Permit Fact Sheet

General Information

Permit Number	WI-0020281-09-0
Permittee Name and Address	VILLAGE OF MOUNT HOREB 138 East Main Street Mount Horeb WI 53572
Permitted Facility Name and Address	Mount Horeb Wastewater Treatment Facility 2450 SAND ROCK ROAD, MOUNT HOREB, WISCONSIN
Permit Term	April 01, 2025 to March 31, 2030
Discharge Location	East bank of the West Branch Sugar River (NE ¼ of NE ¼ of Section 23, T6N, R6E) (Lat: 42.98743N, Lon: 89.74286W)
Receiving Water	West Branch of the Sugar River (West Branch Sugar River/Mt. Vernon Creek Watershed, SP16 – Sugar Pecatonica River Basin) in Dane county
Stream Flow ($Q_{7,10}$)	0.42 cfs
Stream Classification	Limited Forage Fish (from Mt. Horeb STP downstream to CTH JG) Cold Water Community (CTH JG, approximately 2 miles downstream)
Discharge Type	Existing, Continuous
Annual Average Design Flow (MGD)	0.790 MGD
Industrial or Commercial Contributors	None.
Plant Classification	A1 - Suspended Growth Processes; B - Solids Separation; C - Biological Solids/Sludges; P - Total Phosphorus; D - Disinfection; L - Laboratory; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

Facility Description

Mount Horeb Wastewater Treatment Facility is an advanced secondary wastewater treatment facility that completed a major upgrade in May 2020. The plant now consists of screening, grit removal, two oxidation ditches with selector basins for biological phosphorus removal and sized for extended aeration activated sludge, chemical phosphorus removal, two final clarifiers, UV disinfection, and post aeration. As part of the facility upgrade the annual average design flow increased from 0.609 MGD to 0.790 MGD. Sludge removed during primary treatment and waste activated sludge is stabilized in an aerobic digestion process, mechanically thickened, and then land applied on department approved sites.

Substantial Compliance Determination

Enforcement During Last Permit: A notice of noncompliance (NON) was issued 2/15/2019 for a sanitary sewer overflow (SSO) 1/17/2019 to 1/21/2019 caused by force main break. A NON was issued 9/4/2020 for total suspended solids, total phosphorus and nitrogen, ammonia effluent limitation violations throughout 2019 and into May of 2020. A

NON was issued 9/10/2020 for an SSO on 8/11/2019 due to a force main break. The facility has completed all previously required actions as part of the enforcement process.

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on July 12, 2023, this facility has been found to be in substantial compliance with their current permit.

Sample Point Descriptions

Sample Point Designation		
Sample Point Number	**Discharge Flow, Units, and Averaging Period**	**Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)**
701	0.500 MGD (Average January 2019 – August 2024)	Influent: 24-hour flow proportional composite sampler located in the preliminary treatment building, after the mechanical bar screen and prior to grit removal. Flow is monitored by an ultrasonic flow meter at the Parshall flume located outside of the preliminary treatment building after grit removal.
001	N/A Not required during previous permit term	Effluent: 24-hour flow proportional composite and grab samples shall be collected from the bottom of the cascade aerator, prior to discharge to the West Branch of the Sugar River. Flow is monitored by an ultrasonic flow meter at the Parshall flume located downstream of the UV disinfection.
601	New Sample Point	In-stream Sampling Point 601: Representative water samples shall be collected from the West Branch of the Sugar River. Sample point 601 is located downstream of the Mount Horeb WWTF outfall, at the intersection of County Highway JG and Lewis Road (42.94474, -89.71970). Sample point 601 correlates with the sample locations described in the approved AM Plan No. WQT-2024-0004 (November 2023).
602	New Sample Point	In-stream Sampling Point 602: Representative water samples shall be collected from the West Branch of the Sugar River. Sample point 602 is located upstream of the Mount Horeb WWTF outfall, at Docken Road (42.9926, -89.7451). Sample point 602 correlates with the sample locations described in the approved AM Plan No. WQT-2024-0004 (November 2023).
004	131 Dry U.S. Tons (2023 Permit Application)	Aerobically digested, Thickened, Liquid, Class B. Representative sludge samples shall be collected from the sludge storage tank.

Permit Requirements

1 Influent – Monitoring Requirements

1.1 Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	

1.1.1 Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

Flow: The sample frequency has changed to 'Daily' for eDMR reporting purposes.

1.1.2 Explanation of Limits and Monitoring Requirements

Monitoring of influent flow, BOD5 and total suspended solids is required by s. NR 210.04(2), Wis. Adm. Code, to assess wastewater strengths and volumes and to demonstrate the percent removal requirements in s. NR 210.05, Wis. Adm. Code, and in the Standard Requirements section of the permit.

2 Surface Water - Monitoring and Limitations

2.1 Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	22 mg/L	3/Week	24-Hr Flow Prop Comp	October - April
BOD5, Total	Weekly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	May - September
BOD5, Total	Monthly Avg	22 mg/L	3/Week	24-Hr Flow Prop Comp	October - April
BOD5, Total	Monthly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	May - September
Suspended Solids, Total	Weekly Avg	22 mg/L	3/Week	24-Hr Flow Prop Comp	October - April
Suspended Solids, Total	Weekly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	May - September
Suspended Solids, Total	Monthly Avg	22 mg/L	3/Week	24-Hr Flow Prop Comp	October - April

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Suspended Solids, Total	Monthly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	May - September
pH Field	Daily Min	6.0 su	5/Week	Grab	
pH Field	Daily Max	9.0 su	5/Week	Grab	
Dissolved Oxygen	Daily Min	6.0 mg/L	5/Week	Grab	
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	4.0 mg/L	3/Week	24-Hr Flow Prop Comp	October - April
Nitrogen, Ammonia (NH3-N) Total	Weekly Avg	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	May - September
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	4.0 mg/L	3/Week	24-Hr Flow Prop Comp	October - April
Nitrogen, Ammonia (NH3-N) Total	Monthly Avg	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	May - September
E. coli	Geometric Mean - Monthly	126 #/100 ml	Weekly	Grab	May - September
E. coli	% Exceedance	10 Percent	Monthly	Calculated	May - September. See the E. coli Percent Limit section. Enter the result in the DMR on the last day of the month.
Phosphorus, Total	Monthly Avg	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	
Phosphorus, Total	6-Month Avg	0.6 mg/L	3/Week	24-Hr Flow Prop Comp	This is an Adaptive Management interim limit that will go into effect May 1, 2025. An interim limit of 0.5 mg/L may be effective during future permit terms. See schedules and effluent requirements.
Phosphorus, Total		lbs/day	3/Week	Calculated	Calculate the daily mass discharge of phosphorus in lbs/day on the same days phosphorus sampling occurs.
Chloride	Weekly Avg	520 mg/L	4/Month	24-Hr Flow Prop Comp	
Chloride	Monthly Avg	520 mg/L	4/Month	24-Hr Flow	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
				Prop Comp	
Chloride, Variable Limit		lbs/day	4/Month	See Table	Look up the chloride mass from the 'Variable Chloride Mass' table and report the variable limit in the Chloride Variable Limit column on the eDMR.
Chloride	Weekly Avg - Variable	lbs/day	4/Month	Calculated	Report the weekly average mass Chloride result in the Chloride column of the eDMR. See Chloride Mass Limit – Non-Wet Weather and Alternative Wet Weather Mass Limit Section.
Temperature Maximum		deg F	Daily	Continuous	Monitoring January - December 2028.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Annual in rotating quarters. See Nitrogen Series Monitoring section. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite + Nitrate Nitrogen.
Chronic WET	Monthly Avg	1.4 TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	

2.1.1 Changes from Previous Permit

Effluent limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

Flow: Monitoring effluent flow rate is included in the permit. An effluent flow meter was installed in 2018.

Dissolved Oxygen (DO), pH, ammonia, temperature: The sample frequency for these parameters has changed.

E. coli: Fecal coliform monitoring and limits have been replaced with Escherichia coli (E. coli) monitoring and limits.

Phosphorus: The permit includes an Adaptive Management interim limit of 0.6 mg/l expressed as a 6-month average.

Chloride: Chloride limitations have been updated based on chloride effluent data submitted during the previous permit term. An alternative wet weather mass limit has been included in the permit.

Total Nitrogen Monitoring (TKN, N02+N03 and Total N): Annual monitoring is required in specific quarters as outlined in the permit.

Chronic WET: The permit includes a monthly average limit. The instream waste concentration (IWC) has been updated to 74%. Annual chronic WET tests in rotating quarters are scheduled during the permit term.

2.1.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo for the Mount Horeb Wastewater Treatment Facility dated November 26, 2024, prepared by Sarah Luck, and used for this reissuance.

E. Coli: Revisions to bacteria surface water quality criteria to protect recreational uses and accompanying E. coli WPDES permit implementation procedures became effective May 1, 2020. The new rule requires that WPDES permits for facilities with required disinfection include monitoring for E. coli while facilities are disinfecting during the recreation period and establish effluent limitations for E. coli established in s. NR 210.06 (2), Wis. Adm Code. The administrative code rule changes included the following actions: revised the bacteria water quality criteria from fecal coliform to E. coli to protect recreation in ch. NR 102, Wis. Adm. Code.; removed fecal coliform criteria for certain individual waters from ch. NR 104, Wis. Adm. Code.; revised permit requirements for publicly and privately owned sewage treatment works in ch. NR 210, Wis. Adm. Code.; and, updated approved analytical methods for bacteria in ch. NR 219, Wis. Adm. Code.

Phosphorus: The proposed permit will be Mount Horeb's second permit term under new administrative rules for phosphorus discharges that took effect December 1, 2010. Details regarding the administrative rules for phosphorus discharges may be found at: https://dnr.wisconsin.gov/topic/Wastewater/Phosphorus. Phosphorus rules are contained in s. NR 102.06 and ch. NR 217, Subchapter III. A monthly average interim limit of 1 mg/l is effective upon reissuance. An Adaptive Management interim limit of 0.6 mg/l expressed as a 6-month average (averaging period of May through October and November through April) becomes effective May 01, 2025.

Adaptive Management for Total Phosphorus Compliance: Mount Horeb requested, and the department approved a plan to implement a watershed adaptive management approach under s. NR 217.18, Wis. Adm. Code and s. 283.13(7) Wis. Stats. as a means for Mount Horeb to achieve compliance with the phosphorus water quality standard in s. NR 102.06, Wis. Adm. Code. The phosphorus limitations and conditions in this permit reflect the approved Adaptive Management (AM) Plan WQT-2024-0004 (November 2023). The permittee shall design and implement the actions identified in the approved AM Plan No. WQT-2024-0004 in accordance with the goals and measures identified. The goal of the AM plan is to reduce phosphorus loadings within the watershed action area by, at a minimum, 285 lbs/yr by the end of this permit term. In addition, annual progress reports are required. See Schedules section for more details. The department may terminate the AM option based on the reasons enumerated in NR 217.18(3)(e)2, Wis. Adm. Code.

The permit contains an interim adaptive management phosphorus limit of 0.6 mg/l expressed as a six-month seasonal average starting May 01, 2025. The averaging periods for the six-month average limit are May through October and November through April. Compliance with the 0.6 mg/L six-month interim limit is evaluated at the end of each six-month period on April 30 and October 31 annually. The 1.0 mg/l monthly average phosphorus limit is in effect for the duration of the reissued permit.

Surface water monitoring requirements are included in the proposed permit in support of the goals and measures of the Adaptive Management Plan and are discussed in more detail in following subsections of this fact sheet. Sampling is required on the day(s) each week as outlined in the approved Adaptive Management Plan.

Chloride: Acute and chronic chloride toxicity criteria for the protection of aquatic life are included in Tables 1 and 5 of ch. NR 105, Wis. Adm. Code. Subchapter VII of ch. NR 106, Wis Adm. Code, establishes the procedure for calculating WQBELs for chloride. If the permittee's effluent data shows that a calculated WQBEL for chloride cannot be met, then

the permit will include a chloride effluent limitation. Mount Horeb was previously covered under a chloride variance however, considering available effluent data from the permit term, the 1-day P99 and 4-day P99 chloride concentrations are below the calculated WQBELs for chloride. The maximum arithmetic average for four consecutive days of effluent data, 535 mg/l, exceeds the calculated chronic toxicity criterion of 521 mg/l therefore implementation of the Source Reduction Plan shall continue. The weekly average and monthly average limits of 520 mg/l are effective upon permit reissuance. Additionally, weekly average non-wet weather and wet weather mass limits are effective upon permit reissuance. An alternative wet weather mass limit is included in accordance with s. NR 106.07(9), Wis. Adm. Code.

Total Nitrogen Monitoring (NO2+NO3, TKN and Total N): The department has included effluent monitoring for Total Nitrogen through the authority under s. 283.55(1)(e), Wis. Stats., which allows the department to require the permittee to submit information necessary to identify the type and quantity of any pollutants discharged from the point source, and through s. NR 200.065(1)(h), Wis. Adm. Code, which allows for this monitoring to be collected during the permit term. More information on the justification to include total nitrogen monitoring in wastewater permits can be found in the "Guidance for Total Nitrogen Monitoring in Wastewater Permits" dated October 1, 2019.

Whole Effluent Toxicity: Whole effluent toxicity (WET) testing requirements and limits (if applicable) are determined in accordance with ss. NR 106.08 and NR 106.09 Wis. Adm. Code, as revised August 2016. See the current version of the Whole Effluent Toxicity Program Guidance Document and checklist and WET information, guidance and test methods at http://dnr.wi.gov/topic/wastewater/wet.html. Annual chronic WET tests in rotating quarters are scheduled during the permit term, see permit for WET testing quarters.

Monitoring Frequencies: The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. The sample frequencies for pH, DO, ammonia, and temperature were increased to align Mount Horeb with other facilities of similar size to ensure fairness and in consideration of department guidance on sampling frequencies.

Requirements in administrative code (NR 108, 205, 210, and 214 Wis. Adm. Code) and Sections 283.55 Wis. Stats., were considered, where applicable, when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. The department has determined at this time that the aforementioned changes in monitoring frequency are warranted based on the size and type of the facility.

Expression of Limits: In accordance with the federal regulation 40 CFR 122.45(d) and s. NR 205.065, Wis. Adm. Code, limits in this permit are to be expressed as weekly average and monthly average limits whenever practicable. Minor changes have been made to chloride.

PFOS and PFOA: NR 106 Subchapter VIII – Permit Requirements for PFOS and PFOA Dischargers became effective on August 1, 2022. Pursuant to s. NR 106.98(3)(b), Wis. Adm. Code, the department evaluated the need for PFOS and PFOA monitoring taking into consideration the presence of potential PFOS or PFOA industrial wastes, remediation sites and other potential sources of PFOS or PFOA. Based on information available at the time the permit was drafted, the department has determined the permittee does not need to sample for PFOS or PFOA as part of this permit reissuance. The department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

2.2 Sample Point Number: 601- Sugar River – Downstream and 602 – Sugar River – Upstream

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow River		cfs	Monthly	Measure	Provide an estimate of river flow for each day that in-stream phosphorus monitoring is performed May 1 through October 31 annually.
Flow River		cfs	Per Occurrence	Measure	Voluntary river flow estimates for each day that in-stream phosphorus monitoring is performed November 1 through April 30 annually.
Phosphorus, Total		mg/L	Monthly	Grab	Collect samples monthly May 1 through October 31 annually. See permit subsections for sampling and reporting requirements.
Phosphorus, Total		mg/L	Per Occurrence	Grab	Voluntary monitoring November 1 through April 30 annually. See permit subsections for sampling and reporting requirements.
Phosphorus, Total		lbs/month	Monthly	Calculated	Calculate and report total monthly phosphorus loads for the months of May through October annually. See permit subsection for calculation of total monthly loads.
Phosphorus, Total		lbs/month	Per Occurrence	Calculated	Calculated total phosphorus loads may also be reported for the months of November through April, as data is available. See permit subsection for calculation of total monthly loads.

2.2.1 Changes from Previous Permit

Downstream and Upstream surface water monitoring was not required during the previous permit term. Monitoring is included as part of the approved Adaptive Management Plan requirements.

2.2.2 Explanation of Limits and Monitoring Requirements

As part of the Adaptive Management Plan requirements, downstream and voluntary upstream monitoring for river flow rate, in-stream phosphorus concentration and total monthly in-stream phosphorus loads is required during the months of May through October. Monitoring for these same parameters is voluntary during the months of November through April. When voluntary monitoring is completed, results must be reported on the monthly eDMR. The in-stream phosphorus concentration and river flow rate are used to calculate the total monthly loading of phosphorus in the West Branch Sugar River on a monthly basis. This monitoring will allow the permittee to demonstrate reductions in phosphorus loading for each month of the year.

3 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	**Sludge Class (A or B)**	**Sludge Type (Liquid or Cake)**	**Pathogen Reduction Method**	**Vector Attraction Method**	**Reuse Option**	**Amount Reused/Disposed (Dry Tons/Year)**
004	B	Liquid	Fecal Coliform	Injection	Land Application	131 dry US tons
Does sludge management demonstrate compliance? **Yes.**						
Is additional sludge storage required? **No.**						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? **No.**						
Is a priority pollutant scan required? **No, design flow is less than 5 MGD.** Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

3.1 Sample Point Number: 004- SLUDGE

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Solids, Total		Percent	Annual	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Monitoring once in 2026.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Monitoring once in 2026.
PFOA + PFOS		ug/kg	Annual	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Annual	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

3.1.1 Changes from Previous Permit:

Sludge limitations and monitoring requirements were evaluated for this permit term and the following changes were made from the previous permit. See additional explanation of limits under "Explanation of Limits and Monitoring Requirements" below.

PFAS: Monitoring is required annually pursuant to s. NR 204.06(2)(b)9, Wis. Adm. Code.

3.1.2 Explanation of Limits and Monitoring Requirements

Requirements for disposal, including land application of municipal sludge, are determined in accordance with ch. NR 204, Wis. Adm. Code. Ceiling and high-quality limits for metals in sludge are specified in s. NR 204.07(5), Wis. Adm. Code. Requirements for pathogens are specified in s. NR 204.07(6), and in s. NR 204.07(7), Wis. Adm. Code for vector attraction requirements. Limitations for PCBs are addressed in s. NR 204.07(3)(k), Wis Adm. Code.

PFAS: The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA is currently developing a risk assessment to determine future land application rates and expects to release this risk assessment by the end of 2024. In the interim, the department has developed the "Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS."

Collecting sludge data on PFAS concentrations from a wide range of wastewater treatment facilities will help protect public health from exposure to elevated levels of PFAS and determine the department's implementation of EPA's recommendations. To quantitate this risk, PFAS sampling has been included in this WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9, Wis. Adm. Code.

4 Schedules

4.1 Watershed Adaptive Management Option Annual Report Submittals

The permittee shall submit annual reports on the implementation of AM Plan No. WQT-2024-0004 (November 2023) as specified in the "Phosphorus Limitation(s) and Adaptive Management Requirements" permit section and the following schedule.

Required Action	Due Date
Annual Adaptive Management Report: Submit an annual adaptive management report. The annual adaptive management report shall: o Identify those actions from Section 4.01 of the approved adaptive management plan that were completed during the previous calendar year and those actions that are in progress; o Evaluate collected monitoring data; o Document progress in achieving the goals and measures identified in the approved adaptive management plan; o Describe the outreach and education efforts that occurred during the past calendar year; o Identify any corrections or adjustments to the adaptive management plan that are needed to achieve compliance with the phosphorus water quality standards specified in s. NR 102.06, Wis. Adm. Code; o Describe any updates needed to Mount Horeb's approved phosphorus optimization plan; and o Submit results from all sample points outlined in AM plan No. WQT-2024-0004 (November 2023) to the Department using the Department's Laboratory Data Entry System (LDES)	03/31/2026
Annual Adaptive Management Report #2: Submit an Adaptive Management report with the required information described in this section (see above).	03/31/2027
Annual Adaptive Management Report #3: Submit an Adaptive Management report with the required information described in this section (see above).	03/31/2028
Annual Adaptive Management Report #4: Submit an Adaptive Management report with the required information described in this section (see above).	03/31/2029
Renewal of Adaptive Management Plan for Permit Reissuance: If the permittee intends to seek renewal of AM plan No. WQT-2024-0004 (November 2023) per s. NR 217.18, Wis. Adm. Code, for	09/30/2029

the reissued permit term, proposed AM goals and actions based on an updated AM plan shall be submitted to the Department for review and approval. The permittee may propose to adjust load reductions required by AM plan No. WQT-2024-0004 (November 2023) either up or down at the beginning of each WPDES permit term to reflect changes in loads associated with point and non-point sources. This schedule may be modified to incorporate any changes in AM goals and actions, removed if the AM program is terminated per the "Adaptive Management Reopener Clause" permit section, or removed if the adaptive management plan has achieved water quality standards as determined by the Department within the AM action area.	
Final Adaptive Management Report for 1st Permit Term: Submit the final Adaptive Management (AM) report documenting progress made during the first permit term under AM in meeting the watershed phosphorus reduction target of 348 lbs/yr, as well as the anticipated future reductions in phosphorus sources and phosphorus effluent concentrations, which shall be measured in accordance with the AM Plan protocols. The report shall summarize AM activities that have been implemented during the current permit term and state which, if any, actions from the approved AM plan No. WQT-2024-0004 (November 2023) were not pursued and why. The report shall include an analysis of trends on both a monthly and six-month average basis for concentrations and mass effluent discharged. Additionally, there shall be an analysis of any improvements to the quality of surface waters in the Adaptive Management Action Area focusing on phosphorus and flow results collected during the permit term. The surface water analysis shall evaluate how the in-stream loadings have changed over the permit term in comparison to implemented AM actions.	01/31/2030
Comply with Adaptive Management Interim Limit: For the second permit term under Adaptive Management the permittee shall comply with an Adaptive Management total phosphorus interim limit no higher than 0.5 mg/L as a 6-month average, in addition to the 1.0 mg/L monthly avg already effective.	04/01/2030
Annual Adaptive Management Report #6: Submit an Adaptive Management report with the required information described in this section (see above).	03/31/2031
Annual Adaptive Management Report #7: Submit an Adaptive Management report with the required information described in this section (see above).	03/31/2032
Annual Adaptive Management Report #8: Submit an Adaptive Management report with the required information described in this section (see above).	03/31/2033
Annual Adaptive Management Report #9: Submit an Adaptive Management report with the required information described in this section (see above).	03/31/2034
Renewal of Adaptive Management Plan for Permit Reissuance: If the permittee intends to seek renewal of AM plan No. WQT-2024-0004 (November 2023) per s. NR 217.18, Wis. Adm. Code, for the reissued permit term, proposed AM goals and actions based on an updated AM plan shall be submitted to the Department for review and approval. The permittee may propose to adjust load reductions required by AM plan No. WQT-2024-0004 (November 2023) either up or down at the beginning of each WPDES permit term to reflect changes in loads associated with point and non-point sources. This schedule may be modified to incorporate any changes in AM goals and actions, removed if the AM program is terminated per the "Adaptive Management Reopener Clause" permit section, or removed if the adaptive management plan has achieved water quality standards as determined by the Department within the AM action area.	09/30/2034
Final Adaptive Management Report for 2nd Permit Term: Submit the final Adaptive Management (AM) report documenting progress made during the second permit term under AM in meeting the watershed phosphorus reduction target of 565 lbs/yr, as well as the anticipated future reductions in phosphorus sources and phosphorus effluent concentrations, which shall be measured in	01/31/2035

accordance with the AM Plan protocols. The report shall summarize AM activities that have been implemented during the current permit term and state which, if any, actions from the approved AM plan No. WQT-2024-0004 (November 2023) were not pursued and why. The report shall include an analysis of trends on both a monthly and six-month average basis for concentrations and mass effluent discharged. Additionally, there shall be an analysis of any improvements to the quality of surface waters in the Adaptive Management Action Area focusing on phosphorus and flow results collected during the permit term. The surface water analysis shall evaluate how the in-stream loadings have changed over the permit term in comparison to implemented AM actions.	
Annual Adaptive Management Report #11: Submit an Adaptive Management report with the required information described in this section (see above).	03/31/2036
Annual Adaptive Management Report #12: Submit an Adaptive Management report with the required information described in this section (see above).	03/31/2037
Annual Adaptive Management Report #13: Submit an Adaptive Management report with the required information described in this section (see above).	03/31/2038
Annual Adaptive Management Report #14: Submit an Adaptive Management report with the required information described in this section (see above).	03/31/2039
Final Adaptive Management Report 3rd Permit Term: Submit the final Adaptive Management (AM) report documenting progress made during the third permit term under AM in meeting the watershed phosphorus reduction target of 695 lbs/yr, as well as the anticipated future reductions in phosphorus sources and phosphorus effluent concentrations, which shall be measured in accordance with the AM Plan protocols. The report shall summarize AM activities that have been implemented during the current permit term and state which, if any, actions from the approved AM plan No. WQT-2024-0004 (November 2023) were not pursued and why. The report shall include an analysis of trends on both a monthly and six-month average basis for concentrations and mass effluent discharged. Additionally, for informational purposes, there shall be an analysis of any improvements to the quality of surface waters in the Adaptive Management Action Area focusing on phosphorus and flow results collected during the permit term. The surface water analysis shall evaluate how the in-stream loadings have changed over the permit term in comparison to implemented AM actions.	01/31/2040
Achieve Water Quality Standards and Adaptive Management Plan Success: All the receiving waters identified within the AM plan WQT-2024-0004 (November 2023) shall comply with water quality standards specified in s. NR 102.06, Wis. Adm. Code. The permittee shall continue to comply with applicable effluent limits (required under s. 217.18(3)(e)3. expressed as a 6-month avg and 1.0 mg/L monthly avg) and continue monitoring surface waters per WQT-2024-0004 (November 2023) at a minimum of monthly May through October for total phosphorus.	03/31/2040

4.1.1 Explanation of Schedule

This compliance schedule requires the permittee to submit annual adaptive management (AM) annual reports that show progress towards meeting the goals and measures contained in the approved AM plan. The final AM Report for this permit term must document the success of meeting the watershed phosphorus minimum reduction target of 285 lbs/yr. The compliance schedule may be modified at permit reissuance, should changes in AM goals and measures or timing necessitate different dates for schedule items.

Pursuant to s. NR 217.18(1), Wis. Adm. Code, phosphorus water quality criteria must be achieved “as soon as possible”. The duration for this adaptative management schedule is 15 years. This timeframe is consistent with the approved adaptive management plan, and represents the shortest possible duration based upon the following factors that influence time required for the water body to achieve the phosphorus criterion:

- Magnitude of point and/or nonpoint source phosphorus reductions required

- Costs associated with point and/or nonpoint source phosphorus reductions
- For nonpoint source reductions, the time required to contact landowners and receive adequate participation to implement practices
- Physical characteristics of the watershed and receiving water, including landuse, soil properties, slopes, channel gradient, and level of legacy sediment/phosphorus currently in the system

4.2 Chloride Source Reduction Measures

The permittee shall comply with the WQBELs for Chloride and perform the following actions.

Required Action	Due Date
Final Chloride Report: Submit a report summarizing the chloride source reduction measures that have been implemented during the current permit term and the success in maintaining effluent quality at or below the current concentrations. The report shall include an analysis of trends in weekly, monthly, and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data covering the current permit term. The report shall include an analysis of how effluent chloride varies with time and with significant loadings of chloride.	03/31/2030

4.2.1 Explanation of Schedule

The schedule requires the permittee to submit a final report summarizing source reduction measures implemented during the current permit term, and an analysis of chloride concentration and mass discharge data based on chloride sampling and flow data.

4.3 Land Application Management Plan

A management plan is required for the land application system.

Required Action	Due Date
Land Application Management Plan Submittal: Submit an update to the management plan to optimize the land application system performance and demonstrate compliance with ch. NR 204, Wis. Adm. Code, by the Due Date. This management plan shall 1) specify information on pretreatment processes (if any); 2) identify land application sites; 3) describe site limitations; 4) address vegetative cover management and removal; 5) specify availability of storage; 6) describe the type of transporting and spreading vehicle(s); 7) specify monitoring procedures; 8) track site loading; 9) address contingency plans for adverse weather and odor/nuisance abatement; and 10) include any other pertinent information. Once approved, all landspreading activities shall be conducted in accordance with the plan. Any changes to the plan must be approved by the Department prior to implementing the changes.	03/31/2026

4.3.1 Explanation of Schedule

An up-to-date Land Application Management Plan is required that documents how the permittee will manage the land application of biosolids consistent with ch. NR 204, Wis. Adm. Code.

Attachments

Water Quality Based Effluent Limitations for the Mount Horeb Wastewater Treatment Facility WPDES Permit No. WI-0020281-09-0 dated November 26, 2024.

Adaptive Management Plan Approval Letter, dated March 28, 2024

Adaptive Management Plan (WQT-2024-0004), dated November 2023

Justification Of Any Waivers From Permit Application Requirements

No waivers requested or granted as part of this permit reissuance.

Prepared By: BetsyJo Howe, Wastewater Specialist **Date:** 02/12/2025

CORRESPONDENCE/MEMORANDUM

State of Wisconsin

DATE: November 26, 2024

TO: BetsyJo Howe – SCR/Fitchburg

FROM: Sarah Luck – SCR/Fitchburg

SUBJECT: Water Quality-Based Effluent Limitations for the Mount Horeb Wastewater Treatment Facility
WPDES Permit No. WI-0020281-09-0

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Mount Horeb Wastewater Treatment Facility in Dane County. This municipal wastewater treatment facility (WWTF) discharges to the West Branch of the Sugar River, located in the West Branch of Sugar River and Mount Vernon Creek (SP16) Watershed in the Sugar-Pecatonica River Basin. The evaluation of the permit recommendations is discussed in more detail in the attached report.

Based on our review, the following recommendations are made on a chemical-specific basis at Outfall 001:

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow rate						1
BOD_5 May – September October – April			 15 mg/L 22 mg/L	 15 mg/L 22 mg/L		2
TSS May – September October – April			 15 mg/L 22 mg/L	 15 mg/L 22 mg/L		2
pH	9.0 s.u.	6.0 s.u.				2
Dissolved Oxygen		6.0 mg/L				2
Ammonia Nitrogen May – September October – April	 - -		 1.0 mg/L 4.0 mg/L	 **1.0 mg/L** **4.0 mg/L**		2,3
Bacteria *E. coli*				 126 #/100 mL geometric mean		4
Chloride Concentration Limit Mass Limit Wet Weather Mass Limit			 520 mg/L 3,400 lbs/day 5,500 lbs/day	 **520 mg/L** - -		3,5
Phosphorus AM Interim Limits Final				 1.0 mg/L 0.225 mg/L	 0.6 mg/L 0.075 mg/L 0.49 lbs/day	6
TKN, Nitrate+Nitrite, and Total Nitrogen						7

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Temperature						8
Chronic WET				1.4 TUc		9

Footnotes:

1. Monitoring only. A Parshall flume was installed in 2018.
2. No changes from the current permit.
3. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are included in bold.
4. Bacteria limits apply during the disinfection season of May through September. Additional final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. These are the WQBELs for chloride. The wet weather mass limit applies when the dry weather mass limit is exceeded and the facility demonstrates to the Department the exceedance occurred during a wet weather event. In addition to the calculated limits, the facility should continue to implement their source reduction plan and source reduction measures.
6. Under the phosphorus Adaptive Management (AM) Plan, the required interim limit is 0.6 mg/L, expressed as a 6-month average and 1.0 mg/L as a monthly average per s. NR 217.18(3)(e), Wis. Adm. Code. The permittee may be allowed up to five years to meet the interim limit of 0.6 mg/L. The final water quality-based effluent limits are 0.225 mg/L as a monthly average and 0.075 mg/L and 0.49 lbs/day as six-month averages.
7. As recommended in the Department's October 1, 2019 *Guidance for Total Nitrogen Monitoring in Wastewater Permits*, annual total nitrogen monitoring is recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO_3), nitrite (NO_2), and total kjeldahl nitrogen (TKN) (all expressed as N).
8. At least one year of temperature monitoring during the permit term is recommended.
9. Annual chronic WET monitoring is required. The Instream Waste Concentration (IWC) to assess chronic test results is 74%. According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), chronic testing shall be performed using a dilution series of 100%, 75%, 50%, 25% & 12.5%, and the dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the West Branch of the Sugar River. Sampling WET concurrently with any chemical-specific toxic substances is recommended. Tests should be done in rotating quarters, to collect seasonal information about this discharge and should continue after the permit expiration date (until the permit is reissued).

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Sarah Luck (Sarah.Luck@wisconsin.gov) or Diane Figiel (Diane.Figiel@wisconsin.gov).

Attachments (3) – Narrative, Site Map, and Thermal Table

PREPARED BY: Sarah Luck _____ Date: November 26, 2024

Sarah Luck
Water Resources Engineer

E-cc: Kenzie Ostien, Wastewater Engineer – SCR/Fitchburg
Diane Figiel, Water Resources Engineer – WY/3
Kari Fleming, Environmental Toxicologist – WY/3
Nate Willis, Wastewater Engineer – WY/3

Attachment #1

Water Quality-Based Effluent Limitations for
Mount Horeb Wastewater Treatment Facility

WPDES Permit No. WI-0020281-09-0

PART 1 – BACKGROUND INFORMATION

Facility Description

Mount Horeb Wastewater Treatment Facility is an advanced secondary wastewater treatment facility that completed a major upgrade in May 2020. The plant now consists of screening, grit removal, two oxidation ditches with selector basins for biological phosphorus removal and sized for extended aeration activated sludge, chemical phosphorus removal, two final clarifiers, UV disinfection, and post aeration. As part of the facility upgrade the annual average design flow increased from 0.609 MGD to 0.790 MGD. Sludges removed during primary treatment and waste activated sludge is stabilized in an aerobic digestion process, mechanically thickened, and then land applied on department approved sites.

Attachment #2 is a map of the area showing the approximate location of Outfall 001.

Existing Permit Limitations

The current permit, which expired on December 31, 2023, includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
BOD_5 May – September October – April			 15 mg/L 22 mg/L	 15 mg/L 22 mg/L		-
TSS May – September October – April			 15 mg/L 22 mg/L	 15 mg/L 22 mg/L		-
pH	9.0 s.u.	6.0 s.u.				1
Dissolved Oxygen		6.0 mg/L				1
Ammonia Nitrogen May – September October – April	 - -		 1.0 mg/L 4.0 mg/L	 **1.0 mg/L** **4.0 mg/L**		2
Fecal Coliform May – September			**656#/100 mL** **geometric mean**	400#/100 mL geometric mean		2
Chloride			625 mg/L			3
Phosphorus Interim Final				 1.0 mg/L 0.225 mg/L	 0.075 mg/L 0.49 lbs/day	4
Temperature						5
Chronic WET						6

Footnotes:

1. These limitations are not being evaluated as part of this review. Since the water quality criteria (WQC) and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. Additional limits to comply with the expression of limits requirements in ss. NR 106.07 and NR 205.065(7), Wis. Adm. Code, are included in bold.
3. This is an alternative effluent limitation that was included in the permit in place of the WQBELs since a chloride variance was approved by EPA.
4. A compliance schedule is in the current permit to meet the final WQBELs by December 31, 2027.
5. Monitoring only.
6. Three chronic WET tests were required. The IWC for chronic WET was 53%.

Receiving Water Information

- Name: West Branch of the Sugar River
- Waterbody Identification Code (WBIC): 886100
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Limited Forage Fish as listed in ch. NR 104, Wis. Adm. Code (from Mt. Horeb STP downstream to CTH "JG"). At CTH JG, approximately two miles downstream, the classification is cold water community. For the purposes of ammonia limit calculation, the reach downstream of CTH JG is considered Cold Water Category 5.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q_{10} and 7-Q_2 values are from USGS for Station 05435969, where Outfall 001 is located. These flows were provided to the department in a letter from USGS dated 10/16/2008.

  7-Q_{10} = 0.42 cfs (cubic feet per second)
  7-Q_2 = 0.53 cfs
  Harmonic Mean Flow = 0.88 cfs using a drainage area of 1.81 mi^2 (drainage area is at the outfall and is from the updated low flow letter from USGS dated 10/16/2008)
  The Harmonic Mean has been estimated based on average flow and the 7-Q_{10} using an equation from U.S. EPA's *Technical Support Document for Water Quality-Based Toxics Control* (March 1991, EPA/505/2-90-001, pgs. 88-89).

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q_{10} (cfs)	0.44	0.46	0.51	0.54	0.51	0.48	0.46	0.45	0.46	0.47	0.48	0.44
7-Q_2 (cfs)	0.56	0.57	0.67	0.74	0.69	0.66	0.61	0.59	0.59	0.60	0.61	0.57

The following 7-Q_{10} and 7-Q_2 values are from USGS for Station 05435972, at CTH JG (Malone Road). These flows were provided to the department in a letter from USGS dated 10/16/2008.

