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July 20, 2019

Betsy Davis
U.S. Environmental Protection Agency
Water Division
Municipal Permits Section (06-01)
5 Post Office Square, Suite 100
Boston, Massachusetts 02109-3912

Re: Comments on the draft Greater Lawrence Sanitary District Facility NPDES Permit (MA0100447)

Dear Ms Davis:

OspreyOwl Environmental (OOE) has reviewed the draft NPDES Permit no. MA0100447 and is providing the following comments as outlined in 40 CFR §124.13.

OOE has worked with communities within Massachusetts for the purpose of obtaining 'Clean Samples' from various receiving waters and is very familiar with the major dischargers all along the Merrimack River from Manchester, NH to Haverhill, MA.

Comments on Total Phosphorus Limitations

The permit allows a total monthly limit of 0.53 mg/l with a footnote of 10, 11 and a header footnote of 4. Footnote 10 refers the permittee to Part I.H.2, total phosphorus compliance schedule and Part I.H.6, outlining ambient phosphorus monitoring requirements. The header footnote 4 in 'Average Monthly' reporting requirements details using the numerical value of 0 if the sample was non-detect and if one or more samples demonstrates a value, then all non-detect values are to be listed as 'half the detection limit' for that specific sample.

The expectation is that all samples will have some value, but in the event an ambient river sample measures a ND at a detection limit of 10 ug/l (fairly standard minimum detection level for TP) GLSD would need to report 0.005 mg/l (5 ug/l) on their monthly DMR for the ambient WQ value. At river flows near 7 Q10 this would add 25 lbs of total TP mass loading to the Merrimack River that is not warranted. This increases as 7Q10 increased (50 lbs at two times the 7Q10, 100 lbs at four times the 7Q10 etc). This may have significant impact in future waste-load allocations within the watershed.

Total phosphorus should be exempt from the number four footnote, and as other comments will reference, this footnote should be completely eliminated from the draft.

I have reviewed the draft permit, five years of WWTP effluent TP data. This data was used to calculate the 95th percentile of TP discharge from the plant with a calculated concentration of 854 ug/l from 60 samples taken under non-clean sampling conditions. The WWTP pulls a sample from the effluent distribution box (Figure 1) via a vinyl PVC hose through pump housing to a composite 10-liter carboy housed within a refrigerated sampler.

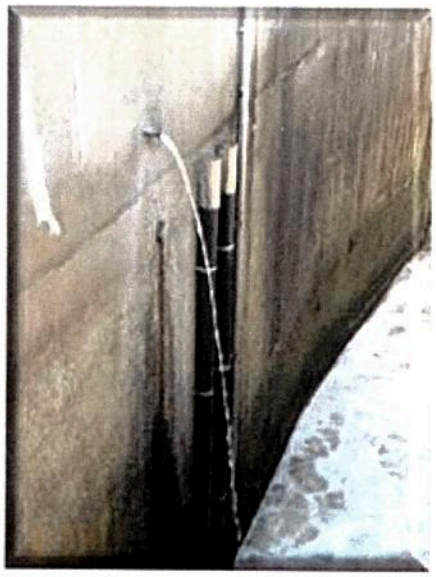

Figure 1 Eff channel sample draw off, sample return

Upon inspection of the sample collection hose, the peristaltic pump hose for sampler transfer, and the 10-liter sample collection plastic carboy, it was determined that three steps could be taken to assure a cleaner sample collection. This also had the added benefit of reducing any minute collected algae in sample hose, pump house and 10-liter carboy that could contribute to an artificially higher TP discharge from the WWTP than was actually being sent to the Merrimack River on a continual basis. Recommendations for a cleaner sample collection were as follows;

1. Change out the pvc, vinyl sample tubing before taking a NPDES reportable sample;
2. Change out the tygon peristaltic pump hose before taking a NPDES reportable sample;
3. Draw a sample of certified TP clean diluent water through the sample hose and pump hose and collect directly into a 'clean sample' container to be analyzed for TP. This will determine any TP contamination contributed by the hosing;
4. Insert a clean plastic bag liner in the 10-liter carboy every time a sample was being taken to prevent effluent from contact with the interior of the 10-liter carboy.

