

June 9, 2017

The Honorable Rhonda Pownell
Mayor, City of Northfield
801 Washington Street
Northfield, MN 55057

RE: New Water Quality Based Effluent Limits
Northfield Wastewater Treatment Facility
NPDES/SDS Permit No. MN0024368

Dear Mayor Pownell:

The Minnesota Pollution Control Agency (MPCA) has completed a review of recent monitoring data collected from the Northfield's Wastewater Treatment Facility (Facility) and downstream receiving waters as part of the permit reissuance process.

There are new water quality based effluent limits (WQBEL) that need to be placed in the reissued permit to ensure compliance with Cannon River Watershed Total Maximum Daily Load (TMDL). Special attention should be directed to the following:

Phosphorus - As summarized in the table below, the Facility will be required to meet the following new effluent limits.

Table 1. Summary of Total Phosphorus effluent limits for the Northfield WWTF

Limit	Limit type	Effective Period	Basis
11.81 kilograms per day	Calendar month average	June – September	WQBEL
19.68 kilograms per day	Calendar month average	October – May	WQBEL
6,223 kilograms per year	12 month moving total	January – December	WQBEL
1.0 milligram per liter	Calendar month average	January – December	State Discharge Restriction

The WQBEL limits above are established in the Cannon River TMDL Study. Additional information on these limits can be found in the attached Cannon River Watershed Upstream of Lake Byllesby Phosphorus Effluent Limit Analysis. The 1.0 milligram per liter limit is a State Discharge Restriction based in Minn. R. 7053.0255.

June 9, 2017

Upon initial review by the MPCA it appears that the Facility can comply with the new limits at current conditions and at design flow and loading. Please provide a response to the following:

1. Concurrence that the Facility can meet the proposed limit at the current flow and design flow and loadings or submit documentation of reasons the Facility will not be able to meet the new limit at current or design flow and loadings.

Please provide the requested information within thirty (30) days of the date of this letter.

If you have any questions or would like to set up a meeting with MPCA staff regarding the new limit(s), the requested information, or any of the information enclosed with this letter, please contact me at shauna.bendt@state.mn.us or at 651-757-2282.

Sincerely,

Shauna Bendt

This document has been electronically signed.

Shauna Bendt

Environmental Specialist 3

Municipal Wastewater Section

Municipal Division

cc: Justin Wagner, Utilities Manager
Rich Kucera, Wastewater Plant Supervisor

Enclosures: Northfield WWTF Effluent Limitations Summary
Phosphorus Effluent Limit Review: Cannon River Watershed Upstream of Lake Byllesby

Fill in white portion of form only

Domestic /Sewage

ELR staff will complete shaded areas

Effluent Limitations Summary

Version 150112

Attach map marking outfall to receiving water

Target completion date:

TO: Steven Weiss	Assigned ELR staff: Scott Kyser			Submittal Date:	
From: Permit Writer / Rev.Engineer	Shauna Bendt / EuDale Mathiason			Phone:	651-757-2282
Permit number:	MN0024368	Outfall #:	SD006	Exp.date:	10/31/2015
Permittee name:	City of Northfield				
Facility name/location:	Northfield WWTF / 1450 Hwy 3 North, Northfield, MN				
Outfall location (PLS coordinates):	T112N R19W S30			County: Dakota	

Design Parameters

Reason: reissuance	Existing Facility	EPA Major: <input checked="" type="checkbox"/> Class: A	Proposed Facility	EPA Major: <input checked="" type="checkbox"/> Class: A
Type of Facility / Disinfection	aeration/chemical P removal		Same	
Stab Ponds: discharge pond acreage (mid-depth)				
Waste Flow Type	continuous			
Nondeg Design Flow date: Nov 5, 1984	3.4 mgd			
Avg Wet Weather Design Flow (mgd)	5.2 mgd			
Avg Dry Weather Design Flow (mgd)	3.23 mgd			
Avg Annual Design Flow (mgd)				
Receiving water	Cannon River			

Applicable State
Regulations:

Receiving Water

Use Class: 2B,3C,4A,4B,5,6

ORVW (Y/N): No

Designation
Date:**Effluent Limitations**

Final Limits for Existing Permit

Final Limits for Proposed Permit

Substance or Characteristic	mg/L		kg/day		mg/L		kg/day	
	AVG	monthly	AVG	monthly	AVG	monthly	AVG	monthly
CBOD ₅	25		322		25		322	
Total Suspended Solids	30		386		30		386	
Fecal Coliform (Geometric mean):	200 orgs/100mL		NA		200 orgs/100mL			
Apr-Oct May-Oct Jan-Dec	Apr-Oct				Apr-Oct			
Ammonia-N: Jun 1 - Sep 30	8.9		175		8.9		175	
Oct 1 - Nov 30	34		668		34		668	
Dec 1 - Mar 31	monitor only				monitor only			
Apr 1 - May 31	20		393		20		393	
pH (Range) (Standard Units)	6.0-9.0		NA		6.0-9.0		NA	
Dissolved Oxygen (daily minimum)	monitor		NA		monitor		NA	
TOXICS (units µg/L) unless otherwise specified	AVG	MAX	AVG	MAX	AVG	MAX	AVG	MAX
	monthly	daily	monthly	daily	monthly	daily	monthly	daily
Residual Chlorine (dechlorination required)	NA		NA	NA	NA		NA	NA
Total Copper		113 ug/L		1.45		113 ug/L		1.45
Mercury (units are ng/L and mg/day)	CalMoAvg	12MoAvg	CalMoAvg	Basis:	CalMoAvg		CalMoAvg	Basis:

(enter remarks at bottom of form)

SDR: State Discharge Restriction

Completed by: _____

Date: _____

Completed by: _____

Date: _____

Fill in white portion of form only

ELR staff will complete shaded areas

Permittee: City of Northfield

Domestic/Sewage

Version 150112

Effluent Limitations Summary

Outfall#: SD006

Effluent Limitations

Substance or Characteristic	Final Limits for Existing Permit				Final Limits for Proposed Permit			
Phosphorus Management Plan (PMP)	None							
Is mass limit frozen by nondeg?					SDR = State Discharge Restriction			
Does this facility participate in a Phosphorus trading agreement ? Yes	CalMoAvg mg/L	12MoAvg mg/L	CalMoAvg kg/day	CYTD Tot (kg/yr)	CalMoAvg mg/L	Y mg/L	CalMoAvg kg/day	12MoMTot (kg/yr)
Phosphorus, Total	1.0		19.6	7174	1.0		see below	6,223
Effective Period	Jan-Dec	Y	Jan-Dec	Jan-Dec	Jan-Dec	Y	Y	Jan-Dec
Phosphorus Limit Basis	Y	Y	Y	Y	SDR	Y	WQBEL	WQBEL
Completed by: LFK		Date: 2/23/17		Remarks: see below				

Significant Industrial Users of municipal system (contact Regional office staff for input)

Significant Industrial Users of Municipal System (Contact Regional Office Staff for Input)	
Pollutant/Analyte (if known)	Industry (name and type)
All Flexs Inc	Metal Finishing
Malt-O-Meal	
Multek Flexible Circuits	Electroplating

Monitoring for Toxics

Pollutant/Analyte	Information source: (DMR, special requirements, priority pollutants, leachate, etc.)