7-Q_{10} = 0.84 cfs (cubic feet per second)
7-Q_2 = 1.1 cfs

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7-Q_{10} (cfs)	0.89	0.94	1.1	1.2	1.1	1.0	0.96	0.93	0.97	0.99	1.0	0.91
7-Q_2 (cfs)	1.2	1.3	1.6	1.8	1.6	1.5	1.4	1.3	1.3	1.4	1.4	1.3

- Hardness = 364 mg/L as $CaCO_3$. This value represents the geometric mean of three WET tests performed by Mount Horeb Wastewater Treatment Facility from June 2019 through February 2023.

- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 100% based on 2002 Mixing Zone Study
- Source of background concentration data: Metals data from the Sugar River (SWIMS Station 133327; Sugar River at Cth A) is used for this evaluation because there is no data available for the West Branch of the Sugar River. The Sugar River is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: None.
- Impaired water status: The West Branch of the Sugar River is impaired due to phosphorus, total suspended solids, and an unknown pollutant approximately 1.5 miles downstream of the outfall.

Effluent Information

- Flow rates:
  Design annual average = 0.790 MGD (Million Gallons per Day)
  Peak daily = 1.771 MGD
  Peak weekly = 1.27 MGD
  Peak monthly = 1.05 MGD
  The peak design flows above are from the plans and specifications approval letter from the Department dated February 17, 2017.
  For reference, the actual average flow from January 2019 through August 2024 was 0.500 MGD.
- Hardness = 362 mg/L as $CaCO_3$. This value represents the geometric mean of four samples collected in March and April 2023 which were reported on the permit application.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable – this facility does not have an approved Zone of Initial Dilution (ZID).
- Water source: Domestic and commercial wastewater with water supply from the Village.
- Additives: Ferric chloride for phosphorus removal.
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness, and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled "MEAN EFFL. CONC.". Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

Copper Effluent Data

Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)	Sample Date	Copper (µg/L)
03/30/23	21	04/14/23	10	04/28/23	13
04/04/23	11	04/18/23	15	05/02/23	22
04/07/23	9.3	04/21/23	11	05/05/23	10
04/11/23	9.5	04/25/23	12		
1-day P_{99} = 27 µg/L					
4-day P_{99} = 19 µg/L					

Attachment #1

Chloride Effluent Data

	Chloride (mg/L)
1-day P_{99}	546
4-day P_{99}	460
30-day P_{99}	411
Mean	385
Std	60
Sample size	280
Range	220 - 575

The following table presents the average concentrations and loadings at Outfall 001 from January 2019 through August 2024 for all parameters with limits in the current permit to meet the requirements of s. NR 201.03(6), Wis. Adm. Code:

Parameter Averages with Limits

	Average Measurement	Average Mass Discharged
BOD_5	3 mg/L*	11.9 lbs/day
TSS	3 mg/L*	9.8 lbs/day
pH field	7.8 s.u.	
Phosphorus	0.65 mg/L	2.8 lbs/day
Ammonia Nitrogen	0.36 mg/L*	
Fecal coliform	33 #/100 mL	
Dissolved oxygen	9.0 mg/L	
Chloride	385 mg/L	

*Results below the level of detection (LOD) were included as zeroes in calculation of average.

PART 2 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR TOXIC SUBSTANCES – EXCEPT AMMONIA NITROGEN

Permit limits for toxic substances are required whenever any of the following occur:

1. The maximum effluent concentration exceeds the calculated limit (s. NR 106.05(3), Wis. Adm. Code)
2. If 11 or more detected results are available in the effluent, the upper 99th percentile (or P_{99}) value exceeds the comparable calculated limit (s. NR 106.05(4), Wis. Adm. Code)
3. If fewer than 11 detected results are available, the mean effluent concentration exceeds 1/5 of the calculated limit (s. NR 106.05(6), Wis. Adm. Code)

Acute Limits based on 1-Q_{10}

Daily maximum effluent limitations for toxic substances are based on the acute toxicity criteria (ATC), listed in ch. NR 105, Wis. Adm. Code. Previously daily maximum limits for toxic substances were calculated as two times the ATC. However, changes to ch. NR 106, Wis. Code, (September 1, 2016) require the Department to calculate acute limitations using the same mass balance equation as used for other limits along with the 1-Q_{10} receiving water low flow to determine if more restrictive effluent limitations are needed to protect the receiving stream from discharges which may cause or contribute to an exceedance of the acute water quality standards. The mass balance equation is provided below.

$$\text{Limitation} = \frac{(WQC)\,(Qs + (1-f)\,Qe) - (Qs - f\,Qe)\,(Cs)}{Qe}$$

Where:

WQC = Acute toxicity criterion or secondary acute value according to ch. NR 105, Wis. Adm. Code.

Qs = average minimum 1-day flow which occurs once in 10 years (1-day Q_{10}) if the 1-day Q_{10} flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q_{10}).

Qe = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

f = Fraction of the effluent flow that is withdrawn from the receiving water, and

Cs = Background concentration of the substance (in units of mass per unit volume) as specified in s. NR 106.06(4)(e), Wis. Adm. Code.

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q_{10} method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations.

The following tables list the calculated WQBELs for this discharge along with the results of effluent sampling. All concentrations are expressed in terms of micrograms per Liter (µg/L), except for hardness and chloride (mg/L).

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)

RECEIVING WATER FLOW = 0.34 cfs, (1-Q_{10} (estimated as 80% of 7-Q_{10})), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MEAN BACK-GRD.	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P_{99}	1-day MAX. CONC.
Arsenic		340	1	432.9	86.6	<1.1		
Cadmium	362	45.1	0.17	57.5	11.5	<0.95		
Chromium	301	4446	4	5666.8	1133	<5.5		
Copper	362	52.3	7	64.7			27	22
Lead	356	365		464.9	93.0	<22		
Nickel	268	1080		1377.2	275	<6.0		
Zinc	333	345		439.4	87.9	56		
Chloride (mg/L)		757	28.1	957.4			546	575

* The indicated hardness may differ from the effluent hardness because the effluent hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the acute criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

* * Per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016 consideration of ambient concentrations and 1-Q_{10} flow rates yields a more restrictive limit than the 2 × ATC method of limit calculation.

Weekly Average Limits based on Chronic Toxicity Criteria (CTC)

RECEIVING WATER FLOW = 0.42 cfs (¼ of the 7-Q_{10}), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	MAX. EFFL. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}	4-day MAX. AVE.
Arsenic		152.2	1	204	40.8	<1.1		

Attachment #1

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	MAX. EFFL. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P_{99}	4-day MAX. AVE.
Cadmium	175	3.82	0.17	5.07	1.0	<0.95		
Chromium	301	325.75	4	436	87.3	<5.5		
Copper	364	31.24	7	39.6				
Lead	356	95.51		128.3	25.7	<22		
Nickel	268	120.18		161	32.3	<6.0		
Zinc	333	344.68		463	92.6	56		
Chloride (mg/L)		395	28.1	521			460	**535**

* The indicated hardness may differ from the receiving water hardness because the receiving water hardness exceeded the maximum range in ch. NR 105, Wis. Adm. Code, over which the chronic criteria are applicable. In that case, the maximum of the range is used to calculate the criterion.

Monthly Average Limits based on Wildlife Criteria (WC)
The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

Monthly Average Limits based on Human Threshold Criteria (HTC)
RECEIVING WATER FLOW = 0.88 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.17	635	127.0	<0.95
Chromium (+3)	3818000	4	6552241	1310448	<5.5
Lead	140		240	48.1	<22
Nickel	43000		73794	14759	<6.0

Monthly Average Limits based on Human Cancer Criteria (HCC)
RECEIVING WATER FLOW = 0.88 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13.3	1	22.1	4.42	<1.1

In addition to evaluating the need for limits for each individual substance for which HCC exist, s. NR 106.06(8), Wis. Adm. Code, requires the evaluation of the cumulative cancer risk. Because no effluent limits are needed based on HCC, determination of the cumulative cancer risk is not needed per s. NR 106.06(8), Wis. Adm. Code.

Conclusions and Recommendations
Based on a comparison of the effluent data and calculated effluent limitations, **effluent limitations are required for chloride.**

Zinc – A single zinc sample was reported on the 2023 permit application. This value (150 µg/L) exceeds $1/5^{th}$ of the acute toxicity criteria (87.9 µg/L) which is used to determine the need to include a limit per s. NR 106.05(6), Wis. Adm. Code. Mount Horeb Wastewater Treatment Facility was able to collect

additional samples to verify the result on the permit application. All samples are shown in the table below.

Sample Date	Zinc (µg/L)
03/30/2023	150
11/05/2024	30
11/08/2024	29
11/11/2024	38
11/14/2024	33
Average	**56**

Given that the mean of the five samples is 56 µg/L, which is below 1/5th of the acute toxicity criteria (87.9 µg/L), **no limits or further monitoring for zinc are required during the permit term.**

Chloride – Mount Horeb Wastewater Treatment Facility is currently covered under a chloride variance. Considering available effluent data from the current permit term (January 2019 through August 2024), the 1-day P_{99} chloride concentration is 546 mg/L, and the 4-day P_{99} of effluent data is 460 mg/L. These effluent concentrations are below the calculated WQBELs for chloride. However, the maximum arithmetic average for four consecutive days of effluent data, 535 mg/L (shown in the table below), exceeds the calculated chronic toxicity criterion of 521 mg/L. Therefore, **a weekly average limit of 520 mg/L (rounded) is required** pursuant to s. NR 106.05(3)(b), Wis. Adm. Code.

Sample Date	Chloride (mg/L)
3/1/2022	570
3/2/2022	500
3/3/2022	505
3/4/2022	565
Average	**535**

In addition to the concentration limit, a mass effluent limit is also required in accordance with s. NR 106.05(4)(b), Wis. Adm. Code. The chronic mass limitation of **3,400 lbs/day** (rounded) is based on the concentration limit and the annual average design flow rate of 0.79 MGD (521 mg/L × 0.79 MGD × 8.34) in accordance with s. NR 106.07(2)(c), Wis. Adm. Code.

An alternative wet weather mass limit of 5,500 lbs/day (rounded) (521 mg/L × 1.27 MGD × 8.34) **should also be included** in accordance with s. NR 106.07(9), Wis. Adm. Code. The peak weekly design flow was used to calculate the wet weather mass limit. The wet weather mass limit applies when the dry weather mass limit is exceeded and the facility demonstrates to the Department the exceedance occurred during a wet weather event.

A **monthly average concentration limit of 520 mg/L** should be included in the permit for expression of limit requirements per s. NR 106.07(4), Wis. Adm. Code, as follows:

> Whenever a weekly average limitation is determined necessary to protect water quality, a monthly average limitation shall also be included in the permit and set equal to the weekly average limit unless a more restrictive limit is already determined necessary to protect water quality.

Mass limitations are not subject to the limit expression requirements if concentration limits are given.

In addition to the numeric limitations, **continuation of the source reduction plan should remain** in order to maintain the current levels of treatment so as not to increase the concentration, level, or loading of chloride to the West Branch of the Sugar River.

Mercury – The permit application did not require monitoring for mercury because the Mount Horeb Wastewater Treatment Facility is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, "there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code." A review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from five samples collected between April 2019 through March 2023 was 0.80 mg/kg, with a maximum reported concentration of 2.14 mg/kg. Therefore, **no mercury monitoring is recommended at Outfall 001.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the type of discharge, the effluent flow rate, and lack of indirect dischargers, **PFOS and PFOA monitoring is not recommended.** The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BOD_5 AND TSS

Biochemical Oxygen Demand

In establishing Biochemical Oxygen Demand (BOD_5) limitations, the primary intent is to prevent a lowering of dissolved oxygen levels in the receiving water below water quality standards as specified in s. NR 102.04(4)(e), Wis. Adm. Code. The 26-lb method is the most frequently used approach for calculating BOD_5 limits when resources are not available to develop a detailed water quality model.

New BOD_5 limits were calculated using the monthly low flows in a memo dated April 25, 2018 in response to comments received by the facility in a letter dated November 9, 2017.

The following tables defines the BOD_5 limits for each month based upon the updated monthly low flows and the new effluent design flow of 0.790 MGD.

	Original Limits (1988)		**New Limits (2018)**					
	Summer (May-Sept)	Winter (Oct-Apr)	Summer	Winter	Jan	Feb	Mar	Apr
7Q10 (cfs)	0.13	0.13	0.42	0.42	0.44	0.46	0.51	0.54
Desing Flow (MGD)	0.59	0.59	0.79	0.79	0.79	0.79	0.79	0.79
Design Flow (cfs)	0.91	0.91	1.22	1.22	1.22	1.22	1.22	1.22
Concentration Limit (mg/L)	15	22	18	27	27	27	28	29
Mass Limit (lbs/day)	76	112	120	176	179	181	186	189
Summer Mass/cfs	72.9	107.4	72.9	107.4	107.4	107.4	107.4	107.4

	New							
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
7Q10 (cfs)	0.51	0.48	0.46	0.45	0.46	0.47	0.48	0.44
Desing Flow (MGD)	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Design Flow (cfs)	1.22	1.22	1.22	1.22	1.22	1.22	1.22	1.22
Concentration Limit (mg/L)	19	19	19	18	19	19	28	27
Mass Limit (lbs/day)	126	124	123	122	123	123	183	179
Summer Mass/cfs	72.9	72.9	72.9	72.9	72.9	72.9	107.4	107.4

Comparing the newly calculated limits to the current BOD_5 limits (15 mg/L May-September and 22 mg/L October-April), **the current limits are more restrictive and therefore should be retained** pursuant to s. NR 207.04(2)(a), Wis. Adm. Code.

BOD_5 mass limits were removed from the permit as documented in the Notice of Final Determination dated December 11, 2018.

Total Suspended Solids
Total Suspended Solids (TSS) limitations are primarily given to maintain or improve water clarity and are not water-quality based. However, the Department typically does not require TSS limits lower than 10 mg/L and are often established as the same concentration as the BOD_5 limitations. Therefore, **TSS effluent limitations of 22 mg/L as weekly and monthly averages in the winter (October through April) and 15 mg/L as weekly and monthly averages in the summer (May through September) are recommended.**

PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. The current permit has weekly average and monthly average limits. These limits are re-evaluated at this time due to the following changes:

- Subchapter IV of ch. NR 106, Wis. Adm. Code allows limits based on available dilution instead of limits set to twice the acute criteria.
- The maximum expected effluent pH has changed.

Daily Maximum Limits based on Acute Toxicity Criteria (ATC)
Daily maximum limitations are based on acute toxicity criteria in ch. NR 105, Wis. Adm. Code, which are a function of the effluent pH and the receiving water classification. The acute toxicity criterion (ATC) for ammonia is calculated using the following equation:

$$\text{ATC in mg/L} = [A \div (1 + 10^{(7.204 - pH)})] + [B \div (1 + 10^{(pH - 7.204)})]$$

Where:

A = 0.411 and B = 58.4 for a Limited Forage Fishery, and
pH (s.u.) = that characteristic of the effluent.

The effluent pH data was examined as part of this evaluation. A total of 926 sample results were reported from January 2019 through August 2024. The maximum reported value was 8.8 s.u. (Standard pH Units). The effluent pH was 8.2 s.u. or less 99% of the time. The 1-day P_{99}, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.3 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.3 s.u. Therefore, a value of 8.3 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.3 s.u. into the equation above yields an ATC = 4.71 mg/L.

Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method

In accordance with s. NR 106.32(2), Wis. Adm. Code, daily maximum ammonia limitations are calculated using the 1-Q_{10} receiving water low flow if it is determined that the previous method of acute ammonia limit calculation (2×ATC) is not sufficiently protective of the fish and aquatic life. The more restrictive calculated limits shall apply.

The calculated daily maximum ammonia nitrogen effluent limits using the mass balance approach with the 1-Q_{10} (estimated as 80 % of 7-Q_{10}) and the 2×ATC approach are shown below.

Daily Maximum Ammonia Nitrogen Determination

	Ammonia Nitrogen Limit mg/L
2×ATC	9.4
1-Q_{10}	6.0

The 1-Q_{10} method yields the most stringent limits for Mount Horeb Wastewater Treatment Facility.

NOTE: Calculating limits based on the limited forage fishery classification at the outfall yields the most restrictive acute limits and are therefore protective downstream where the classification changes.

Weekly and Monthly Average Limits based on Chronic Toxicity Criteria (CTC)

The weekly and monthly average ammonia nitrogen limits are recommended to continue. The WQBEL memo dated April 25, 2018 provides updated calculations as well as justification for the limits in effect to continue. For reference, the original ammonia nitrogen effluent limitations come from the May 3, 1988 model. The summer ammonia limitation was reduced from 2 mg/L to 1 mg/L in the December 8, 1994 ammonia limitations memo based upon a receiving water pH of 7.9 s.u. The ammonia limitations have remained the same since this time.

Effluent Data

The following table evaluates the statistics based upon ammonia data reported from January 2019 through August 2024.

Ammonia Nitrogen Effluent Data

Ammonia Nitrogen mg/L	May - September	October - April
1-day P_{99}	1.28	5.12
4-day P_{99}	0.75	2.84
30-day P_{99}	0.31	1.22

Attachment #1

Ammonia Nitrogen mg/L	May - September	October - April
Mean*	0.11	0.54
Std	0.42	1.37
Sample size	258 (120 ND)	356 (129 ND)
Range	<0.07 - 2.42	<0.07 - 5.98

*"<" means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected (ND) result.

Reasonable Potential

The need to include ammonia limits in the Mount Horeb Wastewater Treatment Facility permit is determined by calculating 99th upper percentile (or P_{99}) values for ammonia during the month ranges and comparing those to the calculated limits. Based on this comparison, there is no reasonable potential for the discharge to exceed any of the calculated ammonia nitrogen limits. However, since the permit currently has weekly and monthly average limits year-round, **the limits must be retained regardless of reasonable potential**, consistent with s. NR 106.33(1)(b), Wis. Adm. Code:

> (b) If a permittee is subject to an ammonia limitation in an existing permit, the limitation shall be included in any reissued permit. Ammonia limitations shall be included in the permit if the permitted facility will be providing treatment for ammonia discharges.

Conclusions and Recommendations

In summary, after rounding to two significant figures, the following ammonia nitrogen limitations are recommended. No mass limitations are recommended in accordance with s. NR 106.32(5), Wis. Adm Code.

Final Ammonia Nitrogen Limits

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
May - September	-	1.0	**1.0**
October - April	-	4.0	**4.0**

Additional limits to meet the requirements in s. NR 106.07, Wis. Adm Code, are denoted in bold text.

PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA

On May 1, 2020, revisions to chs. NR 102 and NR 210, Wis. Adm. Codes, became effective which replace fecal coliform limits with new *Escherichia coli* (*E. coli*) limits for protection of recreational uses. Section NR 210.06(2)(a)1, Wis. Adm. Code, includes two limits which must be included in permits for facilities which are required to disinfect:

1. The geometric mean of *E. coli* bacteria in effluent samples collected in any calendar month may not exceed 126 counts/100 mL.
2. No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 counts/100 mL.

E. coli monitoring is recommended at the same frequency that fecal coliform monitoring is required in the current permit. Mount Horeb Wastewater Treatment Facility's permit requires weekly monitoring, the 410 counts/100 mL limit will effectively function as a daily maximum limit unless the facility performs

additional monitoring. Any additional monitoring beyond what is required by the permit must also be reported on the DMR as required in the standard requirements section of the permit.

These limits are required during May through September. No changes are recommended to the current recreational period and the required disinfection season.

Effluent Data
Mount Horeb Wastewater Treatment Facility has monitored effluent *E. coli* from May through September 2023, and a total of 22 results are available. A geometric mean of 126 counts/100 mL was exceeded in one month (July) with a maximum monthly geometric mean of 127 counts/100 mL. Effluent data did not exceed 410 counts/100 mL. The maximum reported value was 259 counts/100 mL. Based on this effluent data **it appears that the facility can meet new *E. coli* limits and a compliance schedule is not needed in the reissued permit**.

PART 6 – PHOSPHORUS

Technology-Based Effluent Limit
Subchapter II of Chapter NR 217, Wis. Adm. Code, requires municipal wastewater treatment facilities that discharge greater than 150 pounds of total phosphorus per month to comply with a monthly average limit of 1.0 mg/L, or an approved alternative concentration limit.

Since Mount Horeb Wastewater Treatment Facility currently has a limit of 1.0 mg/L in effect, this limit should be included in the reissued permit. This limit remains applicable unless a more stringent WQBEL is given.

In addition, the need for a WQBEL for phosphorus must be considered.

Water Quality-Based Effluent Limits (WQBEL)
Revisions to administrative rules regulating phosphorus took effect on December 1, 2010. These rule revisions include additions to s. NR 102.06, Wis. Adm. Code, which establish phosphorus standards for surface waters. Subchapter III of NR 217, Wis. Adm. Code, establishes procedures for determining WQBELs for phosphorus, based on the applicable standards in ch. NR 102, Wis. Adm. Code.

Section NR 102.06(3)(a), Wis. Adm. Code, specifically names river segments for which a phosphorus criterion of 0.100 mg/L applies. For other stream segments that are not specified in s. NR 102.06(3)(a), Wis. Adm. Code, s. NR 102.06(3)(b), Wis. Adm. Code, specifies a phosphorus criterion of 0.075 mg/L. The phosphorus criterion of 0.075 mg/L applies for the West Branch of the Sugar River.

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Qs), effluent flow rate (Qe), and upstream phosphorus concentrations (Cs) provided below.

$$\text{Limitation} = [(WQC)(Qs+(1-f)\ Qe) - (Qs-f\ Qe)\ (Cs)]/Qe$$

Where:

WQC = 0.075 mg/L for West Branch of the Sugar River
Qs = 100% of the 7-Q_2 of 0.53 cfs
Cs = background concentration of phosphorus in the receiving water pursuant to s. NR

217.13(2)(d), Wis. Adm. Code
Qe = effluent flow rate = 0.79 MGD = 1.22 cfs
f = the fraction of effluent withdrawn from the receiving water = 0

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR 102.07(1)(b) to (c), Wis. Adm. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

A previous evaluation resulted in a WQBEL of 0.075 mg/L using a background concentration of 0.114 mg/L. Section NR 217.13(2)(d), Wis. Adm. Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. There were no additional upstream data to consider; however, data from a station located approximately 3.5 miles downstream was collected in 2017. Data from both the upstream site from 2015 and the downstream site from 2017, stored in the Surface Water Integrated Monitoring System (SWIMS) database, are presented in the table on the next page.

SWIMS ID	133216	10009483
Station Name	Monitoring station at Sugar River West Branch – Docken Road **(upstream of discharge)**	Monitoring station at West Branch of The Sugar River Upstream Of Lewis Rd **(downstream of discharge)**
Waterbody	West Branch Sugar River	West Branch Sugar River
Sample Count	6	6
First Sample	05/18/2015	05/16/2017
Last Sample	10/13/2015	10/13/2017
Mean	0.130 mg/L	0.165 mg/L
Median	0.118 mg/L	0.165 mg/L
NR 217 Median*	0.114 mg/L	0.160 mg/L

*Using the previous procedures in s. NR 217.13(2)(d), Wis. Adm. Code.

Substituting a background concentration above criteria into the limit calculation equation above would result in a calculated limit that is less than the applicable criterion of 0.075 mg/L. However, s. NR 217.13(7), Wis. Adm. Code, specifies that "if the WQBEL calculated pursuant to the procedures in this section is less than the phosphorus criterion specified in s. NR 102.06, Wis. Adm. Code, for the water body, the effluent limit shall be set equal to the criterion."

The impaired water listing of West Branch of the Sugar River downstream of the discharge location also points towards the notion that effluent phosphorus limits equal to the water quality criterion are needed to prevent the discharge from contributing to further impairment of the receiving water. *The Guidance for Implementing Wisconsin's Phosphorus Water Quality Standards for Point Source Discharges* (2020) suggests setting effluent limits equal to the criterion in the absence of an EPA approved total maximum daily load for discharges of phosphorus to phosphorus-impaired waters.

Effluent Data
The following table summarizes effluent total phosphorus monitoring data from July 2019 through August 2024. Data from January 2019 through April 2020 were excluded since the upgrades to the

facility, which included substantial changes for phosphorus treatment, were completed in May 2020.

Total Phosphorus Effluent Data

	mg/L	lbs/day
1-day P_{99}	1.80	7.6
4-day P_{99}	1.01	4.2
30-day P_{99}	0.60	2.4
Mean	0.42	1.6
Std	0.36	1.5
Sample size	674 (10 ND)	673
Range	0.03 - 2.34	0 - 11.4

*"<" means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected (ND) result.

Reasonable Potential Determination
The discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion because the 30-day P_{99} of reported effluent total phosphorus data is greater than the calculated WQBEL. Therefore, **a WQBEL is required.**

Limit Expression
According to s. NR 217.14(2), Wis. Adm. Code, because the calculated WQBEL is less than or equal to 0.3 mg/L, the effluent limit of 0.075 mg/L may be expressed as a six-month average. If a concentration limitation expressed as a six-month average is included in the permit, a monthly average concentration limitation of 0.225 mg/L, equal to three times the WQBEL calculated under s. NR 217.13, Wis. Adm. Code shall also be included in the permit. The six-month average should be averaged during the months of May – October and November – April.

Mass Limits
A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, since the discharge is to a surface water that has a downstream impairment. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.79 MGD = 0.49 lbs/day expressed as a six-month average.**

Adaptive Management Interim Limit
Mount Horeb Wastewater Treatment Facility intends to pursue adaptive management (AM) to comply with the phosphorus WQBELs. Since this is the first permit term in which AM is being pursued, the required interim limit is 0.6 mg/L, expressed as a 6-month average and 1.0 mg/L as a monthly average per s. NR 217.18(3)(e), Wis. Adm. Code. The permittee may be allowed up to five years to meet this interim limit.

PART 7 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR THERMAL

Surface water quality standards for temperature took effect on October 1, 2010. These regulations are detailed in chs. NR 102 (Subchapter II – Water Quality Standards for Temperature) and NR 106 (Subchapter V – Effluent Limitations for Temperature) of the Wisconsin Administrative Code. Daily maximum and weekly average temperature criteria are available for the 12 different months of the year depending on the receiving water classification.

In accordance with s. NR 106.53(2)(b), Wis. Adm. Code, the highest daily maximum flow rate for a calendar month is used to determine the acute (daily maximum) effluent limitation. In accordance with s. NR 106.53(2)(c), Wis. Adm. Code, the highest 7-day rolling average flow rate for a calendar month is used to determine the sub-lethal (weekly average) effluent limitation. These values were based off actual flow reported from January 2019 through August 2024.

The table below summarizes the maximum temperatures reported during monitoring from January 2021 through December 2022.

Monthly Temperature Effluent Data & Limits

Month	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Weekly Maximum (°F)	Daily Maximum (°F)	Weekly Average Effluent Limitation (°F)	Daily Maximum Effluent Limitation (°F)
JAN	49	50	60	85
FEB	48	49	61	92
MAR	50	51	62	93
APR	53	55	69	94
MAY	59	60	75	94
JUN	62	63	80	86
JUL	64	64	86	93
AUG	65	66	85	93
SEP	64	73	78	93
OCT	62	63	66	90
NOV	56	58	58	96
DEC	52	53	61	96

Reasonable Potential

Permit limits for temperature are recommended based on the procedures in s. NR 106.56, Wis. Adm. Code.

- An acute limit for temperature is recommended for each month in which the representative daily maximum effluent temperature for that month exceeds the acute WQBEL. The representative daily maximum effluent temperature is the greater of the following:
  (a) The highest recorded representative daily maximum effluent temperature
  (b) The projected 99th percentile of all representative daily maximum effluent temperatures
- A sub−lethal limitation for temperature is recommended for each month in which the representative weekly average effluent temperature for that month exceeds the weekly average WQBEL. The representative weekly average effluent temperature is the greater of the following:
  (a) The highest weekly average effluent temperature for the month.
  (b) The projected 99th percentile of all representative weekly average effluent temperatures for the month

Comparing the representative highest effluent temperature to the calculated effluent limits determines the reasonable potential of exceeding the effluent limits. Based on this analysis, **temperature limits are not required. At least one year of temperature monitoring during the permit term is recommended**. The complete thermal table used for this calculation is in Attachment #4.

Mount Horeb Wastewater Treatment Facility completed a dissipative cooling (DC) study in accordance with NR 106.59, Wis. Adm. Code, which was approved on July 25, 2012. Consideration of this DC study is not included here since no limits were triggered. **If thermal limits are triggered in the future, a new DC study would be required** due to the upgrade and age of the previous study.

PART 8 – WHOLE EFFLUENT TOXICITY (WET)

WET testing is used to measure, predict, and control the discharge of toxic materials that may be harmful to aquatic life. In WET tests, organisms are exposed to a series of effluent concentrations for a given time and effects are recorded. Decisions below related to the selection of representative data and the need for WET limits were made according to ss. NR 106.08 and 106.09, Wis. Adm. Code. WET monitoring frequency and toxicity reduction evaluation (TRE) recommendations were made using the best professional judgment of staff familiar with the discharge after consideration of the guidance in the *Whole Effluent Toxicity (WET) Program Guidance Document* (2022).

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC_{50} (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.

- Chronic tests predict the concentration that interferes with the growth or reproduction of test organisms during a seven-day exposure. To assure that a discharge is not chronically toxic to organisms in the receiving water, WET tests must produce a statistically valid IC_{25} (Inhibition Concentration) greater than the instream waste concentration (IWC), according to s. NR 106.09(3)(b), Wis. Adm Code. The IWC is an estimate of the proportion of effluent to total volume of water (receiving water + effluent). The **IWC of 74%**, shown in the WET Checklist summary below, was calculated according to the following equation, as specified in s. NR 106.03(6), Wis. Adm Code:

$$IWC\ (as\ \%) = Q_e \div \{(1 - f)\ Q_e + Q_s\} \times 100$$

Where:

Q_e = annual average flow = 0.79 MGD = 1.22 cfs
f = fraction of the Q_e withdrawn from the receiving water = 0
Q_s = 100% of the 7-Q_{10} = 0.42 cfs (based upon the immediate receiving water which is modeled as a cool-cold headwater natural community)

- The IWC of 74%, calculated above, is higher than the current IWC of 53% because consideration of fish and aquatic life at the outfall must be considered, and the current IWC was calculated based on the protection of the coldwater classification two miles downstream. Since the receiving water at the point of discharge is modeled as a cool-cold headwater, which could indicate the presence of aquatic populations, the IWC should be calculated at the point of discharge rather than downstream where the classification changes.

- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), receiving water must be used as the dilution water and primary control in chronic WET tests, unless the use of different dilution water is approved by the Department prior to use. The dilution water used in WET tests conducted on Outfall 001 shall be a grab sample collected from the receiving water location, upstream and out of the influence of the mixing zone and any other known discharge. The specific receiving water location must be specified in the WPDES permit.

- Shown below is a tabulation of all available WET data for Outfall 001. Efforts are made to ensure that decisions about WET monitoring and limits are made based on representative data, as specified in s. NR 106.08(3), Wis. Adm Code. Data which is not believed to be representative of the discharge was not included in reasonable potential calculations. The table below differentiates between tests used and not used when making WET determinations.

  Tests conducted prior to July 1, 2005 are not presented in the table below due to significant changes that were made to WET test methods in 2004. These changes were assumed to be fully implemented by certified labs by no later than June 2005. Data collected before July 1, 2005 do not show repeated toxicity that was never resolved and is not the only data that is available.

WET Data History

Date Test Initiated	Acute Results LC_{50} %				Chronic Results IC_{25} %				Footnotes or Comments
	C. dubia	Fathead minnow	Pass or Fail?	Used in RP?	*C. dubia*	Fathead Minnow	Pass or Fail?	Use in RP?	
01/17/2006	-	-	-	-	>100	>100	Pass	No	1
08/22/2006	>100	>100	Pass	No	91.46	>100	Pass	No	1
06/18/2019	-	-	-	-	>100	>100	Pass	Yes	
09/28/2021	-	-	-	-	>100	84.4	Pass	Yes	
02/14/2023	-	-	-	-	>100	>100	Pass	Yes	

Footnote:

1. *Data Not Representative.* Due to the facility upgrade (completed May 2020) significant changes have occurred which renders data unrepresentative. This data does not show repeated toxicity that was never resolved.

- According to s. NR 106.08, Wis. Adm. Code, WET reasonable potential is determined by multiplying the highest toxicity value that has been measured in the effluent by a safety factor, to predict the likelihood (95% probability) of toxicity occurring in the effluent above the applicable WET limit. The safety factor used in the equation changes based on the number of toxicity detects in the dataset. The fewer detects present, the higher the safety factor, because there is more uncertainty surrounding the predicted value. **WET limits must be given, according to s. NR 106.08(6), Wis. Adm. Code, whenever the applicable Reasonable Potential equation results in a value greater than 1.0.**

  According to s. NR 106.08(6)(d), Wis. Adm. Code, TUa and TUc effluent values are equal to zero whenever toxicity is not detected (i.e. when the LC_{50}, IC_{25} or $IC_{50} \geq 100\%$).

  Acute Reasonable Potential = 0 < 1.0, reasonable potential is not shown, and **an acute WET limit is not required.**

Attachment #1

Chronic Reasonable Potential = [(TU_c effluent) (B)(IWC)]

Chronic WET Limit Parameters

TUc (maximum) $100/IC_{25}$	**B** (multiplication factor from s. NR 106.08(6)(c), Wis. Adm. Code, Table 4)	IWC
100/84.4 = 1.2	6.2 Based on 1 detect	74%

[(TUc effluent) (B)(IWC)] = 5.4 > 1.0

Therefore, **reasonable potential is shown for a chronic WET limit** using the procedures in s. NR 106.08(6) and representative data from 06/18/2019 through 02/14/2023.

Expression of WET limits

Chronic WET limit = [100/IWC] TU_c = = [100/74] TU_c = **1.4 TU_c expressed as a monthly average**

The WET checklist was developed to help DNR staff make recommendations regarding WET limits, monitoring, and other related permit conditions. The checklist indicates whether acute and chronic WET limits are needed, based on requirements specified in s. NR 106.08, Wis. Adm. Code. The checklist steps the user through a series of questions, assesses points based on the potential for effluent toxicity, and suggests monitoring frequencies based on points accumulated during the checklist analysis. As toxicity potential increases, more points accumulate, and more monitoring is recommended to ensure that toxicity is not occurring. A summary of the WET checklist analysis completed for this permittee is shown in the table below. Staff recommendations based on best professional judgment are provided below the summary table. For guidance related to reasonable potential and the WET checklist, see Chapter 1.3 of the WET Guidance Document: https://dnr.wisconsin.gov/topic/Wastewater/WET.html.

WET Checklist Summary

	Acute	Chronic
AMZ/IWC	Not Applicable. **0 Points**	IWC = 74% **15 Points**
Historical Data	No data from last five years. **5 Points**	3 tests used to calculate RP. No tests failed. **0 Points**
Effluent Variability	Effluent limit violations occurred after the plant upgrade as the facility worked to optimize the new treatment system. Nitrogen ammonia violated the monthly average limit (1 mg/L) and the weekly average limit (1 mg/L) in Week 3 and Week 4 in September of 2022. Otherwise, there have been consistent WWTF operations. **0 Points**	Same as Acute. **0 Points**
Receiving Water Classification	< 4 mi to non-variance water. **5 Points**	Same as Acute. **5 Points**
Chemical-Specific Data	No reasonable potential for limits based on ATC. Ammonia, chloride, copper, and zinc detected. Additional Compounds of Concern: None.	Reasonable potential for limits for chloride based on CTC. Ammonia nitrogen limits carried over from the current permit. Copper and zinc detected.

