangered). In addition, the protected anadromous fish species shortnose sturgeon and Atlantic sturgeon are expected to be in Massachusetts coastal waters.

However, EPA does not consider the area influenced by facility discharge (the action area) to be suitable habitat for the species listed above. Based on the normal distribution of these species, it is extremely unlikely that there would be any NMFS listed species in the vicinity of the unnamed brook and the inner Aucoot Cove of Buzzards Bay. EPA has determined that no protected species are present in any area influenced by the discharge. Therefore, no section 7 consultation is required.

XII. Monitoring and Reporting

The effluent monitoring requirements have been established to yield data representative of the discharge under authority of Section 308 (a) of the CWA in accordance with 40 CFR §§122.41 (j), 122.44 (l), and 122.48.

The Draft Permit requires the permittee to continue to electronically report monitoring results obtained during each calendar month as Discharge Monitoring Report (DMRs) to EPA and the state using NetDMR no later than the 15th day of the month following the completed reporting period.

NetDMR is a national web-based tool for regulated CWA permittees to submit DMRs electronically via a secure internet application to U.S. EPA through the Environmental Information Exchange Network. NetDMR allows participants to discontinue mailing in hard copy forms under 40 CFR § 122.41 and § 403.12. NetDMR is accessed from the following url: http://www.epa.gov/netdmr. Further information about NetDMR can be found on the EPA Region 1 NetDMR website located at http://www.epa.gov/region1/npdes/netdmr/index.html.

In most cases, reports required under the permit shall be submitted to EPA as an electronic attachment through NetDMR. Certain exceptions are provided in the permit such as for providing written notifications required under the Part II Standard Permit Conditions. With the use of NetDMR to report DMRs and reports, the permittee is no longer be required to submit hard copies of DMRs or other reports to EPA and is no longer required to submit hard copies of DMRs to MassDEP. However, permittees must continue to send hard copies of reports other than DMRs

to MassDEP until further notice from MassDEP. State reporting requirements are further explained in the draft permit.

XIII. State Certification Requirements

EPA may not issue a permit unless the Massachusetts Department of Environmental Protection 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. EPA has requested permit certification by the state pursuant to 40 CFR § 124.53 and expects that the draft permit will be certified.

XIV. 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 a supporting material for their arguments in full by the close of the public comment period, to Robin Johnson, U.S. EPA, Office of Ecosystem Protection, 5 Post Office Square, Suite 100, Boston, Massachusetts 02109-3912. Any person, prior to such date, may submit a request in writing to EPA and MassDEP for a public hearing to consider the draft permit. 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.

XV. EPA Contact

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

Robin Johnson
Municipal Permits Branch
U.S. Environmental Protection Agency
5 Post Office Square, Suite 100 (OEP 6-1)
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Claire Golden
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978-694-3244
Email: claire.golden@state.ma.us

_____
Date

Ken Moraff, Director
Office of Ecosystem Protection
U.S. Environmental Protection Agency
Boston, MA

Memorandum

To: Paul Hogan, MassDEP/DEM, Worcester, MA

Through: Arthur Johnson, MassDEP/DWM, Worcester, MA
Robert Nuzzo, MassDEP/DWM, Worcester, MA
John Fiorentino, MassDEP/DWM, Worcester, MA

From: Peter Mitchell, MassDEP/DWM, Worcester, MA

Date: June 27, 2007

Subject: **Qualitative benthos assessment upstream and downstream of Marion WWTP discharge**

On 16 May 2007, the Massachusetts Department of Environmental Protection's Division of Watershed Management (MassDEP/DWM) conducted qualitative multi-habitat biological monitoring upstream and downstream of the Marion Wastewater Treatment Plant (NPDES Permit Number MA0100030) discharge to assess potential impacts to the facility's unnamed receiving water (locally known as Effluent Brook). This was a follow-up investigation of a similar monitoring effort conducted by MassDEP/DWM in 2000 prior to facility upgrades.

Aquatic benthic macroinvertebrate biomonitoring was performed based on modifications to the US EPA Rapid Bioassessment Protocol I (RBP I), a screening and reconnaissance assessment that documents specific visual observatories made in the field by a trained professional (Plafkin. et al. 1989). The RBP I protocol is able to discriminate between obviously impacted stream reaches and un-impacted stream reaches. The biological component of the RBPI protocol consists of sampling the benthic macroinvertebrate community and potentially the examination of other aquatic biota (periphyton, macrophytes and fish). The RBPI protocol also includes an assessment of instream and riparian habitat conditions. Benthic macroinvertebrates are captured using a "kick" net. A variety of instream habitats (riffles, pools, runs, snags, macrophytes) are sampled. Collected fauna are identified to Family in the field, and then transported to the MassDEP/DWM microscopy lab for verification of the identifications. Determinations of impairment are made based upon comparison of conditions below the discharge to an upstream (reference) station. Impairments may be determined by the absence of particularly pollution sensitive organisms downstream of the discharge if these organisms are present at the upstream station. Impairment may also be determined by the dominance of pollution tolerant organisms at the downstream sampling locations.

The RBP I survey was conducted at the three stations previously examined by MassDEP/DWM on 17 May 2000. The stations were immediately upstream of the Marion WWTP discharge, 100 meters downstream of the discharge, and approximately 1 kilometer (0.5 miles) downstream of the discharge (Figures 1 and 2). Epifaunal habitat

within each sampling reach was generally similar. Fine substrates (sand and silt) dominated at all stations; however, there were patches of gravel (and some cobble) at the bends and constrictions. Snags and some instream vegetation also supplied habitat amenable to benthic macroinvertebrates. Aquatic vegetation—most notably, water starwort (*Callitriche* sp.)—was prevalent downstream from the discharge but virtually absent upstream. Prolific growth of green algae was observed at all biomonitoring stations, with the community comprised of mainly filamentous forms of green algae and diatoms. Algae densities were estimated as covering 60% (*Fragilaria* sp.—abundant; *Ulothrix* sp.—very abundant; *Chaetophora pisiformis*—very abundant) of the available habitat upstream of the outfall pipe, covering 85% (*Draparnaldia* sp.—very abundant; *Ulothrix* sp.—very abundant) of the available habitat immediately downstream of the outfall pipe, and covering 70% (*Draparnaldia* sp.—very abundant; *Tetraspora cylindrica*—very abundant) of the available habitat 1 kilometer downstream of the outfall pipe. The algae were attached to plants, and some of the more stable inorganic substrates. Baseflow was extremely reduced upstream from the discharge where stream depth was only about 0.10 m and current velocity was barely perceptible. The discharge significantly augmented flow conditions at the two downstream reaches, with greater depth (approximately 0.20 m) and swifter current velocities. In addition, the tea-stained water color above the discharge was not observed below the discharge. It appears that significant dilution of the tannin-laden water is taking place. The riparian zones abutting each of the sampling reaches were dominated by forest. Although some residences are proximal to the stream, the extensive riparian buffer minimizes the potential for non-point source pollution.

The collected benthic samples revealed generally similar communities at all stations (Table 1). There were 10 taxa collected above the discharge, 13 taxa collected immediately below the discharge, and 10 taxa 1 kilometer downstream of the discharge. Chironomidae (midges) and Simuliidae (black flies) were co-dominant at the station upstream of the discharge. Chironomidae, Physidae (physid snails) and Asellidae (isopods) were dominant at the station 100 meters downstream from the discharge. Chironomidae remained hyperdominant at the station 1 kilometer downstream from the discharge (Table 1). All of the above-mentioned taxa display fairly high tolerance of organic pollution (Table 1). Their abundance suggests organic/nutrient enrichment throughout Effluent Brook, and the importance of both suspended and deposited forms of organic materials as a food resource.

When MassDEP/DWM conducted biomonitoring in Effluent Brook in 2000 (Fiorentino 2000), two families of stoneflies (Plecoptera – generally considered the most pollution intolerant aquatic insects) were collected at the upstream station. Plecoptera, and other pollution-sensitive taxa, were absent during the 2007 biosurvey. The benthos samples from each station in 2007 were far more comparable than they were in 2000. This change appears more due to a decrease in intolerant taxa upstream from the discharge, than an increase in intolerant taxa below the discharge.

The benthic community observed in 2007 showed no obvious signs of impairment as a direct result of the Marion WWTP discharge. Rather, water quality degradation may occur throughout (i.e., upstream and downstream from the discharge) Effluent Brook, as evidenced by the lack of pollution-sensitive macroinvertebrate taxa, predominance of taxa highly tolerant of organic enrichment and low dissolved oxygen levels, and prolific

algal growth. It is possible that the discharge is actually improving conditions for benthic macroinvertebrates by increasing flow within Effluent Brook (e.g. creating riffle habitats). Continued monitoring of these stations is recommended, especially if the operations of the Marion WWTP (in terms of either volume or treatment methods) change in the future. Additionally, many new homes have been constructed within the Effluent Brook subbasin since the 2000 survey. Continued residential development may ultimately lead to non-point source pollution impacts to adjacent and/or downstream portions of the stream. Monitoring for these effects is also recommended as part of future sampling efforts. Water quality sampling, particularly for nutrients and various physicochemical parameters (temperature, predawn dissolved oxygen levels, etc.), should be included in future monitoring activities in this stream.

Literature Cited:

Plafkin, J. L., M. T. Barbour, K. D. Porter, S. K. Gross, and R. M. Hughes. 1989. Rapid Bioassessment Protocols for Use in Streams and Rivers: Benthic Macroinvertebrates and Fish. EPA/440/4-89-001. Office of Water, US Environmental Protection Agency, Washington, DC.