Reviewed by: _____

Date:

Wetland Impacts

Location of impacted wetland (PLS coordinates):	Effluent limit review Date: _____ Completed by: _____
Potential impact: <input type="checkbox"/> filling <input type="checkbox"/> excavation <input type="checkbox"/> drainage <input type="checkbox"/> discharge to	

Variances see attached documentation

[illegible]

Reviewed by:

Date:

TMDL Requirements see Comments section at end of Checklist

[illegible]

Permit writer fill in white portion of form only

Domestic/Sewage

ELR staff will complete shaded areas

Effluent Limitations Summary

Version 150112

Permittee: City of Northfield

Outfall#: SD006

Additional Monitoring Requirements (List effluent monitoring only if an effluent limit is **not** assigned)

I = Influent **E** = Effluent **S** = Receiving water (Attach Information Protocol with detailed requirements for receiving water monitoring)

Parameter	I/E/S	Monitoring frequency/duration	I/E/S	Monitoring frequency/duration
Phosphorus	I/E	3x/week		
Total Mercury	I/E	1x/quarter	E	Total and Diss Hg with TSS Grab
Nitrite plus Nitrate	E	2x/year	I/E	1/month, 24 hour composite
TKN	E	2x/year	I/E	1/month, 24 hour composite
TDS	E	2x/year		Same

Dissolved Oxygen: effluent data not reviewed; standard effluent monitoring requirement

Reviewed by: Scott Kyser

Date: 3-20-2017

Reviewed by: _____

Date:

Reviewed by: _____

Date:

Remarks:

Mercury minimization plan required

Phosphorus - The Cannon River Watershed wasteload allocation and effluent limits are as follows: 1.0 mg/L TP calendar month average (SDR); 19.68 kg/day (Oct-May) and 11.81 kg/day (June-Sept) calendar month average; 6,223 kg/yr 12-month moving total. Please refer to the Cannon River Watershed Upstream of Lake Byllesby TP review for additional information. LFK 2/23/17

Office Memorandum

Date: 02/22/2017

TO : File

FROM : Liz Kaufenberg
Effluent Limits Unit
Environmental Analysis and Outcomes Division

PHONE : 651-757-2481

SUBJECT : Total phosphorus effluent limit review: Cannon River Watershed Upstream of Lake Byllesby

Introduction

The purpose of this memorandum is to determine total phosphorus (TP) effluent limits for National Pollutant Discharge Elimination System (NPDES) facilities discharging to the Cannon River Watershed upstream of Lake Byllesby. There are currently 29 active NPDES wastewater treatment facilities (WWTFs) (referred to as The Facilities) in this watershed that discharge via a surface discharge station upstream of Lake Byllesby (Table 1 and Figures 1 and 2). This memorandum will review applicable state discharge requirements (SDR) and eutrophication standards for receiving waters to establish TP effluent limits for all 29 WWTFs. A watershed TMDL for the Cannon River assigned lake eutrophication based TP wasteload allocations for all 29 WWTFs. These wasteload allocations are for Lake Byllesby and other lakes upstream of Lake Byllesby. This document will determine if the downstream lake TP allocations are sufficient for river reaches between a given WWTF and downstream lake. The TMDL study includes 30 lakes with phosphorus impairments as well as 41 stream reaches with bacteria, chloride, nitrate, and/or total suspended solid (TSS) impairments (MPCA, 2016). The TMDL is currently in EPA review with an anticipated decision on its approval sometime early 2017.

There are a couple things to note regarding the WWTFs in the watershed. The David Spinler Construction facility (MNG490076) does not currently discharge from their pit and plans to terminate their permit. As a result, this facility will not be included in the watershed analysis. In addition, there is a proposed new WWTF, Flying J Truck Stop, which will also be included in this review; however, is not listed in Table 1, as it is currently not an established NPDES permittee.

Table 1. Active wastewater treatment facilities discharging to a surface water within the Cannon River Watershed upstream of Lake Byllesby.

Wastewater Treatment Facility	Permit Number
Domestic	
David Spinler Construction Inc	MNG490076
Dennison WWTF	MN0022195
Ellendale WWTF	MNG580014
Elysian WWTF	MN0041114
Faribault WWTF	MN0030121
Geneva WWTF	MN0021008
Hope - Somerset Township WWTF	MN0068802
Kilkenny WWTF	MNG580084
Lonsdale WWTF	MN0031241
Medford WWTF	MN0024112
Meriden Township	MN0068713
MNDOT Heath Creek Rest Area	MN0069639
MNDOT Straight River Rest Area	MN0049514
Morristown WWTF	MNG550017 MN0025895
Northfield WWTF	MN0024368
Owatonna WWTF	MN0051284
Waterville WWTF	MN0025208

Wastewater Treatment Facility	Permit Number
Industrial	
CenterPoint Energy - Waterville	MN0063967
Faribault Dairy Co Inc - Faribault	MNG255092
Faribault Foods - Faribault Division	MN0050491
Genova Minnesota Inc	MN0046957
Hope Creamery	MN0001317
Lakeside Foods Inc - Owatonna Plant	MN0001571
Mathiowetz Construction	MNG490137
Mathy Construction Aggregate	MNG490081
Medford Sand & Gravel (formerly SMCCI - North Sanders Site)	MNG490273
OMG Midwest Inc/Southern MN Construction Co Inc	MNG490131
Viracon	MNG255078
Wondra Pit	MNG490130