Attachment #1

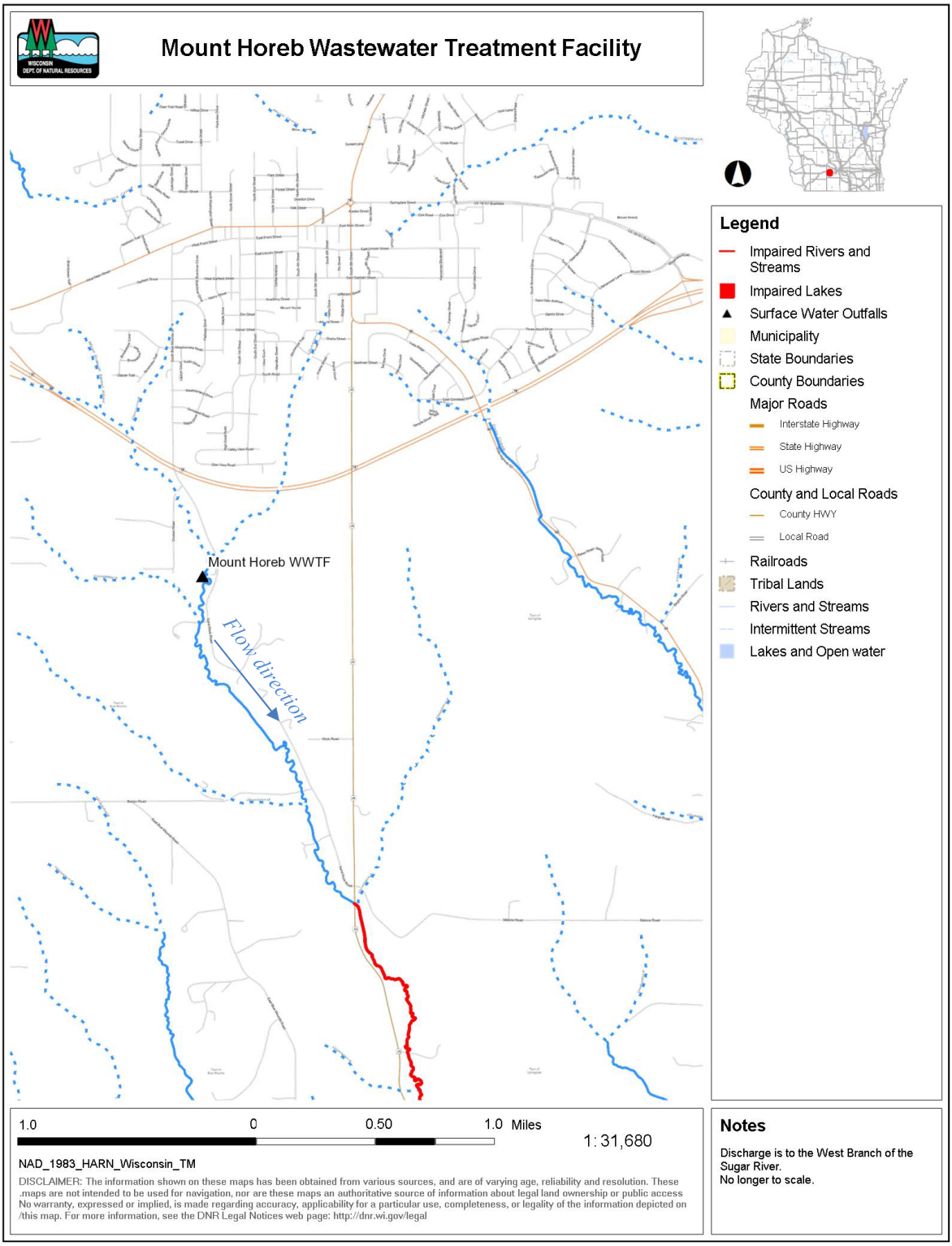
	Acute	Chronic
	3 Points	Additional Compounds of Concern: None. **8 Points**
Additives	No biocides and one water quality conditioner (ferric chloride) added. Permittee has proper P chemical SOP in place. **1 Point**	All additives used more than once per 4 days. **1 Point**
Discharge Category	No industrial contributors. **0 Points**	Same as Acute. **0 Points**
Wastewater Treatment	Secondary or better. **0 Points**	Same as Acute. **0 Points**
Downstream Impacts	No impacts known. **0 Points**	Same as Acute. **0 Points**
Total Checklist Points:	**14 Points**	**29 Points**
Recommended Monitoring Frequency (from Checklist):	None	Annual.
Limit Required?	No	Limit = 1.4 TU_c
TRE Recommended? (from Checklist)	No	No

- After consideration of the guidance provided in the Department's *WET Program Guidance Document* (2022) and other information described above, **no acute WET tests and annual chronic WET tests are recommended** in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).

- According to the requirements specified in s. NR 106.08, Wis. Adm. Code, a chronic WET limit is required. **The chronic WET limit shall be expressed as 1.4 TUc as a monthly average** in the effluent limits table of the permit. A minimum of annual chronic monitoring is required because a chronic WET limit is required. Federal regulations in 40 CFR Part 122.44(i) require that monitoring occur at least once per year when a limit is present.

Attachment #2

Site Map



Attachment #3

Temperature limits for receiving waters with unidirectional flow

(calculation using default ambient temperature data)

						Temp Dates	Flow Dates
Facility:	Mt. Horeb WWTF		**7-Q_{10}:**	0.42	cfs		
Outfall(s):	001		**Dilution:**	100%		**Start:** 01/01/21	01/01/19
Date Prepared:	10/21/2024		**f:**	0		**End:** 12/31/22	06/24/24
Design Flow (Qe):	0.79	MGD	**Stream type:**	Limited forage fish community			
Storm Sewer Dist.	0	ft	**Qs:Qe ratio:**	0.3	:1		
			Calculation Needed?	YES			

Month	Water Quality Criteria			Receiving Water Flow Rate (Qs)	Representative Highest Effluent Flow Rate (Qe)		f	Representative Highest Monthly Effluent Temperature		Calculated Effluent Limit	
	Ta (default)	Sub-Lethal WQC	Acute WQC		7-day Rolling Average (Qesl)	Daily Maximum Flow Rate (Qea)		Weekly Average	Daily Maximum	Weekly Average Effluent Limitation	Daily Maximum Effluent Limitation
	(°F)	(°F)	(°F)	(cfs)	(MGD)	(MGD)		(°F)	(°F)	(°F)	(°F)
JAN	37	54	78	0.44	0.769	1.663	0	49	50	60	85
FEB	39	54	79	0.46	0.665	0.909	0	48	49	61	92
MAR	43	57	80	0.51	0.890	0.962	0	50	51	62	93
APR	50	63	81	0.54	0.725	0.809	0	53	55	69	94
MAY	59	70	84	0.51	0.777	0.864	0	59	60	75	94
JUN	64	77	85	0.48	1.322	5.680	0	62	63	80	86
JUL	69	81	86	0.46	0.657	0.766	0	64	64	86	93
AUG	68	79	86	0.45	0.560	0.790	0	65	66	85	93
SEP	63	73	85	0.46	0.639	0.850	0	64	73	78	93
OCT	55	63	83	0.47	0.844	1.148	0	62	63	66	90
NOV	46	54	80	0.48	0.573	0.656	0	56	58	58	96
DEC	40	54	79	0.44	0.556	0.644	0	52	53	61	96

State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
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WISCONSIN
DEPT. OF NATURAL RESOURCES

3/28/2024

John Klein
138 E Main St
Mount Horeb, 53572

Subject: Mount Horeb Wastewater Treatment Facility - WPDES Permit WI-0020281
Adaptive Management Plan – CONDITIONAL APPROVAL

Dear Mr. Klein:

The Department received the final draft of the Adaptive Management Plan (AM Plan) prepared by Strand Associates on behalf of the Village of Mount Horeb. The final plan dated November 2023 was received via electronic submittal on November 17, 2023. The Department has reviewed the AM plan and has no additional comments at this time.

Based on the WDNR review, the AM Plan is in general conformance with the WDNR Adaptive Management Guidance and requirements contained in s. NR 217.18, Wis. Adm. Code. The plan indicates that Mount Horeb will utilize AM to comply with standards total phosphorus applicable to the discharge from the Mount Horeb Wastewater Treatment Facility, Outfall 001, to the West Branch of Sugar River. Actions outlined in Section 4.01 of the AM plan involve nonpoint phosphorus reductions throughout the West Branch of Sugar River Watershed, identified as the AM plan's action area. For continued AM eligibility, phosphorus reductions undertaken by the Village of Mount Horeb and various AM partners are expected to offset the WWTF's proportional phosphorus loading to West Branch of Sugar River, 285 lbs/yr, within the first permit term.

The project duration is fifteen years (three permit terms) and may be adjusted up or down per the provisions of s. NR 217.18 and s. 283.13(7) Wis. Stats. Based on the milestones found within the AM Plan, phosphorus reduction goals are as follows:

Permit Term 1 – 348 lbs/yr
Permit Term 2 – 565 lbs/yr
Permit Term 3 – 695 lbs/yr

While these reductions may be modeled to demonstrate interim progress, final compliance (as demonstrated pursuant to s. NR 217.18(3)(e)4 Wis. Adm. Code.) will be based on monitoring data from in-stream sampling point located at the intersection of County Highway JG and Lewis Road (42.94474° N, -89.71970° W). This sampling point will be included in the reissued WPDES permit as a monthly monitoring requirement.

The Department conditionally approves the AM Plan as a basis for phosphorus compliance during the next WPDES permit term. The WDNR has assigned the AM plan a tracking number of WQT-2024-0004 and will be referenced as such in the draft WPDES permit. The draft permit will contain an interim limit for phosphorus and reporting requirements consistent with s. NR 217.18, Wis. Adm. Code. The final AM plan will be included as part of the public notice package for permit reissuance, and final approval is subject to public comment and EPA review.

If you have any questions or comments, please contact me at (608) 400 - 5596 or at matthew.claucherty@wisconsin.gov

Thank You,

Matt Claucherty
Phosphorus Implementation Coordinator
Wisconsin Department of Natural Resources

e-CC:
Randy Langer, Strand Associates
Betsyjo Howe, WDNR
Kenzie Ostien, WDNR

Professional

Engineering

Services

Watershed Adaptive Management Plan

Report

Village of

Mount Horeb, WI

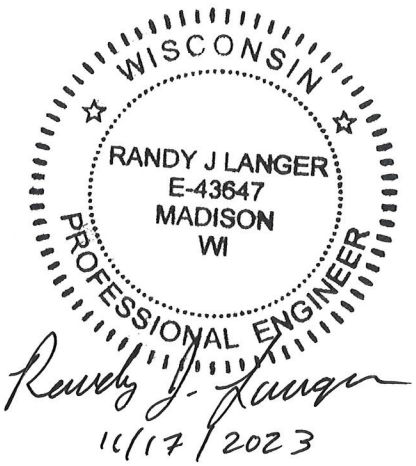
November 2023

STRAND ASSOCIATES®

Report for

Village of Mount Horeb, Wisconsin

Watershed Adaptive Management Plan



Prepared by:

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www.strand.com

November 2023

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Excellence in Engineering
Since 1946

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SECTION 1
INTRODUCTION

1.01 INTRODUCTION

The Wisconsin Administrative Codes (WAC) NR 102 and NR 217 were modified in 2010 to include new water-quality based effluent limits (WQBELs) for phosphorus. This resulted in an update to effluent total phosphorus (TP) concentration limits in the Wisconsin Pollutant Discharge Elimination System (WPDES) permits issued by the Wisconsin Department of Natural Resources (WDNR). The proposed effluent TP concentration limits included in the Village of Mount Horeb's (Village) water pollution control facility's (WPCF) most recent WPDES permit are 0.225 milligrams per liter (mg/L) as a monthly average and 0.075 mg/L as a 6-month average. At the design average flow of 0.79 million gallons per day (MGD), these effluent concentrations represent a TP discharge limit of 1.48 pounds per day (lb/day) as a monthly average and 0.49 lb/day as a 6-month average.

The Village's WPDES permit can be found in Appendix A. As noted in its December 2021 *Preliminary Compliance Alternatives Plan* (PCAP), the Village evaluated compliance options and selected the Watershed Adaptive Management (AM) Plan as the primary compliance strategy. This Watershed AM Plan and Final Compliance Alternatives Plan (FCAP) report serves as a submission for the WPDES permit compliance schedule.

1.02 EXISTING FACILITIES

The Village's WPCF is operated by and serves the Village. Construction of major WPCF improvements commenced in 2017. The updated WPCF biological treatment system went into operation in November 2018, and the construction project was completed in spring 2019.

The WPCF is an oxidation ditch facility, operating with biological phosphorus removal (BPR) and biological nitrogen removal, that provides secondary wastewater treatment of domestic, commercial, and institutional wastewater. A backup/polishing chemical phosphorus removal (CPR) system is available when the BPR system is not removing enough phosphorus to meet the permitted effluent limits. The WPCF currently uses ferric chloride as the phosphorus removal chemical when necessary to meet effluent limits.

The WPCF operates under WPDES Permit No. WI-0020281-08-0. Design flows and loadings are shown in Table 1.02-1.

Design Year	2040
Design Influent Flows	
Average Daily, MGD	0.79
Maximum Daily, MGD	1.77
Peak Hourly Flow, MGD	3.16
Peak Instantaneous, MGD	4.03
Design Average Influent Loadings	
BOD_5, lb/day	1,896
TSS, lb/day	2,018
NH_3-N, lb/day	196
TP, lb/day	45

Notes:
BOD_5=5-day biochemical oxygen demand
NH_3-N=ammonia-nitrogen
TSS=total suspended solids

Table 1.02-1 Design Flows and Loadings

Influent flows and influent and effluent phosphorus concentrations and loads for 2021 through November 2023 are shown in Table 1.02-2. The existing facilities are anticipated to have adequate capacity to meet the current WPDES effluent limits (BOD, TSS, and NH_3-N) over the 20-year planning period.

Table 1.02-2 WPCF Recent Flows and Phosphorus Data

Month	Influent Average Flow (MGD	Influent Average TP Concentration (mg/L)	Influent TP Load (lb/day)	Effluent Average TP Concentration (mg/L)	Effluent Average TP Load (lb/day)
January 2021	0.510	8.23	33.22	0.59	2.50
February 2021	0.446	NA	NA	0.70	2.62
March 2021	0.462	NA	NA	0.45	1.72
April 2021	0.454	2.95	10.09	0.99	3.76
May 2021	0.428	NA	NA	0.96	3.44
June 2021	0.413	NA	NA	0.16	0.55
July 2021	0.415	NA	NA	0.29	1.00
August 2021	0.422	NA	NA	0.53	1.85
September 2021	0.424	3.25	11.66	0.49	1.75
October 2021	0.434	9.84	37.98	0.58	2.11
November 2021	0.420	9.11	31.94	0.43	1.52
December 2021	0.395	NA	NA	0.12	0.40
January 2022	0.395	NA	NA	0.13	0.42
February 2022	0.390	15.20	49.44	0.11	0.36
March 2022	0.401	8.15	27.23	0.12	0.39
April 2022	0.443	8.55	31.57	0.13	0.44
May 2022	0.481	9.70	38.94	0.23	0.86
June 2022	0.530	5.35	23.65	0.40	1.66
July 2022	0.466	NA	NA	0.45	1.57
August 2022	0.442	NA	NA	0.69	1.81
September 2022	0.454	6.12	23.16	0.39	4.53
October 2022	0.422	8.78	30.86	0.20	0.73
November 2022	0.428	6.60	23.58	0.14	0.51
December 2022	0.454	NA	NA	0.12	0.46
January 2023	0.452	13.25	49.94	0.10	0.45
February 2023	0.480	NA	NA	0.07	0.33
March 2023	0.568	NA	NA	0.12	0.56
April 2023	0.599	NA	NA	0.13	0.64
May 2023	0.502	NA	NA	0.59	2.50
June 2023	0.460	NA	NA	0.31	1.20
July 2023	0.469	10.65	41.66	0.66	2.62
August 2023	0.481	NA	NA	0.73	3.10
September 2021	0.433	41.40	149.62	0.54	2.15
October 2021	0.433	NA	NA	0.27	1.06
November 2021	0.429	6.10	21.80	0.12	0.46
December 2021					
2021	**0.435**	**6.68**	**24.98**	**0.52**	**1.94**
2022	**0.442**	**8.56**	**31.05**	**0.26**	**1.15**
2023	**0.482**	**17.85**	**65.76**	**0.33**	**1.37**
Overall Average	**0.452**	**10.19**	**37.43**	**0.37**	**1.49**

Note: NA=not available

1.03 SUMMARY OF OPTIMIZATION EFFORTS

The Village continually works toward optimizing phosphorus removal performance at the WPCF. Refer to the table in Appendix B for a summary of completed and ongoing phosphorus optimization actions by the Village.

In 2020, the WPCF jar tested some poly-aluminum chloride (PAC) coagulants for phosphorus removal using WPCF mixed liquor. The removal from the PAC was greater than ferric chloride, which the WPCF currently uses for its CPR. However, the extra removal did not justify the additional cost of the PAC; therefore, the Village has not pursued use of PAC.

In November 2021, phosphorus concentrations in process return flows were monitored to determine impact on influent phosphorus loadings to secondary treatment. The gravity belt filtrate had an average phosphorus concentration of 15.45 mg/L and a soluble phosphorus concentration of 12.45 mg/L. The digester decant had an average phosphorus concentration of 17.5 mg/L and a soluble phosphorus concentration of 16.05 mg/L. The WPCF is currently optimizing its digester decant controls to reduce the number of solids and associated TP lofting into the decant. The timing of digester aeration will also continue to be optimized to attempt to minimize the release of soluble phosphorus into the decant during periods when aeration is off and the biosolids become anoxic or anaerobic.

Tyrol Basin is the only hauled waste contributor to the WPCF. Hauled waste monitoring was scheduled to begin in 2020 but was delayed because of minimal activity at Tyrol Basin from COVID-19 closures. In 2021, no hauled waste was received from Tyrol Basin. Hauled waste testing will begin when representative samples can be taken. Hauled wastes are not expected to be a significant source of influent phosphorus.

1.04 AM ELIGIBILITY

The purpose of AM is to allow point sources and nonpoint sources (NPSs) to work together to improve water quality in surface waters that are not meeting phosphorus water quality criteria. The goal of AM is to ease the financial burden on communities by allowing a point source to reduce its own phosphorus loadings as well as other phosphorus loadings within its watershed to achieve TP compliance in the receiving stream. Point source dischargers are given less stringent TP interim limits (0.6 mg/L initially, and 0.5 mg/L in the second and third permit terms, on a 6-month average basis) while they work with other sources to reduce loadings. Compliance is measured by monitoring the receiving stream water quality and comparing to the water quality criterion for the stream. In this case, the applicable water quality criterion is 0.075 mg/L TP for the West Branch of the Sugar River. The AM option allows more time and flexibility for phosphorus compliance than the WPCF improvement alternative. The AM option has the following eligibility requirements:

1. The exceedance of the applicable phosphorus criterion in the receiving stream is caused by phosphorus contributions from both point and NPSs.

2. Either the sum of the NPS and the permitted municipal separate storm sewer system contribution of phosphorus to the receiving stream is at least 50 percent of a total contribution within the watershed of the receiving water at the WPCF outfall; or the

applicable phosphorus criterion cannot be met in the watershed without the control of phosphorus from NPS.

3. Documentation that the proposed WQBELs in the applicant's permit will require filtration or other equivalent treatment technology to achieve compliance.

As shown by the data in Table 1.02-1, it is likely the WPCF will be able to meet the AM interim limit of 0.6 mg/L and can likely meet the 0.5-mg/L future interim limit through further optimization of BPR or with chemical polishing. A lower average concentration on the order of 0.35 mg/L may be necessary to meet the AM goals, and this is likely possible with chemical polishing. The Village has already made reductions in NPS loadings through site improvements associated with construction of the new portions of the WPCF. This work included perennial vegetation at and around the new WPCF, streambank restoration, and construction of two bioinfiltration basins as noted in the water quality trading (WQT) Notice of Intent (see Appendix C). Note: A WQT Notice of Intent was submitted to WDNR prior to completion of the PCAP, and prior to selecting the phosphorus compliance alternative.

1.05 COMPONENTS OF AN AM PLAN

The WDNR has identified nine key components to a successful AM plan. These components are as follows:

1. Identify partners.
2. Describe the watershed and set load reduction goals.
3. Conduct a watershed inventory
4. Identify where reductions will occur
5. Describe management measures
6. Estimate load reductions expected by permit term
7. Measuring success
8. Financial security
9. Implementation schedule with milestone

Subsequent sections address each component in detail.

1.06 ABBREVIATIONS AND DEFINITIONS

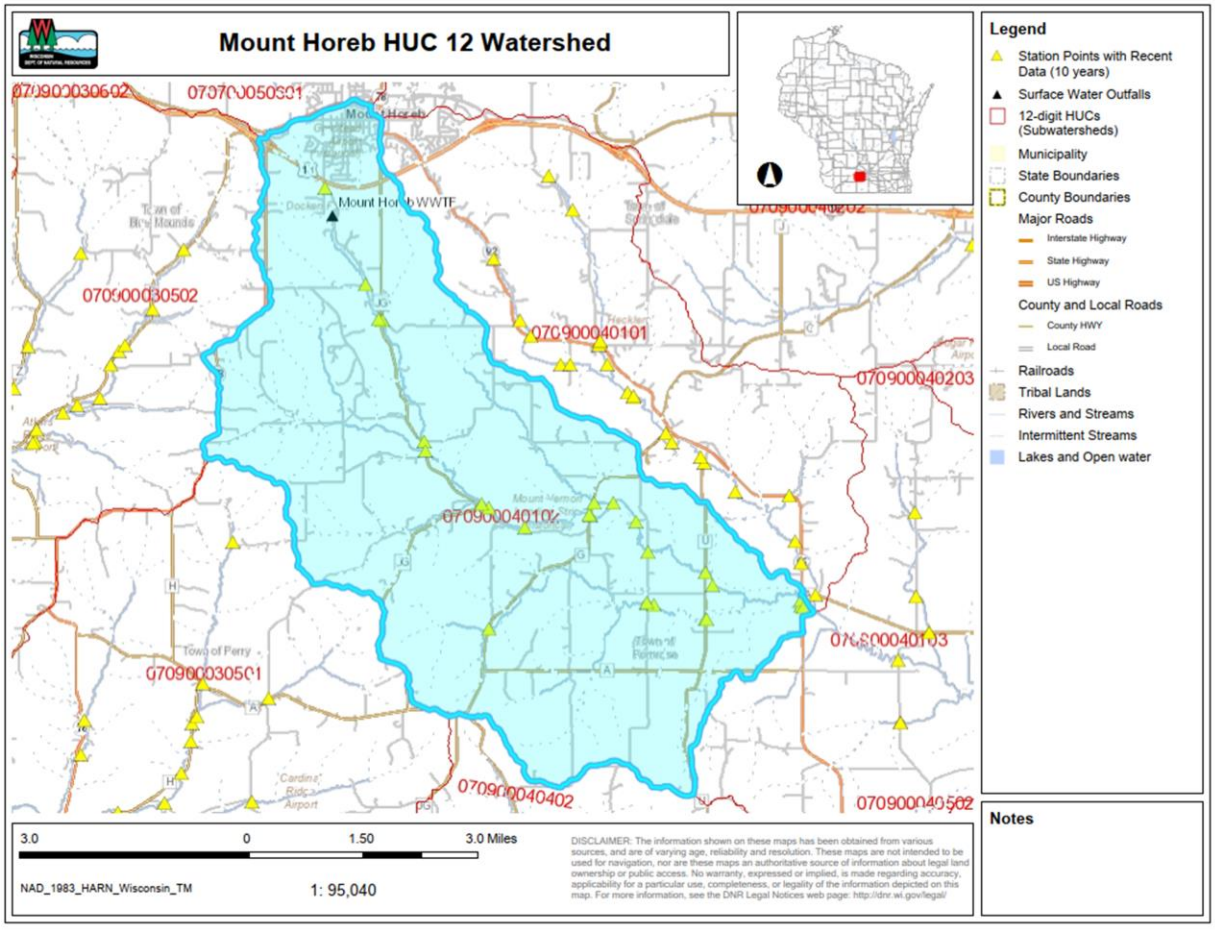
$/lb TP	price per pound of total phosphorus
AM	adaptive management
BB	Bioretention Basin
BMP	Best Management Practice
BOD_5	5-day biochemical oxygen demand
BPR	biological phosphorus removal
CPR	chemical phosphorus removal
CTH	County Trunk Highway
EVAAL	Erosion Vulnerability Assessment for Agricultural Lands
EVI	erosion vulnerability index
FCAP	Final Compliance Alternatives Plan
HDS	hydrodynamic separators
HUC	Hydrologic Unit Code
lb TP/yr	pounds total phosphorus per year
lb/day	pounds per day
lb/year	pounds per year
lbs	pounds
LWRD	Land and Water Resources Department
mg/L	milligrams per liter
MGD	million gallons per day
NH_3-N	ammonia-nitrogen
NPW	net present worth
NRCS	Natural Resource Conservation Service
OPC	opinion of probable cost
PAC	poly-aluminum chloride
PCAP	Preliminary Compliance Alternatives Plan
PRESTO	Pollutant Load Ratio Estimation Tool
SC	Street Cleaning
SWDV	Surface Water Data Viewer
SWIMS	Surface Water Integrated Monitoring System
TP	total phosphorus
TSS	total suspended solids
USDA	United Stated Department of Agriculture
USRWA	Upper Sugar River Watershed Association
Village	Village of Mount Horeb
WAC	Wisconsin Administrative Code
WDNR	Wisconsin Department of Natural Resources
WPCF	water pollution control facility
WPDES	Wisconsin Pollutant Discharge Elimination System
WQBEL	water quality-based effluent limits
WQT	water quality trading

SECTION 2
WATERSHED DESCRIPTION, INVENTORY, AND LOAD REDUCTION GOALS

The Village, located in Dane County, has a population of 7,754 people, according to the 2020 census. The municipal area is 3.23 square miles (sq mi), of which 1.06 sq mi (678 acres) drain to the West Branch of the Sugar River. According to previous correspondence during development of this Watershed AM Plan, the WDNR has accepted the point of compliance as the location where the West Branch of the Sugar River crosses the intersection of County Highway (CTH) JG and Lewis Road.

2.01 WATERSHED DESCRIPTION AND INFORMATION

A Map of the Hydrologic Unit Code (HUC) 12 (# 070900040201) that includes the Village's WPCF outfall is shown in Figure 2.01-1. This figure was provided by the WDNR's Surface Water Data Viewer (SWDV) application.



Source: WDNR's SWDV application.

Figure 2.01-1 HUC 12 Watershed

A map of the watershed upstream of the compliance point is shown in Figure 2.01-2.

WATERSHED MAP

WATERSHED ADAPTIVE MANAGEMENT PLAN

VILLAGE OF MOUNT HOREB

DANE COUNTY, WISCONSIN

FIGURE 2.01-2

1123.063

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A. Soil Types

Data on soil types was obtained from the Natural Resource Conservation Service's (NRCS) Web Soil Survey and Soil Survey Geographic Database. The predominant soil types in the watershed were Edmund silt loam and Newglarus-Dunbarton silt loam and can be seen in Figure 2.01-3. A detailed soils report for the watershed is in Appendix D.

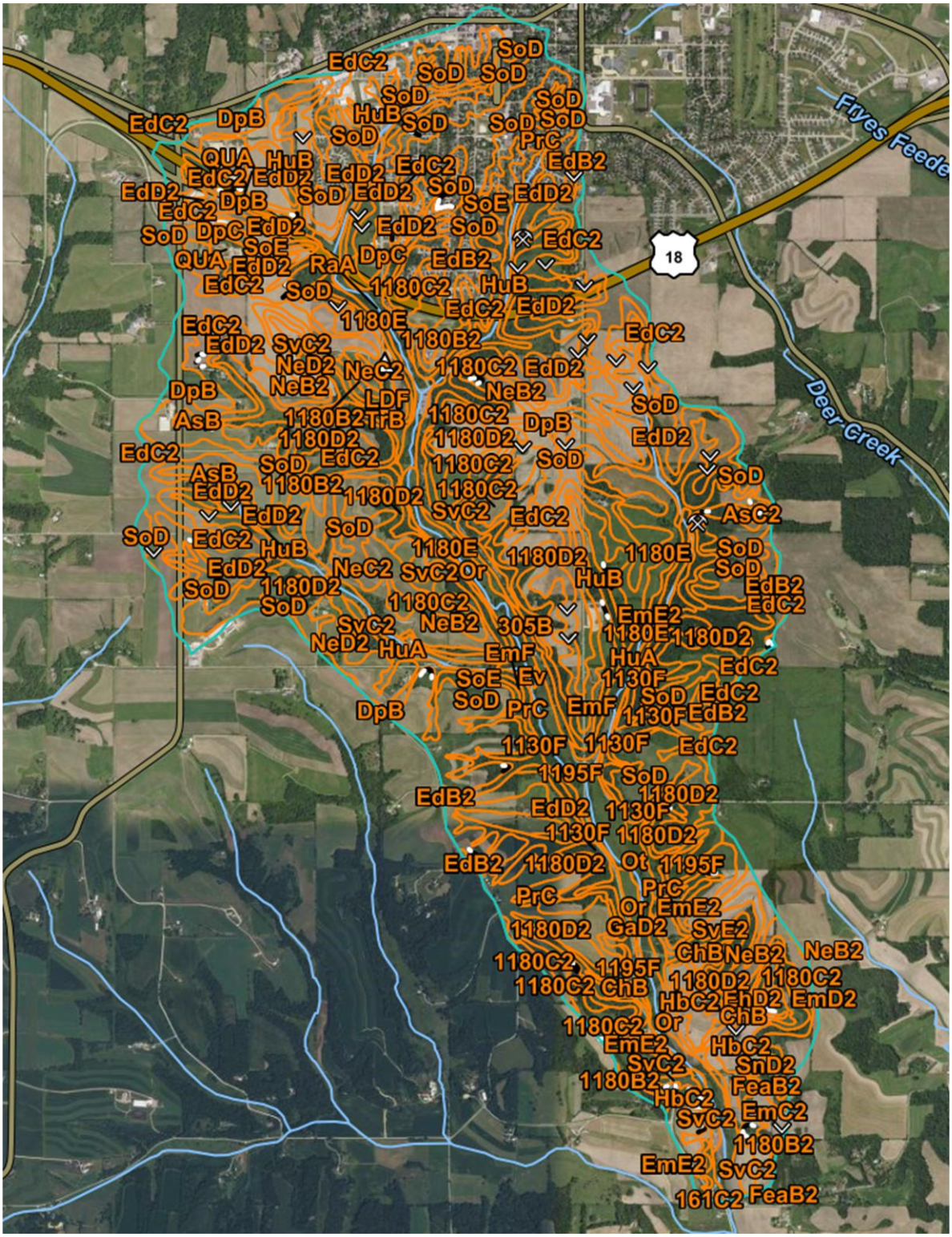

Figure 2.01-3 Soil Survey Map for the Watershed

B. Land Use

Land use data was obtained from the United States Geological Survey Land Cover Institute. This data was used to determine where Best Management Practices (BMPs) can be implemented. The West Branch of the Sugar River watershed is primarily made up of agricultural, open land, and residential land use. A complete breakdown of land use can be found in Figure 2.01-4.

According to calculations performed by the WDNR using the Pollutant Load Ratio Estimation Tool (PRESTO), the WPCF is in an NPS-dominated watershed where the water quality criterion cannot be met without control of NPS. PRESTO documentation indicates the point source to NPS ratio in the watershed at the WPCF outfall is 14:86. The PRESTO documentation indicates the NPS loading upstream of the outfall may range from 306 to 1,260 pounds of TP per year (lb TP/year), with the “most likely” NPS loading being 621 pounds per year (lb/year). The reported total TP load from the WPCF was 1,172 lb/year in the PRESTO documentation, bringing the total lb/year to the range of 1,478 to 2,432 lb/year. These PRESTO values are based on 2009 to 2011 averages. The full PRESTO report is provided in Appendix E.

2.02 WEST BRANCH OF THE SUGAR RIVER WATER QUALITY MONITORING

A. Historic Phosphorus Data

The compliance point for AM has been identified at the intersection of CTH JG and Lewis Road. There are seven data points available from the WDNR’s SWDV application for historic TP levels at this location of the West Branch of the Sugar River. The average of these sampling points resulted in a TP concentration of 0.16 mg/L. Data is summarized in Table 2.02-1.

Date	TP Concentration (mg/L)
May 31, 2011	0.146
May 16, 2017	0.194
June 14, 2017	0.192
July 30, 2017	0.125
August 24, 2017	0.166
September 21, 2017	0.163
October 13, 2017	0.152
Average	0.16

Source: WDNR’s SWDV application.

Table 2.01-1 Historic TP Data

Legend

- Sample Location
- Surface Water Outfall
- Streams and Rivers

Land Use

GENERALIZE

- Agriculture
- Commercial
- Institutional/Governmental
- Mineral Extraction
- Manufacturing
- Open Land
- Recreation
- Residential
- Transportation, Communications and Utilities
- Vacant Subdivided Land
- Wholesale and Retail Trade

Sample Location 1

Mount Horeb WPCF

Sample Location 2

Sample Location 3

N W E S

0 500 1,000 2,000

Feet

LAND USE MAP
WATERSHED ADAPTIVE MANAGEMENT PLAN
VILLAGE OF MOUNT HOREB
DANE COUNTY, WISCONSIN

FIGURE 2.01-4
1123.063

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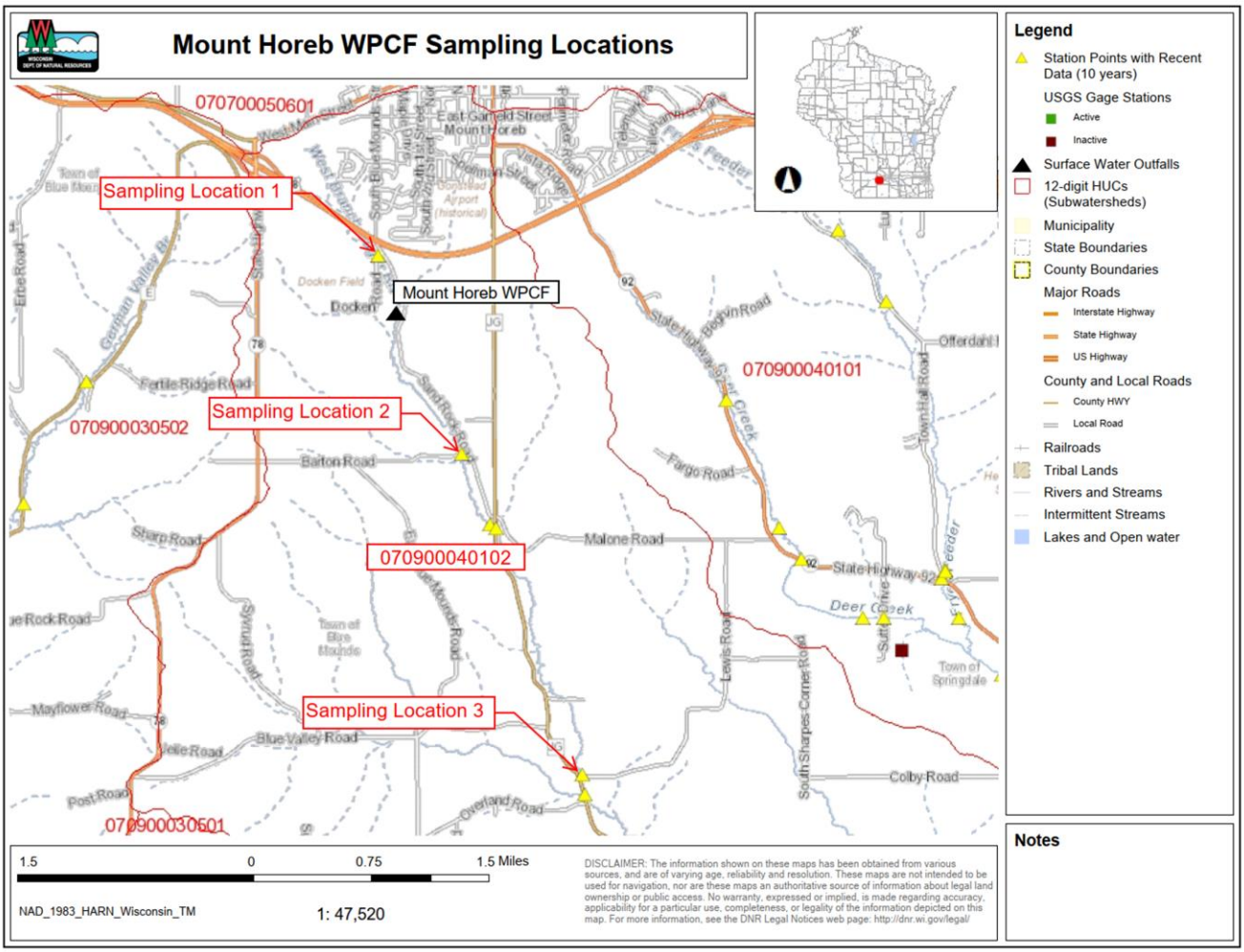
B. In-Stream Sampling Program

The WDNR requires monitoring for instream phosphorous and stream flow for AM programs. In addition to the compliance point, the Village has been monitoring phosphorus concentrations at two additional locations in the watershed to help identify sources of phosphorus loadings. A map of the in-stream sampling locations is presented in Figure 2.02-1. The sampling plan is included as Appendix F.