Fiorentino. 2000. *Memorandum*. From: John Fiorentino. To: Dave Pincumbre. Subject: Qualitative benthos assessment upstream and downstream of Marion WWTP. 21 August 2000. On file at Massachusetts Department of Environmental Protection, Division of Watershed Management, Worcester, MA.

Taxon	FFG[1]	TV[2]	Upstream	100m downstream	1km downstream
Physidae	GC	8	0[3]	4	0
Planorbidae	SC	6	2	1	1
Pisidiidae	FC	6	0	1	1
Lumbriculidae	GC	7	2	3	1
Tubificidae	GC	10	2	3	1
Enchytraeidae	GC	10	2	0	0
Lumbricina	GC	8	0	1	0
Asellidae	GC	8	3	4	2
Crangonyctidae	GC	6	1	1	0
Hydropsychidae	FC	4	0	1	3
Limnephilidae	SH	4	0	1	1
Phyrganeidae	SH	4	1	0	0
Chironomidae	GC	6	4	4	4
Simuliidae	FC	6	4	1	1
Tipulidae	SH	5	1	0	1
Total Richness	--	--	10	13	10

Table 1. Taxa list and relative abundance of benthic macroinvertebrates collected from stations in the vicinity of Marion WWTP discharge-Marion, MA.

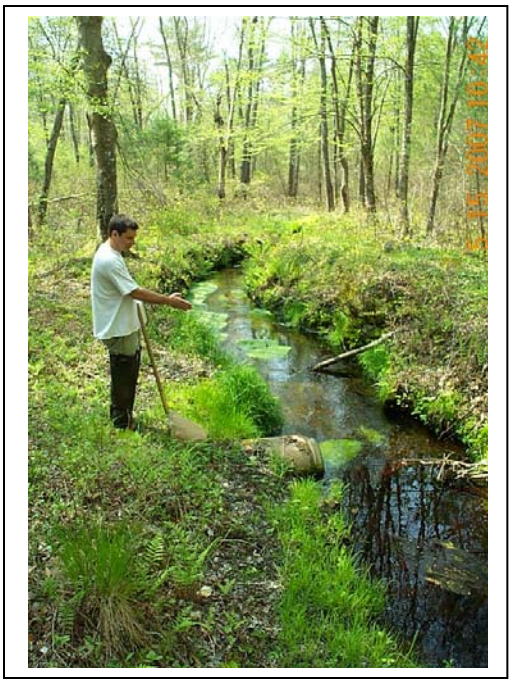
[1] FFG: Functional Feeding Groups. Lists the primary feeding habit of each taxon and follows the abbreviations: SH-Shredder, GC-Gathering Collector, FC-Filtering Collector, SC-Scraper, PR-Predator.

[2] TV: Tolerance Values. Range from 0 for organisms very intolerant of organic pollution to 10 for organisms very tolerant of organic pollution.

[3] Observed Density of taxon. 0 (Absent), 1 (Rare), 2 (Common), 3 (Abundant), 4 (Dominant).

Figure 1: Effluent Brook RBPI Stations Marion, MA

Immediately upstream of discharge



At Discharge, looking downstream

1 km downstream from discharge

Figure 2. Photographs of Marion WWTP discharge study area

Appendix B

DMR SUMMARY - Marion WPCF

September 2010 - August 2014

Monitoring Period End Date	Flow Max	Flow avg*	pH Min	pH Max	BOD, avg monthly loading	BOD, max daily loading	BOD, monthly avg	BOD, weekly avg	BOD, daily max	TSS, avg monthly loading	TSS, max daily loading	TSS, avg monthly	TSS, avg weekly	TSS, max daily
	MGD	MGD	s.u.	s.u.	lb/day	lb/day	mg/l	mg/l	mg/l	lb/day	lb/day	mg/l	mg/l	mg/l
09/30/2010	.539	.321	7.1	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10/31/2010	.413	.333	7.2	7.5	0.0	0.0	0.0	0.0	0.0	1.1	6.9	0.4	0.4	2.0
11/30/2010	.498	.369	7.1	7.4	2.3	12.5	1.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0
12/31/2010	0.474	0.527	7.1	7.4	4.7	11.9	1.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0
01/31/2011	0.537	0.501	7	7.4	0	0	0.0	0.0	0.0	2.8	13.4	1.0	1.0	3.0
02/28/2011	0.752	0.501	7	7.3	7.5	18.8	2.0	2.0	3.0	5.0	12.5	1.0	1.0	2.0
03/31/2011	0.836	0.491	6.8	7.2	12.2	27.9	2.0	2.0	4.0	7.8	20.9	1.0	1.0	3.0
04/30/2011	0.845	0.488	6.7	7.2	21.3	28.2	4.0	4.0	4.0	0.0	0.0	0.0	0.0	0.0
05/31/2011	0.781	0.496	6.7	7.3	4.2	19.5	1.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0
06/30/2011	0.573	0.489	7	7.3	9.9	38.2	3.0	3.0	8.0	0.0	0.0	0.0	0.0	0.0
07/31/2011	0.339	0.485	7.	7.5	3.4	7.0	1.0	1.0	2.0	1.5	6.2	1.0	1.0	2.0
08/31/2011	0.336	0.486	7.2	7.6	11.1	13.3	4.0	4.0	5.0	1.3	6.4	0.0	0.0	0.0
09/30/2011	0.406	0.492	7.1	7.5	2.7	10.9	1.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0
10/31/2011	0.529	0.506	6.9	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11/30/2011	0.690	0.524	6.8	7.3	9.0	33.0	2.0	2.0	7.7	0.0	0.0	0.0	0.0	0.0
12/31/2011	0.664	0.546	7.	7.3	4.3	17.0	1.0	1.0	3.8	0.0	0.0	0.0	0.0	0.0
01/31/2012	0.544	0.555	6.9	7.2	6.6	14.4	1.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0
02/29/2012	0.518	0.546	6.9	7.2	1.9	9.3	1.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0
03/31/2012	0.425	0.526	7.	7.2	4.6	9.7	1.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0
04/30/2012	0.355	0.494	7.1	7.4	4.3	17.3	1.0	1.0	5.0	0.0	0.0	0.0	0.0	0.0
05/31/2012	0.513	0.481	7.	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
06/30/2012	0.409	0.477	7.1	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
07/31/2012	0.252	0.470	7.3	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/31/2012	0.399	0.475	7.1	7.4	4.2	10.6	1.0	1.0	4.0	0.0	0.0	0.0	0.0	0.0
09/30/2012	0.323	0.468	7.3	7.7	3.0	6.9	1.0	1.0	2.0	0.0	0.0	0.0	0.0	0.0
10/31/2012	0.274	0.448	7.1	7.6	4.5	9.4	1.4	1.4	2.8	0.0	0.0	0.0	0.0	0.0
11/30/2012	0.420	0.426	7.2	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12/31/2012	0.491	0.411	6.9	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
01/31/2013	0.494	0.407	7.	7.4	6.7	13.8	2.0	2.0	4.0	0.0	0.0	0.0	0.0	0.0
02/28/2013	0.573	0.412	6.8	7.2	3.2	12.6	1.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0
03/31/2013	0.795	0.442	6.7	7.	5.2	20.8	1.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0
04/30/2013	0.679	0.469	6.8	7.1	5.1	20.3	0.8	0.8	3.2	0.0	0.0	0.0	0.0	0.0
05/31/2013	0.604	0.477	7.	7.3	15.8	25.1	3.0	3.0	5.0	0.0	0.0	0.0	0.0	0.0
06/30/2013	0.764	0.507	6.9	7.3	4.9	19.7	0.8	0.8	3.3	0.0	0.0	0.0	0.0	0.0
07/31/2013	0.582	0.534	6.9	7.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/31/2013	0.268	0.523	7.	7.5	4.4	13.3	2.0	2.0	5.0	0.0	0.0	0.0	0.0	0.0
09/30/2013	0.358	0.525	7.2	7.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10/31/2013	0.259	0.524	7.3	7.6	4.5	16.5	2.0	2.0	7.6	0.0	0.0	0.0	0.0	0.0
11/30/2013	0.245	0.509	7.2	7.5	2.9	6.3	1.0	1.0	3.0	0.0	0.0	0.0	0.0	0.0
12/31/2013	0.543	0.500	7.1	7.3	7.6	37.8	1.9	1.9	9.5	0.0	0.0	0.0	0.0	0.0
01/31/2014	0.707	0.503	6.9	7.2	3.0	11.9	0.6	0.6	2.4	0.0	0.0	0.0	0.0	0.0
02/28/2014	0.782	0.503	6.8	7.3	7.5	16.4	1.7	1.7	4.3	0.0	0.0	0.0	0.0	0.0
03/31/2014	0.751	0.483	7.	7.6	3.0	15.2	0.5	0.5	2.3	0.0	0.0	0.0	0.0	0.0
04/30/2014	0.838	0.490	6.7	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05/31/2014	0.798	0.496	7.	7.4	8.1	32.4	2.0	2.0	7.9	0.0	0.0	0.0	0.0	0.0
06/30/2014	0.578	0.474	6.9	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
07/31/2014	0.773	0.465	6.9	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
08/31/2014	0.507	0.477	7.	7.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
May 2007 limits	Report	0.588	6.5	8.3	42	63	9	13	Report	42	63	9	13	Report
Minimum	.245	.321	6.7	7.	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Maximum	.845	.555	7.3	7.7	21.3	38.2	4.	4.	9.5	7.8	20.9	1.	1.	3.
Average	0.54	0.48	6.99	7.38	4.24	12.04	1.06	1.06	2.83	0.41	1.38	0.09	0.09	0.25
Standard Deviation	0.18	0.05	0.16	0.15	4.47	10.90	1.03	1.03	2.50	1.39	4.15	0.28	0.28	0.76
#measurement	48	48	48	48	48	48	48	48	48	48	48	48	48	48
#exceed 2007 limits	N/A	0	0	0	0	0	0	0	N/A	0	0	0	0	N/A

*Permit limit expressed as 12-month rolling average.