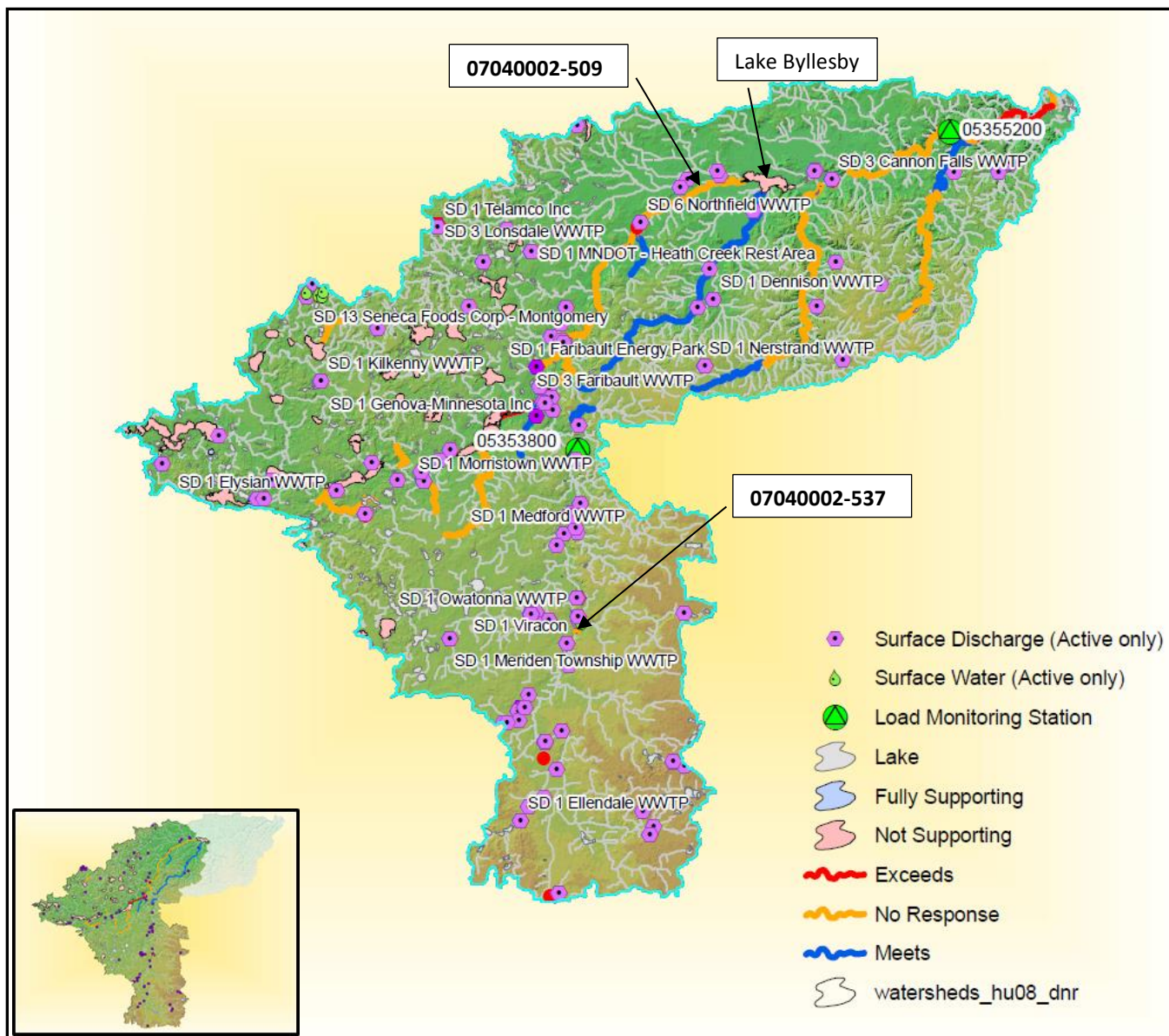


Figure 1. Cannon River Watershed with NPDES WWTFs and river and lake eutrophication water-quality data. Highlighted blue, yellow, or red river reaches indicate where formal water quality assessment have taken place. Blue and yellow mean RES are being met (yellow is where only the causal variable is exceeding, but the response variable is meeting), and red means RES are being exceeded. Note flow travels from headwater areas such as Ellendale, Elysian, and Lonsdale toward the outlet near the USGS load monitoring station 05355200. Insert: Lake Byllesby subwatershed of the Cannon River Watershed covered in this review.

Cannon River Watershed

The Cannon River Watershed includes areas of Dakota, Goodhue, Le Sueur, Steele, Rice, and Waseca counties. It drains approximately 1,460 square miles in the Lower Mississippi River Basin via two main channels, the Cannon and Straight River, to the Mississippi River at Red Wing. The watershed is located in a transition area between the southeast driftless terrain and glaciated lands of south-central Minnesota. Land use in the watershed is mostly cultivated (> 70%) with prairie and deciduous woodland as primary historic land use. As part of the Minnesota Pollution Control Agency's (MPCA) watershed approach, the Cannon River Watershed underwent intensive watershed monitoring in 2011 and 2012. A number of [monitoring and assessment, and strategy development reports](#) are available as part of the effort. There are a number of areas within the watershed identified for projects directed to improve water quality, including a [total maximum daily load \(TMDL\)](#) study for Lake Byllesby due to excess phosphorus. The next intensive watershed monitoring will begin in 2021.

Lake eutrophication standards

Minnesota adopted lake eutrophication standards (LES) in 2008. The [Cannon River Watershed TMDL](#) incorporates 30 lake impairments, most significant and furthest downstream of which is Lake Byllesby (LimnoTech, 2016). The implementation of the TMDL will improve water quality within and up and downstream of Lake Byllesby. The Cannon River TMDL has a site-specific standard for Lake Byllesby of 90 µg/L TP and 30 µg/L Chl-a. Because there is a TMDL for Lake Byllesby, the Cannon River Watershed analysis assumes Lake Byllesby is meeting lake eutrophication standards. Using a HSPF watershed model, various point and nonpoint source scenarios help determine appropriate WLAs of the lakes; including Lake Byllesby (please refer to the [Cannon River Watershed TMDL](#) for more information). The resulting TMDL scenario also provides modeled TP concentrations in river reaches up and downstream of Lake Byllesby for the RES analysis.

River eutrophication standards

Minnesota recently adopted river eutrophication standards (RES) in 2015. The Cannon River is located in both the Central River Nutrient Region (RNR) as well as the South RNR, and has the following applicable standards (Table 2, [Minn. R. 7050.0222](#), Heiskary, 2013).

Table 2. River eutrophication standards criteria specific for the Central and South River Nutrient Regions.

River Nutrient Region	Applicable River Eutrophication Standards			
	Causal Variable	Response Variable		
	TP	Chl-a	DO flux	BOD ₅
	(µg/L)	(µg/L)	(mg/L)	(mg/L)
Central	100	18	≤ 3.5	≤ 2.0
South	150	35*	≤ 4.5	≤ 3.0

*Current rule ([Minn.R. 7050.0222](#)) lists class 2B rivers and streams with Chl-a criterion of 40 µg/L. Intended criterion is 35 µg/L. MPCA plans to correct this in a future rulemaking.

