Adaptive Management Plan for WPDES Permit Total Phosphorus Compliance

Village of Grafton, WI

Issued January 2020
Symbiont Project No. W190209

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TABLE OF CONTENTS

Tables

Figures

Appendices

Section 1.0
INTRODUCTION

The Village of Grafton has spent the past 4 years preparing a plan to meet water quality-based effluent limits (WQBELs) for phosphorus in accordance with the mass values from the total maximum daily load (TMDL) calculation for the Milwaukee River. The planning effort included reviewing how to optimize phosphorus reductions with the current infrastructure, studying options for improving the wastewater treatment process, and estimating watershed reductions that could be used to comply with the permit limits. The Village of Grafton has elected to implement a watershed management plan commonly referred to as Adaptive Management (AM) to achieve compliance with the phosphorus mass allocations found in the Wisconsin Pollution Discharge Elimination System (WPDES) permit.

1.1 BACKGROUND

The Village of Grafton operates a wastewater treatment plant (WWTP) in Ozaukee County. Effluent from the WWTP is discharged to the Milwaukee River in the Milwaukee River (south) watershed of the Milwaukee River basin within TMDL reach MI-17. The effluent is regulated by WPDES Permit No. WI-0020184-09-1.

The Wisconsin Department of Natural Resources (WDNR) reviewed test data collected from the Milwaukee River in 2012 by the Village of Grafton and determined that the median phosphorus concentration of the river upstream from the WWTP outfall was 0.077 mg/L. Wisconsin Administrative Code Chapter NR 102 lists the water quality phosphorus criterion for the Milwaukee River within TMDL reach MI-17 as 0.075 mg/L.

The Village of Grafton has developed a plan that will bring the Milwaukee River into compliance with the NR 102 water quality criterion for phosphorus.

1.2 SUMMARY OF WQBEL VALUES

The Milwaukee River TMDL, approved by the United States Environmental Protection Agency (U.S. EPA), contains mass allocations for all point and non-point sources within the watershed. Monthly mass allocations for point sources are included in Table A.17 on page 70 of Appendix A of the TMDL report. The TMDL mass allocations were recently added to the Village's WPDES permit as daily average mass values. The following table shows both the monthly and daily mass values.

Table 1-1.
Mass Allocations for the Village of Grafton from the TMDL

Total Phosphorus			
Month	**Monthly Mass (lb)**	**Days per Month**	**Daily Average (lb/day)**
January	91.29	31	2.94
February	95.53	28	3.41
March	87.07	31	2.81
April	88.55	30	2.95
May	96.38	31	3.11
June	96.49	30	3.22
July	86.83	31	2.80
August	84.04	31	2.71
September	86.50	30	2.88
October	72.21	31	2.33
November	88.49	30	2.95
December	82.55	31	2.66
Annual Limit	1,055.94		

The month with the most restrictive limit is October, with a monthly mass allocation of 72.21 lbs for an average of 2.33 lb/day. The months with the least restrictive limits are June and February, with monthly mass allocations of 96.49 and 95.53 lbs and daily averages of 3.22 and 3.41 lb/day respectively.