Appendix B

DMR SUMMARY - Marion WPCF

September 2010 - August 2014

Monitoring Period End Date	Fecal coliform, geo avg	Fecal coliform, daily max	Dissolved oxygen	Ammonia, monthly avg	Ammonia, daily max	Total Phosphorus, monthly avg	Total Phosphorus, daily max	Total Nitrogen, monthly avg	Total Nitrogen, max daily	Copper, monthly avg	Copper, daily max
	#/100 ml	#/100 ml	mg/l	mg/l	mg/l	mg/l	mg/l	mg/L	mg/L	µg/l	µg/l
09/30/2010	1	2	5.8	0.300	1.000	2.5	2.8	3.9	3.9	27.	31.
10/31/2010	1	1	5.87	0.000	0.000	2.1	2.2	4.	4.	16.	17.
11/30/2010	1	1	6.3	0.000	0.000	1.9	2.1	5.	5.	49.5	71.
12/31/2010	1	1		0.700	0.700	1.50	1.50	3.8	3.8	22.0	23.0
01/31/2011	1	1		0.000	0.000	1.40	1.50	3.7	3.7	25.0	34.0
02/28/2011	1	1		1.900	1.900	1.30	1.30	4.1	4.1	24.0	26.0
03/31/2011	1	1		1.700	1.700	0.60	1.10	3.1	3.1	13.5	17.0
04/30/2011	1	1		0.000	0.000	2.00	2.40	3.5	3.5	15.5	16.0
05/31/2011	1	1		0.700	2.800	3.30	3.90	5.4	8.6	17.3	23.0
06/30/2011	1	1	6.4	0.000	0.000	1.40	1.60	3.3	4.0	13.0	15.0
07/31/2011	2	3	6.1	0.000	0.000	1.80	1.80	3.6	3.9	0.0	0.0
08/31/2011	1	1	6.2	0.100	0.400	2.70	3.50	3.6	3.6	19.0	21.0
09/30/2011	1	1	6.3	0.200	0.400	1.70	2.20	6.1	6.1	28.5	30.0
10/31/2011	1	1	6.0	0.200	0.280	1.00	1.40	2.9	3.0	28.5	34.0
11/30/2011	1	1		0.110	0.110	0.90	1.10	3.2	3.2	23.0	24.0
12/31/2011	1	1		0.140	0.140	1.20	1.50	4.0	4.0	20.0	20.0
01/31/2012	1	1		0.280	0.280	1.40	1.60	3.1	3.1	17.5	22.0
02/29/2012	1	3		0.170	0.170	1.20	1.30	4.3	4.3	19.5	24.0
03/31/2012	1	2		0.353	0.350	0.82	0.86	2.4	2.4	16.0	16.0
04/30/2012	1	3		0.268	0.268	0.83	1.12	2.4	2.4	19.0	19.0
05/31/2012	1	3		6.750	11.600	0.89	0.92	7.4	7.4	16.0	16.0
06/30/2012	1	1	6.3	0.550	1.390	0.84	1.06	5.0	5.0	17.0	17.0
07/31/2012	1	1	5.9	0.310	0.440	1.67	1.84	1.9	1.9	15.0	15.0
08/31/2012	1	2	6.1	0.280	0.390	1.79	2.26	4.7	5.9	16.0	16.0
09/30/2012	1	5	6.0	0.210	0.250	1.49	1.84	3.3	3.3	17.0	17.0
10/31/2012	1	2	5.9	0.220	0.340	1.87	1.92	3.4	3.4	16.0	16.0
11/30/2012	1	2		0.122	0.122	1.37	1.46	3.0	3.0	15.0	15.0
12/31/2012	1	3		0.090	0.090	1.25	1.29	2.8	2.8	16.0	16.0
01/31/2013	1	2		0.110	0.110	1.02	1.08	2.4	2.4	37.8	60.0
02/28/2013	1	2		0.19	0.19	1.02	1.16	2.7	2.7	16.0	16.0
03/31/2013	1	2		0.41	0.41	0.56	0.70	2.4	2.4	12.0	12.0
04/30/2013	1	1		0.22	0.35	1.45	1.67	2.2	2.7	11.0	11.0
05/31/2013	1	5		0.61	1.18	2.57	2.96	3.7	4.6	10.0	10.0
06/30/2013	1	3	5.7	0.27	0.35	1.07	1.52	2.5	3.3	11.0	11.0
07/31/2013	1	2	5.4	0.24	0.29	2.67	3.18	2.9	2.9	14.0	14.0
08/31/2013	2	8	6.0	0.23	0.28	1.33	1.64	1.9	1.9	23.0	24.0
09/30/2013	2	7	5.3	0.14	0.15	3.43	3.61	4.0	4.0	18.8	23.0
10/31/2013	1	5	5.7	0.14	0.21	2.58	2.63	3.4	3.4	16.3	16.3
11/30/2013	1	2		0.12	0.12	2.37	2.58	2.3	2.3	19.8	19.8
12/31/2013	1.	2.		0.13	0.13	1.23	1.23	3.1	3.1	17.	17.
01/31/2014	1.	7.		0.11	0.11	0.89	1.03	2.5	2.5	13.3	13.3
02/28/2014	1.	2.		0.21	0.21	1.04	1.10	4.2	4.2	27.9	39.3
03/31/2014	1.	1.		1.22	1.22	0.91	0.99	3.5	3.5	14.9	14.9
04/30/2014	1.	1.		0.00	0.00	0.54	0.58	2.7	2.7	20.	20.
05/31/2014	1.	1.		0.18	0.27	2.17	2.48	3.2	3.2	10.1	10.1
06/30/2014	1.	1.	5.7	0.17	0.28	3.79	3.86	2.9	2.9	16.2	16.2
07/31/2014	1.	2.	5.4	0.10	0.14	2.18	2.29	3.3	3.3	26.6	27.2
08/31/2014	1.	3.	6.	0.08	0.12	1.29	1.73	3.5	3.5	50.6	50.6
May 2007 limits	14	43	5	Varies	Report	Report	Report	Report	Report	20	Report
Minimum	1.	1.	5.3	0.0	0.0	.54	.58	1.9	1.9	0.0	0.0
Maximum	2.	8.	6.4	6.75	11.6	3.79	3.9	7.4	8.6	50.6	71.
Average	1.07	2.21	5.92	0.43	0.65	1.60	1.82	3.46	3.62	19.34	21.60
Standard Deviation	0.25	1.73	0.31	1.01	1.71	0.77	0.84	1.06	1.29	8.92	12.51
#measurement	48	48	21	48	48	48	48	48	48	48	48
#exceed 2007 limits	0	0	0	1	N/A	N/A	N/A	N/A	N/A	13	N/A

*Permit limit expresse

Appendix B
WET Test Summary
Marion WPCF

Whole Effluent Toxicity											
Date	Daphnid Acute	Minnow Acute	Daphnid Chronic	Minnow Chronic	Aluminum (ug/l)	Copper (µg/L)	Zinc (ug/l)	Lead (ug/l)	Nickel (µg/L)	Cadmium (ug/l)	Hardness (mg/l)
June-11	100.	100.	100.	100.	<200	12	<50	<5	<40	<4	n/a
September-11	100.	100.	25.	6.25	<100	63	<50	<10	<25	<5	150
December-11	100.	100.	100.	100.	<100	10	<50	<10	<25	<5	82
March-12	70.7	100.	25.	100.	<100	13	<50	<10	<25	<5	120
June-12	100.	100.	12.5	100.	20	27	45	<1	<1	<1	140
September-12	100.	100.	100.	100.	<10	20	52	<0.5	1	<1	86
December-12	100.	100.	100.	100.	12	13	54	<1	1	<1	120
March-13	100.	100.	100.	100.	21	10	33	<0.5	<1	<1	93
June-13	100.	100.	100.	100.	15	9	35	<0.5	<1	<1	61
September-13	100.	100.	100.	100.	<10	19	49	<1	2	<1	130
December-13	100.	100.	100.	100.	11	15	43.91	<1	1.5	<1	210
March-14	100.	100.	100.	100.	11.8	14	37.8	<1	<1	<1	130
June-14	100.	100.	100.	100.	<10	19.42	33.71	<1	<1	<1	64
Limit	100.	100.	100.	100.	Report	Report	Report	Report	Report	Report	Report
Minimum	70.7	100.	12.5	6.25	11.	9.	33.	N/A	1.	N/A	61.
Median	100.	100.	100.	100.	13.5	14.	43.91	N/A	1.25	N/A	120.
Maximum	100.	100.	100.	100.	21.	63.	54.	N/A	2.	N/A	150
# measurements	13.	13.	13.	13.	13.	13.	13.	13.	13.	13.	12.
#exceed limit	1	0	3	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Appendix C
Nitrogen Analysis - Marion WPCF
MA0100030

Nitrogen Loads to Aucoot Cove

Current Loading

Nonpoint Sources

34.5 lbs/day ÷ 14.9 sq. mi. 2.315436242 lbs/day/sq.mi (from Segreganset analysis)

Total NPS loading = loading rate * watershed area (from Taunton fact sheet)

Segreganset drainage area = 14.9 sq. mi. (p. 31 of FS)
Segreganset loading = 34.5 lbs/day (FS Att. A, page 1, avg. of 2004-5 loading)
Loading rate = 34.5 lbs/day / 14.9 sq. mi. = 2.32 lbs/day/sq.mi.