RES analysis follows an iterative review process (Figure 3) to determine applicable TP effluent limits protective of RES. An analysis determines the potential of a WWTF to cause or contribute to an exceedance of the RES TP criterion under current and permitted conditions based on the methodology described in [Procedures for implementing river eutrophication standards in NPDES wastewater permits in Minnesota](#) (MPCA, 2015). The following is a summary of the analyses conducted for the Cannon River Watershed.

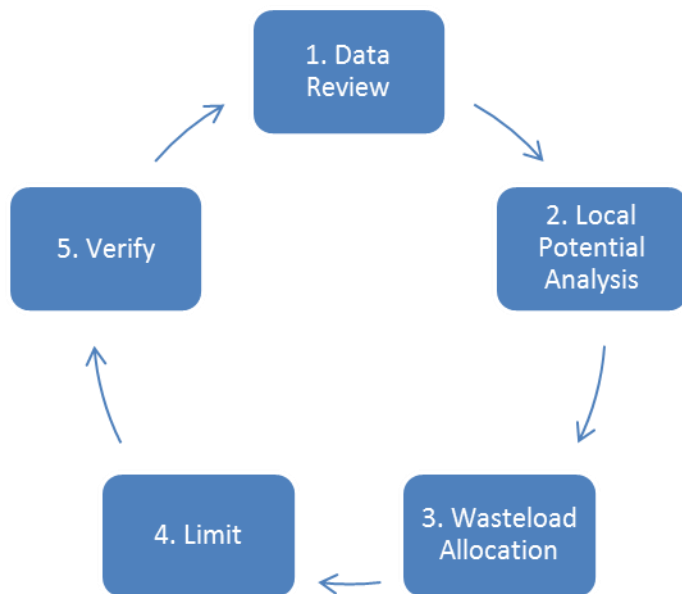


Figure 2. Overview of RES analysis and NPDES limit determination for the Cannon River Watershed.

1. Water quality data review

There are 16 river reaches upstream of Lake Byllesby with upstream NPDES facilities and sufficient TP data for RES analysis (Figure 1). Further river water-quality analysis is below.

2 - 3. Protection analysis, response potential analysis, and reasonable potential analysis based on downstream lake TMDL based wasteload allocations

Summary (steps 2-3)

The same HSPF model used to determine appropriate WLAs for Lake Byllesby also predicts the same WLAs are sufficiently protective for upstream river reaches based on model outputs. The model predicts that the 16 river reaches with sufficient RES data do not require further reductions from point sources. Therefore, additional WLAs for RES are not applicable for NPDES facilities upstream of Lake Byllesby at this time.

Background and Explanation (steps 2-3)

A high-resolution computer water-quality model examines whether limits to protect Lake Byllesby are sufficient to protect the intervening receiving water. A calibrated Hydrological Simulation Program – Fortran (HSPF) model (Bicknell et al., 2005) examines this question analyzing two different scenarios. The first scenario is the current condition calibration run in which The Facilities are at their current actual flow and loading rates (LimnoTech, 2015a). The tenth and eleventh model runs use the Lake Byllesby TMDL WLAs for The Facilities. The modeled water-quality results help examine the 16 river reaches of concern to determine whether additional reductions are necessary (Table 3). The model predicts that 14 reaches will meet the TP criterion based on the TMDL allocations for local lakes and Lake Byllesby. Results show two of the 16 reaches, 07040002-509 and 07040002-537 (Figure 1), exceeding phosphorus concentrations above the respective TP criterion (Table 3).

HSPF model results help to determine TP limits for The Facilities protective for the Cannon River Watershed. An evaluation of all summer river flows over a 18-year period (1995-2012) estimate a long-term summer average TP concentration for various model reduction scenarios, including nonpoint source best management practice implementation assumptions. The implementation procedures are clear that models are generally favored when available for establishing WLAs, which translate into effluent limits.

Water quality models, TMDLs, load duration curves and Water Restoration and Protection Strategy can also be used to establish WLAs. The complexity of these latter techniques is beyond the scope of this

document but generally would be favored over the mass balanced equation as they consider more factors in developing the WLA. (Excerpt from implementation procedures, MPCA 2015)

Minnesota state rule, Minn.R. [7053.0205](#) Subp. 7.C, allows for consideration of nonpoint reductions when setting effluent limits. The use of models and nonpoint reduction assumptions were critical in the Metropolitan Council Environmental Services (MCES) Mississippi River Basin TP Permit. The Minnesota State Court of Appeals recently affirmed MPCA's application of this state rule when establishing effluent limits for the MCES Mississippi River Basin TP Permit. The process for establishing TP limits in the watershed is similar to the process for establishing the MCES WWTF limits.

Table 3. Cannon River Watershed summer (June-September) time-weighted HSPF projected long-term summer average TP concentrations and applicable Central and Southern River Nutrient Region RES criterion. Red highlighted TP concentrations are those exceeding the TP criterion for the respective River Nutrient Region.

Lake Byllesby WLA Modeled River Water Quality				
		Lake Byllesby Baseline Scenario Average TP Concentration (µg/L)	Lake Byllesby Combined Scenario Average TP Concentration (µg/L)	RES Criterion (µg/L)
Reach Name	AUID	TP	TP	TP
Prairie Creek	07040002-504	85	76	150
Cannon River	07040002-507	280	141	150
Cannon River	07040002-508	245	141	150
Cannon River	07040002-509	244	154	150
Straight River	07040002-537	373	160	150
Cannon River	07040002-540	56	52	100
Waterville Creek	07040002-560	99	92	100
Unnamed Creek (Spring Creek)	07040002-568	87	84	150
MacKenzie Creek	07040002-576	99	95	150
Devil Creek	07040002-577	70	67	100
Cannon River	07040002-581	308	142	150
Cannon River	07040002-582	296	141	150
Unnamed Creek	07040002-702	94	91	150
Unnamed Creek	07040002-703	296	71	100
Unnamed Creek	07040002-705	98	94	100
Whitewater Creek	07040002-706	98	90	100

Although 16 river reaches were analyzed for summer average TP concentrations with the Lake Byllesby WLAs, two of the reaches, 07040002-509 and 07040002-537 (Figure 1), necessitate further analysis because they continue to show the potential to exceed the TP criterion.

Cannon River (07040002-509)

This reach of the Cannon River just upstream of Lake Byllesby (07040002-509) is currently meeting RES. The summer average TP concentration (259 µg/L) is exceeding the RES criterion of 150 µg/L TP; however, the Chl-a summer average concentration (15 µg/L) is meeting the RES criterion of 35 µg/L Chl-a. Even though modeled TP data indicates this reach of the Cannon will still exceed the TP criterion with the Cannon River Watershed TMDL WLAs, significant reductions are expected. The HSPF model shows this reach of the Cannon reducing summer (June – September) average concentrations from 244 µg/L to 154 µg/L TP, a 37% reduction (Table 3).