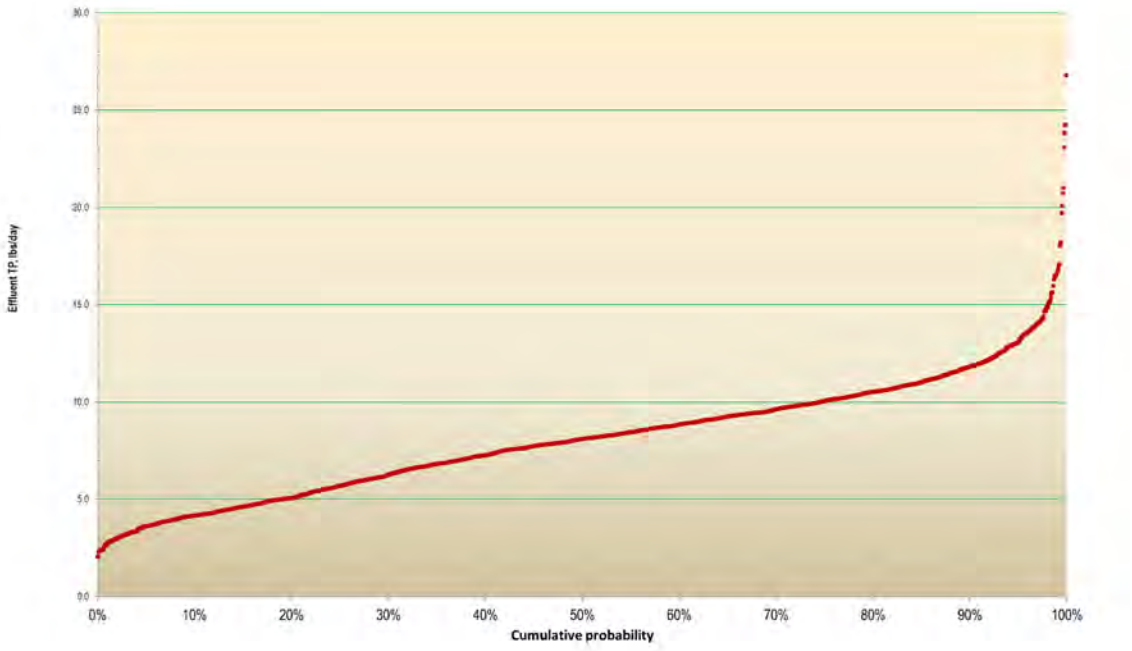
1.3 SUMMARY OF EFFLUENT PHOSPHORUS

The Village of Grafton monitors effluent phosphorus concentration and influent flow in accordance with WPDES permit requirements. Effluent phosphorus concentration and mass for the existing treatment facility operating under current flows and loading conditions has been reviewed throughout the planning period over the last four years. Data compiled from January 2012 through April 2019 indicated the monthly average daily mass of phosphorus in the effluent was 8.15 lb/day with a range from 3.61 to 14.44 lb/day. These values continue to exceed the mass allocations from the TMDL as shown in Table 1-1.

For the purpose of the AM plan, we will focus on phosphorus effluent mass because of compliance with the allocation from the TMDL. Also, effluent mass compares better to non-point source reductions which are often computed in mass reductions.

A cumulative distribution of the effluent mass data was prepared (see Figure 1-1). This data indicates that under current operating conditions, the existing treatment plant is rarely able to achieve a daily effluent phosphorus mass value of 3.4 lb/day or less.

Figure 1-1.
Cumulative Distribution of Total Phosphorous Effluent Mass for Village of Grafton
Jan. 2012 through April 2019



1.4 SUMMARY OF THE TREATMENT PROCESS

The Village of Grafton uses physical, biological, and chemical processes to treat its incoming raw wastewater flows at its WWTP prior to discharge to the Milwaukee River. The WWTP has an average design flow of 2.50 million gallons per day (MGD).

Raw sewage enters the WWTP headworks facilities via 24-inch and 30-inch interceptor sewers. Flows pass through a mechanical bar screen operating in conjunction with a washer compactor unit and then to aerated grit removal for further non-treatable material removal. Ferrous chloride is added at the headworks for removal of influent phosphorus.

Raw wastewater screw lift pumps convey flow to a splitter box that equally distributes flow to either of two primary clarifier units, where large suspended solids settle and floating material is skimmed off. Primary effluent flows are then re-combined and split equally once again between dual single-stage compact activated sludge plants for biological treatment. The compact plants utilize fine bubble aeration and specifically designed selector zones.

Figure 1-2.
Aerial View of the Village of Grafton WWTP

In the compact sludge plants, a mass of microorganisms feed on the suspended and dissolved organic wastes contained in the wastewater. This action aerobically stabilizes the wastewater and aids in converting ammonia to nitrate.

The mixture of wastewater with microorganisms is conveyed equally to four final clarifiers. Two of these clarifiers are contained in the center part of the compact sludge plants. Two units, larger in size, are located downstream from the compact plants. The clarifiers allow physical settling and skimming of solids to occur. A portion of the activated sludge microorganisms that settle to the bottom of the final clarifiers is returned to the compact plants to maintain sufficient populations of biomass, while the rest is removed from the system.

Wasted solids removed throughout the treatment processes are pumped to one of two anaerobic digesters and dewatered for disposal by use of a gravity belt thickener and polymers. Conditioned sludge is ultimately disposed of on WDNR-approved agricultural fields.

Final clarifier effluent receives seasonal UV disinfection and post-aeration from May through September before being discharged to the Milwaukee River.

The north compact wastewater treatment plant was built in 1970. The south compact plant along with the two large additional final clarifiers were built-in 1981. Improvements have been completed to increase the capacity of the facility or to replace aging infrastructure. The last major improvement project was completed in 2005. An anaerobic digester mixing project was completed in 2008, and the installation of ultraviolet disinfection was completed in 2011.