2.32 lbs/day/sq.mi. x 3.75 sq. mi. = **8.7** lbs/day

Total watershed area = 4.06 sq. mi. (from Buzzbaylanduse.xls)

Total NPS loading = loading rate * watershed area
9.40067114 lbs/day

Marion WWTF outfall (May-Oct 2011-2013)
13.7488761 lbs/day

avg flow 0.430056 MGD
avg conc 3.833333

Marion Lagoons (from Horsley Witten report)
16,700 lbs/year divide by 365= **45.7534247** lbs/day

Total load **68.902972** lbs/day
Total area 0.1 sq. mi. Aucoot Cove area (from Marion.mxd)

Load per area **689.02972** lbs TN/day/sq. mi. <--- target loading

Inner Aucoot Cove Target Nitrogen Loading

0.05 sq. mi. Area of Inner Aucoot Cove

Load per area per day = Loading (lbs/day)/Area = Load per area per day

Loading = Load per area * area

Loading rate = **34.45149** lbs/day Target Loading Rate for Inner Aucoot Cove

minus NPS **25.05081** lbs/day Target Loading Rate for Marion outfall and lagoons

Appendix C
Nitrogen Analysis - Marion WPCF
MA0100030

Lagoon Scenario

minus lagoons -43.8522 lbs/day Allowable Loading from WWTF
Average Marion WWTF flow = 0.588 MGD (May-Oct 2011-2013)

Loading(lbs/day) = Flow(mgd) * Conc.(mg/l) * 8.34

-8.942266 mg/l Permit Limit (with lagoon scenario)

Because negative load is not possible, limit would default to 3.0 mg/l (limit of technology).

No Lagoon Scenario

0.05 sq. mi. Area of Inner Aucoot Cove

Load per area per day = Loading (lbs/day)/Area = Load per area per day

Loading = Load per area * area

Loading rate = **34.45149** lbs/day Target Loading Rate for Inner Aucoot Cove

minus NPS **25.05081** lbs/day Target Loading Rate for Marion outfall

Average Marion WWTF flow = 0.588 MGD (May-Oct 2011-2013)

Conc. = Loading/(Flow * 8.34) 5.10832453 mg/l Permit Limit (no lagoon scenario)

Appendix D NPDES Permit for the Marion Water Pollution Control Facility, Marion, Massachusetts, Permit No. MA0100030
Essential Fish Habitat Assessment, November 2014

Under the 1996 Amendments (PL 104-267) to the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §1801 et seq. (1998)), EPA is required to consult with the National Marine Fisheries Services (NMFS) if EPA's action or proposed action that it funds, permits, or undertakes, may adversely impact any essential fish habitat (EFH). Adversely impact means any impact which reduces the quality and/or quantity of EFH (50 C.F.R. § 600.910 (a)). Adverse impacts may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions. The Amendments broadly define essential fish habitat as: waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. §1802 (10)). This letter serves as EPA's notification to NMFS of a proposed permit action that meets the criteria described above.

Essential fish habitat is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b) (1) (A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999 and are identified on the NMFS website at http://www.nero.noaa.gov/hcd/webintro.html. In some cases, a narrative identifies rivers and other waterways that should be considered EFH due to present or historic use by federally managed species.

The federal action being considered in this case is EPA's proposed National Pollutant Discharge Elimination System (NPDES) permit reissuance for the Marion Water Pollution Control Facility (WPCF) in the Town of Marion, Massachusetts. The Draft Permit is intended to replace the existing NPDES permit in regulating discharges from the site. EPA and MassDEP issued the existing permit on September 29, 2006. On October 31, 2006, the Town of Marion (Town) filed a petition for review with the EPA Environmental Appeals Board (EAB) appealing certain conditions in the Final Permit. The contested portions of the permit were stayed, while the uncontested conditions went into effect on March 1, 2007. EPA and the Town reached a settlement in which EPA modified certain conditions of the permit, and the Town withdrew its appeal. The final modified permit became effective August 1, 2007. This permit has been administratively continued, as a complete application for permit reissuance was filed by the Town in accordance with the Administrative Procedures Act (5 U.S.C. 558(c)) and 40 CFR § 122.6.

Marion WPCF Description

The Marion WPCF is a 0.588-MGD wastewater treatment facility. Treatment units include inlet aerated chamber with air handling and odor control, mechanical bar screens, vortex grit chamber with classifier, sequencing batch reactors (SBRs), equalization tank, disc filters, and ultraviolet (UV) disinfection. Treated effluent is discharged to an unnamed brook that discharges to Aucoot Cove. Scum, waste activated sludge from the SBRs, and filter backwash are discharged to onsite

aerated lagoons. The lagoons are also used for equalization and storage of wastewater during high flows exceeding SBR capacity and when one of the SBRs is down for service.

Receiving Water Description

The water quality classification of the unnamed brook receiving the Marion WPCF discharge is not specifically listed in the Buzzards Bay table of the MA Surface Water Quality Standards (SWQS) (see 314 CMR 4.06(5), Table 25), nor does the map of the Buzzards Bay watershed (see 314 CMR 4.06(5) Figure 25) show the water quality classification for this water. Therefore, pursuant to 314 CMR 4.06(4), the brook is a Class B High Quality Water. Under MA SWQS, such waters must have consistently good aesthetic value and, where designated, must be suitable as a source of public water supply with appropriate treatment, as well as for irrigation and other agricultural uses. *Id.* at 314 CMR 4.05(3)(b). They must also be free of floating, suspended or settleable solids that are aesthetically objectionable or could impair uses. *Id*. at 314 CMR 4.05(3)(b)(5). Changes to color or turbidity of the waters that are aesthetically objectionable or use-impairing are also prohibited. *Id*. at 314 CMR 4.05(3)(b)(6). Dissolved oxygen levels in Class B waters must not be less than 5.0 mg/L. *Id*. at 314 CMR 4.05(3)(b)(1).

Aucoot Cove is classified in the tables of the MA SWQS (314 CMR 4.06 (5), Table 25) as Class SA and for shellfishing (the listing is under the heading "Sippican River"). Class SA waters are designated as excellent habitat for fish, other aquatic life and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary contact recreation. In certain waters, excellent habitat for fish, other aquatic life and wildlife may include, but is not limited to, sea grass. Where designated in the tables to 314 CMR 4.00 for shellfishing, these waters shall be suitable for shellfish harvesting without depuration (Approved and Conditionally Approved Shellfish Areas). These waters shall have excellent aesthetic value.

In addition to criteria specific to Class SA and B waters, Massachusetts imposes minimum narrative criteria applicable to all surface waters, including aesthetics ("free from pollutants in concentrations or combinations that settle to form objectionable deposits; float as debris, scum or other matter to form nuisances; produce objectionable odor, color, taste or turbidity; or produce undesirable or nuisance species of aquatic life"); bottom pollutants and alterations ("free from pollutants in concentrations or combinations or from alterations that adversely affect the physical or chemical nature of the bottom, interfere with the propagation of fish or shellfish, or adversely affect populations of non-mobile or sessile benthic organisms"); nutrients[1] ("unless naturally occurring, all surface waters shall be free from nutrients in concentrations that would cause or contribute to impairment of existing or designated uses…"); and toxics ("free from pollutants in concentrations that are toxic to humans, aquatic life or wildlife"). *See* 314 CMR 4.05(5)(a),(b), (c) and (e).

The Commonwealth implements its narrative toxics standard at 314 CMR 4.05 (5)(e) by specifying that, "[f]or pollutants not otherwise listed in 314 CMR § 4.00, the *National Recommended Water Quality Criteria: 2002, EPA 822R-02-047, November 2002* ["Recommended Criteria"] published by EPA pursuant to Section 304(a) of the [CWA], are the allowable receiving water concentrations for the affected waters, unless the Department

[1] Massachusetts Standards do not establish a numeric criterion for total phosphorus or for nitrogen.

…establishes a site specific criterion or determines that naturally occurring background conditions are higher[.]"

Section 303(d) of the CWA requires states to identify those waterbodies that are not expected to meet surface water quality standards after the implementation of technology-based controls and, as such, require the development of total maximum daily loads (TMDL). Inner Aucoot Cove (MA95-71)[2] is listed in the Massachusetts 2012 Integrated List of Waters (303d) (2012 Integrated List) as Category 5: Waters Requiring a TMDL. Inner Aucoot Cove is listed as impaired and requiring a TMDL for total nitrogen, dissolved oxygen, fecal coliform and nutrient/eutrophication biological indicators. A Final Pathogen TMDL has been approved for all waters in the Buzzards Bay watershed. The draft permit is consistent with the assumptions and requirements of the WLA for the discharge.