Other factors control algal production in this reach given the relatively high summer TP concentration. In addition, when TP and Chl-a concentrations are plotted together, the data indicates a negatively correlated relationship, meaning as TP concentrations increase, Chl-a concentrations actually decrease (Figure 4). This may be the result of a few factors; however, the important observation is that the data shows TP is not necessarily causing increased Chl-a concentrations. As a result, further point source reductions, beyond what is required for Lake Byllesby, are not necessary at this time.

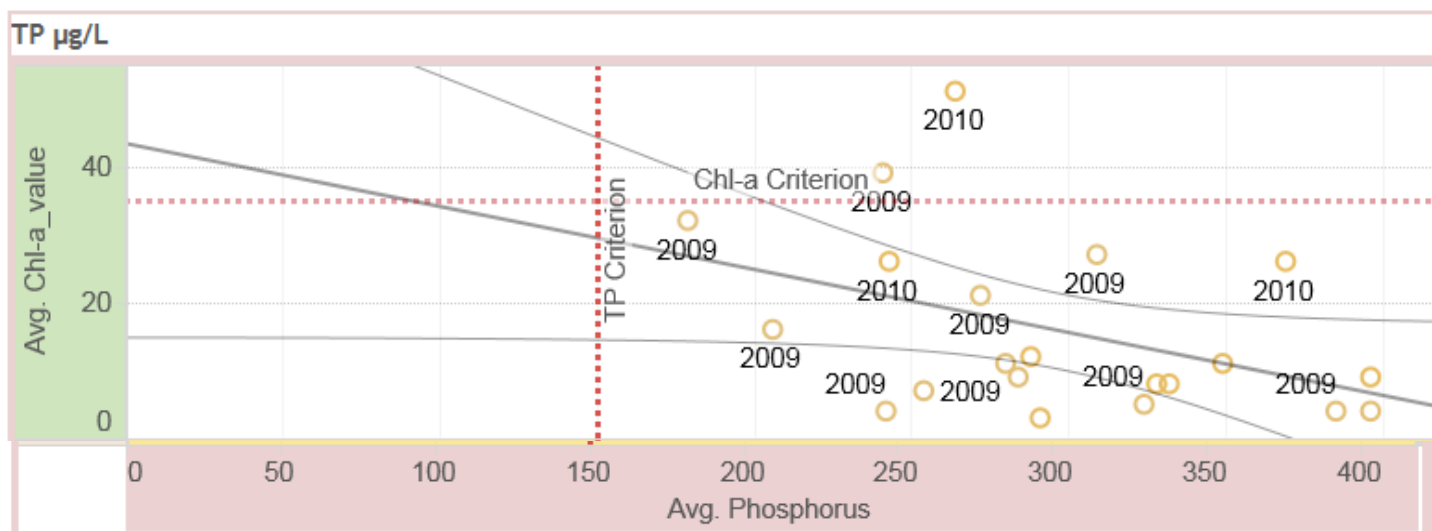


Figure 3. Ambient total phosphorus and Chlorophyll-a relationship for the Cannon River (AUID 07040002-509). Data used were collected during summer (June – September) 2009 and 2010.

Straight River (07040002-537)

A phosphorus load duration curve helps to better understand impacts along the Straight River (07040002-537) from point sources (Figure 5) using the HSPF modeled TP concentrations for baseline “current” conditions and with Lake Byllesby WLAs incorporated. Point sources can have a disproportionate impact on receiving waters during summer (June – September) low flow conditions. The 80th percent flow exceedance (when, on average, 80% of the flow exceeds the respective flow value) is the target flow to represent low flow conditions (MPCA, 2015).

Details of the data for the load duration curve are in the [Cannon River Watershed Total Maximum Daily Load report](#) (MPCA, 2016). The average concentration during summer (June – September) for the baseline scenario is 373 µg/L TP (Figure 5). The TMDL model predicts a phosphorus reduction from 373 µg/L TP (Figure 5) to 160 µg/L TP (Figure 6, Table 3) at the 80th percent flow exceedance with the TMDL WLAs implemented. The green line is the maximum load under various flow conditions to meet the respective RES criterion. Individual daily loads (red dots) above the green line are due to daily concentrations exceeding the criterion.

RCH 807 (Straight River up of Owatonna) Load Duration Curve **New Baseline or "Current Condition"** **June - Sept modeled Flows and TP Loads; Goal 0.150 mg/l**