Source: WDNR's SWDV application

Figure 2.02-1 In-Stream Sampling Locations

Sampling Location No. 1 (Surface Water Integrated Monitoring System [SWIMS] station ID 133216) is located upstream of the WPCF's outfall where the West Branch of the Sugar River crosses Docken Road. This location will be sampled to better quantify upstream phosphorus concentrations.

Sampling Location No. 2 (SWIMS station ID 10009700) is at the intersection of Sand Rock Road and Barton Road. This location will be sampled to better quantify phosphorus loads from the area between the WPCF's outfall and Sampling Location No. 2.

Sampling Location No. 3 (SWIMS station ID 10009483) is at the intersection of CTH JG and Lewis Road. As mentioned previously, this sampling location is the point at which compliance with the water quality criteria is required.

All in-stream phosphorus data collected by the WPCF to date is shown in Table 2.02-1

Month	Average TP Concentration (mg/L)		
	Sampling Location No.1	Sampling Location No. 2	Sampling Location No. 3
January 2022	0.13	0.04	0.05
February 2022	0.08	0.04	0.08
March 2022	0.07	0.06	0.07
April 2022	0.45	0.05	0.45
May 2022	0.14	0.16	0.14
June 2022	0.15	0.10	0.15
July 2022	0.07	0.21	0.07
August 2022	0.20	0.25	0.20
September 2022	0.14	0.14	0.14
October 2022	0.10	0.08	0.10
November 2022	0.13	0.09	0.06
December 2022	NA	NA	NA
January 2023	0.16	0.06	0.05
February 2023	0.02	0.04	0.11
March 2023	0.04	0.09	0.06
April 2023	1.18	0.06	0.94
May 2023	0.14	0.32	0.25
June 2023	0.16	0.12	0.11
July 2023	0.10	0.21	0.16
August 2023	0.11	0.36	0.25
September 2023	0.14	0.24	0.13
October 2023	0.18	0.12	0.06
Average	**0.19**	**0.14**	**0.17**

Table 2.02-1 In-Stream Monitoring Data

An in-stream flow measurement is taken at Sampling Location No. 3 (compliance point). The Village initially used a float test method for stream flow measurement at this location. This method was calibrated against a velocity meter in late 2022, and it was found to severely overestimate stream flow, likely due to uneven channel geometry and the presence of significant in-stream vegetation. A second review of sampling/flow measurement sites in summer 2023 confirmed that this is likely the best available monitoring site considering channel geometry, access (not on private property), and overall location relative to the compliance point. Starting in July 2022, the Village has been using a

velocity meter in combination with channel geometry to measure stream flow. The Village completes stream flow monitoring the last Thursday of each month, as weather and staffing allow. Flow measurements taken to date are shown in Table 2.02-2.

Date	Flow (MGD)
7/7/2022	1.7
7/21/2022	1.7
8/4/2022	0.7
8/18/2022	0.6
9/9/2022	0.5
9/21/2022	0.5
10/20/2022	0.9
11/30/2022	2.0
1/26/2023	2.2
2/23/2023	2.5
3/30/2023	2.3
4/27/2023	2.5
5/25/2023	3.2
6/29/2023	3.2
7/27/2023	3.2
8/31/2023	3.2
9/28/2023	5.2
10/26/2023	7.1
Average	**2.4**

Table 2.02-2 Stream Flow Measurements at Lewis Road (Sampling Location 3)

2.03 PHOSPHORUS LOAD REDUCTION GOALS

Phosphorus reduction calculations were computed for the first permit term following the prescribed method detailed in Appendix A of *A Guide to the Adaptive Management Options for Phosphorus in Wisconsin*. Given that the compliance point is downstream of the WPCF discharge, the method was modified to account for some loadings entering the stream between the WPCF discharge and the compliance point.

Initial variables required for calculation are presented in Table 2.03-1.

Variables	
WPCF's average influent flow	0.452 MGD
Average long-term effluent phosphorus concentration	0.37 mg/L
Average annual flow of receiving water	2.4 MGD
Phosphorus concentration in receiving water	0.17 mg/L
Conversion factor	8.34

Table 2.03-1 Variables for Load Reduction Calculations

A. Load Reduction Goals by Permit Term

The WPCF's annual phosphorus load was determined from the WPCF's average influent flow and effluent phosphorus concentration.

$$0.452\ MGD\ x\ 0.37\ \frac{mg}{L}\ x\ 8.34\ \ x\ 365\ \frac{day}{year} = 509\ \frac{pounds}{year} \qquad \text{E1}$$

The current phosphorus load in the receiving water:

$$2.4\ MGD\ x\ 0.17\ \frac{mg}{L}\ x\ 8.34\ x\ 365\ \frac{day}{year} = 1{,}242\ \frac{pounds}{year} \qquad \text{E2}$$

Percent contribution of phosphorus load:

$$\frac{509\ \frac{pounds}{year}}{1{,}242\ \frac{pounds}{year}} = 41\% \qquad \text{E3}$$

Given a water quality criterion for phosphorus of 0.075 mg/L, the acceptable annual phosphorus load in the receiving water was calculated.

$$2.4\ MGD\ x\ 0.075\ \frac{mg}{L}\ x\ 8.34\ x\ 365\ \frac{day}{year} = 547\ \frac{pounds}{year} \qquad \text{E4}$$

The phosphorus load reduction required in the watershed is given by the following equation:

$$1{,}242\ \frac{pounds}{year} - 547\ \frac{pounds}{year} = 695\ \frac{pounds}{year} \qquad \text{E5}$$

The needed reduction of phosphorus:

$$695\ \frac{pounds}{year}\ x\ 41\% = 285\ \frac{pounds}{year} \qquad \text{E7}$$

For the first permit term, the WPCF will need to reduce a minimum of 284 lb/year of phosphorus. However, the WDNR recommends the first year reduction be a minimum of 50 percent of the total required phosphorus load reduction. In this case, that would be 348 lb/year of phosphorus.
Table 2.03-2 shows the required reduction by permit term.

Permit Term	Years	Total Load Reduction Goal (lb/year)
1	2024 to 2028	348
2	2029 to 2033	565
3	2034 to 2038	695
4	2039 to 2043	695

Table 2.03-2 Phosphorus Load Reduction Goal by Permit Term

2.04 WATERSHED INVENTORY

A watershed inventory was conducted for the West Branch of the Sugar River watershed to identify opportunities for implementing BMPs for a successful AM plan.

A. Point Sources

The only point source present in the West Branch of the Sugar River watershed is the Village's WPCF. Current effluent phosphorus data for the Village's WPCF is provided in Appendix G and summarized in Table 2.04-1.

Year	Annual Average Influent Flow (MGD)	Annual Average Effluent Phosphorus Concentration (mg/L)	Daily Average Effluent Phosphorus Loading (lb/day)	Annual Effluent Phosphorus Loading (lb/year)
2021	0.435	0.52	1.94	708
2022	0.442	0.26	1.15	420
2023	0.482	0.33	1.37	500
Average	**0.452**	**0.37**	**1.49**	**544**

Table 2.04-1 WPCF Effluent Phosphorus Summary

B. Urban and Rural NPS

Urban and rural BMPs were investigated for their potential contribution to reduced phosphorus loads to the West Branch of the Sugar River watershed.

Figure 2.04-1 shows the drainage system and drainage basin boundaries in the Village, including storm sewer/culverts, detention ponds, bioretention basins, floodplains, wetlands, and outfalls. Figures 2.04-2, 2.04-3, and 2.04-4 show the zoning, WinSLAMM land use, and soils, respectively, within the Village for lands draining to the West Branch of the Sugar River.

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Date: 7/8/2022

Time: 9:31:00 AM

Legend

Descript

- Potential Bioretention Basin
- Potential Dry to Wet Pond Conversion
- Potential Hydrodynamic Separator
- Potential Permeable Pavement
- Potential Water amd Sediment Control Basin
- Potential Wet Pond

Permeable Pavement

Parking

- Permeable Pavement
- Parking Lot
- OUTFALL
- CATCHBASIN
- MANHOLES
- STORM SEWER
- Water Main
- Sanitary Sewer
- WATERSHEDS
- 100-Year Floodplain
- Municipal_Boundaries
- Wetlands

Reach 80
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Reach 15
Reach 16
Reach 11
Mount Horeb WWTP

N
W E
S

0 700 1,400 2,800 Feet

FIGURE **2.04**-1
1123.063

STRAND ASSOCIATES®

WATERSHED MAP

WATERSHED ADAPTIVE MANAGEMENT PLAN
VILLAGE OF MOUNT HOREB
DANE COUNTY, WISCONSIN

ZONING MAP

WATERSHED ADAPTATIVE MANAGEMENT PLAN AND FINAL COMPLIANCE ALTERNATIVES PLAN FOR PHOSPHORUS
VILLAGE OF MOUNT HOREB
DANE COUNTY, WISCONSIN

Legend

- Village Limits
- General Catchments
- Conservancy
- A-1 - Agriculture
- R-1 - Single Family Residential
- R-2 - Two-Family Residential
- R-3 - Multi-family Residential
- R-4 - Elderly Housing Residential
- MB - Main St Business
- NB - Neighborhood Business
- PB - Planned Business
- RB - Recreational Business
- CB - Central Business
- PI - Planned Industrial
- I-1 - Restricted Industrial
- I-2 - General Industrial
- PD-1 - Planned Development

Stewart Park, Blue View Dr, Manor Dr, County Rd S, Wally Rd, Bergum Rd, JG, Hickory St, Tvedt Dr, Lake St, Durtschi Dr, Waltz Park, N 8th St, Green St, Boecks Park, N Grove St, N 3rd St, N 4th St, Oak St, Union Cemetery, Nesheim Park, E Main St, Liberty Park, Perimeter St, ID, S 1st St, S 2nd St, S 4th St, S 5th St, S 6th St, S 8th St, E Lincoln St, Norsk Golf Club, Tyrol Ter, Lillehammer Ln, Ridgeview Rd, W Garfield St, E Garfield St, 60, 92, 151, 51, 80, 50, 40, 30, 70, 90, 25, 24, 23, 22, 26, 20, 27, 21, 14, 130, 100, 15, 16, 11, 110, 120, 10, 12, 13, Grundahl Park, Mary Dr, View Ct, Valley St, Howard Himsel Park, Green Valley Rd, Eggum Rd, Gonstead Rd, State Road 92, County Road JG, County Rd E, State Road 78, US Highway 18 and 151, Glenview Rd, Docken's Field, Roger Rd, Docken Rd, 500, Rem View Ln

N W E S

0 500 1,000 2,000
US Feet

STRAND ASSOCIATES®

FIGURE 2.04-2
1123.063

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Reach 110
Reach 120
Reach 500
Reach 500

Mount Horeb WWTP

Legend

WATERSHEDS

SLU

- DOWNTOWN
- DUPLEX
- HDRNA
- INST
- LDRNA
- LI
- MDRNA
- MDRWA
- MFR
- MI
- OPEN
- PARK
- SCH
- STRIPCOM
- Municipal_Boundaries
- Parcels

N
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0 750 1,500 3,000
Feet

WINSLAMM LAND USE MAP

WATERSHED ADAPTIVE MANAGEMENT PLAN
VILLAGE OF MOUNT HOREB
DANE COUNTY, WISCONSIN

STRAND ASSOCIATES®

FIGURE **2.04**-3
1123.063

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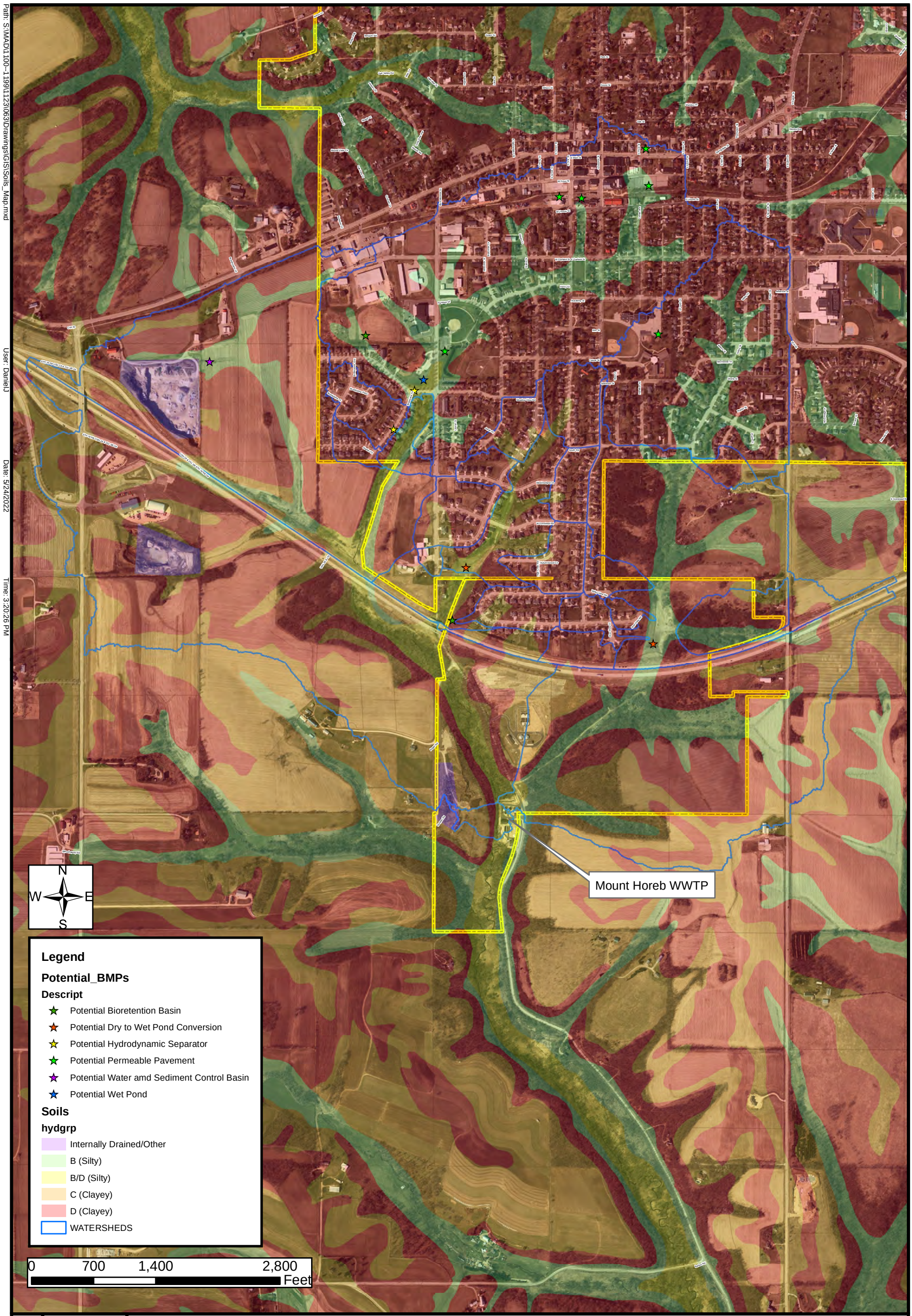

FIGURE 2.**04-4**
1123.063

STRAND ASSOCIATES®

SOILS MAP

WATERSHED ADAPTIVE MANAGEMENT PLAN
VILLAGE OF MOUNT HOREB
DANE COUNTY, WISCONSIN

C. Stormwater Quality Modeling–Existing Conditions

Stormwater quality modeling for the Village was completed using the WinSLAMM v10.4.1, herein referred to as WinSLAMM. WinSLAMM is a computer model approved by WDNR to address the requirements of WAC NR 151 that analyzes NPS abatement. WinSLAMM has been calibrated using extensive water quality data throughout the United States. As this model is used for regulatory purposes, the results can be compared to other past and ongoing studies. WinSLAMM is regularly updated to include additional water quality monitoring data to further refine its predictive capabilities.

WinSLAMM is a planning-level tool that enables municipalities to make decisions regarding BMPs necessary to achieve NPS urban runoff standards described in WAC NR 151. WinSLAMM specifically analyzes control practices including street sweeping, wet detention ponds, bioretention basins, catch basin and inlet sumps, infiltration devices, porous pavements, and grass swales. WinSLAMM also predicts relative pollutant contributions from "source areas" including rooftops, parking lots, driveways, streets, sidewalks, and pervious space.

Land uses shown in Figure 2.04-3 are defined using standard land use designations in WinSLAMM based on review of the Village's existing land use and zoning maps. Soils shown in Figure 2.04-4 were determined by NRCS soils maps.

The amount of stormwater pollutants running off the land is referred to as the baseline condition load. The baseline condition is considered to have no stormwater BMPs employed. The existing condition load is generated by simulating the effectiveness of current stormwater management practices in removing TP from stormwater. For the Village, the existing condition load was evaluated by including two dry detention basins, a bioretention basin, and street sweeping in the WinSLAMM models. The original stormwater plans for the dry detention basins indicated that the Mickelson and Lavold regional dry detention basins achieved a 67.0 percent and 67.2 percent TSS reduction when modeled in WinDetpond, assuming no sediment resuspension. The dry detention basins also include rock filled thermal reduction beds to meet Dane County's requirements for thermally sensitive watersheds in preference to wet detention ponds that can increase stormwater temperatures. Figure 2.04-1 shows the location of the existing stormwater BMPs. Pictures of the existing BMPs are included in Figures 2.04-5, 2.04-6, and 2.04-7. It is Strand Associates, Inc.®'s (Strand) understanding that the Village provides twice monthly street sweeping of all Village streets with a high-efficiency, vacuum street sweeper (2019 Tennant Sentinel) from early April (March 30 used in modeling) to late November (November 24 used in modeling). Catch basins with sumps were not modeled. For purposes of modeling, it was assumed that there was light parking and no parking controls. Table 2.04-2 includes the baseline condition and existing condition annual TP load, by subbasin. As can be seen, modeling shows that the Village achieves a 9.99 percent TP reduction under existing conditions.

Basin Name	Baseline TP (lb)	Existing TP (lb)	Existing Reduction in TP (lb)	Existing Reduction in TP (%)	Existing BMPs[1,2]
10	179.2	157.8	21.3	11.9	BB + SC
20	83.9	70.5	13.4	16.0	BB + SC
30	4.5	4.2	0.4	7.9	SC
40	11.5	10.6	0.9	7.9	SC
50	22.6	21.4	1.2	5.3	SC
60	195.3	180.2	15.2	7.8	BB + SC
70	1.9	1.7	0.2	9.8	SC
80	37.3	35.4	1.9	5.2	SC
90	5.8	5.3	0.5	8.4	SC
100	10.2	9.5	0.8	7.7	SC
110	5.5	5.1	0.4	7.2	SC
120	6.3	5.9	0.4	6.3	SC
130	7.0	6.5	0.5	6.8	SC
Total	**571.0**	**514.0**	**57.0**	**10.0**	

Notes:
lb=pounds
[1]SC modeled as Street Cleaning
[2]BB modeled as Bioretention Basin

Table 2.04-2 Existing Conditions

Figure 2.04-5 Mickelson Dry Detention Basin

Figure 2.04-6 Lavold Dry Detention Basin

Figure 2.04-7 Bioretention Basin at Public Works Yard

D. Rural/Agricultural NPSs

Erosion of streambanks and sediment loss from farmland is a leading contributor of NPS pollution. These vulnerable areas are of high priority and are sites where BMPS can be placed to minimize runoff. The WDNR's Erosion Vulnerability Assessment for Agricultural Lands (EVAAL) tool was used to prioritize areas within the watershed that may be vulnerable to soil erosion and thus, increased nutrient transport (phosphorus loss). The EVAAL tool was used in correlation with soil, land cover, and watershed data. To use the EVAAL tool, the following datasets were obtained: LiDAR-based Digital Elevation Model, Area of Interest Boundary, United States Department of Agriculture (USDA)-NRCS Soil Survey Geographic, and Culvert Lines.

The EVAAL tool results assign an erosion vulnerability index (EVI) value to various farm fields in the action area. Here higher values indicate increased vulnerability to erosion, and this is summarized in Figure 2.04-8 as well as Appendix H. Given the distribution of the high priority areas across the watershed, it would be beneficial to target areas where multiple parcels are owned by the same landowner.

To identify landowners, the EVI map was overlayed with landowner parcel data. This essentially assigned an EVI value to each parcel. This is summarized in Figure 2.04-9 as well as Appendix H.

The EVI for each parcel was multiplied by parcel acreage. This product was then summed by landowner. This allows for a prioritization of landowners who have a combination of more acreage and higher EVIs on the parcels that they own. This will help the Village prioritize which landowners it begins discussions with. For purposes of confidentiality, this list is not published in this report.

Legend

- Sample Location
- Surface Water Outfall
- Streams and Rivers

EVI

Value

High : 3

Low : 0

Sample Location 1

Mount Horeb WPCF

Sample Location 2

Sample Location 3

N

W E

S

0 500 1,000 2,000

Feet

FIGURE 2.04-8
1123.063

STRAND ASSOCIATES®

EROSION VULNERABILITY INDEX MAP
WATERSHED ADAPTIVE MANAGEMENT PLAN
VILLAGE OF MOUNT HOREB
DANE COUNTY, WISCONSIN

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Legend

- Sample Location
- Surface Water Outfall
- Streams and Rivers

Parcels

MEAN

- 0.000000 - 0.497181
- 0.497182 - 0.901256
- 0.901257 - 1.221744
- 1.221745 - 1.518496
- 1.518497 - 1.867696
- 1.867697 - 2.444370

Sample Location 1

Mount Horeb WPCF

Sample Location 2

Sample Location 3

N W E S

0 500 1,000 2,000

Feet

FIGURE 2.04-9
1123.063

STRAND ASSOCIATES®

EROSION VULNERABILITY INDEX PARCEL MAP
WATERSHED ADAPTIVE MANAGEMENT PLAN
VILLAGE OF MOUNT HOREB
DANE COUNTY, WISCONSIN

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SECTION 3
AM PROJECT PLANNING

3.01 PARTNERS

The expertise and involvement of community and professional organizations, local government agencies, and landowners is necessary for the success of AM. For the Village's WPCF's watershed AM project, the following project partners were identified.

A. The Village

The Village operates the Village's WPCF, treating domestic wastewater. The Village shall be responsible for stream monitoring, including the collection of samples at the AM compliance point, and meeting the facilities interim effluent phosphorus limits. Moreover, the Village shall work with landowners to implement BMPs and generate annual progress reports. All financial matters shall be handled through the Village. The Village is responsible for overall implementation of this Watershed AM Plan.

B. WPDES Permit Holder

The Village's WPCF is the only permitted WPDES discharge in the watershed.

C. Strand

Strand is an engineering consulting firm that has assisted the Village with development of this plan. Strand also designed the Village WPCF's upgrade in 2016 and has assisted with continual optimization of the WPCF. Strand will continue to assist with implementation of this plan as necessary and can assist with annual AM program reporting.

D. Upper Sugar River Watershed Association (USRWA)

The USRWA is a non-profit conservation organization working to protect and restore natural resources in the Upper Sugar River watershed and surrounding areas. USRWA achieves this through cultivating relationships with landowners, advocating for conservation, and educating the community on environmental literacy. The Village and USRWA have had previous correspondence regarding this Watershed AM Plan and understand the potential mutual benefits for both parties.

E. Dane County Land and Water Resources Department (LWRD)

The Dane County LWRD is a government agency that strives to protect the natural, cultural, and historic resources of Dane County. The LWRD works to increase access to healthy land, water, and other natural resources to the community. The Village has contracted with the LWRD for its assistance in implementation of this Watershed AM Plan, as it has the resources and relationships that will likely prove beneficial for identifying specific projects that can be implemented. The contract between the Village and County can be found in Appendix I.

F. Local Landowners

There are several landowners in the West Branch of the Upper Sugar River watershed whose land is currently in agricultural production. There are also several farms that house livestock (mostly dairy and beef cattle). The Village intends to work with the LWRD to develop relationships with local landowners and identify opportunities for BMP implementation. The LWRD shall verify and monitor implementation of BMPs.

3.02 PROPOSED PHOSPHORUS REDUCTION MEASURES

A. Potential Urban NPS Reduction Measures

To assist the Village in identifying stormwater BMPs to potentially assist in reducing phosphorus loads to the West Branch of the Sugar River as part of watershed AM, several stormwater BMPs were considered. The WinSLAMM model described in Section 2 was used to model these BMPs and predict the associated reduction in phosphorus loads. Table 3.02-1 lists the predicted performance of each BMP evaluated. Further discussion of each BMP is provided in the following.

1. Dry to Wet Detention Basin Conversion

The Mickelson and Lavold regional dry detention basins were designed with thermal control to achieve a weighted (between new and redevelopment) ordinance required 64.5 percent and 60 percent TSS reduction, respectively. Likewise, each of these basins has an existing sanitary sewer within its footprint that would complicate conversion of the dry detention basin to a wet detention basin. At the Mickelson dry detention basin, the sanitary sewer appears to be located on the east embankment of the pond so that excavation for a wet pool would not impact the sanitary sewer. At the Lavold dry detention basin, the sanitary sewer appears to be in the center of the pond at a depth of approximately 8 feet and includes a sanitary sewer connection to the west across the pond to Glen View Road and Glen View Court. Given these circumstances, conversion of the dry detention basins to wet detention basins has been considered but not further evaluated.

A similar dry detention basin could potentially be constructed in the open land southeast of the Homestead Cooperative of Mount Horeb northwest of the intersection of Meadow View Road and South Blue Mounds Street. It appears that the storm sewer is approximately 7.25 feet deep in this location, making an approximately 10-foot-deep dry detention basin with thermal control potentially feasible.

2. Wet Detention Basin

Because of the thermal sensitivity concerns described previously, wet detention basins were not considered or evaluated.

3. Wet Detention Basin with Chemical Treatment

Because of the thermal sensitivity concerns described previously, wet detention basins with chemical treatment that enhance TP removal through coagulation that captures dissolved phosphorus were not considered or evaluated.

4. Underground Wet Detention Basin

Because of the thermal sensitivity concerns described previously, underground wet detention basins were not considered or evaluated.

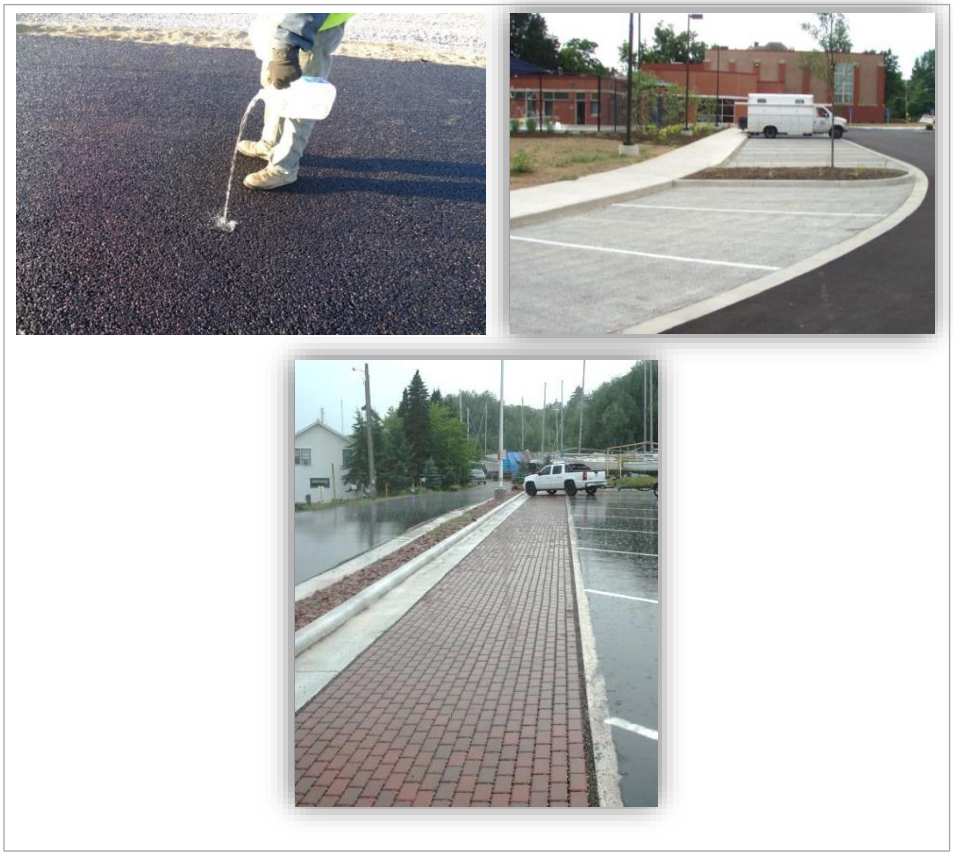
5. Bioretention Basin

A bioretention basin at the 18-inch outfall on the west end of Glen View Road was identified as a potential BMP. This bioretention basin would need to be located on Wisconsin Department of Transportation or private land and would need to avoid a sanitary sewer that parallels the storm sewer system in the area. A bioretention basin northeast of the intersection of Brookstone Crest and Meadow View Road was identified as a potential BMP. This bioretention basin would need to be located on private land and avoid future potential extension of a sanitary sewer in the area. If this land were to develop, a future stormwater BMP would likely be in this general area. If these basins were properly designed, based on WDNR standards, it is expected that they can achieve 80 percent TSS reduction (equivalent to approximately 54 percent TP reduction).

6. Permeable Pavement

Permeable pavement was analyzed at several locations of Village-owned or school district-owned parking lots, as shown on Figure 3.2-1.

When analyzing permeable pavement, a 5:1 traditional pavement to permeable pavement run-on ratio is allowed by WDNR Permeable Pavement Technical Standard 1008. Technical Standard 1008 allows for 100 percent TSS and TP reduction for the portion of incoming flows infiltrating into the ground beneath the pavement and 65 percent TSS and 35 percent TP removal for incoming flows flowing out of an underdrain in a permeable pavement system. Typical options for permeable pavement, as shown in Figure 3.02-1, include permeable asphalt, permeable concrete, and paver blocks.



Permeable asphalt, permeable concrete, permeable paver blocks (clockwise from top left)

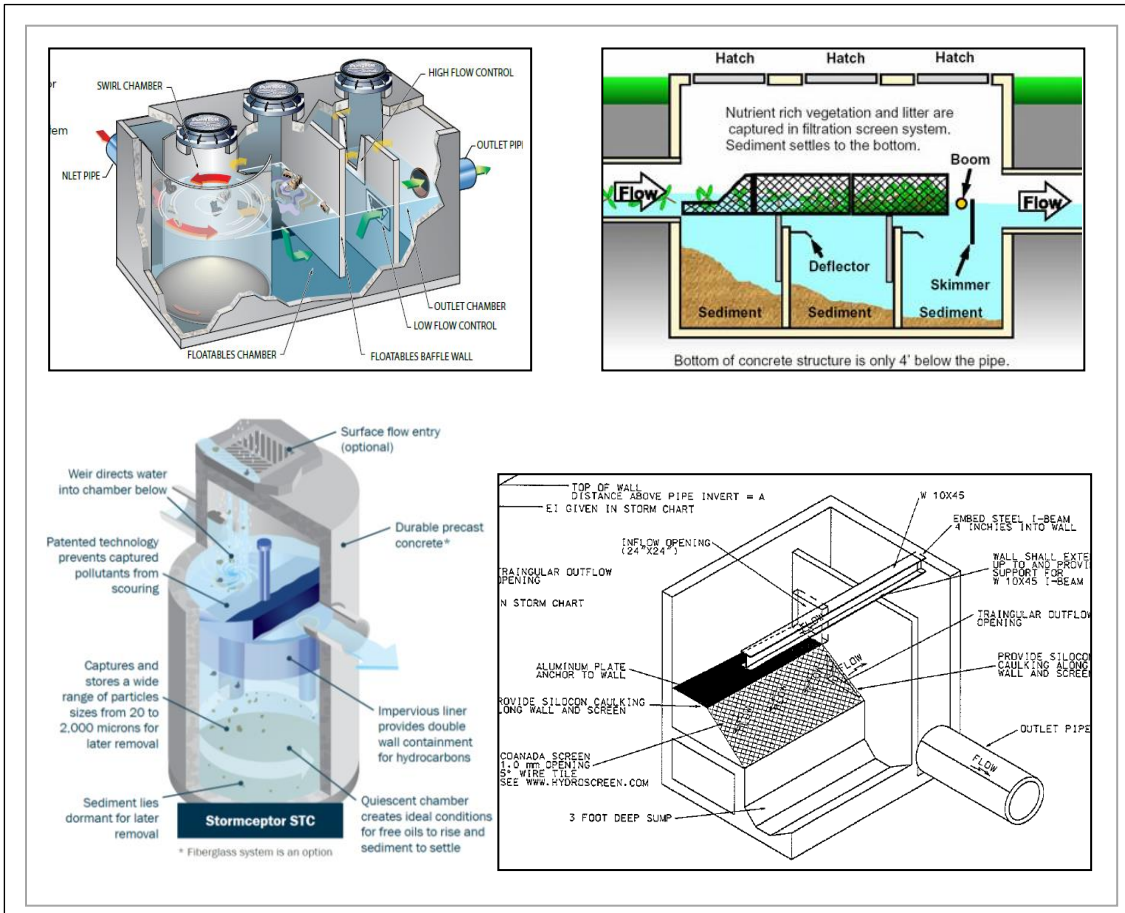
Figure 3.02-1 Permeable Pavement Options

7. Hydrodynamic Separator

Hydrodynamic separators were considered at two locations, as shown on Figure 3.02-2. Hydrodynamic separators are generally less effective than wet detention and bioretention basins, but are considered when there is little open land available to site a more traditional stormwater BMP such as a wet detention or bioretention basin. Hydrodynamic separators typically will treat only low flows (1- to 2-year storm events) while bypassing high flows around or through the unit. Appropriately-sized hydrodynamic separators generally can expect to achieve a 15 to 25 percent TSS reduction and a 12 to 20 percent TP reduction, though this performance goes down in areas already treated by street sweeping and catch basins with sumps. Hydrodynamic separators are proven to be effective in reducing urban stormwater pollutants (nutrients, TSS, TP, oil/grease, trash, and other debris) when adequately maintained. Typical maintenance would be provided via a vacuum truck two to three times per year. Hydrodynamic separators are typically less effective in TSS and TP control where there is a high density of catch basins with sumps in a watershed because the catch basins with sumps have a similar treatment mechanism as hydrodynamic separators. Catch basins,

however, do little to capture oil/grease, trash, and floatables. It is Strand's understanding through the review of record drawings that there are no catch basins with sumps. Besides the locations shown on Figure 3.02-2, hydrodynamic separators should be considered during street reconstruction projects at locations with no treatment at existing outfalls.

Typical options for hydrodynamic separators, as shown in Figure 3.02-2, include Vortechs (Contech Engineered Solutions [Contech]) units, Nutrient Separating Baffle Box (Oldcastle Infrastructure), Stormceptor (Contech), and nonproprietary Coanda screen pretreatment units. Strand recommends an alternatives analysis be completed during design to determine the most cost-effective hydrodynamic separator at a given location while considering performance, need for bypass, ease of maintenance, and cost. Costs shown in Table 4.01-1 assume construction of Nutrient Separating Baffle Boxes as manufactured by Oldcastle Infrastructure as they have an internal bypass mechanism.



Vortech, Nutrient Separating Baffle Box, Stormceptor, Coanda Screen (clockwise from top left)

Figure 3.02-2 Hydrodynamic Separator Options

8. Increased Frequency of Street Sweeping

As described previously, the Village currently performs street sweeping with a vacuum sweeper twice per month along curb and gutter streets. This frequency is considered an above-average frequency. The Village could achieve an increase of 13.2 lb TP/yr by changing to a weekly frequency as shown in Table 3.02-1.

9. TP Credit for Leaf Management Program

The WDNR released a February 17, 2022, updated guidance document titled Municipal Phosphorus Reduction Credit for Leaf Management Programs. This guidance document offers TP credit for residential land uses and up to a 25 percent TP credit if coupled with weekly high-efficiency street sweeping and meeting several other conditions. The guidance also requires that leaf collection start by October 7 for communities in Dane County. Because the two dry detention basins in the watershed are modeled to achieve greater than 25 percent reduction, the watersheds draining to those basins would not be eligible for the credit at this time. This leaves the westerly watersheds as potential candidates for this credit.

The Village completes curbside leaf collection starting in mid- to late-September through the end of November with a tow-behind vacuum unit. The Village estimates the frequency of pickup to be between once and twice per week during this period. During wet conditions, mechanical pickup of leaves is employed. This level of leaf collection is considered above-average and only improvements to the current operations would result in a benefit to water quality of the West Branch of the Sugar River. Quantification of that benefit beyond the TP credit offered by the WDNR is not currently feasible.