EFH Species

EFH is only designated for species for which federal fisheries management plans exist (16 U.S.C. § 1855(b) (1) (A)). EFH designations for New England were approved by the U.S. Department of Commerce on March 3, 1999. The following list of EFH species associated with the action area of the Marion WPCF discharge was taken from the Summary of Essential Fish Habitat (EFH) Designation, at the website http://www.greateratlantic.fisheries.noaa.gov/hcd/STATES4/CapecodtoNH/41407040.html

10' x 10' Square Coordinates:

Boundary	North	East	South	West
Coordinate	41° 50.0' N	70° 40.0' W	41° 40.0' N	70° 50.0' W

Square Description (i.e. habitat, landmarks, coastline markers): Atlantic Ocean waters within the square within Buzzards Bay affecting the following: south of Wareham, MA., from the west half of Great Neck west to Hiller Cove as well as affecting the far end of Stony Point Dike.

Species	Eggs	Larvae	Juveniles	Adults
Atlantic cod *(Gadus morhua)*	X	X	X	X
haddock *(Melanogrammus aeglefinus)*	X	X		
red hake *(Urophycis chuss)*			X	X
redfish *(Sebastes fasciatus)*	n/a			

[2] Impaired area defined as "From the confluence with Aucoot Creek, Marion to the boundary of Division of Marine Fisheries designated shellfishing growing area BB31.1, north and southwest from Haskell Island, Marion (formerly part of segment 95-09).

winter flounder *(Pseudopleuronectes americanus)*	X	X	X	X
windowpane flounder *(Scophthalmus aquosus)*	X	X	X	X
American plaice *(Hippoglossoides platessoides)*			X	X
Atlantic sea herring *(Clupea harengus)*			X	X
bluefish *(Pomatomus saltatrix)*			X	X
long finned squid *(Loligo pealeii)*	n/a	n/a	X	X
short finned squid *(Illex illecebrosus)*	n/a	n/a	X	X
Atlantic butterfish *(Peprilus triacanthus)*	X	X	X	X
Atlantic mackerel *(Scomber scombrus)*	X	X	X	X
summer flounder *(Paralichthys dentatus)*				X
scup *(Stenotomus chrysops)*	X	X	X	X
black sea bass *(Centropristis striata)*	X	X	X	X
surf clam *(Spisula solidissima)*	n/a	n/a		
ocean quahog *(Artica islandica)*	n/a	n/a		
spiny dogfish *(Squalus acanthias)*	n/a	n/a		
sandbar shark *(Carcharhinus plumbeus)*				X
bluefin tuna *(Thunnus thynnus)*			X	X

A review of the relevant essential fish habitat information provided by NMFS indicates that EFH has been designated for 21 managed species within the NMFS boundaries during one or more of the life stage categories (i.e. eggs, larvae, juveniles, adults, and spawning adults) encompassing Buzzards Bay. It is possible that a number of these species utilize these receiving waters for spawning, while others are present seasonally.

Eelgrass Protection

As stated earlier in this document, EPA consults with NMFS if EPA's action may adversely impact EFH, either directly, indirectly, in a site-specific manner or habitat wide. EPA is aware that the potential impact of a permitting action to eelgrass habitat is a site-specific indirect impact to EFH that must be evaluated as part of the consultation. The discharge of elevated nitrogen into an estuary has been identified as a cause of eelgrass degradation. A reasonable potential analysis was performed for the effects of nitrogen on the action area of the proposed discharge. The reasonable potential analysis examines the effects of nitrogen on water quality in Aucoot Cove rather than the unnamed brook. In freshwater systems, such as the unnamed brook, aquatic plant growth is typically limited by phosphorus, meaning that excess nitrogen does not increase plant growth. Please see page 25 of the fact sheet for a reasonable potential analysis of phosphorus in the unnamed brook.

Aucoot Cove is a deep, well flushed embayment of approximately 0.5 square miles area. The water quality classification of Aucoot Cove is SA, the most protective classification for saline waters. It is also a designated shellfishery. Inner Aucoot Cove is listed as impaired for total nitrogen, dissolved oxygen, and nutrients/eutrophication biological indicators. To interpret the narrative nutrient criteria, consistent with 122.44 (d)(1)(vi), and determine the appropriate threshold concentration, EPA reviewed nitrogen, dissolved oxygen and algal data collected by the Buzzards Bay Coalition at various locations in Aucoot Cove.

The water quality criterion for dissolved oxygen is 6.0 mg/L in Class SA Waters, such as Aucoot Cove. Aquatic plants and algae give off oxygen from photosynthesis during the day, but absorb oxygen during the night for respiration. Therefore, low dissolved oxygen (DO) in the early morning hours is one indication of eutrophication. Low DO events cause fish kills, noxious odors, and dead zones in estuaries.

Data collected by the Buzzards Bay Coalition indicates that the monitoring sites closest to the discharge have the highest likelihood for DO violations. Monitoring station AC7, at the mouth of the unnamed brook to Aucoot Cove, violated the DO criterion in 71% of monitoring events. Other monitoring stations in Aucoot Cove also frequently violate the DO criterion, with AC2 violating 45% of events, AC4 56%, and AC5a 45%.

Results from monitoring sites in Hiller's Cove, located adjacent to Aucoot Cove, show much lower violation frequencies. HL2 violated the 6.0 mg/L DO standard in 12% of sampling events, and HL1 violated the standard in only 7% of events. Hiller Cove, like Aucoot Cove, receives stormwater pollution from a developed area; but unlike Aucoot Cove has no POTW point sources.

The Massachusetts Department of Environmental Protection (MassDEP) has identified total nitrogen levels believed to be protective of eelgrass habitats as less than 0.39 mg/L and ideally less than 0.3 mg/L and *chlorophyll a* levels as 3-5 µg/L and ideally less than 3 µg/L (MADEP/SMAST, 2003)[3]. Monitoring station AC2, located in inner Aucoot Cove, has a median

[3] Massachusetts Department of Environmental Protection, UMASS-Dartmouth School for Marine Science and Technology. 2003. Massachusetts Estuaries Project: Site-Specific Nitrogen Thresholds for Southeastern Massachusetts

nitrogen concentration of 0.47 mg/L. In contrast, AC3, which currently supports eelgrass, has a median total nitrogen concentration of 0.35 mg/L[4].

To determine an appropriate threshold concentration, EPA considered the procedure developed by the Massachusetts Estuaries Project (MEP). This procedure identifies a target nitrogen concentration threshold based on a location within the estuary where water quality standards are not violated, in order to identify a nitrogen concentration consistent with unimpaired conditions. This approach is consistent with EPA guidance regarding the use of reference conditions for the purposes of developing nutrient water quality criteria.

EPA generally recommends three types of scientifically defensible empirical approaches for setting numeric criteria to address nitrogen/phosphorus pollution[5] a reference condition approach, mechanistic modeling, and stressor-response analysis. The reference condition approach derives criteria from observations collected in reference waterbodies. Reference waterbodies represent least disturbed and/or minimally disturbed conditions within a region (Stoddard et al., 2006) that support designated uses (EPA, 2000a). Therefore, the range of conditions observed within reference waterbodies provides appropriate values upon which criteria can be based. The reference condition approach requires the ability to define and identify reference waterbodies, and relies on the availability of sufficient data from these reference waterbodies to characterize the distributions of different nutrient variables. Aucoot Cove is classified as an SA water and currently supports eelgrass in the middle cove, but not the inner cove. Based on its depth, strata, and other characteristics the inner cove would be expected to support eelgrass. Therefore, the primary water quality parameter considered in determining a reference location is eelgrass.

Eelgrass continues to grow in middle Aucoot Cove, but is receding from inner Aucoot Cove. This is a predictable result of the inner cove receiving nutrient inputs from point and non-point sources without the same degree of tidal flushing that characterizes the middle cove. GIS data collected by MassDEP and analyzed by EPA indicate that eelgrass coverage in Aucoot Cove has retreated from its historical extent. (see Figure 5 of the fact sheet). During a site visit on September 10, 2014, EPA staff observed eelgrass beds in Aucoot Cove that appeared patchy, yellowed, and shaded by attached algae. Some die-off may be expected late in the growing

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Embayments: Critical Indicators Interim Report. Massachusetts Department of Environmental Protection. July 21, 2003. Revised September 16, 2003 and December 22, 2003.

[4] Data available at http://www.savebuzzardsbay.org/ProtectBay/CleanWater/SoundScience/BayHealthMap

[5] Environmental Protection Agency. 2001. Nutrient Criteria Technical Guidance Manual: Estuarine and Coastal Marine Waters. U.S. Environmental Protection Agency, Office of Water, EPA-822-B-01-001. October 2001. Published Online: http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/marine/index.cfm

Environmental Protection Agency. 2000a. Nutrient Criteria Technical Guidance Manual: Rivers and Streams. U.S. Environmental Protection Agency, Office of Water and Office of Science and Technology, EPA-822-B-00-002. July 2000. Published Online:
http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/rivers/index.cfm

Environmental Protection Agency. 2000b. Nutrient Criteria Technical Guidance Manual: Lakes and Reservoirs. U.S. Environmental Protection Agency, Office of Water and Office of Science and Technology, EPA-822-B00-001. April 2000. Published Online: http://water.epa.gov/scitech/swguidance/standards/criteria/nutrients/lakes/index.cfm

season. However, the thick algal cover seems to be the immediate cause of the poor condition of the eelgrass beds.