This practice was done for the May 21st through June 27th effluent composite testing and resulted in lower overall effluent TP than has been reported with the five-years of DMR that was used to calculate the 95th percentile value of 854 ug/l. The values for TP calculation (95th percentile) plant effluent (387.7 ug/l) and for upstream Merrimack River ambient TP concentration (median value of 50 ug/l) are in the below as taken with clean sampling methods.

Total Phosphorus Concentrations

Date	Eff ug/l	M018 ug/l	River Q cfs
5/21/2019	448	41	12,500
6/4/2019	217	54	9,410
6/5/2019	239	37	8,880
6/12/2019	235	32	8,040
6/13/2019	314	38	9,720
6/14/2019	147	46	8,290
6/18/2019	220	50	8,140
6/19/2019	238	50	7,550
6/25/2019	139	64	6,820
6/26/2019	157	64	7,080
Median	227.5	**50**	
95th Percentile	**387.7**	64	

Using 'Clean Sampling' values only, cfs values as outlined in the Fact Sheet, and solving for the downstream Total Phosphorus concentration would utilize the following equation;

$$Cr = \frac{(869\ cfs) \times (50\ ug/l) + (80.46\ cfs) \times (387.7\ ug/l)}{949.46}$$

Cr = 78.9 ug/l

As this is below the Gold Book guidance value of 100 ug/l, there is no reasonable potential to violate the water quality standard.

As this 'Clean Sampling' data is minimal, and the expectation is that the EPA would like to see ongoing proof that this trend is indeed representative of water quality conditions, one of the following should be adopted.

Delay the 0.53 mg/l limit for a year to allow GLSD to continue gathering TP data that adequately reflect the trends that are evident at the plant and ambient river concentrations taken under 'Clean Sampling' conditions.

Place a 'Monitor Only' provision in the permit to allow GLSD to gather five-years worth of data during this permit cycle for use in developing a reflective limit in the next permit renewal.

Begin the process of waste-load allocation with the information contained in the 15-year in the CDM study as coordinated by the USCAE and make the 'Best Use' of this available scientifically-based information.

EPA recommendations published under section 304(a) of the CWA serve several purposes, including providing guidance to States and Tribes in adopting water quality standards for nutrients that ultimately provide a basis for controlling discharges or releases of pollutants.

The values for both causal (total nitrogen, total phosphorus) and biological and physical response (chlorophyll *a*, turbidity, dissolved oxygen) variables represent a set of starting points for States and Tribes to use in establishing their own criteria in standards to protect uses. EPA recommends that States and Tribes establish numerical criteria based on section 304(a) guidance, ***section 304(a) guidance modified to reflect site-specific conditions, or other scientifically defensible methods***. EPA has also published methods for modifying 304(a) criteria on a site-specific basis. For nutrients, however, EPA expects that, in most cases, it will be necessary for States and authorized Tribes to identify with greater precision the nutrient levels that protect aquatic life and recreational uses.

These sections from the CWA specifically encourage States to go beyond guidance values (100 ug/l Gold Book criterial for TP) and modify values to reflect site-specific conditions, or other scientifically defensible methods. The CDM Merrimack River study does both.

The study was a 15-year complilaton of datasets throughout the Merrimack River Watershed in three phases. Data has been collected, verified, tabulated and used to demonstrate the current viability of the Merrimack River and modelled future scenarios under varying loading conditions. This document meets all the site-specific conditions and scientifically defensible methods as outlined in the 304(a) guidance.