1.5 WWTP PHOSPHORUS OPTIMIZATION

The Village of Grafton's staff have completed phosphorus optimization activities. Previous reports identified a decreasing influent phosphorus concentration trend. However, this trend has stopped, and influent concentrations have stabilized for now. While decreasing influent phosphorus would seem to be desirable, phosphorus is a critical nutrient for the activated sludge treatment process. Plant staff would need to add phosphorus to the influent if the phosphorus concentration were to drop too low. Village of Grafton has not pursued any source reduction opportunities at this time but may choose to do so if influent concentrations start to increase.

The Village of Grafton believes that the existing plant infrastructure and operational procedures are optimized for the removal of phosphorus. Any further reductions would include significant costs to implement infrastructure modifications. The Village of Grafton does plan as part of the AM plan to spend capital to make improvements to the existing wastewater treatment plant to reduce effluent phosphorus below the requirements of NR 219.

1.6 ELIGIBILITY

The Village of Grafton is eligible to use AM as a compliance alternative because:

1. The instream phosphorus concentration upstream from the discharge outfall was determined to be 0.077 mg/L which is above the criteria of 0.075 mg/L.
2. The PRESTO™ tool developed by the WDNR indicates that the ratio of point source to non-point source phosphorus load at the Village of Grafton discharge location is 17:83, meaning that 17% of the phosphorus load in the reach of the Milwaukee River is from point sources, including Village of Grafton, and 83% of the load is from non-point sources.

This confirms that more than 50% of the total phosphorus load comes from non-point sources.

3. Optimization of the existing WWTP will not be enough to achieve the mass allocations from the TMDL for the Milwaukee River. Additional treatment equipment, such as filtration, will be required to reduce the effluent phosphorus concentration to below the WQBEL values from the TMDL.

Section 2.0
NINE KEY PLAN ELEMENTS

In accordance with WDNR guidelines, the AM plan is comprised of nine key elements that are summarized in the following sections. The nine key elements include:

1. Identification of partners
2. Watershed description (action area) and load reduction goals
3. Watershed inventory
4. Identify where reductions will occur
5. Describe management measures
6. Estimate load reductions within permit term
7. Identify how success will be measured
8. Describe financial security
9. Schedule and milestones

2.1 PARTNERS

The Village of Grafton plans to pursue phosphorus reductions opportunities within the action area and the Greater Milwaukee River Reach MI-16 in order to bring the Milwaukee River into compliance with the 0.075 mg/L criterion. The Village of Grafton plans to work with the following area partners:

- Wisconsin Department of Natural Resources
- Ozaukee County
- Milwaukee River Watershed Clean Farm Families

The amount of involvement of these regional partners will vary depending on the project type and location. For example, Ozaukee County has been working closely with farmers to implement new farming techniques to reduce runoff. The Village plans to work with the County to support their efforts.

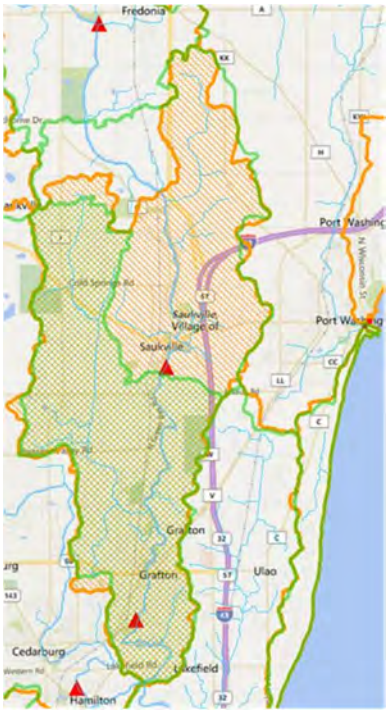
2.2 DESCRIBE WATERSHED (ACTION AREA) AND DETERMINE LOAD REDUCTION GOALS

The action area for the Village of Grafton's adaptive management plan is defined as the Greater Milwaukee River Reach MI-17 which includes the Village of Grafton WWTP outfall. The action area is defined as the portion of the Milwaukee River from its confluence with Cedar Creek on the downstream end and Saukville on the northern end. MI-17 reach is shown on Figure 2-1 as the green hashed area. Instream sampling has not been completed at the downstream location of this reach. The WDNR determined at the time of permit reissuance that the median total phosphorus (TP) concentration upriver from the Village of Grafton WWTP outfall was 0.077 mg/L. Additional river sampling performed by the Village of Grafton downstream of the outfall resulted in a median TP concentration of 0.084 mg/L. The raw data collected by the Village is shown in Table 2-1.