10. More Stringent TP Reduction Requirements for New Development

The Village's current postconstruction ordinance requires 80 and 40 percent TSS reduction for new development and redevelopment, respectively, that corresponds to an approximate 54 and 27 percent TP control. The Village could entertain an ordinance change to include a specific TP reduction requirement that is more stringent than the current ordinance.

For example, if 1 acre of commercial redevelopment occurs yearly within the watershed, the Village can achieve a reduction of 11.0 lb/year TP due to redevelopment meeting 80 percent TSS reduction by the end of a 20-year planning period.

Likewise, assuming the 40-acre parcel develops west of the Village and is required to meet an 80 percent TP reduction (rather than the current equivalent 54 percent reduction), the Village can achieve an additional reduction of 10.1 lb/year TP.

Urban Stormwater BMP	Drainage Area to BMP (acres)	Reduction in TP (lb/year)	Reduction in TP (%)	Comment
Basin 60 Dry Pond	187.4	5.5	2.8	
Basin 40 5x10 HDS	10.8	1.2	10.8	
Basin 40 6x12 HDS	10.8	1.4	12.5	
Basin 50 6x12 HDS	20.9	1.9	8.6	
Basin 50 8x16 HDS	20.9	2.9	12.9	
Basin 51 Bioretention Basin	10.6	6.3	54	
Basin 100 Bioretention Basin	10.1	5.5	54	
Basin 60 Permeable Pavement ID 1	0.3	0.3	93.4	
Basin 10 Permeable Pavement ID 2	0.7	0.7	93.5	
Basin 60 Permeable Pavement ID 3	0.5	0.6	93.5	
Basin 60 Permeable Pavement ID 4	0.1	0.1	92.8	
Basin 60 Permeable Pavement ID 5	1.4	1.3	92.8	
Basin 60 Permeable Pavement ID 6	0.3	0.3	93.4	
Weekly Street Cleaning Frequency	NA	13.2	2.3	
TP Credit for Leaf Management Program	TBD	TBD	TBD	Requires an improvement in current operations.
1-Acre of Redevelopment at 80 percent TSS and 54 percent TP Reduction	1	0.55	80	Requires an ordinance change.
40-Acre Medium Density Residential New Development at 80 percent TP Reduction Requirement	40	10.1	80	Requires an ordinance change.

Notes:
HDS=hydrodynamic separators
TBD=To Be Determined

Table 3.02-1 Potential TP Reduction for Evaluated Stormwater BMPs

B. Potential Agricultural NPS Reduction Measures

The Village has previously completed the following measures as part of the WPCF construction:

1. Restoration of the streambank along the west side of the existing WPCF.

2. Construction of the new north facility on agricultural land, essentially taking that land out of production. The areas not occupied by structures were planted into perennial vegetation. Additionally, most of the stormwater from the north facility site is directed to a bioinfiltration basin.

3. Construction of a bioretention basin on the existing WPCF site to receive most of the stormwater runoff at this location.

4. Restoration of the stream bank near the existing sewer line south of United States Highway-18 and next to Sand Rock Road to prevent the stream from encroaching onto the existing site and sewer.

Currently, the Village owns approximately 100 acres of undeveloped land in the watershed. It is likely that some of this land will be developed in the future, in which case higher levels of TSS and TP reduction should be required. In areas that will not be developed, planting of perennial grasses could be considered. Based on Snap-Plus modeling of similar land, it is likely a 0.5 to 1.0 lb/acre reduction in TP could be realized. Using the Village-owned land could be considered in the near term, as the Village already has control over this land and working with a third party would not be required.

The watershed presents opportunities for implementation of other agricultural NPS BMPs. Table 3.02-2 presents several common agricultural NPS practices that could be considered. Further discussion on proposed agricultural NPS measures currently pursued by the Village is included in Section 4.

Cropland	Livestock
Nutrient management	Relocate livestock feedlots and feeding pens
Riparian vegetative buffers	Controlling milking center wastewaters
Permanent vegetation	Relocate pasture feeding sites
Grassed waterways	Alternative (off-stream) watering system
Retention structures	Rotational grazing systems
No-Till systems	Vegetative filter strip
Sub-surface fertilizer application	
Terraces	

Source: WDNR AM Guidance, 2020.

Table 3.02-2 Agricultural BMPs

SECTION 4
WATERSHED AM PROJECT IMPLEMENTATION STRATEGY

4.01 PROPOSED MANAGEMENT MEASURES

The goal of the Watershed AM Plan is to improve the water quality of the West Branch of the Sugar River watershed, and the program is anticipated to span four 5-year permit terms. As calculated in Section 3, the WPCF must reduce at least 443 pounds of phosphorus for the first permit term. This will be accomplished through implementation of urban and agricultural BMPs. Partnerships with the LWRD and landowners will be necessary to meet these goals.

A. Proposed Urban Stormwater Measures

Urban stormwater BMPs are generally significantly more expensive than agricultural BMPs (on a price per pound of total phosphorus [$/lb TP] removed basis). Table 4.01-1 shows relative opinion of probable costs (OPC) for design and construction of urban stormwater BMPs (on a $/lb of TP removed basis) presented in Section 3. Under watershed AM, communities generally pursue more cost-effective agricultural BMPs augmented by urban stormwater BMPs that make sense for the community or are otherwise required for development. While generally more expensive, urban stormwater BMPs are typically under the control of the community rather than agricultural property owner for agricultural BMPs.

Urban Stormwater BMP	$/lb TP (20-year NPW)	Comment
Dry to Wet Detention Basin Conversion	$2,500 to $3,500	
Wet Detention Basin	$3,000 to $4,500	
Chemical Treatment of Existing Wet Detention Basins	$700 to $1,000	NA–No wet detention basins in the watershed due to thermally sensitive streams in watershed
Underground Wet Detention Basin	$4,500 to $7,000	
Bioretention Basin	$2,500 to $7,000	
Permeable Pavement	$11,000 to $20,000	
Hydrodynamic Separator	$4,000 to $10,000	
Increased Frequency of Street Sweeping	$1,000 to $2,000	Requires an improvement in current operations.
TP Credit for Leaf Management Program	TBD	Requires an improvement in current operations.
More Stringent TP reduction requirements for new development	TBD	Requires an ordinance change. Cost borne by developer, not City.

NPW=net present worth

Table 4.01-1 OPC (Including Design and Construction)

Because of the significantly higher cost of urban BMPs, it is recommended that reductions required for the first permit term be secured through nonpoint agricultural BMPs, which are likely much more cost effective. However, it is recommended that the Village consider more stringent stormwater requirements for new development and redevelopment.

B. Proposed NPS and Agricultural BMPs

Agricultural BMPs are generally more cost effective compared to urban stormwater BMPs. For purposes of this plan, it is assumed that all first permit term reductions will result from agricultural BMPs, with most of the reduction resulting from implementation of the Continuous Cover Program described in the following.

The Village currently has an agreement with the County for assistance with AM implementation. This agreement is included in Appendix I. The Village and County are actively promoting their Continuous Cover Program in the watershed, which provides a financial incentive for landowners to remove fields from production and establish continuous cover. The County offers an incentive of $150/acre for up to 15 years plus financial assistance with installation. To promote more participation, the Village is offering an additional incentive of $75/acre for a total incentive of $225/acre. Letters to landowners are being sent in late fall 2024.

Widespread soil test phosphorus data at the field level is not currently available. To estimate the total land required for field-based BMPs, a phosphorus sensitivity analysis is shown in Table 4.01-2. Based on conversations with the County, a TP reduction rate of 1 lb TP per acre to a maximum rate of 2.0 TP reduction per acre is assumed when converting row cropped fields to continuous cover. At these rates, 174 to 348 acres of agricultural land would be required in the first permit term. The required acreage to achieve a reduction of 348 pounds of TP within the first 5-year permit term is summarized in Table 4.01-2. A phosphorus mass load reduction of 695 lb is expected to be achieved over the course of 4- to 5-year permit terms, requiring 348 to 695 acres of continuous cover.

lb of TP Reduction per Acre	Required Acres for Permit First Term Reductions	Required Acres for Total Program Reductions
1.0	348	695
1.5	232	463
2.0	174	348

Table 4.01-2 TP Reduction Sensitivity Analysis

The Village currently owns approximately 26 acres of land that is currently in a corn/soybean rotation. The Village plans to convert this land to a continuous cover during the first permit term. The potential load reduction associated with this change will be modeled using SnapPlus.

These required acreages would be reduced if urban BMPs are successfully implemented, or if barnyard/feedlot-related or similar BMPs are implemented on agricultural land. A review of barnyards and feedlots was completed using aerial imagery. The presence (or lack of) was

confirmed by driving by each farm. Active barnyards and feedlots (as of fall 2023) are shown in Figure 4.01-1.

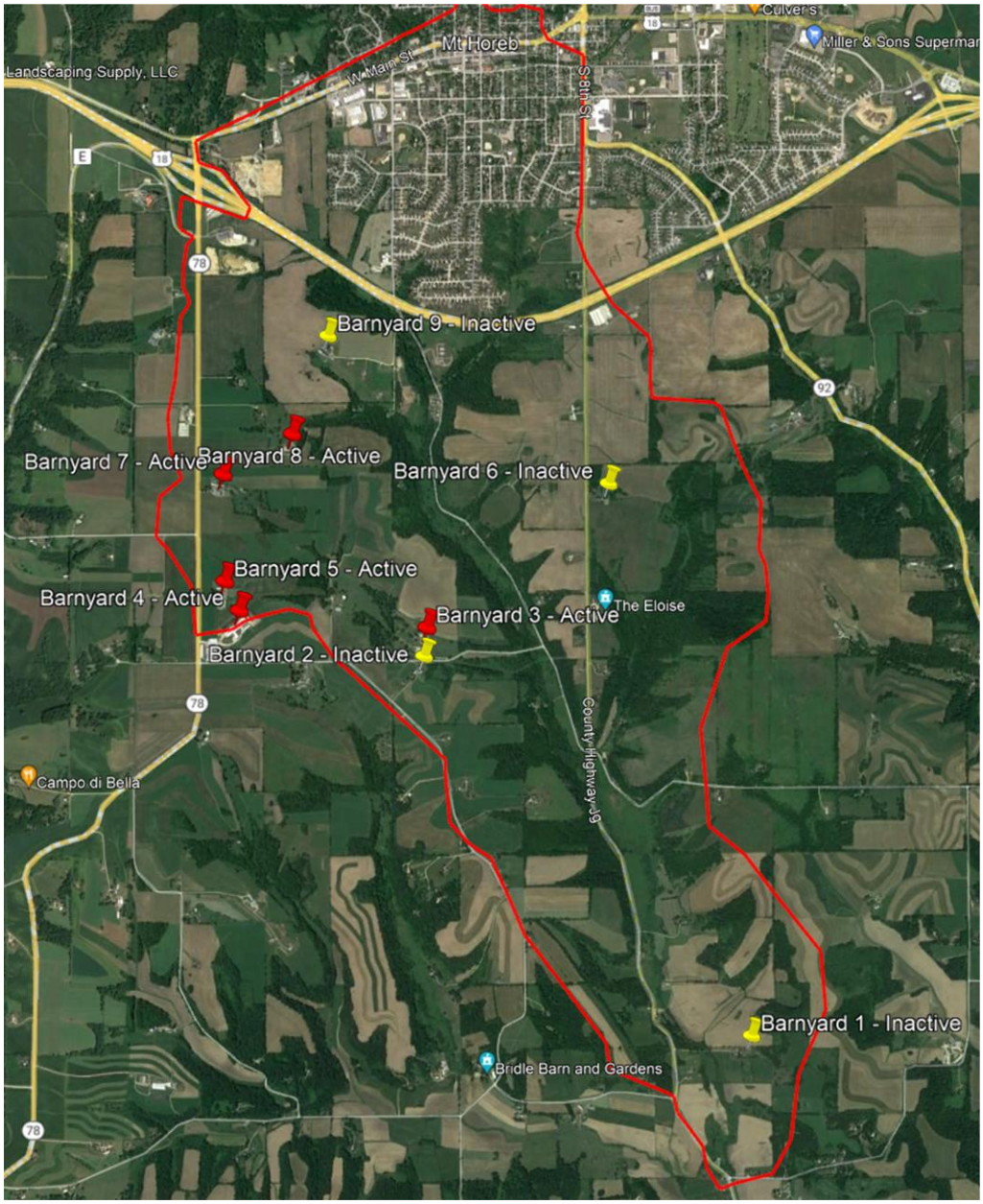


Figure 4.01-1 Active Barnyards and Feedlots

Due to the limited number of active feedlots and barnyards, the Village does not anticipate relying on BMPs associated with feedlots or barnyards for a significant portion of the required load reduction. However, the Village will consider these opportunities if they arise.

The Village does not currently have an inventory of streambank erosion. The Village will work with partners such as the County or USRWA to identify potential opportunities for load reduction through streambank restoration, but does not anticipate streambank restoration being a significant part of the load reductions in the first permit term.

4.02 OPINION OF AM PROGRAM COSTS AND FUNDING SOURCES

For purposes of this Watershed AM Plan, it is assumed that all reductions will be completed on non-Village-owned agricultural land at a cost of $100/lb TP per year. This should represent a conservative maximum cost for the program, as the required reduction on agricultural land would go down as the WPCF improves performance, as development results in improved stormwater control, and if more cost-effective agricultural BMPs are implemented. Table 4.02-1 presents projected program implementation costs.

These costs are developed based on the following assumptions and notes:

1. The total required load reduction goal will be implemented incrementally each year of the respective permit term. Because of the time necessary to develop relationships, identify BMPs, implement BMPs, and measure results, it is highly unlikely the entire load reduction goal can be accomplished in the first year of the respective permit term.

2. An extra 10 percent load reduction is assumed as a cushion.

3. Annual whole-field management practices are assumed at a cost of $100/lb TP reduced. It is assumed costs increase by $10/lb TP each permit term. These costs include Village and LWRD administrative costs.

4. Present worth is calculated on a 20-year basis at a discount rate of 2.625 percent.

5. All costs are in fourth quarter, 2022 dollars.

6. Monitoring costs consist of Village staff time and laboratory costs.

7. The annual reports column assumes a cost of $10,000 for the annual report on non-permit renewal years, a cost of $30,000 for the AM report on permit renewal years. This column also includes a cost of $30,000 for purchasing an orthophosphate analyzer in year 2028.

8. It is assumed that there will be additional cost because of increased chemical usage starting in 2029 when the WPCF needs to comply with the 0.5-mg/L interim limit. These additional costs result from increased chemical usage and increased biosolids production.

Permit Term	Year	TP lb/yr	Load Reduction[1] lb/yr	Price/lb	Annual Cost	Sludge and CPR[4]	Reports[2], OP Analyzer[3]	Monitoring	Total
1	2024	87	96	$100	$10,000	$0	$10,000	$9,600	$29,600
	2025	174	191	$100	$19,000	$0	$10,000	$9,600	$38,600
	2026	261	287	$100	$29,000	$0	$10,000	$9,600	$48,600
	2027	348	383	$100	$38,000	$0	$10,000	$9,600	$57,600
	2028	348	383	$100	$38,000	$0	$60,000	$9,600	$107,600
2	2029	391	430	$110	$47,000	$10,000	$10,000	$9,600	$76,600
	2030	435	479	$110	$53,000	$10,000	$10,000	$9,600	$82,600
	2031	478	526	$110	$58,000	$10,000	$10,000	$9,600	$87,600
	2032	522	574	$110	$63,000	$10,000	$10,000	$9,600	$92,600
	2033	565	622	$110	$68,000	$10,000	$30,000	$9,600	$117,600
3	2034	608	669	$120	$80,000	$20,000	$10,000	$9,600	$119,600
	2035	652	717	$120	$86,000	$20,000	$10,000	$9,600	$125,600
	2036	695	765	$120	$92,000	$20,000	$10,000	$9,600	$131,600
	2037	695	765	$120	$92,000	$20,000	$10,000	$9,600	$131,600
	2038	695	765	$120	$92,000	$20,000	$30,000	$9,600	$151,600
4	2039	695	765	$130	$99,000	$20,000	$10,000	$9,600	$138,600
	2040	695	765	$130	$99,000	$20,000	$10,000	$9,600	$138,600
	2041	695	765	$130	$99,000	$20,000	$10,000	$9,600	$138,600
	2042	695	765	$130	$99,000	$20,000	$10,000	$9,600	$138,600
	2043	695	765	$130	$99,000	$20,000	$10,000	$9,600	$138,600
								Present Worth	**$1,530,000**

Notes:
Present worth is calculated on a 20-year basis at discount rate shown.
[1]All costs are fourth quarter 2021 dollars.
[2]Engineering reports.
[3]Includes a new orthophosphate analyzer at year 5.
[4]Additional chemical and sludge starting in year 6 (0.5-mg/L limit at WPCF).

Table 4.02-1 Projected Program Implementation Costs

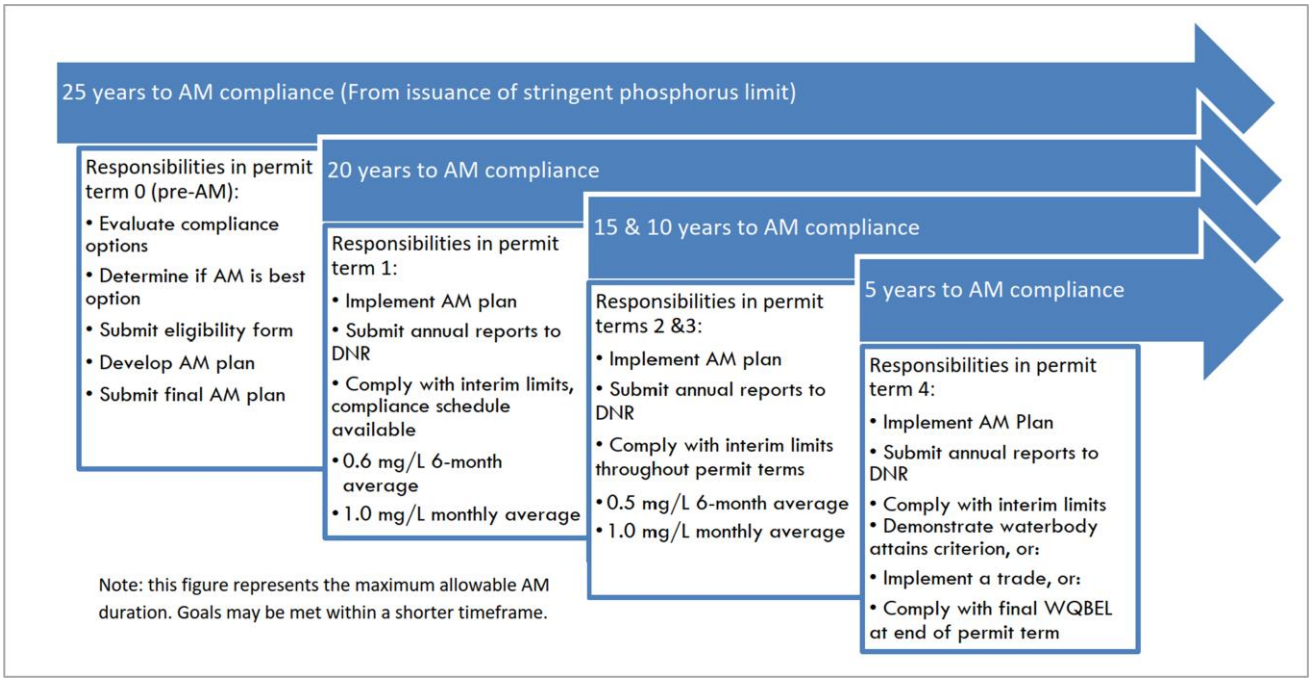
The Village's WPCF will assume primary financial responsibility for AM in the West Branch of the Sugar River watershed. Additional funding sources may help offset the total AM program costs. These funding sources include the following:

- Dane County Continuous Cover Program
- USDA-NRCS Regional Conservation Partnership Program
- USDA-NRCS Environmental Quality Incentives Program
- USDA-NRCS Conservation Stewardship Program
- Trout Unlimited
- Conservation Reserve Enhancement Program

As individual BMPs are identified, applicability of these funding sources should be reviewed. It is likely that use of these funding sources a significantly reduce AM program costs.

4.03 PROPOSED AM PROGRAM IMPLEMENTATION SCHEDULE

A general implementation schedule can be found below in Figure 4.03-1.



Source: WDNR AM Guidance, 2020.

Figure 4.03-1 Watershed AM Generalized Timeline

4.04 MEASURING PROGRAM SUCCESS

The Village will use appropriate tools to quantify potential load reductions from implemented BMPs. WDNR has published a list of tools based on best management practice. These are included in Appendix J. Considering that the Village anticipates the majority of the load reduction in the first permit term will come from implementation of the County's Continuous Cover Program, SnapPlus will be the primary tool used for quantifying load reduction and monitoring the Village's success in achieving the load reduction goal.

The Village will also continue its in stream monitoring program to monitor program success. Using the monitoring data, trends of in stream phosphorus concentrations will be developed. In addition, TP loads will be calculated using the corresponding flow rates. Both will be used to help gauge the impact of upstream improvements.

The WDNR requires the Village to submit an annual report, detailing progress made toward the Watershed AM Plan. The annual reports will serve as a form of communication between the Village

and the WDNR. In the annual reports, the Village will evaluate collected monitoring data and describe implemented BMPs and their progress on improving water quality in the action area. The annual reports are important as they can inform permit modifications. These modifications may include changes to the amount of phosphorus being offset in the current permit term, adjustment to the action area size, and modifications to monitoring requirements.

4.05 NEXT STEPS

Implementation of the following next steps are recommended by the Village. Implementation of these items should begin in the next year and will be continuous throughout the AM program.

1. Execute service agreement with Dane County LWRD. Begin working with Dane County LWRD to identify desired BMPs.

2. Budget for anticipated annual AM program costs.

3. Begin reaching out to landowners to identify opportunities for implementation of cost-effective BMPs.

4. Consider implementation of BMPs on Village-owned agricultural land.

5. Consider ordinance changes to require higher levels of stormwater treatment for new development and redevelopment.

6. Continue monitoring phosphorus concentrations and loads within the receiving stream.

7. Continue optimization of phosphorus removal at the WPCF.

APPENDIX A
WPDES PERMIT

WISCONSIN
DEPT. OF NATURAL RESOURCES

WPDES PERMIT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

PERMIT TO DISCHARGE UNDER THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM

VILLAGE OF MOUNT HOREB

is permitted, under the authority of Chapter 283, Wisconsin Statutes, to discharge from a facility located at
2447 SAND ROCK ROAD, MOUNT HOREB, WISCONSIN

NE ¼ of NE ¼ of Section 23, T6N, R6E
to
WEST BRANCH SUGAR RIVER (WEST BRANCH SUGAR RIVER/MOUNT VERNON CREEK WATERSHED, SP16 – SUGAR-PECATONICA RIVER BASIN) IN DANE COUNTY

Outfall – Lat: 42.98743° N / Lon: 89.74286° W

in accordance with the effluent limitations, monitoring requirements and other conditions set forth in this permit.

The permittee shall not discharge after the date of expiration. If the permittee wishes to continue to discharge after this expiration date an application shall be filed for reissuance of this permit, according to Chapter NR 200, Wis. Adm. Code, at least 180 days prior to the expiration date given below.

State of Wisconsin Department of Natural Resources
For the Secretary

By _____
Tim Ryan
Wastewater Field Supervisor

12/10/2018
Date Permit Signed/Issued

PERMIT TERM: EFFECTIVE DATE - January 01, 2019 **EXPIRATION DATE - December 31, 2023**

TABLE OF CONTENTS

1 Influent Requirements

1.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
701	Representative influent samples shall be collected after the mechanical bar screen.

1.2 Monitoring Requirements

The permittee shall comply with the following monitoring requirements.

1.2.1 Sampling Point 701 - INFLUENT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Continuous	Continuous	
BOD_5, Total		mg/L	3/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	3/Week	24-Hr Flow Prop Comp	

2 Surface Water Requirements

2.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
001	Representative effluent samples shall be collected from the bottom of the cascade aerator, prior to discharge to the West Branch of the Sugar River.

2.2 Monitoring Requirements and Effluent Limitations

The permittee shall comply with the following monitoring requirements and limitations.

2.2.1 Sampling Point (Outfall) 001 - EFFLUENT

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD_5, Total	Monthly Avg	22 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect October through April.
BOD_5, Total	Monthly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect May through September.
BOD_5, Total	Weekly Avg	22 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect October through April.
BOD_5, Total	Weekly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect May through September.
Suspended Solids, Total	Monthly Avg	22 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect October through April.
Suspended Solids, Total	Monthly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect May through September.
Suspended Solids, Total	Weekly Avg	22 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect October through April.
Suspended Solids, Total	Weekly Avg	15 mg/L	3/Week	24-Hr Flow Prop Comp	Limit in effect May through September.
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	1.0 mg/L	2/Week	24-Hr Flow Prop Comp	Limit in effect May through September.
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	4.0 mg/L	2/Week	24-Hr Flow Prop Comp	Limit in effect October through April.
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	1.0 mg/L	2/Week	24-Hr Flow Prop Comp	Limit in effect May through September.
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	4.0 mg/L	2/Week	24-Hr Flow Prop Comp	Limit in effect October through April.
Fecal Coliform	Geometric Mean - Wkly	656 #/100 ml	Weekly	Grab	Limit in effect May through September.

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Fecal Coliform	Geometric Mean - Monthly	400 #/100 ml	Weekly	Grab	Limit in effect May through September.
Dissolved Oxygen	Daily Min	6.0 mg/L	3/Week	Grab	
pH Field	Daily Max	9.0 su	3/Week	Grab	
pH Field	Daily Min	6.0 su	3/Week	Grab	
Phosphorus, Total	Monthly Avg	1.0 mg/L	3/Week	24-Hr Flow Prop Comp	This is an interim limit. The final water quality based effluent limits are 0.225 mg/L as a monthly avg. & 0.075 mg/L (0.49 lbs/day) as a 6-month avg. See subsections 2.2.1.2 through 2.2.1.4 for compliance options and 4.1 for the compliance schedule.
Phosphorus, Total		lbs/day	3/Week	Calculated	Calculate the daily mass discharge of phosphorus in lbs/day on the same days phosphorus sampling occurs. Mass discharge (lbs/day) = daily concentration (mg/L) x daily flow (MGD) x 8.34.
Chloride	Weekly Avg	625 mg/L	4/Month	24-Hr Flow Prop Comp	This is an interim limit. Sampling shall be done on four consecutive days one week each month See subsections 2.2.1.5 for chloride source reduction measures, 2.2.1.6 for 4/Month sampling and 4.2 for the Chloride Target Value compliance schedule.
Chloride		lbs/day	4/Month	Calculated	Calculate the daily mass discharge of chloride in lbs/day on the same days chloride sampling occurs. Mass discharge (lbs/day) = daily concentration (mg/L) x daily flow (MGD) x 8.34.
Chronic WET		TUc	See Listed Qtr(s)	24-Hr Flow Prop Comp	See subsection 2.2.1.7 for Whole Effluent Toxicity (WET) testing dates and WET requirements.

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Temperature Maximum		deg F	3/Week	Continuous	Monitoring Only - January 1, 2021 through December 31, 2022. See subsection 2.2.1.8 for temperature monitoring requirements.

2.2.1.1 Annual Average Design Flow

The annual average design flow of the permittee's wastewater treatment facility is 0.609 MGD. (Note: The permittee is in the process of a major plant upgrade that is scheduled to be completed during the first year of the permit term. The design flow will increase to 0.79 MGD. The limitations in this permit will not change based on the new design flow.).

2.2.1.2 Phosphorus Water Quality Based Effluent Limitation(s)

The final water quality based effluent limit for phosphorus are **0.225 mg/L as a monthly average and 0.075 mg/L (0.49 lbs/day) as a 6-month average** and will take effect per the Phosphorus Compliance Schedule unless:

(A) As part of the application for the next reissuance, or prior to filing the application, the permittee submits either: 1.) a watershed adaptive management plan and a completed Watershed Adaptive Management Request Form 3200-139; or 2.) an application for water quality trading; or 3.) an application for a variance; or 4.) new information or additional data that supports a recalculation of the numeric limitation; and

(B) The Department modifies, revokes and reissues, or reissues the permit to incorporate a revised limitation before the expiration of the compliance schedule*.

Note: The permittee may also submit an application for a variance within 60 days of this permit reissuance, as noted in the permit cover letter, in accordance with s. 283.15, Stats.

If Adaptive Management or Water Quality Trading is approved as part of the permit application for the next reissuance or as part of an application for a modification or revocation and reissuance, the plan and specifications submittal, construction, and final effective dates for compliance with the total phosphorus WQBEL may change in the reissued or modified permit. In addition, the numeric value of the water quality based effluent limit may change based on new information (e.g. a TMDL) or additional data. If a variance is approved for the next reissuance, interim limits and conditions will be imposed in the reissued permit in accordance with s. 283.15, Stats., and applicable regulations. A permittee may apply for a variance to the phosphorus WQBEL at the next reissuance even if the permittee did not apply for a phosphorus variance as part of this permit reissuance.

Additional Requirements: If a water quality based effluent limit has taken effect in a permit, any increase in the limit is subject to s. NR 102.05(1) and ch. NR 207, Wis. Adm. Code. When a six-month average effluent limit is specified for Total Phosphorus the applicable averaging periods are May through October and November through April.

*Note: The Department will prioritize reissuances and revocations, modifications, and reissuances of permits to allow permittees the opportunity to implement adaptive management or nutrient trading in a timely and effective manner.

2.2.1.3 Alternative Approaches to Phosphorus WQBEL Compliance

Rather than upgrading its wastewater treatment facility to comply with WQBELs for total phosphorus, the permittee may use Water Quality Trading or the Watershed Adaptive Management Option, to achieve compliance under ch. NR 217, Wis. Adm. Code, provided that the permit is modified, revoked and reissued, or reissued to incorporate any such alternative approach. The permittee may also implement an upgrade to its wastewater treatment facility in combination with Water Quality Trading or the Watershed Adaptive Management Option to achieve compliance,

provided that the permit is modified, revoked and reissued, or reissued to incorporate any such alternative approach. If the Final Compliance Alternatives Plan concludes that a variance will be pursued, the Plan shall provide information regarding the basis for the variance.

2.2.1.4 Submittal of Permit Application for Next Reissuance and Adaptive Management or Pollutant Trading Plan or Variance Application

The permittee shall submit the permit application for the next reissuance at least 6 months prior to expiration of this permit. If the permittee intends to pursue adaptive management to achieve compliance with the phosphorus water quality based effluent limitation, the permittee shall submit with the application for the next reissuance: a completed Watershed Adaptive Management Request Form 3200-139, the completed Adaptive Management Plan and final plans for any system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code. If the permittee intends to pursue pollutant trading to achieve compliance, the permittee shall submit an application for water quality trading with the application for the next reissuance. If system upgrades will be used in combination with pollutant trading to achieve compliance with the final water quality-based limit, the reissued permit will specify a schedule for the necessary upgrades. If the permittee intends to seek a variance, the permittee shall submit an application for a variance with the application for the next reissuance.

2.2.1.5 Chloride Variance – Implement Source Reduction Measures

This permit contains a variance to the water quality-based effluent limit (WQBEL) for chloride granted in accordance with s. NR 106.83(2), Wis. Adm. Code. As conditions of this variance the permittee shall (a) maintain effluent quality at or below the interim effluent limitation specified in the table above, (b) implement the chloride source reduction measures specified below, (c) follow the approved "Chloride Source Reduction Measures Plan" dated January 9, 2017 and (d) perform the actions listed in the compliance schedule. (See the Schedules of Compliance section herein.):

- Monitor for chloride effluent concentrations four consecutive days one week per month.
- Maintain chloride effluent levels below an interim limit of 625 mg/L as a weekly average.
- Work with commercial, municipal and institutional sources to prevent increases in the amount of chloride discharged, and seek reductions from those sources.
- Reduce the use of ferrous chloride at the WPCF by implementing biological phosphorus removal.
- Develop and implement management practices to reduce the discharge of chloride to the sanitary sewer system at municipal and county facilities housing vehicles used for snow plowing and road de-icing/anti-icing.
- Investigate streets and other areas that require high salt use in winter whereby salt is entering the collection system and implement reduction measures.
- Minimize chloride loading to the sanitary sewer collection system from infiltration and inflow (I/I).
- Educate softener owners of the impact of chloride on water quality; provide information about increasing softener efficiency and reducing the use of softened water.
- Investigate the feasibility of implementing a water softener tune up program and a water softener upgrade program from timed to demand. This information will be used for possible implementation of a program during the current reissuance.
- Adopt and implement an ordinance that requires the use of demand-initiated regeneration and a high salt efficiency standard for new and replacement softeners.

2.2.1.6 Chloride 4/Month Sampling Frequency

A sample frequency of 4/Month requires that samples be collected on four consecutive days one week each month. Any four consecutive days of sampling shall be exclusive to one week of a month; where Week 1 is days 1-7, Week 2 is days 8-14, Week 3 is days 15-21, and Week 4 is days 22-28. Any monitoring performed on days 29, 30, or 31 (the

stub week) will not be included in any weekly average. Notwithstanding this requirement, when four consecutive days of chloride sampling per week would result in the need to monitor chloride on weekends, sampling may occur over a two-week period. This should not be construed as allowing chloride sampling to occur over a two-week period when sampling could occur over four consecutive days per week (as defined above) that would not result in the need for sampling on weekends. Note that only the daily concentration result and calculated daily mass discharge needs to be reported on the electronic discharge monitoring report (eDMR); the eDMR will automatically calculate the weekly average and compare to the weekly average limit to determine compliance.

2.2.1.7 Whole Effluent Toxicity (WET) Testing

Primary Control Water: West Branch Sugar River

Instream Waste Concentration (IWC): 52.8%

Dilution series: At least five effluent concentrations and dual controls must be included in each test.

- **Chronic:** 100, 75, 50, 25, 12.5% and any additional selected by the permittee.

WET Testing Frequency:

Acute tests are not required.

Chronic tests shall be conducted once every other year in rotating quarters in order to collect seasonal information about the discharge. Tests are required during the following quarters.

- **Chronic:** *April 1–June 30, 2019; July 1–September 30, 2021; and January 1–March 31, 2023 (three tests total)*

Chronic WET testing shall continue after the permit expiration date (until the permit is reissued) in accordance with the WET requirements specified for the last full calendar year of this permit. For example, the next test would be required in January 1–March 31, 2025.

Testing: WET testing shall be performed during normal operating conditions. Permittees are not allowed to turn off or otherwise modify treatment systems, production processes, or change other operating or treatment conditions during WET tests.

Reporting: The permittee shall report test results on the Discharge Monitoring Report form, and also complete the "Whole Effluent Toxicity Test Report Form" (Section 6, "*State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, 2nd Edition*"), for each test. The original, complete, signed version of the Whole Effluent Toxicity Test Report Form shall be sent to the Biomonitoring Coordinator, Bureau of Water Quality, 101 S. Webster St., P.O. Box 7921, Madison, WI 53707-7921, within 45 days of test completion. The Discharge Monitoring Report (DMR) form shall be submitted electronically by the required deadline.

Determination of Positive Results: A chronic toxicity test shall be considered positive if the Toxic Unit - Chronic (TU_c) is greater than 1.9 for either species. The TU_c shall be calculated as follows: $TU_c = 100 \div IC_{25}$.

Additional Testing Requirements: Within 90 days of a test which showed positive results, the permittee shall submit the results of at least 2 retests to the Biomonitoring Coordinator on "Whole Effluent Toxicity Test Report Forms". The 90 day reporting period shall begin the day after the test which showed a positive result. The retests shall be completed using the same species and test methods specified for the original test (see the Standard Requirements section herein).

Chloride and WET Testing: This permit includes whole effluent toxicity (WET) testing. Since WET test failures are sometimes associated with elevated chloride levels, the permittee shall coordinate chloride monitoring with required WET testing.

2.2.1.8 Effluent Temperature Monitoring

For manually measuring effluent temperature, grab samples should be collected at 6 evenly spaced intervals during the 24-hour period. Alternative sampling intervals may be approved if the permittee can show that the maximum effluent temperature is captured during the sampling interval. For monitoring temperature continuously, collect measurements in accordance with s. NR 218.04(13). This means that discrete measurements shall be recorded at intervals of not more than 15 minutes during the 24-hour period. In either case, report the maximum temperature measured during the day on the DMR.

3 Land Application Requirements

3.1 Sampling Point(s)

The discharge(s) shall be limited to land application of the waste type(s) designated for the listed sampling point(s) on Department approved land spreading sites or by hauling to another facility.

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
004	Aerobically digested, Thickened, Liquid, Class B; Representative sludge samples shall be collected from the sludge storage tank.