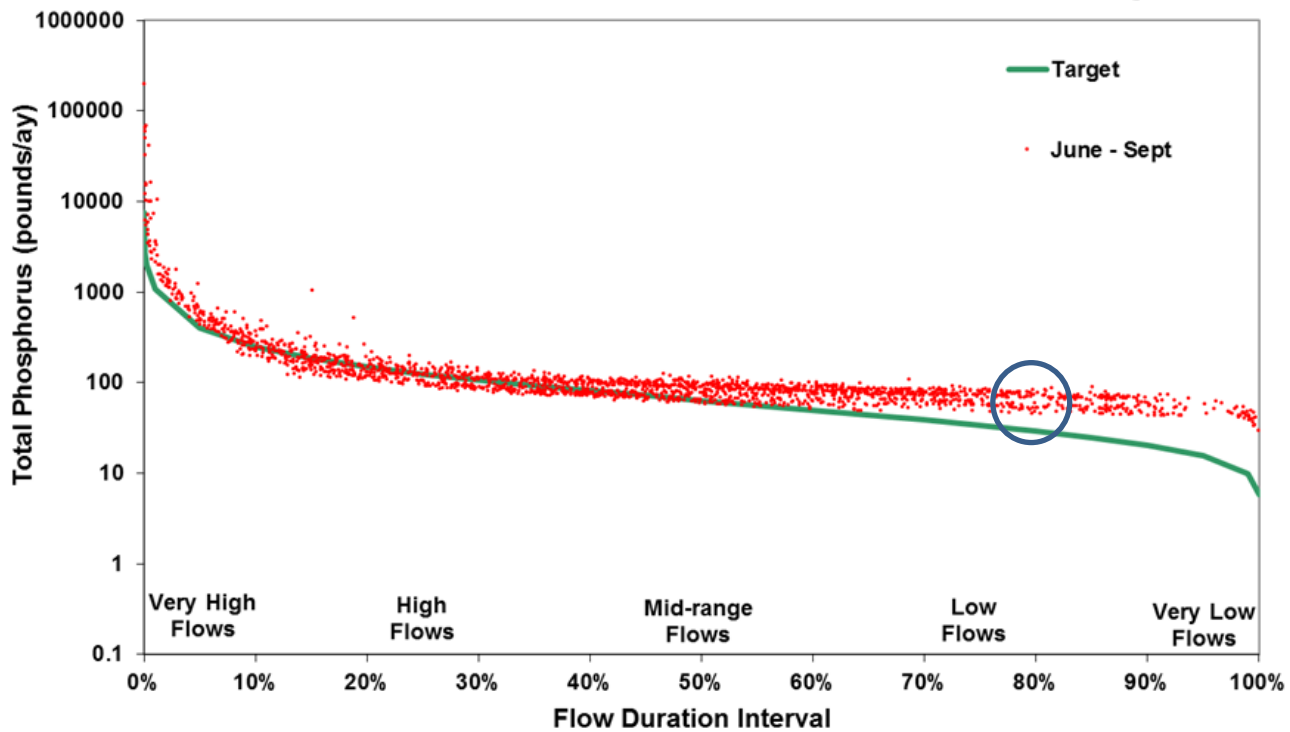


Figure 4. Total phosphorus load duration curve (as described above) for the Straight River (AUID 07040002-537) under baseline conditions (LimnoTech, 2015b). The blue circle represents the average summer (June – September) TP concentration of 373 µg/L TP.

Striaight River Scenario 11
RCH 807 June - September Only
0.150 mg/l Goal

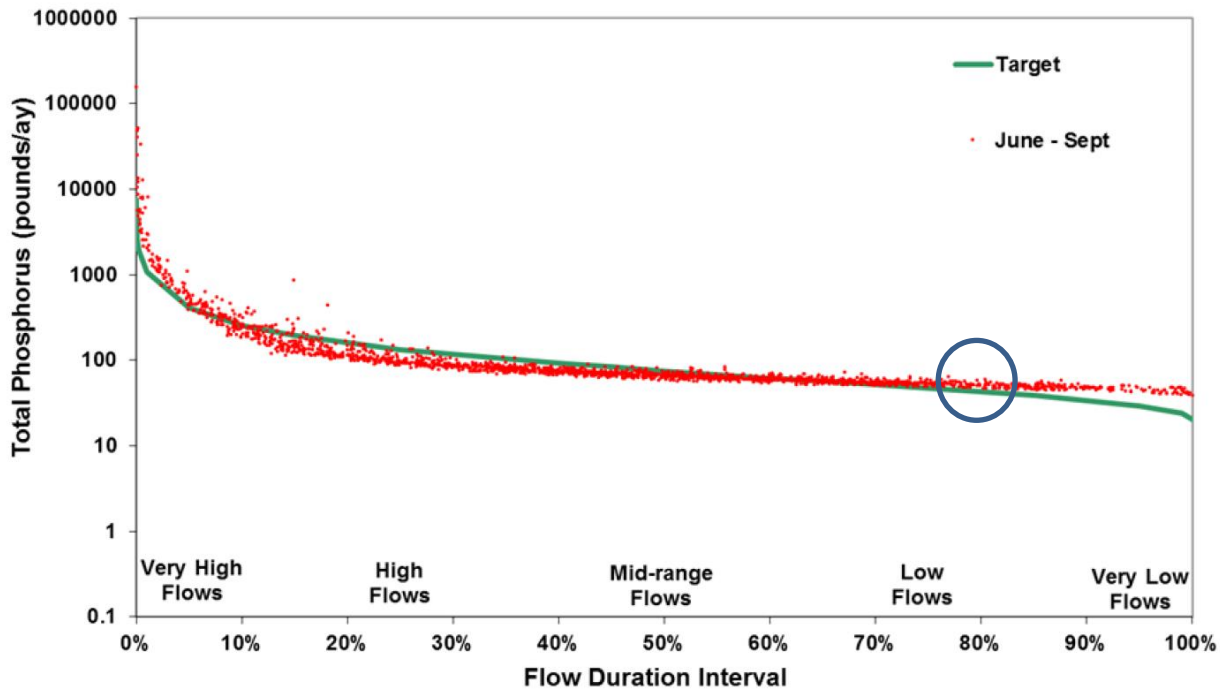


Figure 5. Total phosphorus load duration curve (as described above) for the Straight River (AUID 07040002-537) with TMDL wasteload allocations (LimnoTech, 2015b). The blue circle represents the average summer (June – September) TP concentration of 160 µg/L TP.

Implementing the Cannon River Watershed TMDL WLAs may significantly reduce phosphorus concentrations; however, modeled data suggests TP concentrations will still exceed the RES criterion for the Straight River (Figure 6). As a result, MPCA analyzes the TP and Chl-a relationship in the Straight River. In order for RES to exceed the standard, both the cause and response variable need to exceed the standard. It is not enough for just TP to exceed. As with the Cannon River (07040002-509), the TP and Chl-a data, when plotted together, indicate a negative relationship between TP and Chl-a (Figure 7). This relationship suggests that as TP increases, Chl-a is not necessarily expected to increase as well. Thus, it is not reasonable to require further reductions from WWTFs based on three factors: 1) the river is currently meeting RES; 2) significant TP reductions are expected from reductions required in the TMDL; and 3) Chl-a is not expected to increase based on the negative relationship.