For this analysis, EPA is using monitoring station AC3 as the reference location. As shown in Figure 4 of the fact sheet, this location is in a current eelgrass bed. The median total nitrogen concentration at AC3 between 2007 and 2012 was 0.35 mg/L, which will be the target concentration for this analysis. EPA notes that this value is consistent with TN concentration thresholds to protect eelgrass beds identified in other estuaries. Moreover, AC3 has the lowest *chlorophyll a* levels of any monitoring station in Aucoot Cove for which these data are available. The average *chlorophyll a* level at AC3 between 2007 and 2012 was 7.0 µg/L, still higher than the MassDEP/SMAST of 3-5 µg/L.

EPA has concluded that at existing levels, nitrogen in the Marion WPCF discharge has the reasonable potential to cause or contribute to water quality violations in Inner Aucoot Cove as discussed in Section IV.B.3 of the fact sheet. Inner Aucoot Cove is listed as impaired and requiring a TMDL for total nitrogen, dissolved oxygen, and nutrient/eutrophication biological indicators. Monitoring stations closest to the discharge, such as AC2 and AC7, are more impaired than stations further out in the cove. While the Marion WPCF has attained an impressive level of nitrogen removal from its discharge, its average effluent nitrogen concentration of 3.46 mg/l is still ten times higher than the concentration needed to support eelgrass in the cove.

Finding

EPA has determined that the draft permit has been conditioned in such a way so as to minimize any adverse impacts to EFH for the following reasons:

- This permit action does not constitute a new source of pollutants. It is the reissuance of an existing NPDES permit;
- The WPCF withdraws no water from the unnamed brook or Buzzards Bay; therefore, no life stages of EFH species are vulnerable to impingement or entrainment from this WPCF;
- A Final Pathogen TMDL has been approved for all waters in the Buzzards Bay watershed. The draft permit is consistent with the assumptions and requirements of the waste load allocation for the discharge;
- The draft permit is designed so that the discharge meets Massachusetts State Water Quality Standards;
- The draft permit contains water quality-based limits for total suspended solids, BOD_5, ammonia-nitrogen, total nitrogen, total phosphorus and total copper;
- The proposed water quality-based limits for nitrogen are designed to protect eelgrass in Aucoot Cove and Buzzards Bay;
- The draft permit prohibits the discharge of pollutants or combinations of pollutants in toxic amounts;
- The permit requires toxicity testing four times per year to ensure that the discharge does not present toxicity problems.

EPA believes that the conditions and limitations contained within the proposed permit adequately protect all aquatic life, including those with designated EFH in the receiving water, and that further mitigation is not warranted. If adverse impacts to EFH are detected as a result of this permit action, or if new information is received that changes the basis for these conclusions, EPA will contact NMFS Habitat Division.

Legend

- WWTP Influent Intake Point
- WWTP Influent Force Main
- WWTP Effluent Sewer Pipe
- Water Supply Wells

FIGURE 1

TOWN OF MARION, MASSACHUSETTS
WASTEWATER TREATMENT PLANT
LOCUS MAP

N

0 2,500 5,000 Feet

1 inch = 2,500 feet

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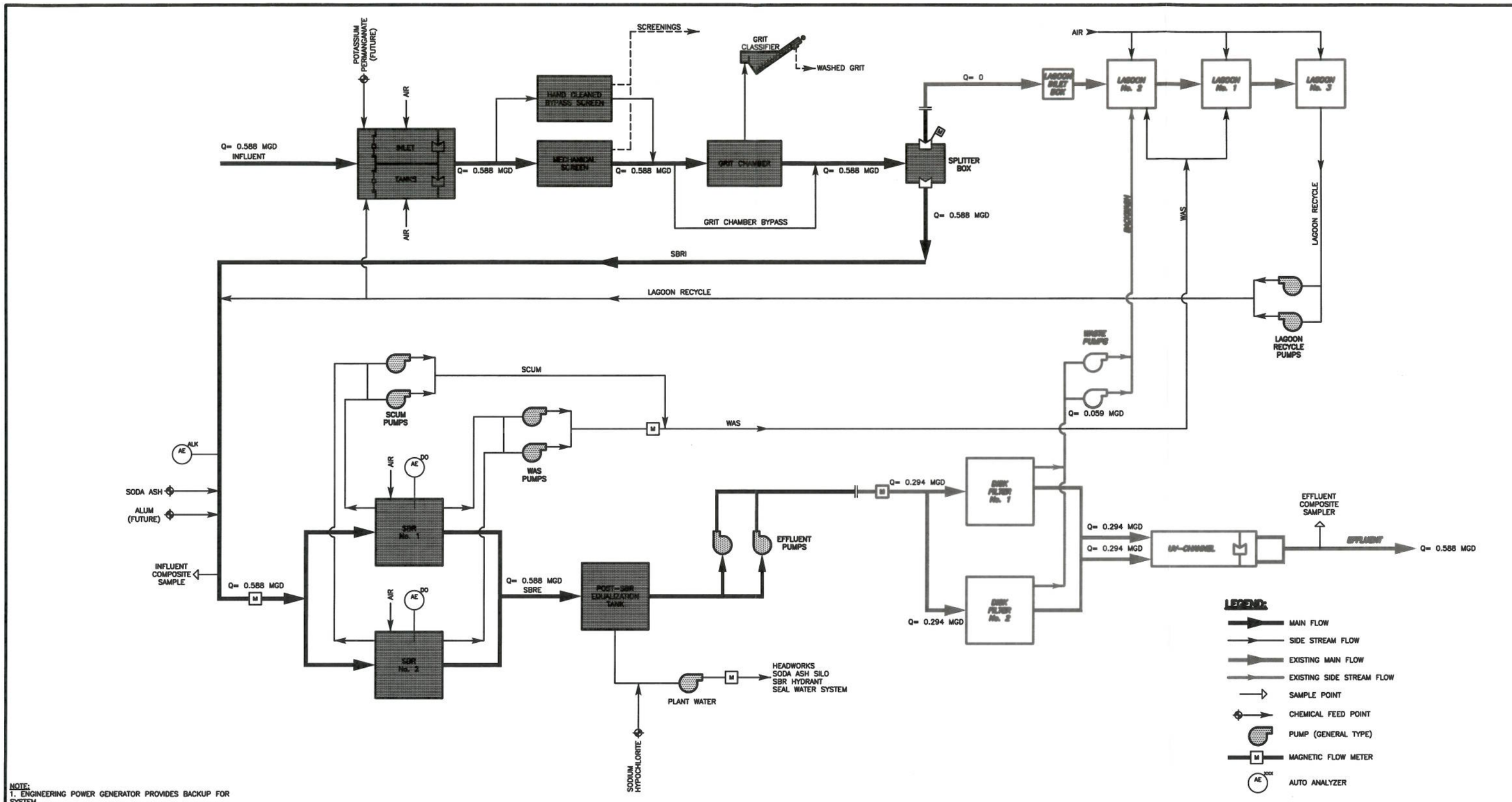


NOTE:
1. ENGINEERING POWER GENERATOR PROVIDES BACKUP FOR SYSTEM.
2. REDUNDANT UV LIGHT BANKS PROVIDED IN UV CHANNEL.

PLANT DESCRIPTION:

THE MARION WWTP IS A SEQUENCING BATCH REACTOR (SBR) TREATMENT PLANT. INFLUENT IS FIRST PROCESSED THROUGH TWO INLET TANKS, WHICH SERVE TO AERATE AND FRESHEN THE WASTEWATER. THE INFLUENT THEN PASSES THROUGH A BAR SCREEN AND VORTEX GRIT CHAMBER BEFORE EXITING THE HEADWORKS BUILDING TOWARD THE SBR PROCESS. REMOVED SCREENINGS AND GRIT ARE WASHED AND COMPACTED, AND BAGGED AND PLACED INTO A DUMPSTER ADJACENT TO THE BUILDING. INFREQUENTLY, THE INFLUENT FLOW RATE THROUGH THE HEADWORKS EXCEEDS THE PROCESS CAPACITY OF THE SBRS. AN OVERFLOW WEIR IS USED TO DIRECT THESE EXCESS FLOWS TO THE ORIGINAL LAGOON SYSTEM, WHICH IS USED FOR EQUALIZATION. THE LAGOON SYSTEM CONSISTS OF APPROXIMATELY 20 ACRES AND IS A CRITICAL PROCESS FOR OPERATION OF THE PLANT. THE PLANT WAS DESIGNED TO WORK TOGETHER WITH THE LAGOON SYSTEM. THE STAFF AT THE WWTP MONITOR THE LAGOONS CLOSELY AND WHEN NEEDED HAVE THE ABILITY TO ALSO DRAW WATER FROM THE LAGOONS AND RETURN IT THROUGH THE PLANT FOR ADDITIONAL TREATMENT. THE SBRS PROVIDE BIOCHEMICAL OXYGEN DEMAND (BOD) AND TOTAL SUSPENDED SOLIDS (TSS) REMOVAL, NITRIFICATION, AND DENITRIFICATION. THE SBRS ARE OPERATED IN A MANNER TO PROVIDE SUFFICIENT AEROBIC TIME (FOR BOD AND NITRIFICATION), ANOXIC MIX TIME (FOR DENITRIFICATION) AND SETTLING TIME PRIOR TO DECANT. OPERATION OF THE TWO SBRS IS COORDINATED SUCH THAT ONE REACTOR IS ALWAYS IN THE "FILL" PHASE OF THE PROCESS CYCLE. THE PLANT DOES NOT ALLOW FOR OPERATION OF ONE SBR TANK DURING PERIODS OF MAINTENANCE AND STILL BE ABLE TO MEET THE NPDES PERMIT DISCHARGE LIMITS. THIS UNDERSCORES THE NEED FOR THE LAGOON SYSTEM AS EQUALIZATION STORAGE AND DURING TIMES OF NEEDED MAINTENANCE. EFFLUENT FROM SBRS FLOWS TO AN EQUALIZATION TANK. THE TANK IS NECESSARY BECAUSE THE DECANT RATE FROM THE SBRS EXCEEDS THE PEAK CAPACITY OF THE DOWNSTREAM PROCESSES (DISK FILTERS AND UV DISINFECTION). EFFLUENT IS THEN PUMPED FROM THE EQUALIZATION TANK TO THE YARD PIPING THAT FEEDS THE DISK FILTERS. WASTE ACTIVATED SLUDGE (WAS) FROM THE SBRS IS PUMPED TO THE EXISTING LAGOONS AND THE LAGOONS ARE USED FOR WAS STABILIZATION. THE LAGOONS ARE PROVIDED WITH DIFFUSED AERATION TO AUGMENT THE SYSTEM'S ABILITY TO STABILIZE THE WAS, AND TO REDUCE NUISANCE ODORS. FINALLY, EFFLUENT IS TREATED THROUGH THE DISK FILTER PROCESS BEFORE FLOWING THROUGH THE UV SYSTEM FOR DISINFECTION. DISINFECTION EFFLUENT IS DISCHARGED TO EFFLUENT BROOK.