3.2 Monitoring Requirements and Limitations

The permittee shall comply with the following monitoring requirements and limitations.

3.2.1 Sampling Point (Outfall) 004 - SLUDGE

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Jan 1, 2020 - Dec 31, 2020
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Jan 1, 2020 - Dec 31, 2020
Solids, Total		Percent	Annual	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Annual	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Annual	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Annual	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Annual	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Annual	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Annual	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Annual	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Annual	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Annual	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Annual	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Annual	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Annual	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Annual	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Annual	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Annual	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Annual	Composite	
Nitrogen, Total Kjeldahl		Percent	Annual	Composite	
Nitrogen, Ammonium (NH_4-N) Total		Percent	Annual	Composite	
Phosphorus, Total		Percent	Annual	Composite	

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Phosphorus, Water Extractable		% of Tot P	Annual	Composite	
Potassium, Total Recoverable		Percent	Annual	Composite	

Other Sludge Requirements	
Sludge Requirements	**Sample Frequency**
List 3 Requirements – Pathogen Control: The requirements in List 3 shall be met prior to land application of sludge.	**Annual**
List 4 Requirements – Vector Attraction Reduction: The vector attraction reduction shall be satisfied prior to, or at the time of land application as specified in List 4.	**Annual**

3.2.1.1 Changes in Feed Sludge Characteristics

If a change in feed sludge characteristics, treatment process, or operational procedures occurs which may result in a significant shift in sludge characteristics, the permittee shall reanalyze the sludge for List 1, 2, 3 and 4 parameters each time such change occurs.

3.2.1.2 Sludge Which Exceeds the High Quality Limit

Cumulative pollutant loading records shall be kept for all bulk land application of sludge which does not meet the high quality limit for any parameter. This requirement applies for the entire calendar year in which any exceedance of Table 3 of s. NR 204.07(5)(c), is experienced. Such loading records shall be kept for all List 1 parameters for each site land applied in that calendar year. The formula to be used for calculating cumulative loading is as follows:

[(Pollutant concentration (mg/kg) x dry tons applied/ac) ÷ 500] + previous loading (lbs/acre) = cumulative lbs pollutant per acre

When a site reaches 90% of the allowable cumulative loading for any metal established in Table 2 of s. NR 204.07(5)(b), the Department shall be so notified through letter or in the comment section of the annual land application report (3400-55).

3.2.1.3 Sludge Analysis for PCBs

The permittee shall analyze the sludge for Total PCBs one time during **2020**. The results shall be reported as "PCB Total Dry Wt". Either congener-specific analysis or Aroclor analysis shall be used to determine the PCB concentration. The permittee may determine whether Aroclor or congener specific analysis is performed. Analyses shall be performed in accordance with Table EM in s. NR 219.04, Wis. Adm. Code and the conditions specified in Standard Requirements of this permit. PCB results shall be submitted by January 31, following the specified year of analysis.

3.2.1.4 Lists 1, 2, 3, and 4

List 1 TOTAL SOLIDS AND METALS See the Monitoring Requirements and Limitations table above for monitoring frequency and limitations for the List 1 parameters
Solids, Total (percent)
Arsenic, mg/kg (dry weight)
Cadmium, mg/kg (dry weight)
Copper, mg/kg (dry weight)
Lead, mg/kg (dry weight)
Mercury, mg/kg (dry weight)
Molybdenum, mg/kg (dry weight)
Nickel, mg/kg (dry weight)
Selenium, mg/kg (dry weight)
Zinc, mg/kg (dry weight)

List 2 NUTRIENTS See the Monitoring Requirements and Limitations table above for monitoring frequency for the List 2 parameters
Solids, Total (percent)
Nitrogen Total Kjeldahl (percent)
Nitrogen Ammonium (NH4-N) Total (percent)
Phosphorus Total as P (percent)
Phosphorus, Water Extractable (as percent of Total P)
Potassium Total Recoverable (percent)

List 3
PATHOGEN CONTROL FOR CLASS B SLUDGE

The permittee shall implement pathogen control as listed in List 3. The Department shall be notified of the pathogen control utilized and shall be notified when the permittee decides to utilize alternative pathogen control.

The following requirements shall be met prior to land application of sludge.

Parameter	Unit	Limit
Fecal Coliform*	MPN/gTS or CFU/gTS	2,000,000
OR, ONE OF THE FOLLOWING PROCESS OPTIONS		
Aerobic Digestion	Air Drying	
Anaerobic Digestion	Composting	
Alkaline Stabilization	PSRP Equivalent Process	

* The Fecal Coliform limit shall be reported as the geometric mean of 7 discrete samples on a dry weight basis.

List 4
VECTOR ATTRACTION REDUCTION

The permittee shall implement any one of the vector attraction reduction options specified in List 4. The Department shall be notified of the option utilized and shall be notified when the permittee decides to utilize an alternative option.

One of the following shall be satisfied prior to, or at the time of land application as specified in List 4.

Option	Limit	Where/When it Shall be Met
Volatile Solids Reduction	≥38%	Across the process
Specific Oxygen Uptake Rate	≤1.5 mg O_2/hr/g TS	On aerobic stabilized sludge
Anaerobic bench-scale test	<17 % VS reduction	On anaerobic digested sludge
Aerobic bench-scale test	<15 % VS reduction	On aerobic digested sludge
Aerobic Process	>14 days, Temp >40°C and Avg. Temp > 45°C	On composted sludge
pH adjustment	>12 S.U. (for 2 hours) and >11.5 (for an additional 22 hours)	During the process
Drying without primary solids	>75 % TS	When applied or bagged
Drying with primary solids	>90 % TS	When applied or bagged
Equivalent Process	Approved by the Department	Varies with process
Injection	-	When applied
Incorporation	-	Within 6 hours of application

3.2.1.5 Daily Land Application Log

Daily Land Application Log

Discharge Monitoring Requirements and Limitations

The permittee shall maintain a daily land application log for biosolids land applied each day when land application occurs. The following minimum records must be kept, in addition to all analytical results for the biosolids land applied. The log book records shall form the basis for the annual land application report requirements.

Parameters	Units	Sample Frequency
DNR Site Number(s)	Number	Daily as used
Outfall number applied	Number	Daily as used
Acres applied	Acres	Daily as used
Amount applied	As appropriate * /day	Daily as used
Application rate per acre	unit */acre	Daily as used
Nitrogen applied per acre	lb/acre	Daily as used
Method of Application	Injection, Incorporation, or surface applied	Daily as used

*gallons, cubic yards, dry US Tons or dry Metric Tons

4 Schedules

4.1 Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus

The permittee shall comply with the WQBELs for Phosphorus as specified. No later than 14 days following each compliance date, the permittee shall notify the Department in writing of its compliance or noncompliance. If a submittal is required, a timely submittal fulfills the notification requirement.

Required Action	Due Date
Operational Evaluation Report: The permittee shall prepare and submit to the Department for approval an operational evaluation report. The report shall include an evaluation of collected effluent data, possible source reduction measures, operational improvements or other minor facility modifications that will optimize reductions in phosphorus discharges from the treatment plant during the period prior to complying with final phosphorus WQBELs and, where possible, enable compliance with final phosphorus WQBELs by December 31, 2020. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than December 31, 2020 and state whether the measures, improvements, and modifications will enable compliance with final phosphorus WQBELs. Regardless of whether they are expected to result in compliance, the permittee shall implement the measures, improvements, and modifications in accordance with the plan and schedule specified in the operational evaluation report. If the operational evaluation report concludes that the facility can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the permittee shall comply with the final phosphorus WQBEL by December 31, 2020 and is not required to comply with the milestones identified below for years 3 through 9 of this compliance schedule ('Preliminary Compliance Alternatives Plan', 'Final Compliance Alternatives Plan', 'Final Plans and Specifications', 'Treatment Plant Upgrade to Meet WQBELs', 'Complete Construction', 'Achieve Compliance'). STUDY OF FEASIBLE ALTERNATIVES - If the Operational Evaluation Report concludes that the permittee cannot achieve final phosphorus WQBELs with source reduction measures, operational improvements and other minor facility modifications, the permittee shall initiate a study of feasible alternatives for meeting final phosphorus WQBELs and comply with the remaining required actions of this schedule of compliance. If the Department disagrees with the conclusion of the report, and determines that the permittee can achieve final phosphorus WQBELs using the existing treatment system with only source reduction measures, operational improvements, and minor facility modifications, the Department may reopen and modify the permit to include an implementation schedule for achieving the final phosphorus WQBELs sooner than December 31, 2025.	12/31/2019
Compliance Alternatives, Source Reduction, Improvements and Modifications Status: The permittee shall submit a 'Compliance Alternatives, Source Reduction, Operational Improvements and Minor Facility Modification' status report to the Department. The report shall provide an update on the permittee's: (1) progress implementing source reduction measures, operational improvements, and minor facility modifications to optimize reductions in phosphorus discharges and, to the extent that such measures, improvements, and modifications will not enable compliance with the WQBELs, (2) status evaluating feasible alternatives for meeting phosphorus WQBELs.	12/31/2020
Preliminary Compliance Alternatives Plan: The permittee shall submit a preliminary compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment facility is necessary to achieve final phosphorus WQBELs, the submittal shall include a preliminary engineering design	12/31/2021

report. If the plan concludes Adaptive Management will be used, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 without the Adaptive Management Plan. If water quality trading will be undertaken, the plan must state that trading will be pursued.	
Final Compliance Alternatives Plan: The permittee shall submit a final compliance alternatives plan to the Department. If the plan concludes upgrading of the permittee's wastewater treatment is necessary to meet final phosphorus WQBELs, the submittal shall include a final engineering design report addressing the treatment plant upgrades, and a facility plan if required pursuant to ch. NR 110, Wis. Adm. Code. If the plan concludes Adaptive Management will be implemented, the submittal shall include a completed Watershed Adaptive Management Request Form 3200-139 and an engineering report addressing any treatment system upgrades necessary to meet interim limits pursuant to s. NR 217.18, Wis. Adm. Code. If the plan concludes water quality trading will be used, the submittal shall identify potential trading partners. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2022
Progress Report on Plans & Specifications: Submit progress report regarding the progress of preparing final plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2023
Final Plans and Specifications: Unless the permit has been modified, revoked and reissued, or reissued to include Adaptive Management or Water Quality Trading measures or to include a revised schedule based on factors in s. NR 217.17, Wis. Adm. Code, the permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with final phosphorus WQBELs, and a schedule for completing construction of the upgrades by the complete construction date specified below. (Note: Permit modification, revocation and reissuance, and reissuance are subject to s. 283.53(2), Stats.) Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2024
Treatment Plant Upgrade to Meet WQBELs: The permittee shall initiate construction of the upgrades. The permittee shall obtain approval of the final construction plans and schedule from the Department pursuant to s. 281.41. Stats. Upon approval of the final construction plans and schedule by the Department pursuant to s. 281.41, Stats., the permittee shall construct the treatment plant upgrades in accordance with the approved plans and specifications. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2025
Construction Upgrade Progress Report #1: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2026
Construction Upgrade Progress Report #2: The permittee shall submit a progress report on construction upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	03/31/2027
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface	11/30/2027

Water section of this permit.	
Achieve Compliance: The permittee shall achieve compliance with final phosphorus WQBELs. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	12/31/2027

4.2 Chloride Target Value

As a condition of the variance to the water quality based effluent limitation(s) for chloride granted in accordance with s. NR 106.83(2), Wis. Adm. Code, the permittee shall perform the following actions.

Required Action	Due Date
Annual Chloride Progress Report: Submit an annual chloride progress report. The annual chloride progress report shall: Indicate which chloride source reduction measures or activities in the approved Source Reduction Plan have been implemented; Include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data; and Include an analysis of how influent and effluent chloride varies with time and with significant loadings of chloride such as loads from industries or road salt intrusion into the collection system. Note that the interim limitation of 625 mg/L remains enforceable until new enforceable limits are established in the next permit issuance. The first annual chloride progress report is to be submitted by the Date Due.	01/31/2020
Annual Chloride Progress Report #2: Submit the chloride progress report as defined above.	01/31/2021
Annual Chloride Progress Report #3: Submit the chloride progress report as defined above.	01/31/2022
Annual Chloride Progress Report #4: Submit the chloride progress report as defined above.	01/31/2023
Final Chloride Report: Submit the final chloride report documenting the success in meeting the chloride target value of 563 mg/L, as well as the anticipated future reduction in chloride sources and chloride effluent concentrations. The report shall summarize chloride source reduction measures that have been implemented during the current permit term and state which, if any, source reduction measures from the approved Source Reduction Plan were not pursued and why. The report shall include an analysis of trends in weekly, monthly and annual average chloride concentrations and total mass discharge of chloride based on chloride sampling and flow data covering the current permit term. The report shall also include an analysis of how influent and effluent chloride varies with time and with significant loadings of chloride such as loads from industries or road salt intrusion into the collection system. Additionally the report shall include proposed target values and source reduction measures for negotiations with the department if the permittee intends to seek a renewed chloride variance per s. NR 106.83, Wis. Adm. Code, for the reissued permit. Note that the target value is the benchmark for evaluating the effectiveness of the chloride source reduction measures, but is not an enforceable limitation under the terms of this permit.	06/30/2023
Annual Chloride Reports After Permit Expiration: In the event that this permit is not reissued on time, the permittee shall continue to submit annual chloride reports each year covering source reduction measures implemented and chloride concentration and mass discharge trends.	

4.3 Plant Upgrade Progress Reports and Department Notification

Required Action	Due Date
Progress Report #1: Submit a progress report on the treatment plant upgrade.	12/31/2019
Progress Report #2: Submit a progress report on the treatment plant upgrade. If the plant upgrade has already been completed by the date due, the permittee shall notify the Department prior to putting the upgraded plant on-line.	06/30/2020
Notify the Department of Treatment Facility Upgrade Completion: Prior to putting the upgraded plant on-line the permittee shall notify the Department.	

5 Standard Requirements

NR 205, Wisconsin Administrative Code: The conditions in ss. NR 205.07(1) and NR 205.07(2), Wis. Adm. Code, are included by reference in this permit. The permittee shall comply with all of these requirements. Some of these requirements are outlined in the Standard Requirements section of this permit. Requirements not specifically outlined in the Standard Requirement section of this permit can be found in ss. NR 205.07(1) and NR 205.07(2).

5.1 Reporting and Monitoring Requirements

5.1.1 Monitoring Results

Monitoring results obtained during the previous month shall be summarized and reported on a Department Wastewater Discharge Monitoring Report. The report may require reporting of any or all of the information specified below under 'Recording of Results'. This report is to be returned to the Department no later than the date indicated on the form. A copy of the Wastewater Discharge Monitoring Report Form or an electronic file of the report shall be retained by the permittee.

Monitoring results shall be reported on an electronic discharge monitoring report (eDMR). The eDMR shall be certified electronically by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

If the permittee monitors any pollutant more frequently than required by this permit, the results of such monitoring shall be included on the Wastewater Discharge Monitoring Report.

The permittee shall comply with all limits for each parameter regardless of monitoring frequency. For example, monthly, weekly, and/or daily limits shall be met even with monthly monitoring. The permittee may monitor more frequently than required for any parameter.

5.1.2 Sampling and Testing Procedures

Sampling and laboratory testing procedures shall be performed in accordance with Chapters NR 218 and NR 219, Wis. Adm. Code and shall be performed by a laboratory certified or registered in accordance with the requirements of ch. NR 149, Wis. Adm. Code. Groundwater sample collection and analysis shall be performed in accordance with ch. NR 140, Wis. Adm. Code. The analytical methodologies used shall enable the laboratory to quantitate all substances for which monitoring is required at levels below the effluent limitation. If the required level cannot be met by any of the methods available in NR 219, Wis. Adm. Code, then the method with the lowest limit of detection shall be selected. Additional test procedures may be specified in this permit.

5.1.3 Recording of Results

The permittee shall maintain records which provide the following information for each effluent measurement or sample taken:

- the date, exact place, method and time of sampling or measurements;
- the individual who performed the sampling or measurements;
- the date the analysis was performed;
- the individual who performed the analysis;
- the analytical techniques or methods used; and
- the results of the analysis.

5.1.4 Reporting of Monitoring Results

The permittee shall use the following conventions when reporting effluent monitoring results:

- Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 0.1 mg/L, report the pollutant concentration as < 0.1 mg/L.

- Pollutant concentrations equal to or greater than the limit of detection, but less than the limit of quantitation, shall be reported and the limit of quantitation shall be specified.

- For purposes of calculating NR 101 fees, the 2 mg/l lower reporting limits for BOD_5 and Total Suspended Solids shall be considered to be limits of quantitation

- For the purposes of reporting a calculated result, average or a mass discharge value, the permittee may substitute a 0 (zero) for any pollutant concentration that is less than the limit of detection. However, if the effluent limitation is less than the limit of detection, the department may substitute a value other than zero for results less than the limit of detection, after considering the number of monitoring results that are greater than the limit of detection and if warranted when applying appropriate statistical techniques.

5.1.5 Compliance Maintenance Annual Reports

Compliance Maintenance Annual Reports (CMAR) shall be completed using information obtained over each calendar year regarding the wastewater conveyance and treatment system. The CMAR shall be submitted and certified by the permittee in accordance with ch. NR 208, Wis. Adm. Code, by June 30, each year on an electronic report form provided by the Department.

In the case of a publicly owned treatment works, a resolution shall be passed by the governing body and submitted as part of the CMAR, verifying its review of the report and providing responses as required. Private owners of wastewater treatment works are not required to pass a resolution; but they must provide an Owner Statement and responses as required, as part of the CMAR submittal.

The CMAR shall be certified electronically by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The certification verifies that the electronic report is true, accurate and complete.

5.1.6 Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings or electronic data records for continuous monitoring instrumentation, copies of all reports required by the permit, and records of all data used to complete the application for the permit for a period of at least 3 years from the date of the sample, measurement, report or application. All pertinent sludge information, including permit application information and other documents specified in this permit or s. NR 204.06(9), Wis. Adm. Code shall be retained for a minimum of 5 years.

5.1.7 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 Department, it shall promptly submit such facts or correct information to the Department.

5.1.8 Reporting Requirements – Alterations or Additions

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

- The alteration or addition to the permitted facility may meet one of the criteria for determining whether a facility is a new source.
- The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification requirement applies to pollutants which are not subject to effluent limitations in the existing permit.
- 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 that are different from or absent in the existing permit, including notification of additional use of disposal sites not reported during the permit application process nor reported pursuant to an approved land application plan. Additional sites may not be used for the land application of sludge until department approval is received.

5.2 System Operating Requirements

5.2.1 Noncompliance Reporting

Sanitary sewer overflows and sewage treatment facility overflows shall be reported according to the 'Sanitary Sewer Overflows and Sewage Treatment Facility Overflows' section of this permit.

The permittee shall report the following types of noncompliance by a telephone call to the Department's regional office within 24 hours after becoming aware of the noncompliance:

- any noncompliance which may endanger health or the environment;
- any violation of an effluent limitation resulting from a bypass;
- any violation of an effluent limitation resulting from an upset; and
- any violation of a maximum discharge limitation for any of the pollutants listed by the Department in the permit, either for effluent or sludge.

A written report describing the noncompliance shall also be submitted to the Department's regional office within 5 days after the permittee becomes aware of the noncompliance. On a case-by-case basis, the Department may waive the requirement for submittal of a written report within 5 days and instruct the permittee to submit the written report with the next regularly scheduled monitoring report. In either case, the written report shall contain a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; the steps taken or planned to reduce, eliminate and prevent reoccurrence of the noncompliance; and if the noncompliance has not been corrected, the length of time it is expected to continue.

A scheduled bypass approved by the Department under the 'Scheduled Bypass' section of this permit shall not be subject to the reporting required under this section.

NOTE: Section 292.11(2)(a), Wisconsin Statutes, requires any person who possesses or controls a hazardous substance or who causes the discharge of a hazardous substance to notify the Department of Natural Resources **immediately** of any discharge not authorized by the permit. **The discharge of a hazardous substance that is not authorized by this permit or that violates this permit may be a hazardous substance spill. To report a hazardous substance spill, call DNR's 24-hour HOTLINE at 1-800-943-0003.**

5.2.2 Flow Meters

Flow meters shall be calibrated annually, as per s. NR 218.06, Wis. Adm. Code.

5.2.3 Raw Grit and Screenings

All raw grit and screenings shall be disposed of at a properly licensed solid waste facility or picked up by a licensed waste hauler. If the facility or hauler are located in Wisconsin, then they shall be licensed under chs. NR 500-555, Wis. Adm. Code.

5.2.4 Sludge Management

All sludge management activities shall be conducted in compliance with ch. NR 204 "Domestic Sewage Sludge Management", Wis. Adm. Code.

5.2.5 Prohibited Wastes

Under no circumstances may the introduction of wastes prohibited by s. NR 211.10, Wis. Adm. Code, be allowed into the waste treatment system. Prohibited wastes include those:

- which create a fire or explosion hazard in the treatment work;
- which will cause corrosive structural damage to the treatment work;
- solid or viscous substances in amounts which cause obstructions to the flow in sewers or interference with the proper operation of the treatment work;
- wastewaters at a flow rate or pollutant loading which are excessive over relatively short time periods so as to cause a loss of treatment efficiency; and
- changes in discharge volume or composition from contributing industries which overload the treatment works or cause a loss of treatment efficiency.

5.2.6 Bypass

This condition applies only to bypassing at a sewage treatment facility that is not a scheduled bypass, approved blending as a specific condition of this permit, a sewage treatment facility overflow or a controlled diversion as provided in the sections titled 'Scheduled Bypass', 'Blending' (if approved), 'SSO's and Sewage Treatment Facility Overflows' and 'Controlled Diversions' of this permit. Any other bypass at the sewage treatment facility is prohibited and the Department may take enforcement action against a permittee for such occurrences under s. 283.89, Wis. Stats. The Department may approve a bypass if the permittee demonstrates all the following conditions apply:

- The bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;
- There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities or adequate back-up equipment, retention of untreated wastes, reduction of inflow and infiltration, 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. When evaluating feasibility of alternatives, the department may consider factors such as technical achievability, costs and affordability of implementation and risks to public health, the environment and, where the permittee is a municipality, the welfare of the community served; and
- The bypass was reported in accordance with the Noncompliance Reporting section of this permit.

5.2.7 Scheduled Bypass

Whenever the permittee anticipates the need to bypass for purposes of efficient operations and maintenance and the permittee may not meet the conditions for controlled diversions in the 'Controlled Diversions' section of this permit, the permittee shall obtain prior written approval from the Department for the scheduled bypass. A permittee's written request for Department approval of a scheduled bypass shall demonstrate that the conditions for bypassing specified in the above section titled 'Bypass' are met and include the proposed date and reason for the bypass, estimated volume and duration of the bypass, alternatives to bypassing and measures to mitigate environmental harm caused by the bypass. The department may require the permittee to provide public notification for a scheduled bypass if it is

determined there is significant public interest in the proposed action and may recommend mitigation measures to minimize the impact of such bypass.

5.2.8 Controlled Diversions

Controlled diversions are allowed only when necessary for essential maintenance to assure efficient operation. Sewage treatment facilities that have multiple treatment units to treat variable or seasonal loading conditions may shut down redundant treatment units when necessary for efficient operation. The following requirements shall be met during controlled diversions:

- Effluent from the sewage treatment facility shall meet the effluent limitations established in the permit. Wastewater that is diverted around a treatment unit or treatment process during a controlled diversion shall be recombined with wastewater that is not diverted prior to the effluent sampling location and prior to effluent discharge;
- A controlled diversion does not include blending as defined in s. NR 210.03(2e), Wis. Adm. Code, and as may only be approved under s. NR 210.12. A controlled diversion may not occur during periods of excessive flow or other abnormal wastewater characteristics;
- A controlled diversion may not result in a wastewater treatment facility overflow; and
- All instances of controlled diversions shall be documented in sewage treatment facility records and such records shall be available to the department on request.

5.2.9 Proper Operation and Maintenance

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training as required in ch. NR 114, Wis. Adm. Code, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the permit.

5.2.10 Operator Certification

The wastewater treatment facility shall be under the direct supervision of a state certified operator. In accordance with s. NR 114.53, Wis. Adm. Code, every WPDES permitted treatment plant shall have a designated operator-in-charge holding a current and valid certificate. The designated operator-in-charge shall be certified at the level and in all subclasses of the treatment plant, except laboratory. Treatment plant owners shall notify the department of any changes in the operator-in-charge within 30 days. Note that s. NR 114.52(22), Wis. Adm. Code, lists types of facilities that are excluded from operator certification requirements (i.e. private sewage systems, pretreatment facilities discharging to public sewers, industrial wastewater treatment that consists solely of land disposal, agricultural digesters and concentrated aquatic production facilities with no biological treatment).

5.3 Sewage Collection Systems

5.3.1 Sanitary Sewage Overflows and Sewage Treatment Facility Overflows

5.3.1.1 Overflows Prohibited

Any overflow or discharge of wastewater from the sewage collection system or at the sewage treatment facility, other than from permitted outfalls, is prohibited. The permittee shall provide information on whether any of the following conditions existed when an overflow occurred:

- The sanitary sewer overflow or sewage treatment facility overflow was unavoidable to prevent loss of life, personal injury or severe property damage;

- There were no feasible alternatives to the sanitary sewer overflow or sewage treatment facility overflow such as the use of auxiliary treatment facilities or adequate back-up equipment, retention of untreated wastes, reduction of inflow and infiltration, or preventative maintenance activities;
- The sanitary sewer overflow or the sewage treatment facility overflow was caused by unusual or severe weather related conditions such as large or successive precipitation events, snowmelt, saturated soil conditions, or severe weather occurring in the area served by the sewage collection system or sewage treatment facility; and
- The sanitary sewer overflow or the sewage treatment facility overflow was unintentional, temporary, and caused by an accident or other factors beyond the reasonable control of the permittee.

5.3.1.2 Permittee Response to Overflows

Whenever a sanitary sewer overflow or sewage treatment facility overflow occurs, the permittee shall take all feasible steps to control or limit the volume of untreated or partially treated wastewater discharged, and terminate the discharge as soon as practicable. Remedial actions, including those in NR 210.21 (3), Wis. Adm. Code, shall be implemented consistent with an emergency response plan developed under the CMOM program.

5.3.1.3 Permittee Reporting

Permittees shall report all sanitary sewer overflows and sewage treatment overflows as follows:

- The permittee shall notify the department by telephone, fax or email as soon as practicable, but no later than 24 hours from the time the permittee becomes aware of the overflow;
- The permittee shall, no later than five days from the time the permittee becomes aware of the overflow, provide to the department the information identified in this paragraph using department form number 3400-184. If an overflow lasts for more than five days, an initial report shall be submitted within 5 days as required in this paragraph and an updated report submitted following cessation of the overflow. At a minimum, the following information shall be included in the report:

  ◦The date and location of the overflow;
  ◦The surface water to which the discharge occurred, if any;
  ◦The duration of the overflow and an estimate of the volume of the overflow;
  ◦A description of the sewer system or treatment facility component from which the discharge occurred such as manhole, lift station, constructed overflow pipe, or crack or other opening in a pipe;
  ◦The estimated date and time when the overflow began and stopped or will be stopped;
  ◦The cause or suspected cause of the overflow including, if appropriate, precipitation, runoff conditions, areas of flooding, soil moisture and other relevant information;
  ◦Steps taken or planned to reduce, eliminate and prevent reoccurrence of the overflow and a schedule of major milestones for those steps;
  ◦A description of the actual or potential for human exposure and contact with the wastewater from the overflow;
  ◦Steps taken or planned to mitigate the impacts of the overflow and a schedule of major milestones for those steps;
  ◦To the extent known at the time of reporting, the number and location of building backups caused by excessive flow or other hydraulic constraints in the sewage collection system that occurred concurrently with the sanitary sewer overflow and that were within the same area of the sewage collection system as the sanitary sewer overflow; and
  ◦The reason the overflow occurred or explanation of other contributing circumstances that resulted in the overflow event. This includes any information available including whether the overflow was unavoidable to prevent loss of life, personal injury, or severe property damage and whether there were feasible alternatives to the overflow.

NOTE: A copy of form 3400-184 for reporting sanitary sewer overflows and sewage treatment facility overflows may be obtained from the department or accessed on the department's web site at http://dnr.wi.gov/topic/wastewater/SSOreport.html. As indicated on the form, additional information may be submitted to supplement the information required by the form.

- The permittee shall identify each specific location and each day on which a sanitary sewer overflow or sewage treatment facility overflow occurs as a discrete sanitary sewer overflow or sewage treatment facility overflow occurrence. An occurrence may be more than one day if the circumstances causing the sanitary sewer overflow or sewage treatment facility overflow results in a discharge duration of greater than 24 hours. If there is a stop and restart of the overflow at the same location within 24 hours and the overflow is caused by the same circumstance, it may be reported as one occurrence. Sanitary sewer overflow occurrences at a specific location that are separated by more than 24 hours shall be reported as separate occurrences; and
- A permittee that is required to submit wastewater discharge monitoring reports under NR 205.07 (1) (r) shall also report all sanitary sewer overflows and sewage treatment facility overflows on that report.

5.3.1.4 Public Notification

The permittee shall notify the public of any sanitary sewer and sewage treatment facility overflows consistent with its emergency response plan required under the CMOM (Capacity, Management, Operation and Maintenance) section of this permit and s. NR 210.23 (4) (f), Wis. Adm. Code. Such public notification shall occur promptly following any overflow event using the most effective and efficient communications available in the community. At minimum, a daily newspaper of general circulation in the county(s) and municipality whose waters may be affected by the overflow shall be notified by written or electronic communication.

5.3.2 Capacity, Management, Operation and Maintenance (CMOM) Program

- The permittee shall have written documentation of the Capacity, Management, Operation and Maintenance (CMOM) program components in accordance with s. NR 210.23(4), Wis. Adm. Code. Such documentation shall be available for Department review upon request. The Department may request that the permittee provide this documentation or prepare a summary of the permittee's CMOM program at the time of application for reissuance of the WPDES permit.
- The permittee shall implement a CMOM program in accordance with s. NR 210.23, Wis. Adm. Code.
- The permittee shall at least annually conduct a self-audit of activities conducted under the permittee's CMOM program to ensure CMOM components are being implemented as necessary to meet the general standards of s. NR 210.23(3), Wis. Adm. Code.

5.3.3 Sewer Cleaning Debris and Materials

All debris and material removed from cleaning sanitary sewers shall be managed to prevent nuisances, run-off, ground infiltration or prohibited discharges.

- Debris and solid waste shall be dewatered, dried and then disposed of at a licensed solid waste facility.
- Liquid waste from the cleaning and dewatering operations shall be collected and disposed of at a permitted wastewater treatment facility.
- Combination waste including liquid waste along with debris and solid waste may be disposed of at a licensed solid waste facility or wastewater treatment facility willing to accept the waste.

5.4 Surface Water Requirements

5.4.1 Permittee-Determined Limit of Quantitation Incorporated into this Permit

For pollutants with water quality-based effluent limits below the Limit of Quantitation (LOQ) in this permit, the LOQ calculated by the permittee and reported on the Discharge Monitoring Reports (DMRs) is incorporated by reference into this permit. The LOQ shall be reported on the DMRs, shall be the lowest quantifiable level practicable, and shall be no greater than the minimum level (ML) specified in or approved under 40 CFR Part 136 for the pollutant at the time this permit was issued, unless this permit specifies a higher LOQ.

5.4.2 Appropriate Formulas for Effluent Calculations

The permittee shall use the following formulas for calculating effluent results to determine compliance with average concentration limits and mass limits and total load limits:

Weekly/Monthly/Six-Month/Annual Average Concentration = the sum of all daily results for that week/month/six-month/year, divided by the number of results during that time period. [Note: When a six-month average effluent limit is specified for Total Phosphorus the applicable periods are May through October and November through April.]

Weekly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the week.

Monthly Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the month.

Six-Month Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the six-month period. [Note: When a six-month average effluent limit is specified for Total Phosphorus the applicable periods are May through October and November through April.]

Annual Average Mass Discharge (lbs/day): Daily mass = daily concentration (mg/L) x daily flow (MGD) x 8.34, then average the daily mass values for the entire year.

Total Monthly Discharge: = monthly average concentration (mg/L) x total flow for the month (MG/month) x 8.34.

Total Annual Discharge: = sum of total monthly discharges for the calendar year.

12-Month Rolling Sum of Total Monthly Discharge: = the sum of the most recent 12 consecutive months of Total Monthly Discharges.

5.4.3 Effluent Temperature Requirements

Weekly Average Temperature – The permittee shall use the following formula for calculating effluent results to determine compliance with the weekly average temperature limit (as applicable): Weekly Average Temperature = the sum of all daily maximum results for that week divided by the number of daily maximum results during that time period.

Cold Shock Standard – Water temperatures of the discharge shall be controlled in a manner as to protect fish and aquatic life uses from the deleterious effects of cold shock. 'Cold Shock' means exposure of aquatic organisms to a rapid decrease in temperature and a sustained exposure to low temperature that induces abnormal behavior or physiological performance and may lead to death.

Rate of Temperature Change Standard – Temperature of a water of the state or discharge to a water of the state may not be artificially raised or lowered at such a rate that it causes detrimental health or reproductive effects to fish or aquatic life of the water of the state.

5.4.4 Visible Foam or Floating Solids

There shall be no discharge of floating solids or visible foam in other than trace amounts.

5.4.5 Surface Water Uses and Criteria

In accordance with NR 102.04, Wis. Adm. Code, surface water uses and criteria are established to govern water management decisions. Practices attributable to municipal, industrial, commercial, domestic, agricultural, land development or other activities shall be controlled so that all surface waters including the mixing zone meet the following conditions at all times and under all flow and water level conditions:

a) Substances that will cause objectionable deposits on the shore or in the bed of a body of water, shall not be present in such amounts as to interfere with public rights in waters of the state.

b) Floating or submerged debris, oil, scum or other material shall not be present in such amounts as to interfere with public rights in waters of the state.

c) Materials producing color, odor, taste or unsightliness shall not be present in such amounts as to interfere with public rights in waters of the state.

d) Substances in concentrations or in combinations which are toxic or harmful to humans shall not be present in amounts found to be of public health significance, nor shall substances be present in amounts which are acutely harmful to animal, plant or aquatic life.

5.4.6 Percent Removal

During any 30 consecutive days, the average effluent concentrations of BOD_5 and of total suspended solids shall not exceed 15% of the average influent concentrations, respectively. This requirement does not apply to removal of total suspended solids if the permittee operates a lagoon system and has received a variance for suspended solids granted under NR 210.07(2), Wis. Adm. Code.

5.4.7 Fecal Coliforms

The weekly and monthly limit(s) for fecal coliforms shall be expressed as a geometric mean.

5.4.8 Seasonal Disinfection

Disinfection shall be provided from May 1 through September 30 of each year. Monitoring requirements and the limitation for fecal coliforms apply only during the period in which disinfection is required. Whenever chlorine is used for disinfection or other uses, the limitations and monitoring requirements for residual chlorine shall apply. A dechlorination process shall be in operation whenever chlorine is used.

5.4.9 Total Residual Chlorine Requirements (When De-Chlorinating Effluent)

Test methods for total residual chlorine, approved in ch. NR 219 - Table B, Wis. Adm. Code, normally achieve a limit of detection of about 20 to 50 micrograms per liter and a limit of quantitation of about 100 micrograms per liter. Reporting of test results and compliance with effluent limitations for chlorine residual and total residual halogens shall be as follows:

- Sample results which show no detectable levels are in compliance with the limit. These test results shall be reported on Wastewater Discharge Monitoring Report Forms as "< 100 µg/L". (Note: 0.1 mg/L converts to 100 µg/L)

- Samples showing detectable traces of chlorine are in compliance if measured at less than 100 µg/L, unless there is a consistent pattern of detectable values in this range. These values shall also be reported on

Wastewater Discharge Monitoring Report Forms as "<100 µg/L." The facility operating staff shall record actual readings on logs maintained at the plant, shall take action to determine the reliability of detected results (such as re-sampling and/or calculating dosages), and shall adjust the chemical feed system if necessary to reduce the chances of detects.

- Samples showing detectable levels greater than 100 µg/L shall be considered as exceedances, and shall be reported as measured.

- To calculate average or mass discharge values, a "0" (zero) may be substituted for any test result less than 100 µg/L. Calculated values shall then be compared directly to the average or mass limitations to determine compliance.

5.4.10 Whole Effluent Toxicity (WET) Monitoring Requirements

In order to determine the potential impact of the discharge on aquatic organisms, static-renewal toxicity tests shall be performed on the effluent in accordance with the procedures specified in the *"State of Wisconsin Aquatic Life Toxicity Testing Methods Manual, 2nd Edition" (PUB-WT-797*, November 2004) as required by NR 219.04, Table A, Wis. Adm. Code). All of the WET tests required in this permit, including any required retests, shall be conducted on the *Ceriodaphnia dubia* and fathead minnow species. Receiving water samples shall not be collected from any point in contact with the permittee's mixing zone and every attempt shall be made to avoid contact with any other discharge's mixing zone.