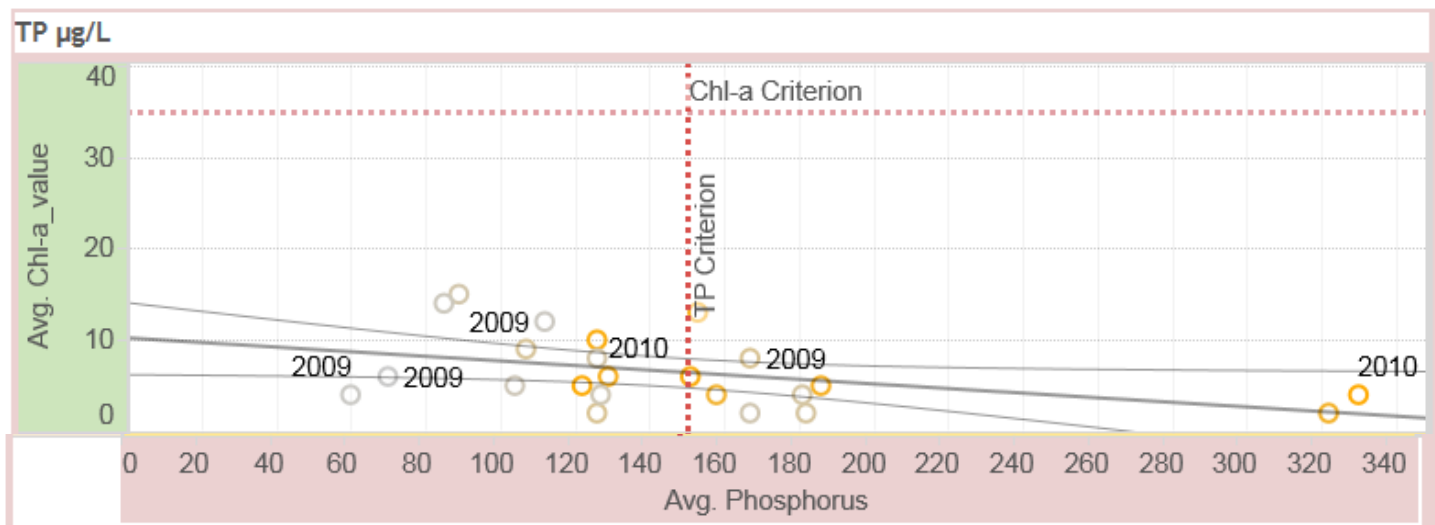


Figure 6. Ambient total phosphorus and Chlorophyll-a relationship for the Straight River (AUID 07040002-537). Data used were collected during summer (June – September) 2009 and 2010.

Flying J Truck Stop

Flying J truck stop is located off highway interstate 35 in Minnesota (Figure 8). They are currently trucking the domestic waste generated at the truck stop and are in the process of requesting to treat and discharge the waste instead. Flying J requested preliminary effluent limits for discharge at five different surface water locations for treated domestic strength sewage (Figure 8). All five discharges have a proposed maximum design flow of 0.02 mgd and an average design flow of 0.015 mgd. The facility design is to treat typical domestic strength waste using a mechanical treatment system consisting of sequencing batch reactors including anoxic treatment, chemical addition to treat phosphorus and UV for disinfection.

The preliminary limits are for a surface discharge to an unnamed stream (07040002-999) which flows to Heath Creek (07040002-521), and ultimately the Cannon River (07040002-508). Preliminary TP limits include a June – September water-quality based effluent limit (WQBEL) of 0.024 kg/day (equivalent to a monthly average concentration of 0.32 mg/L) to meet RES as well as a 28 kg/yr (equivalent to a monthly average concentration of 1.0 mg/L) to meet LES protective of Lake Byllesby. The total mass may need to be offset by trading on an annual basis, using whichever mass value is more restrictive based on time of year (0.024 kg/day June – September and 28 kg/yr October – May). Trading details are determined upon approval of the TMDL.

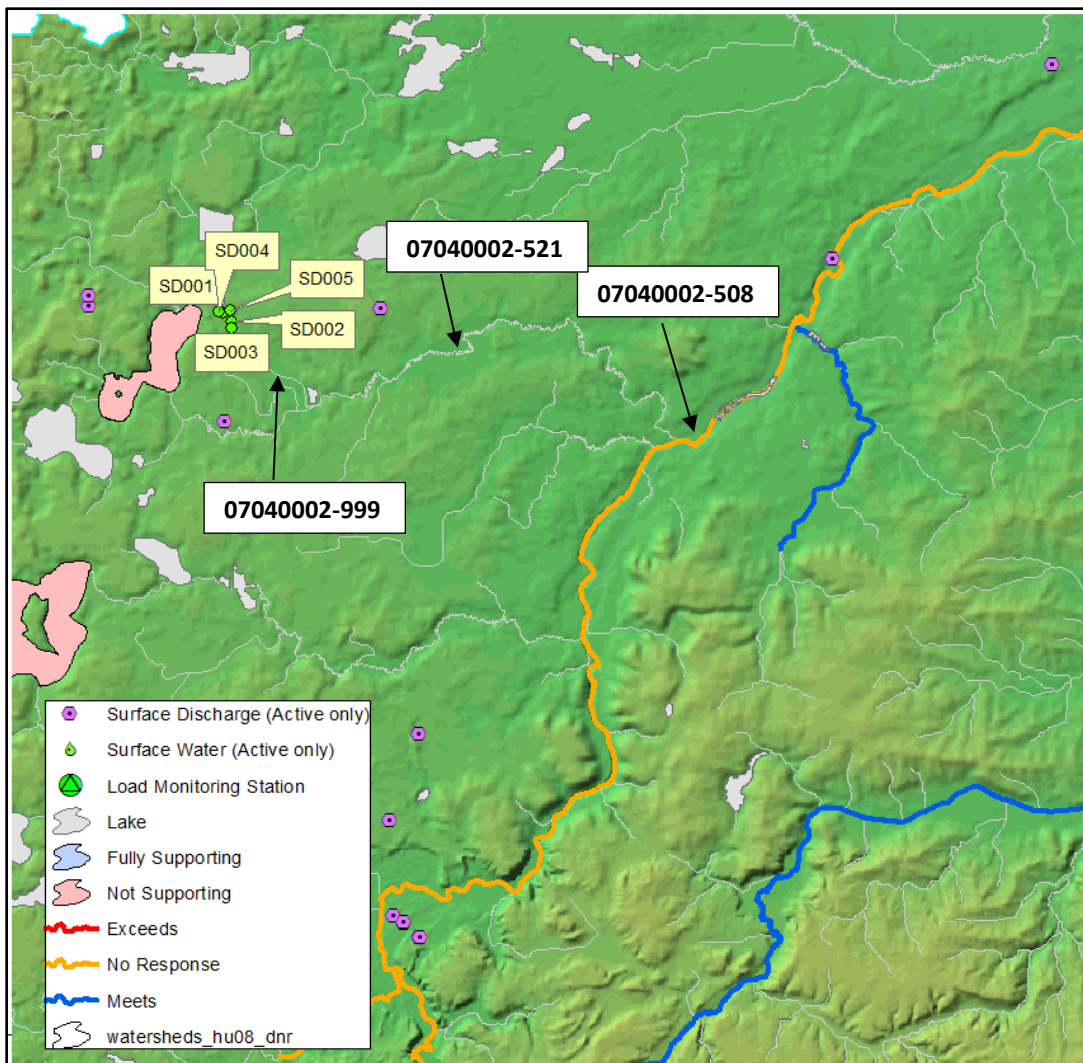


Figure 7. Cannon River Watershed with the five proposed discharge locations (SD001-SD005) for Flying J Truck Stop. Flow travels from an unnamed stream (07040002-999) to Heath Creek (07040002-521), and ultimately the Cannon River (07040002-508).

4. Converting WLA to permit effluent limits

The Facilities do not need to have additional limits to protect for RES in the Cannon River Watershed. Nonetheless, current concentration and mass limits, based on SDR ([Minn. R. 7053.0255](#)) and LES are still applicable, in addition to final effluent limits determined for Flying J Truck Stop.