TOWN OF MARION, MASSACHUSETTS
NPDES PERMIT RENEWAL

FIGURE 2

PROCESS FLOW DIAGRAM

FORM 2S, PART A.6

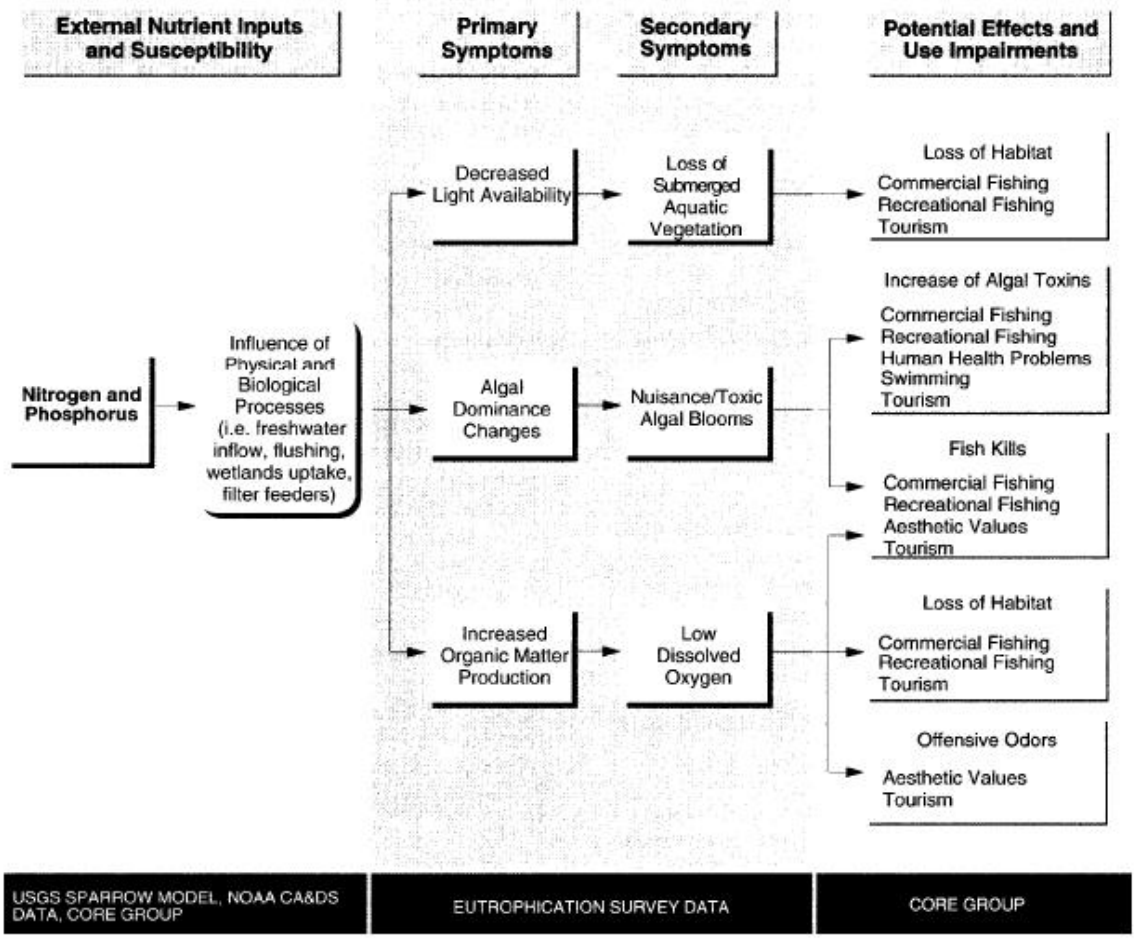


Figure 3. Eutrophication Flow Chart.

Legend

- 2013 Eelgrass
- BBC Sampling stations

1 inch = 833 feet

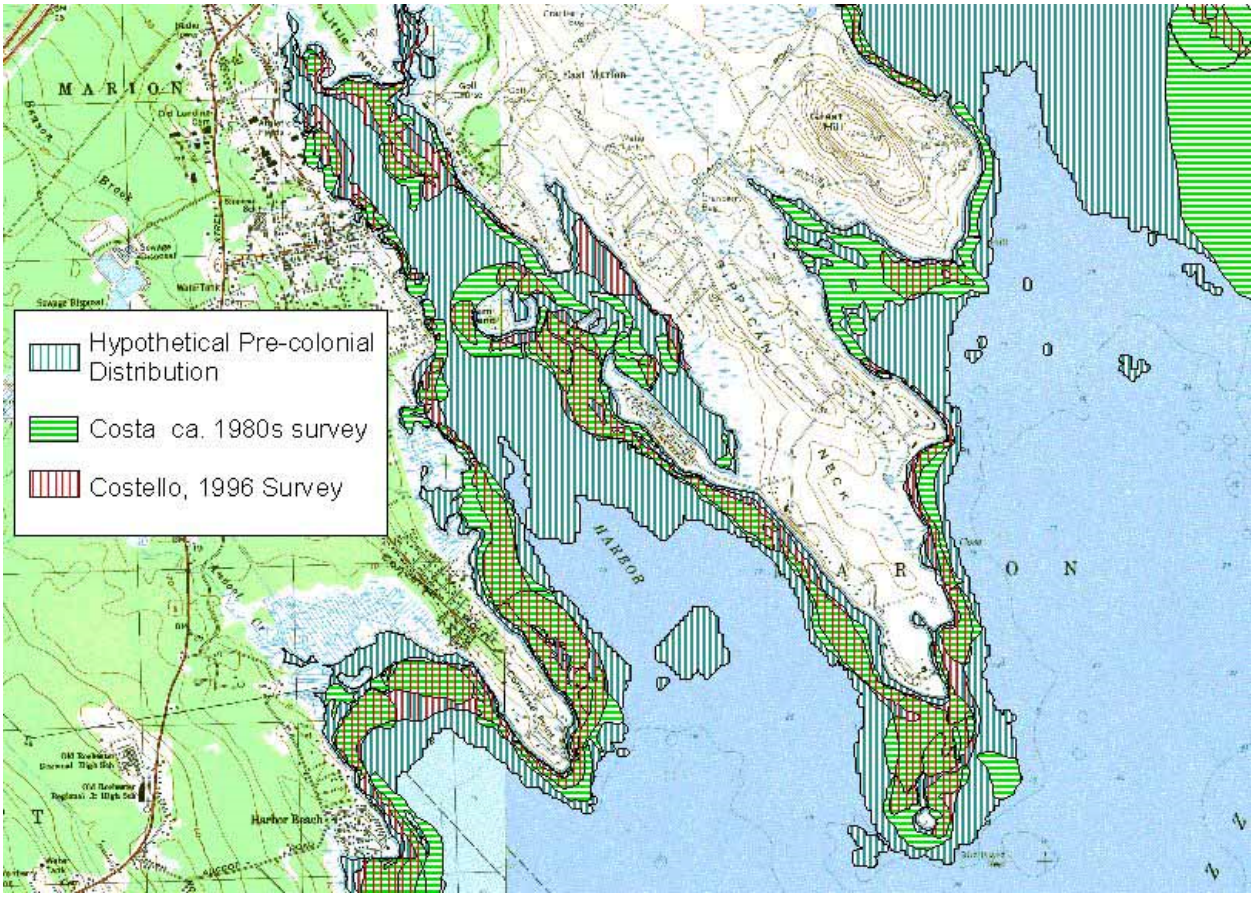
N

Figure 4
2013 Eelgrass Coverage in Aucoot Cove

Eelgrass coverage layer is maintained by the MassDEP Wetlands Conservancy Program. For additional information on the MassDEP Eelgrass Mapping Project, visit: http://www.mass.gov/eea/agencies/massdep/water/watersheds/eelgrass-mapping-project.html.
BBC = Buzzards Bay Coalition

EPA

Figure 5. Comparison between the Costa 1980s, DEP's 1996, and the hypothetical pre-colonial distribution of eelgrass around Marion, MA.