5.4.11 Whole Effluent Toxicity (WET) Identification and Reduction

Within 60 days of a retest which showed positive results, the permittee shall submit a written report to the Biomonitoring Coordinator, Bureau of Water Quality, 101 S. Webster St., PO Box 7921, Madison, WI 53707-7921, which details the following:

- A description of actions the permittee has taken or will take to remove toxicity and to prevent the recurrence of toxicity;

- A description of toxicity reduction evaluation (TRE) investigations that have been or will be done to identify potential sources of toxicity, including some or all of the following actions:

  (a) Evaluate the performance of the treatment system to identify deficiencies contributing to effluent toxicity (e.g., operational problems, chemical additives, incomplete treatment)
  (b) Identify the compound(s) causing toxicity
  (c) Trace the compound(s) causing toxicity to their sources (e.g., industrial, commercial, domestic)
  (d) Evaluate, select, and implement methods or technologies to control effluent toxicity (e.g., in-plant or pretreatment controls, source reduction or removal)

- Where corrective actions including a TRE have not been completed, an expeditious schedule under which corrective actions will be implemented;

- If no actions have been taken, the reason for not taking action.

The permittee may also request approval from the Department to postpone additional retests in order to investigate the source(s) of toxicity. Postponed retests must be completed after toxicity is believed to have been removed.

5.4.12 Reopener Clause

Pursuant to s. 283.15(11), Wis. Stat. and 40 CFR 131.20, the Department may modify or revoke and reissue this permit if, through the triennial standard review process, the Department determines that the terms and conditions of this permit need to be updated to reflect the highest attainable condition of the receiving water.

5.5 Land Application Requirements

5.5.1 Sludge Management Program Standards And Requirements Based Upon Federally Promulgated Regulations

In the event that new federal sludge standards or regulations are promulgated, the permittee shall comply with the new sludge requirements by the dates established in the regulations, if required by federal law, even if the permit has not yet been modified to incorporate the new federal regulations.

5.5.2 General Sludge Management Information

The General Sludge Management Form 3400-48 shall be completed and submitted prior to any significant sludge management changes.

5.5.3 Sludge Samples

All sludge samples shall be collected at a point and in a manner which will yield sample results which are representative of the sludge being tested, and collected at the time which is appropriate for the specific test.

5.5.4 Land Application Characteristic Report

Each report shall consist of a Characteristic Form 3400-49 and Lab Report. The Characteristic Report Form 3400-49 shall be submitted electronically by January 31 following each year of analysis.

Following submittal of the electronic Characteristic Report Form 3400-49, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report is true, accurate and complete. The Lab Report must be sent directly to the facility's DNR sludge representative or basin engineer unless approval for not submitting the lab reports has been given.

The permittee shall use the following convention when reporting sludge monitoring results: Pollutant concentrations less than the limit of detection shall be reported as < (less than) the value of the limit of detection. For example, if a substance is not detected at a detection limit of 1.0 mg/kg, report the pollutant concentration as < 1.0 mg/kg .

All results shall be reported on a dry weight basis.

5.5.5 Calculation of Water Extractable Phosphorus

When sludge analysis for Water Extractable Phosphorus is required by this permit, the permittee shall use the following formula to calculate and report Water Extractable Phosphorus:
Water Extractable Phosphorus (% of Total P) =
[Water Extractable Phosphorus (mg/kg, dry wt) ÷ Total Phosphorus (mg/kg, dry wt)] x 100

5.5.6 Monitoring and Calculating PCB Concentrations in Sludge

When sludge analysis for "PCB, Total Dry Wt" is required by this permit, the PCB concentration in the sludge shall be determined as follows.

Either congener-specific analysis or Aroclor analysis shall be used to determine the PCB concentration. The permittee may determine whether Aroclor or congener specific analysis is performed. Analyses shall be performed in accordance with the following provisions and Table EM in s. NR 219.04, Wis. Adm. Code.

- EPA Method 1668 may be used to test for all PCB congeners. If this method is employed, all PCB congeners shall be delineated. Non-detects shall be treated as zero. The values that are between the limit of detection and the limit of quantitation shall be used when calculating the total value of all congeners. All results shall be added together and the total PCB concentration by dry weight reported. **Note**: It is recognized that a number of the congeners will co-elute with others, so there will not be 209 results to sum.
- EPA Method 8082A shall be used for PCB-Aroclor analysis and may be used for congener specific analysis as well. If congener specific analysis is performed using Method 8082A, the list of congeners tested shall include at least congener numbers 5, 18, 31, 44, 52, 66, 87, 101, 110, 138, 141, 151, 153, 170, 180, 183, 187, and 206 plus any other additional congeners which might be reasonably expected to occur in the particular sample. For either type of analysis, the sample shall be extracted using the Soxhlet extraction (EPA Method 3540C) (or the Soxhlet Dean-Stark modification) or the pressurized fluid extraction (EPA Method 3545A). If Aroclor analysis is performed using Method 8082A, clean up steps of the extract shall be performed as necessary to remove interference and to achieve as close to a limit of detection of 0.11 mg/kg as possible. Reporting protocol, consistent with s. NR 106.07(6)(e), should be as follows: If all Aroclors are less than the LOD, then the Total PCB Dry Wt result should be reported as less than the highest LOD. If a single Aroclor is detected then that is what should be reported for the Total PCB result. If multiple Aroclors are detected, they should be summed and reported as Total PCBs. If congener specific analysis is done using Method 8082A, clean up steps of the extract shall be performed as necessary to remove interference and to achieve as close to a limit of detection of 0.003 mg/kg as possible for each congener. If the aforementioned limits of detection cannot be achieved after using the appropriate clean up techniques, a reporting limit that is achievable for the Aroclors or each congener for the sample shall be determined. This reporting limit shall be reported and qualified indicating the presence of an interference. The lab conducting the analysis shall perform as many of the following methods as necessary to remove interference:

3620C – Florisil	3611B - Alumina
3640A - Gel Permeation	3660B - Sulfur Clean Up (using copper shot instead of powder)
3630C - Silica Gel	3665A - Sulfuric Acid Clean Up

5.5.7 Annual Land Application Report

Land Application Report Form 3400-55 shall be submitted electronically by January 31, each year whether or not non-exceptional quality sludge is land applied. Non-exceptional quality sludge is defined in s. NR 204.07(4), Wis. Adm. Code. Following submittal of the electronic Annual Land Application Report Form 3400-55, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

5.5.8 Other Methods of Disposal or Distribution Report

The permittee shall submit electronically the Other Methods of Disposal or Distribution Report Form 3400-52 by January 31, each year whether or not sludge is hauled, landfilled, incinerated, or exceptional quality sludge is

distributed or land applied. Following submittal of the electronic Report Form 3400-52, this form shall be certified electronically via the 'eReport Certify' page by a responsible executive or municipal officer, manager, partner or proprietor as specified in s. 283.37(3), Wis. Stats., or a duly authorized representative of the officer, manager, partner or proprietor that has been delegated signature authority pursuant to s. NR 205.07(1)(g)2, Wis. Adm. Code. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

5.5.9 Approval to Land Apply

Bulk non-exceptional quality sludge as defined in s. NR 204.07(4), Wis. Adm. Code, may not be applied to land without a written approval letter or Form 3400-122 from the Department unless the Permittee has obtained permission from the Department to self approve sites in accordance with s. NR 204.06 (6), Wis. Adm. Code. Analysis of sludge characteristics is required prior to land application. Application on frozen or snow covered ground is restricted to the extent specified in s. NR 204.07(3) (l), Wis. Adm. Code.

5.5.10 Soil Analysis Requirements

Each site requested for approval for land application must have the soil tested prior to use. Each approved site used for land application must subsequently be soil tested such that there is at least one valid soil test in the four years prior to land application. All soil sampling and submittal of information to the testing laboratory shall be done in accordance with UW Extension Bulletin A-2100. The testing shall be done by the UW Soils Lab in Madison or Marshfield, WI or at a lab approved by UW. The test results including the crop recommendations shall be submitted to the DNR contact listed for this permit, as they are available. Application rates shall be determined based on the crop nitrogen recommendations and with consideration for other sources of nitrogen applied to the site.

5.5.11 Land Application Site Evaluation

For non-exceptional quality sludge, as defined in s. NR 204.07(4), Wis. Adm. Code, a Land Application Site Request Form 3400-053 shall be submitted to the Department for the proposed land application site. The Department will evaluate the proposed site for acceptability and will either approve or deny use of the proposed site. The permittee may obtain permission to approve their own sites in accordance with s. NR 204.06(6), Wis. Adm. Code.

5.5.12 Class B Sludge: Fecal Coliform Limitation

Compliance with the fecal coliform limitation for Class B sludge shall be demonstrated by calculating the geometric mean of at least 7 separate samples. (Note that a Total Solids analysis must be done on each sample). The geometric mean shall be less than 2,000,000 MPN or CFU/g TS. Calculation of the geometric mean can be done using one of the following 2 methods.

Method 1:

Geometric Mean = $(X_1 \times X_2 \times X_3 \ldots \times X_n)^{1/n}$

Where X = Coliform Density value of the sludge sample, and where n = number of samples (at least 7)

Method 2:

Geometric Mean = $\text{antilog}[(X_1 + X_2 + X_3 \ldots + X_n) \div n]$

Where X = $\log_{10}$ of Coliform Density value of the sludge sample, and where n = number of samples (at least 7)

Example for Method 2

Sample Number	Coliform Density of Sludge Sample	$\log_{10}$
1	6.0×10^5	5.78
2	4.2×10^6	6.62
3	1.6×10^6	6.20
4	9.0×10^5	5.95
5	4.0×10^5	5.60
6	1.0×10^6	6.00

7	5.1×10^5	5.71

The geometric mean for the seven samples is determined by averaging the $\log_{10}$ values of the coliform density and taking the antilog of that value.
$(5.78 + 6.62 + 6.20 + 5.95 + 5.60 + 6.00 + 5.71) \div 7 = 5.98$
The antilog of $5.98 = 9.5 \times 10^5$

5.5.13 Class B Sludge - Vector Control: Injection

No significant amount of the sewage sludge shall be present on the land surface within one hour after the sludge is injected.

6 Summary of Reports Due

FOR INFORMATIONAL PURPOSES ONLY

Description	Date	Page
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Operational Evaluation Report	December 31, 2019	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Compliance Alternatives, Source Reduction, Improvements and Modifications Status	December 31, 2020	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Preliminary Compliance Alternatives Plan	December 31, 2021	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Final Compliance Alternatives Plan	December 31, 2022	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Progress Report on Plans & Specifications	December 31, 2023	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Final Plans and Specifications	December 31, 2024	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Treatment Plant Upgrade to Meet WQBELs	March 31, 2025	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Construction Upgrade Progress Report #1	March 31, 2026	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Construction Upgrade Progress Report #2	March 31, 2027	13
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Complete Construction	November 30, 2027	14
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Achieve Compliance	December 31, 2027	14
Chloride Target Value -Annual Chloride Progress Report	January 31, 2020	14
Chloride Target Value -Annual Chloride Progress Report #2	January 31, 2021	14
Chloride Target Value -Annual Chloride Progress Report #3	January 31, 2022	14
Chloride Target Value -Annual Chloride Progress Report #4	January 31, 2023	14
Chloride Target Value -Final Chloride Report	June 30, 2023	14
Chloride Target Value -Annual Chloride Reports After Permit Expiration	See Permit	14
Plant Upgrade Progress Reports and Department Notification -Progress Report #1	December 31, 2019	15
Plant Upgrade Progress Reports and Department Notification -Progress Report #2	June 30, 2020	15
Plant Upgrade Progress Reports and Department Notification -Notify the Department of Treatment Facility Upgrade Completion	See Permit	15

Compliance Maintenance Annual Reports (CMAR)	by June 30, each year	17
General Sludge Management Form 3400-48	prior to any significant sludge management changes	26
Characteristic Form 3400-49 and Lab Report	by January 31 following each year of analysis	26
Land Application Report Form 3400-55	by January 31, each year whether or not non-exceptional quality sludge is land applied	27
Other Methods of Disposal or Distribution Report Form 3400-52	by January 31, each year whether or not sludge is hauled, landfilled, incinerated, or exceptional quality sludge is distributed or land applied	27
Wastewater Discharge Monitoring Report	no later than the date indicated on the form	16

Report forms shall be submitted electronically in accordance with the reporting requirements herein. Any facility plans or plans and specifications for municipal, industrial, industrial pretreatment and non industrial wastewater systems shall be submitted to the Bureau of Water Quality, P.O. Box 7921, Madison, WI 53707-7921. All other submittals required by this permit shall be submitted to:
South Central Region, 3911 Fish Hatchery Road, Fitchburg, WI 53711-5397

APPENDIX B
WPCF OPTIMIZATION SUMMARY

Table A-1 Source Reduction, Operational Improvements, and Minor Facility Modifications Preliminary Compliance Alternatives Plan (PCAP)

Item No.	Optimization Action	Plan Description	Start Date	Completion Date	Anticipated Outcome and Reductions
1	Routinely characterize influent wastewater.	Begin routine testing of the Water Pollution Control Facility (WPCF) influent for total phosphorus (TP), soluble non-reactive phosphorus (SNRP), readily biodegradable biochemical oxygen demand (BOD) concentration, and total Kjeldahl nitrogen (TKN).	January 2020	Ongoing	Monitor influent phosphorus and BOD levels and take action if changes are noted.
2	Soluble non-reactive phosphorus (SNRP) evaluation.	Measure SNRP concentrations in influent and effluent.	January 2020	Results were reported in the December 2020 status report.	SNRP analysis will assist in evaluating potential treatment or variances.
3	Optimize return activated sludge (RAS) flow.	Implement new control strategy for RAS pumps.	January 2020	December 2020	Improve biological phosphorus removal (BPR) performance consistency by providing more consistent solids wasting and return flows
4	Analyze decant and gravity belt thickener (GBT) filtrate. Optimize thickening process.	Begin periodic process return flow (PRF) (decant and GBT filtrate) testing and investigate polymer delivery system for operational improvements.	January 2020	Ongoing. Some results are reported in this PCAP in December 2021.	Periodic PRF testing and optimization of aerobic digesters and polymer use may lead to reduced process return TP and solids loading.
5	Phosphorus levels in water supply.	Test drinking water for phosphorus.	January 2020	December 2020	The results will be used to determine the base concentration of phosphate in the water.
6	Periodically review WPCF operating data.	Revisit plant data and operational logs to evaluate long term trends. Review potential for operational strategy adjustments.	January 2020	Ongoing. Results were reported in the December 2020 status report and in this 2021 PCAP report.	Observation of long-term operational trends that may lead to operational strategy changes resulting in increased plant performance.
7	Hauled waste monitoring.	Hauled waste (if any) will be periodically tested to determine background concentration.	January 2021	Results will be reported in the Final Compliance Alternatives Plan in December 2022.	The results will be used to determine the base concentration of phosphorus in the hauled waste.
8	Continued fermenter optimization.	Control hydraulic detention time and the amount of time that sequestered solids are in the fermentation tank.	January 2020	Ongoing	Optimization of the fermenter may produce more readily soluble BOD food sources for polyphosphate-accumulating organisms (PAOs).
9	Continued BPR optimization.	Control mixer on and off cycling in fermenter and anaerobic zone to promote inline fermentation. Review and test sources of supplemental carbon.	January 2020	Ongoing	Inline fermentation or carbon addition may produce more readily soluble BOD food sources for PAOs.

APPENDIX C
WQT NOTICE OF INTENT

State of Wisconsin
Department of Natural Resources
101 South Webster Street
Madison WI 53707-7921
dnr.wi.gov

Notice of Intent to Conduct Water Quality Trading

Form 3400-206 (1/14)

Notice: Pursuant to s. 283.84, Wis. Stats., and ch. NR 217 Wis. Adm. Code, this form must be completed by any WPDES permittee that is using water quality trading as a method of complying with a permit limitation. Failure to complete this form would not result in penalties. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.).

Applicant Information

Permittee Name	Permit Number	Facility Site Number
Village of Mount Horeb	WI- 0020281-07-0	

Facility Address	City	State	ZIP Code
2447 Sand Rock Road	Mount Horeb	WI	53572

Project Contact Name (if applicable)	Address	City	State	ZIP Code
John Klein	2447 Sand Rock Road	Mount Horeb	WI	53572

Project Name
Water Pollution Control Facility Improvements Water Quality Trading

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
West Branch of the Sugar River	Phosphorus	070900040102

Is the permittee in a point or nonpoint source dominated watershed?
(See PRESTO results - http://dnr.wi.gov/topic/surfacewater/presto.html)

- ○ Point source dominated
- ◉ Nonpoint source dominated

Credit Generator Information

Credit generator type (select all that apply):

- ☐ Permitted Discharge (non-MS4/CAFO)
- ☐ Permitted MS4
- ☐ Permitted CAFO
- ☒ Urban nonpoint source discharge
- ☒ Agricultural nonpoint source discharge
- ☐ Other - Specify: _____

Are any of the credit generators in a different HUC 12 than the applicant?

- ○ Yes; HUC 12: _____
- ◉ No
- ○ Unsure

Are any of the credit generators downstream of the applicant?

- ○ Yes
- ◉ No
- ○ Unsure

Will a broker/exchange be used to facilitate trade?

- ○ Yes; Name: _____
- ◉ No
- ○ Unsure

Point to Point Trades (Traditional Municipal / Industrial Discharge, MS4, CAFO)

Discharge Type	Permit Number	Name	Contact Address	Is the point source credit generator currently in compliance with their permit requirements?
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure
○ Traditional ○ MS4 ○ CAFO				○ Yes ○ No ○ Unsure

Point to Nonpoint Trades (Non-permitted Agricultural, Non-Permitted Urban, etc.)

List the practices that will be used to generate credits:

There are four sites for credit generation outlined below, with a fifth site being considered.

(1) The streambank along the west side of the the existing wastewater treatment facility (2447 Sand Rock Road) will be restored.

(2) The new north facility (2450 Sand Rock Road) will be constructed on agricultural land, taking the land out of production. Storm water from the majority of the site will be directed to a bioinfiltration basin. Perennial vegetation will be established in the remaining areas.

(3) A bioretention basin will be constructed on the existing WWTP site, which will receive most of the stormwater runoff from the site.

(4)The streambank near the existing sewer line just south of the highway US-18 and next to Sand Rock Road has been restored to prevent the stream from encroaching onto the existing site and sewer.

(5) The Village is also considering taking agricultural land north east of the existing treatment facility out of production and turning a portion into a dog park and the remaining land to perennial grass.

*See additional information in cover letter.

Method for quantifying credits generated:
- ☐ Monitoring
- ☒ Modeling, Names: SLAMM
- ☐ Other: _____

Projected date credits will be available: 05/01/2019

The preparer certifies all of the following:

- I am familiar with the specifications submitted for this application, and I believe all applicable items in this checklist have been addressed.
- I have completed this document to the best of my knowledge and have not excluded pertinent information.

Signature of Preparer	Date Signed
Randy Langer	1/24/18

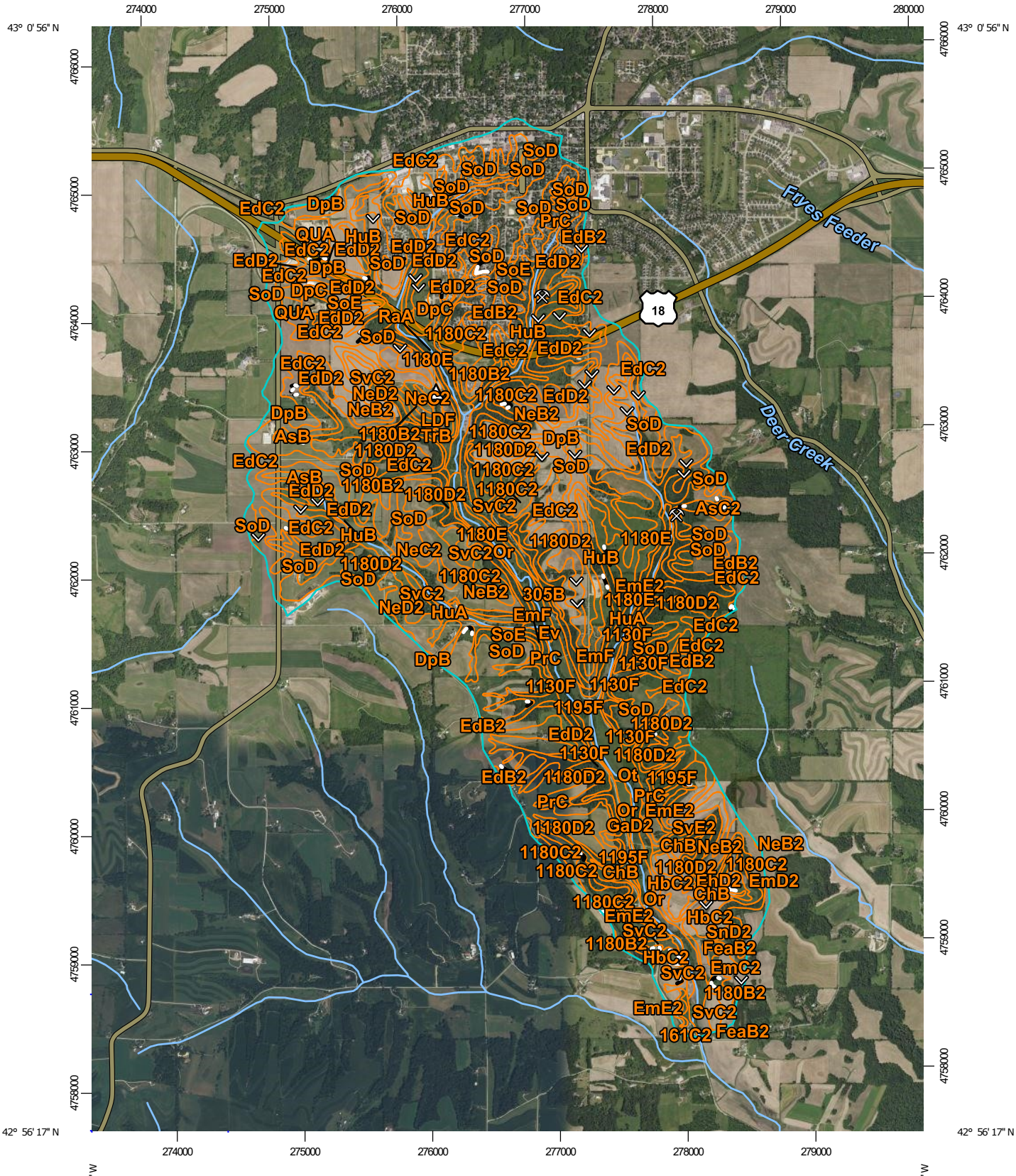
Authorized Representative Signature

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision. Based on my inquiry of those persons directly responsible for gathering and entering the information, the information is, to the best of my knowledge and belief, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Signature of Authorized Representative	Date Signed
	1/24/18

APPENDIX D
SOILS REPORT

Soil Map—Dane County, Wisconsin
(Village of Mount Horeb)



Map Scale: 1:41,900 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 500 1000 2000 3000

Feet
0 2000 4000 8000 12000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Dane County, Wisconsin
Survey Area Data: Version 21, Sep 6, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Apr 29, 2011—Aug 14, 2020

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
161C2	Fivepoints silt loam, 6 to 12 percent slopes, moderately eroded	0.1	0.0%
161D2	Fivepoints silt loam, 12 to 20 percent slopes, moderately eroded	0.4	0.0%
305B	Richwood silt loam, 1 to 6 percent slopes	15.9	0.4%
1130F	Lacrescent-Dunbarton complex, very stony, 30 to 60 percent slopes	43.5	1.1%
1180B2	Newglarus-Dunbarton silt loams, 2 to 6 percent slopes, moderately eroded	19.3	0.5%
1180C2	Newglarus-Dunbarton silt loams, 6 to 12 percent slopes, moderately eroded	208.0	5.4%
1180D2	Newglarus-Dunbarton silt loams, 12 to 20 percent slopes, moderately eroded	378.3	9.8%
1180E	Newglarus-Dunbarton, very stony, silt loams, 20 to 30 percent slopes, very rocky	80.6	2.1%
1195F	Elkmound-Northfield complex, 30 to 60 percent slopes, very rocky	13.9	0.4%
AsB	Ashdale silt loam, 2 to 6 percent slopes	16.7	0.4%
AsC2	Ashdale silt loam, 6 to 12 percent slopes, eroded	2.3	0.1%
BaC2	Basco silt loam, 6 to 12 percent slopes, eroded	6.6	0.2%
ChB	Chaseburg silt loam, moderately well drained, 2 to 6 percent slopes	18.0	0.5%
DpB	Dodgeville silt loam, 2 to 6 percent slopes	259.1	6.7%
DpC	Dodgeville silt loam, 6 to 12 percent slopes	50.4	1.3%
EdB2	Edmund silt loam, 2 to 6 percent slopes, eroded	159.0	4.1%
EdC2	Edmund silt loam, 6 to 12 percent slopes, eroded	705.4	18.2%
EdD2	Edmund silt loam, 12 to 20 percent slopes, eroded	414.7	10.7%

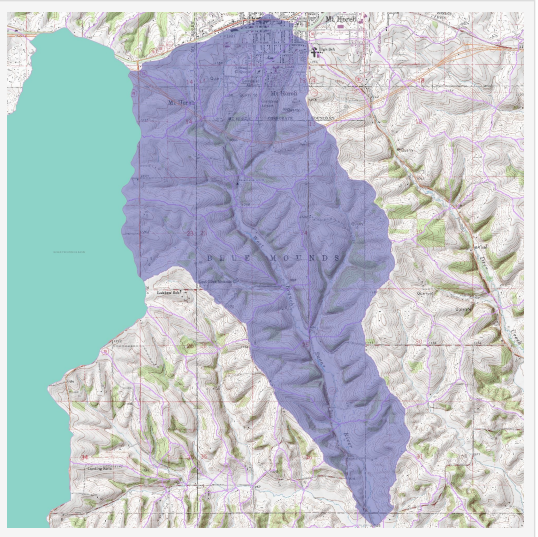
Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EhD2	Eleva sandy loam, 12 to 20 percent slopes, eroded	9.3	0.2%
EmC2	Elkmound sandy loam, 6 to 12 percent slopes, eroded	12.8	0.3%
EmD2	Elkmound sandy loam, 12 to 20 percent slopes, eroded	13.7	0.4%
EmE2	Elkmound sandy loam, 20 to 30 percent slopes, eroded	56.1	1.5%
EmF	Elkmound sandy loam, 30 to 60 percent slopes	23.4	0.6%
Ev	Elvers silt loam	2.0	0.1%
FeaB2	Festina silt loam, 1 to 6 percent slopes, moderately eroded	19.0	0.5%
GaD2	Gale silt loam, 12 to 20 percent slopes, moderately eroded	8.1	0.2%
HbC2	Hixton loam, 6 to 12 percent slopes, moderately eroded	64.1	1.7%
HbD2	Hixton loam, 12 to 20 percent slopes, moderately eroded	22.2	0.6%
HuA	Huntsville silt loam, 0 to 2 percent slopes	45.0	1.2%
HuB	Huntsville silt loam, 2 to 6 percent slopes	92.7	2.4%
LDF	Landfill	3.8	0.1%
NeB2	Newglarus silt loam, moderately deep, 2 to 6 percent slopes, moderately eroded	24.3	0.6%
NeC2	Newglarus silt loam, moderately deep, 6 to 12 percent slopes, moderately eroded	18.7	0.5%
NeD2	Newglarus silt loam, moderately deep, 12 to 20 percent slopes, moderately eroded	14.8	0.4%
Or	Orion silt loam, 0 to 3 percent slopes, occasionally flooded	61.3	1.6%
Ot	Otter silt loam	105.1	2.7%
PrC	Port Byron silt loam, 6 to 12 percent slopes	284.3	7.4%
QUA	Quarry	20.9	0.5%
RaA	Radford silt loam, 0 to 3 percent slopes	45.6	1.2%
SnD2	Churchtown silt loam, 12 to 20 percent slopes, moderately eroded	3.2	0.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
SoD	Sogn silt loam, 2 to 20 percent slopes	386.2	10.0%
SoE	Sogn silt loam, 20 to 35 percent slopes	21.9	0.6%
SvC2	Seaton silt loam, driftless valley, 6 to 12 percent slopes, moderately eroded	103.5	2.7%
SvE2	Seaton silt loam, driftless valley, 20 to 30 percent slopes, moderately eroded	2.4	0.1%
TrB	Troxel silt loam, 0 to 3 percent slopes	9.4	0.2%
Totals for Area of Interest		**3,865.9**	**100.0%**

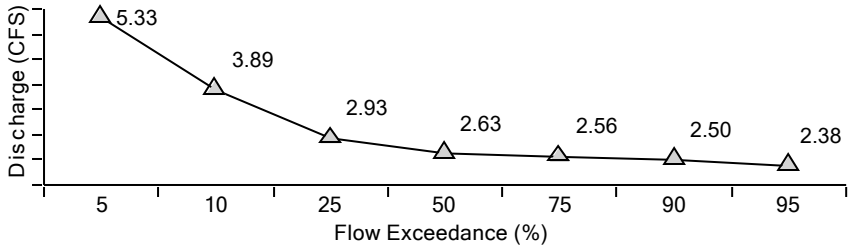
APPENDIX E
PRESTO LITE REPORT

PRESTO-Lite Watershed Delineation Report

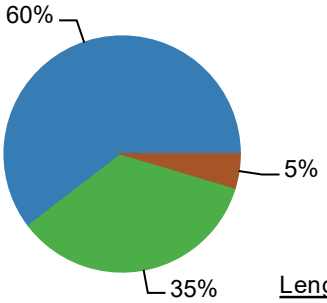
Reach ID: 200020298
Watershed Name: Primrose Branch-West Branch Sugar River
Waterbody Name: West Branch Sugar River
HUC08: Sugar
Watershed Area: 6.07 mi²
Average Annual Precipitation: 35.39in



Stream Flow

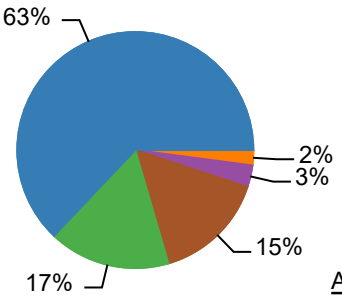


Tributary Stream Type



Type	Length
Cool-Cold Headwater	12761 ft
Coldwater	7380 ft
Cold Headwater	974 ft
Cool-Cold Mainstem	0 ft
Cold Mainstem	0 ft
Large River	0 ft
Macroinvertebrates	0 ft
Warm Headwater	0 ft
Warm Mainstem	0 ft

Landcover



Type	Area
Agriculture	3.81 mi²
Urban	1.01 mi²
Forest	0.93 mi²
Grassland	0.18 mi²
Barren	0.13 mi²
Wetland	0.01 mi²

PRESTO Phosphorus Load Estimate

Avg. Annual Nonpoint Phosphorous Load (80% Confidence Interval)	6,828 (2,885 - 16,159) lbs
Number of Facilities (Individual Facility Information below)	1
Avg. Annual Point-source Phosphorous Load (2010 - 2012 total of all facilities)	1,135lbs
Most Likely Point : Nonpoint Phosphorous Ratio	14% : 86%
Low Estimate Point : Nonpoint Phosphorous Ratio (Adaptive Management)	7% : 93%

Adaptive Management Results

Facilities Discharging to the Primrose Branch-West Branch Sugar River Watershed:

Facility Name	Permit #	Outfall #	Waste Type	Receiving Water	Avg. Phosphorus Load (lbs.) (2010 - 2012)
MOUNT HOREB WASTEWATER TREATMENT FACILITY	0020281	001	Municipal	West Branch Sugar River	1135

Watershed Analysis Limitations

- This analysis relies on pre-defined catchments from the Wisconsin Hydrography Data-Plus and may not delineate from the exact location required. When assessing phosphorus loads for specific facility in support of efforts such as adaptive management, care should be taken to ensure that additional downstream point sources do not exist. For adaptive management information related to specific facilities please reference the PRESTO website http://dnr.wi.gov/topic/surfacewater/presto.html
- Delineation of watersheds is based on a topographic assessment and therefore do not account for modified drainage networks such as stormwater sewer systems and ditched agriculture.
- If a watershed requires delineation from an exact location the user may use the desktop version of PRESTO that requires ESRI ArcGIS. The PRESTO tool and default datasets can be downloaded at http://dnr.wi.gov/topic/surfacewater/presto.html
- Data sources for this report originate from the WDNR's Wisconsin Hydrography Data-Plus value-added dataset and the point and non-point source loading information including in the WDNR's PRESTO model.
- If you have questions about the report generated from the PRESTO-Lite application please contact: DNRWATERQUALITYMODELING@wisconsin.gov

APPENDIX F
SURFACE WATER SAMPLING PLAN

F.01 SAMPLING PLAN PURPOSE AND OVERVIEW

The Village of Mount Horeb, Wisconsin (Village) operates a water pollution control facility (WPCF) that discharges into the West Branch of the Sugar River. The purpose of this plan is to provide additional phosphorus water quality data and flow data at selected locations in the receiving stream. This data will be used to supplement the existing in-stream phosphorus data, which will be necessary for purposes of developing the adaptive management plan and setting load reduction goals. Future data will also be used to monitor impacts of improvements and ultimately compliance.

F.02 SAMPLING LOCATIONS

As part of the adaptive management strategy, the Village will need to conduct in-stream sampling to monitor for phosphorus. The following sampling locations are recommended:

A. Sampling Location 1 (Surface Water Integrated Monitoring System [SWIMS] Station ID 133216)

Sampling Location 1 is located upstream of the WPCF outfall where the West Branch Sugar River crosses Docken Road. This location will be sampled to better quantify upstream phosphorus concentrations and loads. A photograph of the sampling location is shown in Figure F.02-1. Samples will be collected from the center of the stream.

Figure F.02-1 Sampling Location 1 Photograph

B. Sampling Location 2 (SWIMS Station ID 10009700)

Sampling Location 2 is located near Sand Rock Road and Barton Road. This location will be sampled to better quantify phosphorus loads from the area between the WPCF outfall and Sampling Location 2. A photograph of the sampling location is shown in Figure F.02-2. Samples will be collected from the center of the stream.

Figure F.02-2 Sampling Location 2 Photograph

C. Sampling Location 3 (SWIMS Station ID 10009483)

Sampling Location 3 is located near County Highway JG and Lewis Road. This sampling point is the point at which compliance with the water quality criteria is required. It will also help quantify phosphorus losses between Sampling Locations 1 and 2. A photograph of Sampling Location 3 is shown in Figure F.02-3. Samples will be collected from the center of the stream.

Figure F.02-3 Sampling Location 3 Photograph

A map of the three sampling locations is shown in Figure F.02-4.

F.03 SAMPLING FREQUENCY AND TIMING

At least one sample should be collected each month from May through October on a predetermined date regardless of weather conditions according to the Wisconsin Department of Natural Resources (WDNR) guidance. However, more than one sample may be collected in a month. Collection of two samples from May through October is recommended. One sample per month for the remaining months is also recommended. Results from all samples collected during a 28-day period are averaged and counted as a single sample.

In-stream flow measurements shall be taken at each sampling location. Flow measurements will be calculated using velocity measurements retrieved from a hand held velocity meter.

F.04 FIELD PROCEDURE

The sampling procedure will be as follows:

1. Collect samples on predetermined days regardless of weather.

2. Collect samples at the center of the stream (or area of highest flow) at each location, approximately 3 to 6 inches below the water surface.

3. Rinse the sample bottle three times with water from the same location as the sample. Care should be taken to disturb the sampling area as little as possible.

4. Collect a grab sample using a pole with a sample bottle attached or other means as appropriate for the circumstances. Completely immerse the sampling bottle when taking the sample. A small hole in the cap of the bottle should allow water into the sample bottle without disturbing the sediment or water surface.

5. Samples are to be preserved and refrigerated at the Village's WPCF laboratory. The sample will be analyzed for total phosphorus in house at the Village's WPCF laboratory.

F.05 QUALITY ASSURANCE

The Village should follow standard WDNR required protocol in the handling and analysis of all samples. Adequate blanks, duplicates, or other quality assurance/quality control samples should be collected and analyzed as needed to assure high quality results. Finally, a checklist is included to further help Village staff understand what is required each time sampling is to be performed.