5. Verify final limits (multiple downstream endpoints and seasonal considerations)

The first river reach downstream of Lake Byllesby in the Cannon River Watershed with sufficient water quality data for RES analysis is the Cannon River (07040002-502). This reach has RES criteria of $\leq 100 \mu\text{g/L}$ TP and $\leq 18 \mu\text{g/L}$ Chl-a, $\leq 3.5 \text{ mg/L}$ DO flux, and $\leq 2.0 \text{ mg/L}$ BOD₅. Further discussion on this and other river reaches downstream of Lake Byllesby will be included in the total phosphorus effluent limit review memo for the portion of the Cannon River Watershed downstream of Lake Byllesby. The TP criterion for Lake Byllesby is $90 \mu\text{g/L}$ so the concentration coming out of Lake Byllesby will be at or below $90 \mu\text{g/L}$ TP the majority of the time with the Lake Byllesby WLAs implemented.

Lakes

TP WQBELs for lakes have been issued since 2008 when LES were adopted. Simple mass balance equations have not been used to calculate WQBELs for WWTFs upstream of lakes. The BATHUB model has been the primary tool for calculating WLAs for lakes; however, in some cases, such as Lake Byllesby and Lake Pepin, models that are more complicated have been used to ensure WLAs are protective.

In addition to Lake Byllesby, effluent from NPDES WWTFs in the Cannon River Watershed discharges upstream of Lake Pepin, a riverine lake on the Mississippi River. Because the phosphorus criterion for Lake Byllesby (90 µg/L) is less than the criterion for Lake Pepin (100 µg/L), it is reasonable to conclude that WLAs for Lake Byllesby are also sufficient for Lake Pepin. Therefore, The Facilities do not have RP to cause or contribute to the excess nutrient impairment in Lake Pepin, and therefore, are not required to have additional WQBELs on the basis of water quality in Lake Pepin.

Cannon River Watershed total phosphorus effluent limits

In total, SDR, Lake Byllesby, and Lake Pepin limits are applicable for the Cannon River Watershed WWTFs in order to meet water quality standards in receiving waters. A summary of all appropriate TP limits for WWTFs upstream of Lake Byllesby and the respective time frames is summarized in Table 4.

Table 4. Summary of applicable TP limits for facilities in the Cannon River Watershed with corresponding time period.

		Existing Total Phosphorus Limits					Lake Byllesby Limits ^b		
		SDR ^a		Lake Eutrophication Standards			October - May	June-September	Annual
Wastewater Treatment Facility	Permit Number	calendar month average	12-month moving average	calendar month average	12-month moving total	calendar YTD total	calendar month average	calendar month average	12-month moving total ^c
Domestic		mg/L	mg/L	kg/day	kg/yr	kg/yr	kg/day	kg/day	kg/yr
Dennison WWTF	MN0022195								69
Ellendale WWTF	MNG580014								277
Elysian WWTF	MN0041114	1.0			135				135
Faribault WWTF	MN0030121	1.0				9671	26.50	15.90	8,378
Flying J Truck Stop ^d	TBD								
Geneva WWTF	MN0021008								191
Hope - Somerset Township WWTF	MN0068802								70
Kilkenny WWTF	MNG580084	1.0		1.2					31
Lonsdale WWTF	MN0031241		1.0		285				285
Medford WWTF	MN0024112			0.72					263
Meriden Township	MN0068713					44			44
MNDOT Heath Creek Rest Area	MN0069639					8			8
MNDOT Straight River Rest Area	MN0049514				50				33
Morristown WWTF	MNG550017 MN0025895	1.0			145				145
Northfield WWTF	MN0024368	1.0		19.6		7174	19.68	11.81	6,223
Owatonna WWTF	MN0051284	1.0		18.9		6908	18.93	11.36	5,984
Waterville WWTF	MN0025208	1.0			387				387
Industrial									
CenterPoint Energy - Waterville	MN0063967								2
Faribault Dairy Co Inc - Faribault	MNG255092								12

Faribault Foods - Faribault Division	MN0050491								691
Genova Minnesota Inc	MN0046957								24
Hope Creamery	MN0001317								2
Lakeside Foods Inc - Owatonna Plant	MN0001571								775
Mathiowetz Construction	MNG490137								29
Mathy Construction Aggregate	MNG490081								562
Medford Sand & Gravel (formerly SMCCI - North Sanders Site) SD012	MNG490273								75
Medford Sand & Gravel (formerly SMCCI - North Sanders Site) SD002	MNG490273								89
OMG Midwest Inc/Southern MN Construction Co Inc (Dundas Wash Plant S&G)	MNG490131								582
OMG Midwest Inc/Southern MN Construction Co Inc (Owatonna Quarry)	MNG490131								269
OMG Midwest Inc/Southern MN Construction Co Inc (Thomas S&G)	MNG490131								582
Viracon	MNG255078								190
Wondra Pit	MNG490130								394

^aState Discharge Restriction based on 7050.0255.

^bDetermination of the Lake Byllesby TP limits are found in the Cannon River Watershed TMDL.

^c12-month moving total is preferred limit type; however, year-to-date total limit type may be used under appropriate facility-specific conditions.

^dPreliminary TP effluent limits determined for Flying J Truck Stop are as follows: June – September water quality based effluent limit (WQBEL) of 0.024 kg/day (equivalent to a monthly average concentration of 0.32 mg/L) is needed to meet river eutrophication standards this. In addition, a 28 kg/yr (equivalent to a monthly average of 1.0 mg/L) is also applicable for lake eutrophication standards for Lake Byllesby. The total mass may need to be offset by trading on an annual basis, using whichever mass value is more restrictive based on time of year (0.024 kg/day June – September and 28 kg/yr (October – May). Trading details will be determined upon approval of the TMDL.

Summary

This analysis demonstrates with the proposed WLAs, The Facilities do not have reasonable potential to cause or contribute to a river eutrophication impairment in the Cannon River Watershed upstream of Lake Byllesby with WLAs derived for the Cannon River Watershed TMDL. As such, limits required for the TMDL are sufficient for the immediate receiving waters upstream of Lake Byllesby. The total phosphorus effluent limit review memo for the Cannon River Watershed downstream of Lake Byllesby will address NPDES facilities located downstream of Lake Byllesby within the Cannon River Watershed. The WLAs determined protective of Lake Byllesby are also sufficiently protective of Lake Pepin. Therefore, The Facilities do not have RP to cause or contribute to the excess nutrient impairment in Lake Pepin, and are ultimately not required to have additionally restrictive WQBELs. An overview of all appropriate TP limits and respective time frames is summarized in Table 4. Finally, the permittees should be informed that more restrictive TP limits may be necessary with additional water quality monitoring.

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