In Table 4-1, Scenario #2, the baseline current conditions demonstrate that 1,540 lbs of average TP/day is discharged throughout the watershed at average total daily discharge from the WWTPs at an average daily flow of 98 mgd. These are current conditions in which the CDM study does not demonstrate any non-compliance with Merrimack River D.O., oxygen saturation, pH or any visible algal blooms or signs of eutrophication. EPA also indicates in the draft permit that there were no known instances of nutrient induced algal blooms at the time of draft permit release

Table 4-1, Scenario #6 shows full design discharge amounts from all large treatment plants at 198 mgd (this modeled result is twice the current average daily discharge). The modelling is done with a maximum discharge of 1 mg/l of TP from each large contributing WWTP. The modelled daily maximum loading to the Merrimack River is 1,378 lbs of TP. This is 162 lbs less TP that the current daily discharge that is causing no adverse effects to the Merrimack River.

The CDM Study modelling illustrate that a 1 mg/l TP concentration at full design flows of all WWTPs discharging to the Merrimack River would demonstrate compliance with conditions and even exhibit less total overall TP discharge than was evident during the 15-year study.

At a design flow of 52 mgd for GLSD that would equate to 1 x 8.34 x 52 = 433.68 lbs/day of total phosphorus discharge.

When looking at current permitted TP discharges to the Merrimack River, the GLSD discharge of 433 lbs/day would be the second lowest allocated lbs of TP/mgd within the watershed. This demonstrates an equitable distribution among the three largest dischargers.

City	LBS/DAY	Design Q	**Lbs of TP /MGD**	Permit Date
Concord, NH	199	10.1	**19.7**	2011
Franklin, NH	201	11.1	**18.1**	2017
Manchester, NH	236	34	**6.9**	2015
Merrimack, NH	168.8	5	**33.8**	2014
Nashua, NH	227	16	**14.2**	2016
Lowell, MA[1]	288	32	**9.0**	2019
GLSD, MA	433	52	**8.3**	2019

Respectfully submitted,

Ricardo Cantu,
President – OspreyOwl Environmental

[1] Lowell Draft NPDES, 1.08 mg/l at 32 mgd of design flow

Section 4

Nutrient Scenario Results and Discussion

As discussed in Section 3, 16 nutrient-related scenarios were developed in collaboration with stakeholders – Manchester, New Hampshire, Nashua, New Hampshire, Lowell, Massachusetts, GLSD, Massachusetts, and Haverhill, Massachusetts. Each scenario is run for the months of May through October across multiple years so that the scenario results can be interpreted with respect to the probability of exceeding water quality criteria across a wide range of climatic and hydrological conditions.

The scenarios that were presented in **Table 3-1** are summarized in **Table 4-1** below where the basis for each nutrient scenario is given as well as the average monthly total phosphorus and total nitrogen loads to the mainstem river. Summary statistics are presented for the entire mainstem Pemigewasset and Merrimack Rivers, not just for the Lower Merrimack study area.

Table 4-1 Summary of Average WWTP, TP, and TN Loads for the Lower Merrimack Nutrient Scenarios

Scenario	Basis	WWTP Flow Condition (millions of gallons per day [mgd])	Average WWTP TP (pounds [lbs]/day)	Average WWTP TN (lbs/day)
Scenario 1	Historical (2000-2002) loads and flows	132	1,497	17,810
Scenario 2	Baseline Current Conditions	98	1,540	13,023
Scenario 3	Summer Max Flows	154	2,326	19,844
Scenario 4	Current WWTP Effluent Flows at 1 mg/L TP (or current concentrations if lower)	98	681	13,023
Scenario 5	80% design Flow at permitted TP loads (current concentrations if no permit)	158	2,298	21,345
Scenario 6	Design Flow at 1 mg/L TP (or current concentrations if lower)	198	1,378	26,681
Scenario 7	Increased water withdrawals from the river at baseline WWTP conditions	98	1,540	13,023
Scenario 8	Estimated year 2100 temperature and tidal boundary condition sensitivity with WWTPs at design flow with 1 mg/L TP (or current concentrations if lower)	198	1,378	26,681
Scenario 9	Zero Discharge in Massachusetts with Permitted TP Loads and Current WWTP Effluent Flows in New Hampshire	38	1,163	7,226