Phosphorus Sampling Form
Village of Mount Horeb

Date and Time: _____
Operator(s): _____
Weather Conditions: _____
Precipitation: _____

Stream Conditions	Sampling Location		
	1	2	3
Odor			
Surface Material			
Turbidity			
Temperature			
Notes			

Sampling Procedure:

1. Collect samples on predetermined days, regardless of weather.

2. The sampling locations are as follows:

   a. Sampling Location 1: Upstream of the outfall at Docken Road.
   b. Sampling Location 2: Near Sand Rock Road and Barton Road.
   c. Sampling Location 3: Near County Highway JG and Lewis Road.

3. Take samples from the center of the West Branch of the Sugar River at the area of greatest flow at approximately 3 to 6 inches below the water surface.

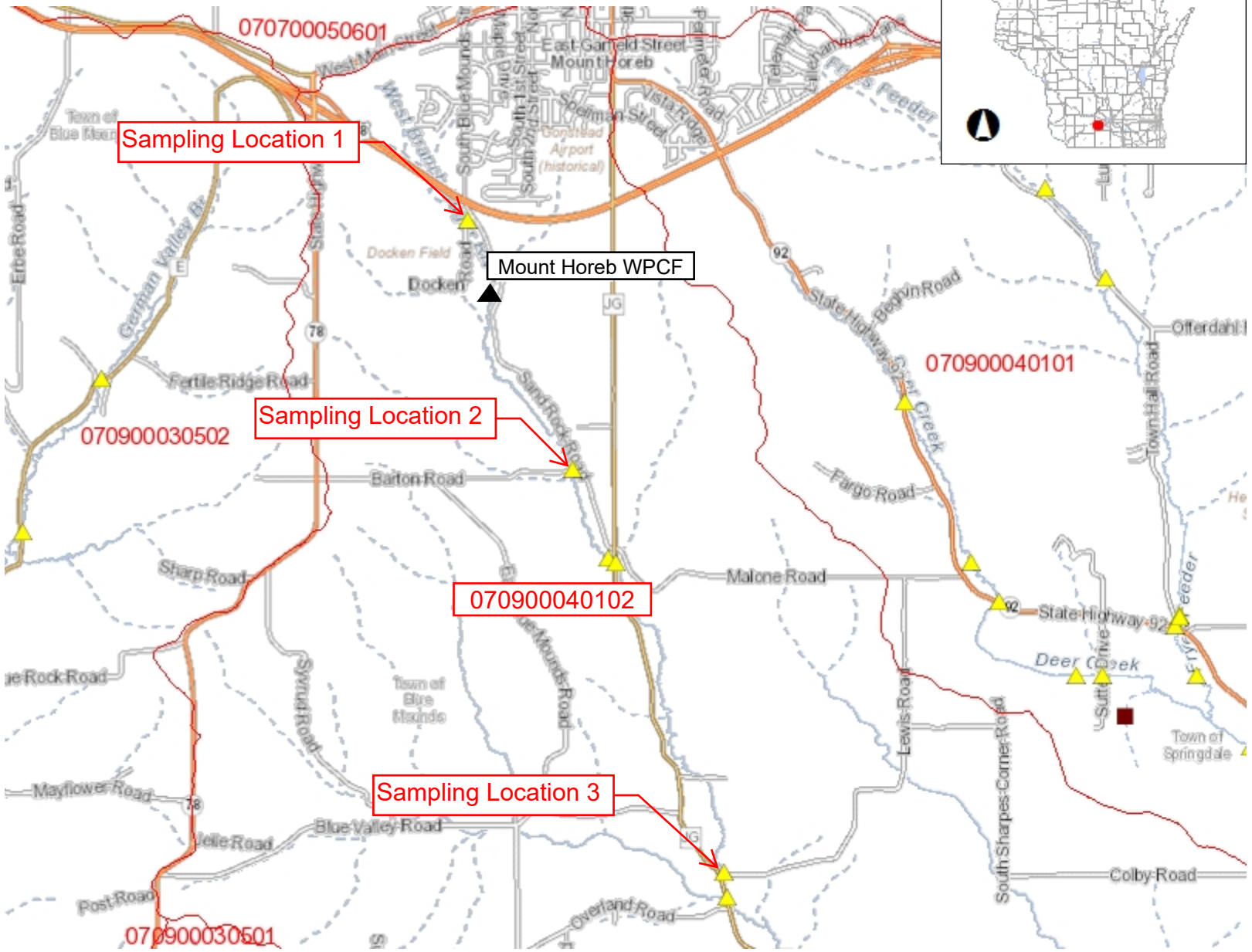
4. Rinse the sample bottle three times with water from the same location as the sample. Care should be taken to disturb the sampling area as little as possible.

5. Finally, collect the grab sample and have someone wearing gloves cap the bottle.

6. Add the prescribed amount of sulfuric acid (H_2SO_4) (generally 2.0 milliliters [mL]) at the Village's WPCF laboratory, and cap and invert several times to mix. Uncap and check pH by touching pH paper to residual water on the inside cap. Add additional acid if a pH of 2 or less is not achieved.

7. Refrigerate the sample. The sample will be analyzed for total phosphorus.

Mount Horeb WPCF Sampling Locations



Legend

- Station Points with Recent Data (10 years)
- USGS Gage Stations
  - Active
  - Inactive
- Surface Water Outfalls
- 12-digit HUCs (Subwatersheds)
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

Notes

1.5 0 0.75 1.5 Miles

NAD_1983_HARN_Wisconsin_TM

1: 47,520

APPENDIX G
PHOSPHORUS DATA

Table G-1 Phosphorus Data

Month	Influent Average Flow (MGD)	Influent Average TP Concentration (mg/L)	Influent TP Load (lb/day)	Effluent Average TP Concentration (mg/L)	Effluent Average TP Load (lb/day)
January 2021	0.51	8.23	33.22	0.59	2.5
February 2021	0.446	NA	NA	0.7	2.62
March 2021	0.462	NA	NA	0.45	1.72
April 2021	0.454	2.95	10.09	0.99	3.76
May 2021	0.428	NA	NA	0.96	3.44
June 2021	0.413	NA	NA	0.16	0.55
July 2021	0.415	NA	NA	0.29	1
August 2021	0.422	NA	NA	0.53	1.85
September 2021	0.424	3.25	11.66	0.49	1.75
October 2021	0.434	9.84	37.98	0.58	2.11
November 2021	0.42	9.11	31.94	0.43	1.52
December 2021	0.395	NA	NA	0.12	0.4
January 2022	0.395	NA	NA	0.13	0.42
February 2022	0.39	15.2	49.44	0.11	0.36
March 2022	0.401	8.15	27.23	0.12	0.39
April 2022	0.443	8.55	31.57	0.13	0.44
May 2022	0.481	9.7	38.94	0.23	0.86
June 2022	0.53	5.35	23.65	0.4	1.66
July 2022	0.466	NA	NA	0.45	1.57
August 2022	0.442	NA	NA	0.69	1.81
September 2022	0.454	6.12	23.16	0.39	4.53
October 2022	0.422	8.78	30.86	0.2	0.73
November 2022	0.428	6.6	23.58	0.14	0.51
December 2022	0.454	NA	NA	0.12	0.46
January 2023	0.452	13.25	49.94	0.1	0.45
February 2023	0.48	NA	NA	0.07	0.33
March 2023	0.568	NA	NA	0.12	0.56
April 2023	0.599	NA	NA	0.13	0.64
May 2023	0.502	NA	NA	0.59	2.5
June 2023	0.46	NA	NA	0.31	1.2
July 2023	0.469	10.65	41.66	0.66	2.62
August 2023	0.481	NA	NA	0.73	3.1
September 2023	0.433	41.4	149.62	0.54	2.15
October 2023	0.433	NA	NA	0.27	1.06
November 2023	0.429	6.1	21.8	0.12	0.46
2021	**0.435**	**6.68**	**24.98**	**0.52**	**1.94**
2022	**0.442**	**8.56**	**31.05**	**0.26**	**1.15**
2023	**0.482**	**17.85**	**65.76**	**0.33**	**1.37**
Overall Average	**0.452**	**10.19**	**37.43**	**0.37**	**1.49**

APPENDIX H
EROSION VULNERABILITY INDEX MAPS

Legend

- Sample Location
- Surface Water Outfall
- Streams and Rivers

EVI

Value

High : 3

Low : 0

Sample Location 1

Mount Horeb WPCF

Sample Location 2

Sample Location 3

N

W E

S

0 500 1,000 2,000

Feet

FIGURE 2.04-8
1123.063

STRAND ASSOCIATES®

EROSION VULNERABILITY INDEX MAP
WATERSHED ADAPTIVE MANAGEMENT PLAN
VILLAGE OF MOUNT HOREB
DANE COUNTY, WISCONSIN

Path: \\strand.com\projects\MAD\1100--1199\1123\063\Design\s-Studies-Reports_Wastewater-Treatment\EVAA\EVI.mxd User: CobyW Date: 10/9/2022 Time: 11:59:01 AM

Legend

- Sample Location
- Surface Water Outfall
- Streams and Rivers

Crop

rotation

- No agriculture
- Pasture/Hay/Grassland
- Dairy Rotation
- Potato/Grain/Veggie Rotation
- Cash Grain
- Continuous Corn

Sample Location 1

Mount Horeb WPCF

Sample Location 2

Sample Location 3

N
W E
S

0 500 1,000 2,000
Feet

STRAND ASSOCIATES®

FIGURE 2.04-9
1123.063

CROP ROTATION MAP
WATERSHED ADAPTIVE MANAGEMENT PLAN
VILLAGE OF MOUNT HOREB
DANE COUNTY, WISCONSIN

Path: \\strand.com\projects\MAD\1100--1199\1123\063\Designs-Studies-Reports_Wastewater-Treatment\EVAL\CROP ROTATION.mxd User: ColyW Date: 12/9/2022 Time: 12:04:21 PM

Legend

- Sample Location
- Surface Water Outfall
- Streams and Rivers

Parcels

MEAN

- 0.000000 - 0.497181
- 0.497182 - 0.901256
- 0.901257 - 1.221744
- 1.221745 - 1.518496
- 1.518497 - 1.867696
- 1.867697 - 2.444370

Sample Location 1

Mount Horeb WPCF

Sample Location 2

Sample Location 3

N W E S

0 500 1,000 2,000

Feet

FIGURE 2.04-9
1123.063

EROSION VULNERABILITY INDEX PARCEL MAP
WATERSHED ADAPTIVE MANAGEMENT PLAN
VILLAGE OF MOUNT HOREB
DANE COUNTY, WISCONSIN

Path: Y:\land.com\projects\MMDA\1100--1199\1123063\Designs-Studies-Reports_Wastewater-Treatment\EVA\ALEVI PARCELS.mxd User: CdyW Date: 12/9/2022 Time: 12:06:48 PM

APPENDIX I
DANE COUNTY AGREEMENT FOR ADAPTIVE MANAGEMENT SERVICES

Dane County Contract Cover Sheet

Revised 01/2023

Dept./Division	LWRD/Admin		
Vendor Name	Village of Mount Horeb	**MUNIS #**	8471
Brief Contract Title/Description	LWRD staff will plan, design & certify implementation of conservation practices that reduce the transport and delivery of nutrients & sediment to nearby surface water.		
Contract Term	signing until cancelled		
Contract Amount	LWRD charging vendor $91.96/hr		

Contract # Admin will assign	15150

Type of Contract	
☐	**Dane County Contract**
■	**Intergovernmental**
☐	**County Lessee**
☐	**County Lessor**
☐	**Purchase of Property**
☐	**Property Sale**
☐	**Grant**
☐	**Other**

Department Contact Information	
Name	Kyle Minks
Phone #	608.669.1864
Email	minks.kyle@countyofdane.com
Purchasing Officer	

Vendor Contact Information	
Name	John Klein
Phone #	608.437.3101
Email	john.klein@mounthorebwi.info

Purchasing Authority		
☐	**$12,000 or under – Best Judgment** (1 quote required)	
☐	**Between $12,000 – $43,000 ($0 – $25,000 Public Works)** (3 quotes required)	
☐	**Over $43,000 ($25,000 Public Works)** (Formal RFB/RFP required)	**RFB/RFP #**
☐	**Bid Waiver – $43,000 or under** ($25,000 or under Public Works)	
☐	**Bid Waiver – Over $43,000** (N/A to Public Works)	
■	**N/A – Grants, Leases, Intergovernmental, Property Purchase/Sale, Other**	

MUNIS Req.					
Req #	**Org:** LWRCONSV	**Obj:** 81740	**Proj:**	
	Org:	**Obj:**	**Proj:**	
Year	**Org:**	**Obj:**	**Proj:**	

Budget Amendment	
☐	A Budget Amendment has been requested via a Funds Transfer or Resolution. Upon addendum approval and budget amendment completion, the department shall update the requisition in MUNIS accordingly.

Resolution Required if contract exceeds $100,000 ($40,000 PW)			
■	Contract does not exceed $100,000 ($40,000 Public Works)		
☐	Contract exceeds $100,000 ($40,000 Public Works) – resolution required.	**Res #**	
☐	A copy of the Resolution is attached to the contract cover sheet.	**Year**	

CONTRACT MODIFICATIONS – Standard Terms and Conditions		
☐ No modifications.	☐ Modifications and reviewed by:	■ Non-standard Contract

APPROVAL	
Dept. Head / Authorized Designee	
Hicklin, Laura	Digitally signed by Hicklin, Laura Date: 2023.06.22 16:16:30 -05'00'

APPROVAL – Contracts Exceeding $100,000	
Director of Administration	**Corporation Counsel**

APPROVAL – Internal Contract Review – Routed Electronically – Approvals Will Be Attached		
DOA:	**Date In:** 6/22/23 **Date Out:** _____	☒ Controller, Purchasing, Corp Counsel, Risk Management

Goldade, Michelle

From: Goldade, Michelle
Sent: Tuesday, June 27, 2023 10:39 AM
To: Hicklin, Charles; Rogan, Megan; Gault, David
Cc: Stavn, Stephanie; Oby, Joe
Subject: Contract #15150
Attachments: 15150.pdf

Tracking:

Recipient	Read	Response
Hicklin, Charles	Read: 6/27/2023 11:39 AM	Approve: 6/27/2023 11:39 AM
Rogan, Megan	Read: 6/27/2023 10:54 AM	Approve: 6/27/2023 10:55 AM
Gault, David	Read: 6/27/2023 10:51 AM	Approve: 6/27/2023 10:55 AM
Stavn, Stephanie	Read: 6/27/2023 4:00 PM	
Oby, Joe		

Dave – as Dan is out of the office this week, could you please approve for Risk Management as well?

Please review the contract and indicate using the vote button above if you approve or disapprove of this contract.

Contract #15150
Department: Land & Water Resources
Vendor: Village of Mount Horeb
Contract Description: Provide staff to plan, design & certify implementation of conservation practices
Contract Term: ongoing
Contract Amount: LWRD charging $91.96/hr

Michelle Goldade
Administrative Manager
Dane County Department of Administration
Room 425, City-County Building
210 Martin Luther King, Jr. Boulevard
Madison, WI 53703
PH: 608/266-4941
Fax: 608/266-4425
TDD: Call WI Relay 711

Please Note: I currently have a modified work schedule...I am in the office Mondays and Wednesdays and working remotely Tuesdays, Thursdays and Fridays in accordance with COVID 19 response guidelines.

COUNTY OF DANE
INTERGOVERNMENTAL AGREEMENT

AGREEMENT NO. 15150

EXPIRATION DATE: ANYTIME UPON 90 DAYS NOTICE

DEPARTMENT: Land and Water Resources

THIS AGREEMENT, made and entered into by and between the COUNTY OF DANE (hereafter referred to as "COUNTY") and the Village of Mount Horeb (hereinafter referred to as "MUNICIPALITY");

W I T N E S S E T H:

WHEREAS COUNTY, whose address is c/o County Administration 425 City-County Building, 210 Martin Luther King, Jr., Blvd., Madison, WI 53709, has licensed and certified staff to plan, design, and certify the implementation of conservation practices that reduce the transport and delivery of nutrients and sediments to nearby surface water; and

WHEREAS county staff have extensive experience in assisting rural landowners and agricultural producers with the voluntary implementation of conservation practices.

WHEREAS MUNICIPALITY, whose address is: 2447 Sand Rock Road, Mount Horeb, Wisconsin 53572 is pursuing Watershed Adaptive Management as defined in NR 217.18 in watershed HUC 12: 070900040102 and desires to have COUNTY, who is willing and able, provide services set forth herein; and

WHEREAS MUNICIPALITY, agrees to commit financial resources to landowners within the HUC 12: 070900040102 watershed for the installation of conservation practices that reduce phosphorus; and

WHEREAS MUNICIPALITY, is implementing its Wisconsin Department of Natural Resources approved Adaptive Management Plan titled: Watershed Adaptive Management Plan and Final Compliance Alternatives Plan for Phosphorus Removal; and

WHEREAS, pursuant to Section 66.0301, Wis. Stats., COUNTY and MUNICIPALITY wish to formalize an agreement regarding conservation practices that may be used for compliance for the MUNICIPALITY'S Adaptive Management Plan;

NOW, THEREFORE, in consideration of the above premises and the mutual covenants of the parties hereinafter set forth, the receipt and sufficiency of which is acknowledged by each party for itself, COUNTY and MUNICIPALITY do agree as follows:

1.1 The term of this Agreement shall commence as of the date by which all parties hereto have executed this Agreement and shall have no fixed expiration date. Either party may terminate this Agreement without cause on 90 days advance written notice, provided that the requirements of this paragraph do not apply to a termination under either paragraph 5.2 or paragraph 5.4.

2.1 COUNTY agrees to perform the following planning service:

a. Assist with finding landowners and potential projects that reduce nutrient and sediment runoff.
b. Work with landowners to establish objectives that reduce nutrient and sediment runoff.
c. Identify and evaluate alternative conservation practices and/or engineered solutions that could result in total phosphorus and total suspended solids reductions as determined through one-on-one conversations and farm walk-overs with landowners, producers, renters and consultants.
d. Analyze available information to establish current baseline conditions including estimated total phosphorus and total suspended solid losses.
e. Formulate options for installing conservation practices and/or structural practices to address total phosphorus and total suspended solids and evaluate the effectiveness of these options with landowners.
f. Consult with landowners to make conservation practice implementation plans that can reduce total phosphorus and total suspended solids and address other resource concerns as appropriate.
g. Assist landowners with developing timelines to implement conservation practices.
h. Develop cost estimates for planned and designed practices where the County is providing the technical services.

2.2 COUNTY agrees to perform the following technical services:

a. Conduct survey and design work for conservation practices.
b. Review third party construction plans when the County is not the primary technical service provider.
c. Conduct construction oversight of practice installation.
d. Verify and document that conservation practices are installed in accordance with the design and applicable technical standards.
e. Calculate and quantify nutrient and or sediment reductions.

2.3 COUNTY agrees to perform the following County administered cost share program services:

a. Discuss with landowners available cost share options.
b. Develop and review cost share agreements with landowners for approved conservation practices and funding sources.
c. Process reimbursement payments in accordance with cost share agreements and contracts.

2.4 COUNTY agrees to provide the following upon request by MUNCIPALITY:

a. Written notice of any potential conservation practices located within the project area resulting from services provided under this agreement. Written notice shall include;
    i. Location and name of potential conservation practice(s) to be implemented
    ii. Name of landowner and or operator implementing the practice
    iii. Estimated phosphorus reductions by practice
    iv. Estimated costs for conservation practice(s) implementation
    v. Estimated staff time and costs

b. An annual report submitted by February 1st of the following year documenting;
   i. Date, name, and location of any conservation practice(s) implemented within the watershed
   ii. Design life expectancy of the practice(s)
   iii. Calculated phosphorus reductions as a result of practice implementation

2.5 MUNICIPALITY or its designee shall:

c. Meet with the County a minimum of twice a year to discuss project progress and conditions set forth in this Agreement.

d. Work with the County on identifying project participants and viable phosphorus reducing conservation projects.

e. Ensure funding for cost share assistance is made available to participants implementing phosphorus reducing conservation practices.

f. Approve or deny funding to participants for the implementation of conservation practices that reduce phosphorus within (45) days of being notified of the funding request.

g. Ensure that any participants generating phosphorus reductions/credits as part of Mount Horeb *Watershed Adaptive Management Plan and Final Compliance Alternatives Plan for Phosphorus Removal* is in compliance with local, State, and Federal rules and regulations. If at any time noncompliance enforcement is brought upon a participant any phosphorus reductions/credits generated by that participant will no longer be utilized by Mount Horeb for compliance with its Wisconsin Pollution Discharge Elimination System (WPDES) permit.

3.1 MUNICIPALITY shall designate an employee or official to serve as its authorized agent for purposes this Agreement. MUNICIPALITY shall notify COUNTY of any change in its authorized agent.

4.1 MUNICIPALITY agrees to reimburse COUNTY for its labor costs under this agreement at the rate of $91.96 per hour, pro-rated for fractions of an hour to the nearest 1/10th hour. Travel time is billable as a labor cost.

4.2 As of April 1st of each year of the term of this Agreement the wage rate set forth in paragraph 4.1 shall be adjusted in accordance with changes in the CPI - All Urban Consumers - Midwest - All Items - Annual. Such adjustments shall be computed by the formula A/B x C = D where A is the Annual CPI Index the most recent year; B is the Annual CPI Index for the next most recent year; C is the wage rate immediately prior to the adjustment; and D is the adjusted wage rate. Alternatively, the formula may be expressed as

$$\frac{\text{Annual CPI of most recent year}}{\text{Annual CPI of next most recent year}} \times \text{Current wage rate before adjustment} = \text{Adjusted wage rate}$$

4.3 MUNICIPALITY agrees to reimburse COUNTY for those miscellaneous direct expenses, other than costs of labor, which COUNTY has informed or will inform MUNICIPALITY from time to time are not included in the labor rate set forth in paragraph 4.1 and which MUNICIPALITY has approved in advance.

4.4 COUNTY shall invoice MUNICIPALITY monthly by the 15th of the month. Billable hours will be documented with time and date per each request or inspection. Invoices shall be due and payable by MUNICIPALITY to COUNTY within 60 days thereafter. Unpaid balances,

which remain outstanding after the due date shall be, assessed a penalty at the rate of one percent (1%) per month on the outstanding balance as of the last day of the month. All payments shall be remitted to the Dane County Land and Water Resources Department 5201 Fen Oak Drive Room 208 Madison, WI 53718. Payments should be made to Dane County Treasurer.

4.5 COUNTY shall not provide services nor seek reimbursement exceeding the Annual Financial Cap without written approval from MUNICIPALITY's Authorized Agent.

4.6 The 2023 Annual Financial Cap is $10,000. MUNICIPALITY will provide written notice to COUNTY with updated Annual Financial Cap amounts by January 31st of each calendar year.

5.1 Neither MUNICIPALITY nor COUNTY shall assign or transfer any interest or obligation in this Agreement, whether by assignment or novation, without the prior written consent of the other party.

5.2 If, through any cause, a party shall fail to fulfill in timely and proper manner its obligations under this Agreement, or if a party shall violate any of the covenants or stipulations of this Agreement, the other party shall thereupon have the right to terminate this Agreement by giving a thirty (30) day written notice to the defaulting or breaching party of such termination and specifying the effective date thereof.

5.3 In the event a party exercises its right to terminate this Agreement under paragraph 5.2, the defaulting or breaching party shall not be relieved of liability to the terminating party for damages sustained by the terminating party by virtue of any default or breach.

5.4 If during the term of this Agreement, failure of the Dane County Board of Supervisors or the State or Federal Governments to appropriate sufficient funds to carry out COUNTY's obligations hereunder shall result in automatic termination of this Agreement as of the date funds are no longer available, provided, however that COUNTY has given MUNICIPALITY not less than sixty (60) days' notice prior to the effective date of any termination under this paragraph.

6.1 MUNICIPALITY agrees to secure at MUNICIPALITY's own expense all personnel necessary to carry out MUNICIPALITY's obligations under this Agreement. Such personnel shall not be deemed to be employees of COUNTY nor shall they or any of them have or be deemed to have any direct contractual relationship with COUNTY.

6.2 Notices, bills, invoices and reports required by this Agreement shall be deemed delivered as of the date of postmark if deposited in a United States mailbox, first class postage attached, addressed to a party's address as set forth above. It shall be the duty of a party changing its address to notify the other party in writing within a reasonable time.

7.1 The MUNICIPALITY and the COUNTY, each for itself, shall be responsible for any injuries, claims or losses arising from or caused by the acts or omissions of its agents or employees acting within the scope of their employment, in accordance with secs. 893.80 and 895.46(1), Wis. Stats. The obligations of the parties under this paragraph shall survive the expiration or termination of this contract.

7.2 In order to protect itself and COUNTY, its officers, boards, commissions, agencies, employees and representatives under the indemnity provisions of paragraph 7.1 above,

MUNICIPALITY will at all times during the term of this Agreement keep in full force and effect comprehensive general liability and auto liability insurance policies issued by a company or companies authorized to do business in the State of Wisconsin and licensed by the Wisconsin Insurance Department, with liability coverage provided for therein in the amounts of at least $1,000,000.00 CSL (Combined Single Limits). Coverage afforded shall apply as primary. COUNTY shall be given ten (10) days advance notice of cancellation or nonrenewal. Upon execution of this Agreement, MUNICIPALITY shall furnish COUNTY with a certificate of insurance listing COUNTY as an additional insured and, upon request, certified copies of the required insurance policies. If MUNICIPALITY's insurance is underwritten on a Claims-Made basis, the Retroactive Date shall be prior to or coincide with the date of this agreement, the Certificate of Insurance shall state that coverage is Claims-Made and indicate the Retroactive Date, MUNICIPALITY shall maintain coverage for the duration of this agreement and for two years following the completion of this agreement. MUNICIPALITY shall furnish COUNTY, annually on the policy renewal date, a Certificate of Insurance as evidence of coverage. It is further agreed that MUNICIPALITY shall furnish the COUNTY with a 30-day notice of aggregate erosion, in advance of the Retroactive Date, cancellation, or renewal. It is also agreed that on Claims-Made policies, either MUNICIPALITY or COUNTY may invoke the tail option on behalf of the other party and that the Extended Reporting Period premium shall be paid by MUNICIPALITY. In the event any action, suit or other proceeding is brought against COUNTY upon any matter herein indemnified against, COUNTY shall give reasonable notice thereof to MUNICIPALITY and shall cooperate with MUNICIPALITY's attorneys in the defense of the action, suit or other proceeding. MUNICIPALITY shall furnish evidence of adequate Worker's Compensation Insurance.

7.3 The parties do hereby expressly agree that COUNTY, acting at its sole option and through its Risk Manager, may waive any and all requirements contained in paragraphs 7.1 and 7.2 above, such waiver to be in writing only. Such waiver may include or be limited to a reduction in the amount of coverage required above. The extent of waiver shall be determined solely by COUNTY's Risk Manager taking into account the nature of the work and other factors relevant to COUNTY's exposure, if any, under this Agreement.

8.1 In the performance of its obligations under this Agreement, both parties agree not to discriminate because of race, religion, marital status, age, color, sex, disability, national origin or ancestry, income level or source of income, arrest record or conviction record, less than honorable discharge, physical appearance, sexual orientation, gender identity, political beliefs, or student status. Both parties further agree not to discriminate against any contractor, subcontractor or person who offers to contract or subcontract for services under this Agreement because of race, religion, color, age, disability, sex, sexual orientation, gender identity or national origin. During the term of this Agreement, each party agrees to abide by its respective affirmative action plan.

9.1 It is expressly understood and agreed to by the parties hereto that in the event of any disagreement or controversy between the parties, Wisconsin law shall be controlling. Venue for any legal proceedings shall be in the Dane County Circuit Court.

9.2 In no event shall the acceptance of any payment required by this Agreement constitute or be construed as a waiver by COUNTY of any breach of the covenants of this Agreement or a waiver of any default of MUNICIPALITY and the acceptance of any such payment by COUNTY while any such default or breach shall exist shall in no way impair or prejudice the right of COUNTY with respect to recovery of damages or other remedy as a result of such breach or default.

9.3 This Agreement is intended to be an agreement solely between the parties hereto and for their benefit only. No part of this Agreement shall be construed to add to, supplement, amend, abridge or repeal existing duties, rights, benefits or privileges of any third party or parties, including but not limited to employees of either of the parties.

9.4 The entire agreement of the parties is contained herein and this Agreement supersedes any and all oral agreements and negotiations between the parties relating to the subject matter hereof. The parties expressly agree that this Agreement shall not be amended in any fashion except in writing, executed by both parties.

9.5 The parties may evidence their agreement to the foregoing upon one or several counterparts of this instrument, which together shall constitute a single instrument.

9.6 This Agreement, and any amendment or addendum relating to it, may be executed and transmitted to any other party by legible facsimile reproduction or by scanned legible electronic PDF copy, and utilized in all respects as, an original, wet-inked manually executed document. Further, this Agreement and any amendment or addendum thereto, may be stored and reproduced by each party electronically, photographically, by photocopy or other similar process, and each party may at its option destroy any original document so reproduced. All parties hereto stipulate that any such legible reproduction shall be admissible in evidence as the original itself in any judicial, arbitration or administrative proceeding whether or not the original is in existence and whether or not such reproduction was made by each party in the regular course of business. This term does not apply to the service of notices under this Agreement.

IN WITNESS WHEREOF, COUNTY and MUNICIPALITY, by their respective authorized agents, have caused this Agreement to be executed, effective as of the date by which all parties hereto have affixed their respective signatures, as indicated below.

FOR COUNTY:

Date Signed: 6/29/2023

Joseph T. Parisi

JOSEPH T PARISI, County Executive

* * * *

FOR MUNICIPALITY:

Date Signed: 6/12/23

Date Signed: 6/12/23 Nic Owen

* Type or print names below signature lines

APPENDIX J
WQT PRACTICES TABLE

Management Practice	Uncertainty Factor[1]	Applicable Technical Standard	Method for Calculating Pollutant Load Reductions	Notes
Agricultural Practices				
Whole Field Management: Requires an approved nutrient management plan, filter strips/buffer strips[3], grassed waterways[4], conservation or no till[5], and cover crops. Additional practices as deemed by NRCS or county conservationist may be required to protect against mobilization and delivery of pollutants.	1	NRCS 590, 393, 332, 412, 345 329, 340 and 330	SnapPlus or equivalent model results compared to baseline	Requires an approved NRCS 590 nutrient management plan (NMP) that meets both the soil test-P and PI requirements. Requires a draw down strategy for nutrient concentrations that are above University of Wisconsin-Extension soil fertility recommendations. No application of manure, biosolids, or industrial wastes on snow covered or frozen ground or on fields with high groundwater or tile drainage. A crop or livestock producer engaged in a trade agreement must have all fields under an approved NMP, not just fields engaged in the trade.
Companion Crops (perennial vegetation)	1	NRCS 340	SnapPlus or equivalent model results compared to baseline Model as perennial cover	Companion crops must be established to provide continuous protection to soil surface and placed in support of Nutrient Management and supporting practices outlined below.
Conservation Easement	1	NRCS 327	SnapPlus or equivalent model results compared to baseline	Land in perennial vegetation.

Management Practice	Uncertainty Factor[1]	Applicable Technical Standard	Method for Calculating Pollutant Load Reductions	Notes
Nutrient Management and supporting practices:	2 (3)	NRCS 590		An approved NMP is required with any of the listed supporting practices. All supporting practices receive the same uncertainty factor as the NMP. To receive an uncertainty factor of 2, a crop or livestock producer engaged in a trade agreement must have all fields under an approved NMP, not just fields engaged in the trade. An uncertainty factor of 2, instead of (3), may be used when documentation can be provided through historic cropping records **or** soil testing that nutrient levels are stable or dropping, an indication of adherence to the NMP. An uncertainty factor of (3) is required if fields are not brought into compliance with ss. NR 151.02 and NR 151.04, Wis. Adm. Code. An uncertainty factor of (3) is required if fields are managed without a NMP or with a NMP that does not meet the NRCS 590 standard. Current and historic field and farm information/cropping records must be described and captured within SnapPlus to allow DNR to verify phosphorus loss calculations are accurate and phosphorus loss is not shifted to other fields. No application of manure, biosolids or industrial wastes allowed on snow-covered or frozen ground or on fields with high groundwater or tile drainage. Establishing **grassed waterways** on fields in support of nutrient management and other supporting practices lowers the uncertainty factor to 1.5.
Tillage Options[5]				
Mulch Till	2 (3)	NRCS 345		
No Till	2 (3)			
		NRCS 329		
Riparian Filter Strip (edge of field)	2 (3)	NRCS 393		
Grassed Waterway	See Notes	NRCS 412		
Cover Crop	2 (3)	NRCS 340	SnapPlus or equivalent model results compared to baseline	
Other practices simulated in SnapPlus	2 (3)			
CAFO and Barnyard Production Area Practices	2	NRCS 362	University of Wisconsin Barnyard Tool APLE or equivalent modeling method	
Diversion	2	NRCS 558		
Roof Runoff Structure	4	NRCS 635		
Vegetated Treatment System	4	NRCS 656		
Constructed Wetland				
Sediment Control Basin	2	NRCS 350	RUSLE2	For agricultural runoff control.

Management Practice	Uncertainty Factor[1]	Applicable Technical Standard	Method for Calculating Pollutant Load Reductions	Notes
Streambank Stabilization and Shoreline Protection			Appropriate methods include NRCS recession calculation. See Appendix F for detailed methods.	For livestock producers, streambank stabilization must be accompanied by riparian fencing or other controls to prevent destruction of streambanks.
Without aquatic habitat adjustment	3	NRCS 580 NRCS 382		
With aquatic habitat adjustment	2	NRCS 580 NRCS 395		
Dredging, Lake Treatment and Wetland Restoration				
Lakes and Reservoirs			Load reductions calculated by determining seasonal flux rate.	Dredging must remove sediment to the original or native layer. Seasonal flux rate should be calculated based on a calibrated model and monitoring data. Annual load reductions are generated based on the calculated seasonal flux rate. Load reductions are generated on a prorated annual basis until the flux rate returns to pre-dredging flux rate conditions. Contact WDNR when developing monitoring plan.
Dredging and removal of in-situ sediment and nutrients or treatment (i.e., alum)	3			
Dredging and removal of in-situ sediment and nutrients or treatment accompanied by aquatic habitat restoration.	2	NRCS 395		
Rivers or Streams				
Dredging with stable stream banks, installation of appropriately wide buffer strips and supporting upland practices addressing pollutants of concern	2	NRCS 580		
Dredging without stabilized stream banks or without supporting upland practices	3			
Wetland Restoration	1	NRCS 657 NRCS 658	SnapPlus or equivalent model results compared to baseline	Load Reductions are generated for land placed out of production such as the conversion of agricultural land back to wetland. Credits may not be generated by using wetlands to treat runoff. See Appendix J – Wetland Restoration for more information.

Management Practice	Uncertainty Factor[1]	Applicable Technical Standard	Method for Calculating Pollutant Load Reductions	Notes
Urban Practices				
Bioretention for Infiltration	2	DNR 1004	SLAMM, P8, or Recarga	Urban practices are not to be installed in wetlands, as they will be ineffective in hydric soils with a high water table.
Infiltration Basin	2	DNR 1003	SLAMM, P8, or Recarga	
Infiltration Trench	2	DNR 1007	SLAMM, P8, or Recarga	
Proprietary Storm Water Sedimentation Devices	2	DNR 1006	SLAMM	
Vegetated Infiltration Swales	2	DNR 1005	SLAMM or P8	
Wet Detention Pond	2	DNR 1001	SLAMM or P8	

[1] Uncertainty factors provided in this table are applicable to TP and TSS only.

[2] When using SnapPlus or an equivalent model to calculate load reductions, use the same soil type and field slope when calculating pollutant loads prior to and after installation of the management practice.

[3] Filter strips / buffer strips required adjacent to concentrated flow areas, intermittent or perennial.

[4] Grassed waterways required for concentrated flow areas.

[5] No till shall conform to NRCS 329 Standard; Conservation till shall conform to NRCS 345 Standard with a calculated STIR value of 35 or less.

For more location information please visit www.strand.com

Office Locations

Ames, Iowa | 515.233.0000

Brenham, Texas | 979.836.7937

Cincinnati, Ohio | 513.861.5600

Columbus, Indiana | 812.372.9911

Columbus, Ohio | 614.835.0460

Joliet, Illinois | 815.744.4200

Lexington, Kentucky | 859.225.8500

Louisville, Kentucky | 502.583.7020

Madison, Wisconsin* | 608.251.4843

Milwaukee, Wisconsin | 414.271.0771

Nashville, Tennessee | 615.800.5888

Phoenix, Arizona | 602.437.3733

*Corporate Headquarters

STRAND ASSOCIATES®