Source: Buzzards Bay National Estuary Program.

http://buzzardsbay.org/eelgrass-historical.htm

From the website:

Hypothetical Eelgrass Distribution during the Colonial Period

For the 2003 Coalition State of the Bay report we estimated eelgrass cover circa 1600. This is a speculative exercise, but it was worthwhile to imagine the potential distribution of eelgrass in Buzzards Bay without human impacts such as nitrogen loading, increased water turbidity associated with urban runoff, resuspension of sediments from boat traffic, and other human disturbances.

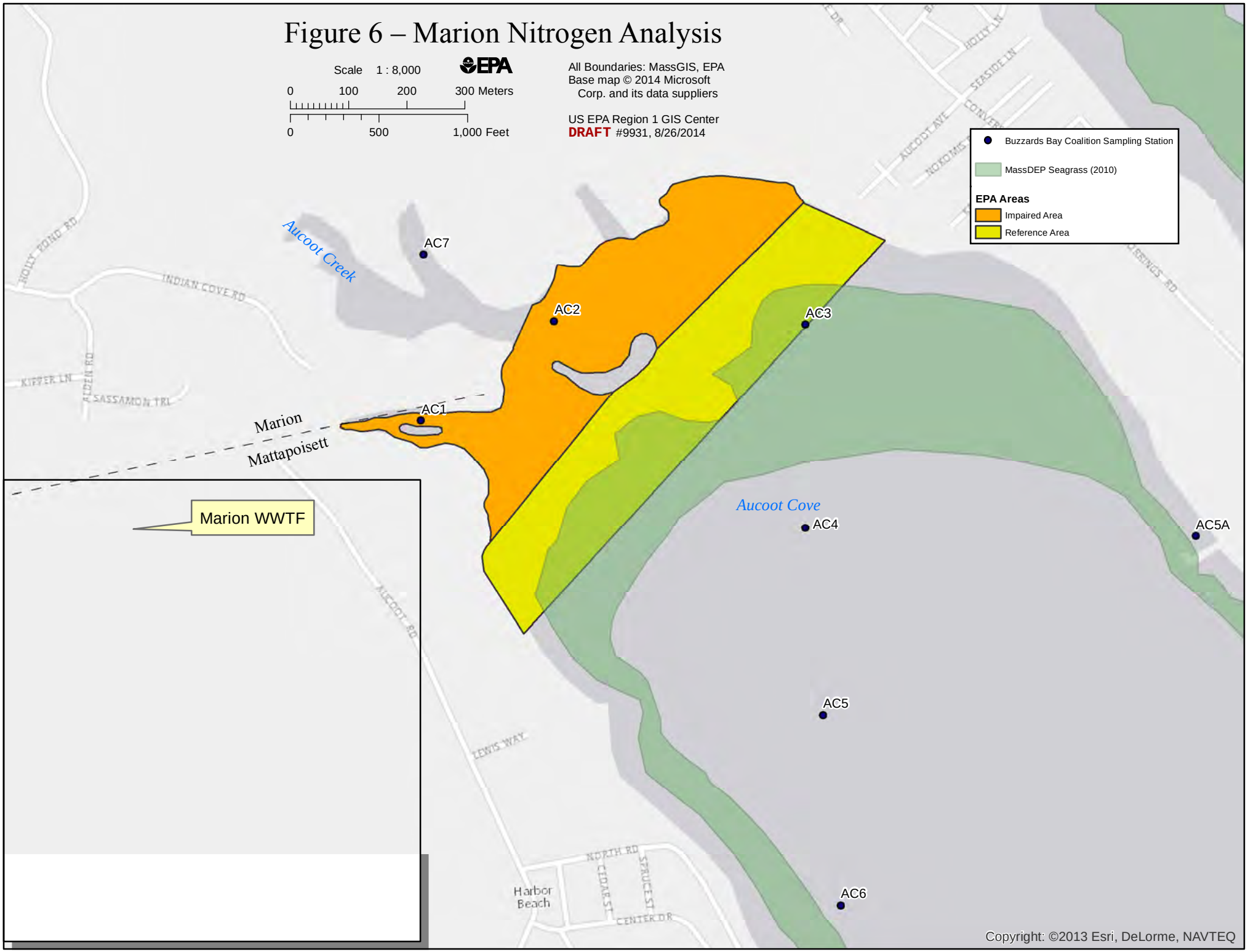
Eelgrass distribution is largely dependent upon water transparency. This is evident in the clear waters of offshore areas of Cape Cod and Islands, where eelgrass often grows between 20 and 30 feet MLW, and deeper depths of eelgrass beds have been recorded by divers. In less polluted and better flushed harbors and coves, eelgrass beds can still be found to depths

between eight and twelve feet. In contrast, in most polluted embayments, eelgrass, if present at all, may only grow to depths of 6 feet MLW or often much less.

These patterns of growth became the basis of assumed eelgrass distribution in pristine conditions. Using the depth of growth of eelgrass in clean waters, we can speculate what eelgrass abundance in Buzzards Bay may have once been, and a hypothetical historical eelgrass habitat in Buzzards Bay can be postulated. Such hypotheses can even be tested using sediment cores because Costa (1988, 1989) and others have shown that the remains of eelgrass seed coats (tests) are a valuable biostratigraphical marker that remain in the sediments of many bays and harbors, possibly for many centuries. For example, no eelgrass has been found in inner Apponagansett Bay (Dartmouth) for decades, but sediment cores show eelgrass was abundant for centuries based on assumed rates of sedimentation (Costa, 1988a).

For the estimation of eelgrass cover in 1600, the following two assumptions were made. For upper Buzzards Bay (roughly a line drawn from North Falmouth to Mattapoisett), we assumed eelgrass grew to 12 ft. MLW. For the lower half Buzzards Bay, we assumed eelgrass grew down to 20 feet MLW.

Figure 6 – Marion Nitrogen Analysis



MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION
COMMONWEALTH OF MASSACHUSETTS
1 WINTER STREET
BOSTON, MASSACHUSETTS 02108

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY – REGION 1
OFFICE OF ECOSYSTEM PROTECTION
5 POST OFFICE SQUARE
BOSTON, MASSACHUSETTS 02109

JOINT PUBLIC NOTICE OF A DRAFT NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT TO DISCHARGE INTO WATERS OF THE UNITED STATES UNDER SECTIONS 301 AND 402 OF THE CLEAN WATER ACT, AS AMENDED, AND SECTIONS 27 AND 43 OF THE MASSACHUSETTS CLEAN WATERS ACT, AS AMENDED, AND REQUEST FOR STATE CERTIFICATION UNDER SECTION 401 OF THE CLEAN WATER ACT.

DATE OF NOTICE: **December 3, 2014 – January 2, 2015**

PERMIT NUMBER: **MA0100030**

PUBLIC NOTICE NUMBER: MA003-14

NAME AND MAILING ADDRESS OF APPLICANT:

Paul Dawson
Town of Marion
50 Benson Brook Road
Marion, MA 02738

NAME AND ADDRESS OF THE FACILITY WHERE DISCHARGE OCCURS:

Marion Water Pollution Control Facility
50 Benson Brook Road
Marion, Massachusetts 02738

RECEIVING WATER: Unnamed Brook to Aucoot Cove (Class B)
HUC12: 010900020305

The U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (MassDEP) have cooperated in the development of a draft permit for the Marion WPCF, which discharges treated domestic wastewater. Sludge from this facility is stored in on-site sewage lagoons. The effluent limits and permit conditions imposed have been drafted to assure compliance with the Clean Water Act, 33 U.S.C. sections 1251 et seq., the Massachusetts Clean Waters Act, G.L. c. 21, §§ 26-53, 314 CMR 3.00, and State Surface Water Quality Standards at 314 CMR 4.00. EPA has requested that the State certify this draft permit pursuant to Section 401 of the Clean Water Act and expects that the draft permit will be certified.

INFORMATION ABOUT THE DRAFT PERMIT:

The draft permit and explanatory fact sheet may be obtained at no cost at http://www.epa.gov/region1/npdes/draft_permits_listing_ma.html or by contacting:

Robin Johnson
U.S. Environmental Protection Agency – Region 1
5 Post Office Square, Suite 100 (OEP06-1)
Boston, MA 02109-3912
Telephone: (617) 918-1045

The administrative record containing all documents relating to this draft permit including all data submitted by the applicant may be inspected at the EPA Boston office mentioned above between 9:00 a.m. and 5:00 p.m., Monday through Friday, except holidays.

PUBLIC COMMENT AND REQUEST FOR PUBLIC HEARING:

All persons, including applicants, who believe any condition of this draft permit is inappropriate, must raise all issues and submit all available arguments and all supporting material for their arguments in full by **January 2, 2015** to the address listed above. Any person, prior to such date, may submit a request in writing to EPA and MassDEP for a public hearing to consider this draft permit. 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 this draft permit, the Regional Administrator will respond to all significant comments and make the responses available to the public at EPA's Boston office.

FINAL PERMIT DECISION:

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.

DAVID FERRIS, DIRECTOR
MASSACHUSETTS WASTEWATER
MANAGEMENT PROGRAM
MASSACHUSETTS DEPARTMENT OF
ENVIRONMENTAL PROTECTION

KEN MORAFF, DIRECTOR
OFFICE OF ECOSYSTEM PROTECTION
EPA-REGION 1