Table 2-1.
Milwaukee River Sample Data Collected Down River from the WWTP Outfall

	7/10/2012	8/14/2012	9/27/2012	10/17/2012	5/7/2013	Average	Median
SW-5	0.085	0.048	0.148	0.046	0.084	0.0822	0.084
SW-6	0.14	0.094	0.031	0.027	0.075	0.0734	0.075

Figure 2-1. Action Area Village of Grafton Adaptive Management Plan



Only data for the growing season is shown in Table 2-1. Samples were collected from two locations labeled SW-5 and SW-6. For the purposes of this plan, the data from SW-5 was used.

A simple mass balance is used to estimate the target phosphorus reduction for the adaptive management plan to return this part of the Milwaukee River to compliance with the water quality criterion. The Village contracted with United States Geological Survey (USGS) to provide the annual average flow of 378 cfs (244 MGD) for this section of the Milwaukee River. Combining this flow with an instream concentration reduction of 0.009 mg/L (which represents the difference between the 2012 sampling resultant concentration of 0.084 mg/L and the criterion value of 0.075 mg/L) yields an annual reduction target of 6,700 lb/year to bring this reach into compliance with the water quality standard for phosphorus. There is excess phosphorus that is flowing into the action area.

The upstream phosphorus concentration from the WWTP outfall is 0.077 mg/L, implying that over 20% of the phosphorus is from sources outside the action area. Reductions in the Greater Milwaukee River nonpoint source area upriver will help reduce the instream phosphorus concentration within the action area.

2.3 WATERSHED INVENTORY

The TMDL report can be used to estimate the baseline loads from various sources within and upstream from the action area. The TMDL report indicates that the baseload phosphorus mass into MI-16 and MI-17 from MS4s, non-point sources and point sources, exceeds 16,000 lb/yr.

The Village's proportional share of the in-river phosphorus mass is calculated by comparing the current average WWTP phosphorus discharge to the current in river phosphorus mass as shown in Table 2-2.

Table 2-2.
The Village of Grafton TP Discharge as Compared to the Milwaukee River

Phosphorus Source	Mass Calculation	Annual Mass
The Village of Grafton WWTP	Average daily discharge: 8.15 lb Annual discharge: 8.15 x 365 days = 2,975 lb	2,975
Greater Milwaukee River Reach MI-17	Average flow: 244 MGD Median concentration: 0.084 mg/L Average daily mass: 8.34*0.084*244 = 170.94 lb Annual TP mass: 170.94 x 365 = 62,392 lb	62,392

The Village's proportional share within the Milwaukee River is computed as follows:

The Village of Grafton share = $\frac{2{,}975\ lb\ from\ the\ WWTP}{62{,}392\ lb\ TP\ mass\ in\ the\ Milwaukee\ River} x\ 100 = 4.8\%$

The Village of Grafton has worked with Sand County Foundation (SCF) to conduct an initial inventory of agricultural (ag) operation non-point source reduction opportunities within the Milwaukee River watershed upstream from the Village of Grafton WWTP outfall primarily in reaches MI-17 and MI-16. SCF identified that approximately 25,000 acres of farmland exist in the targeted areas of MI-17 and MI-16. The following table contains a summary of the farmland inventory collected by SCF along with an initial baseline phosphorus yield using Stanford Network Analysis Platform (SNAP) + modeling and current typical farm practices.

Table 2-3.
Farmland Inventory with Baseline P Mass Projections from SNAP +

Type of Ag Operation	% of Land	Acres of Ag type (acres)	Baseline P (lb)
Cash Grain	40%	10,000	70,066.6
Dairy	40%	10,000	30,672.9
CAFO	20%	5,000	20,325.0
Total		**25,000**	**121,064.5**

The 6,700 lb/yr reduction needed to bring the river into compliance with the WQBEL criteria is less than 6% of the baseline SNAP + projections.

SNAP + analysis was performed for a "typical" agricultural operation using soil data from the target area. This analysis provided baseline phosphorus load projections from each ag operation that was also included in Table 2-2.

It is worth noting that the baseline mass load values reported in the TMDL of 16,000 lb/yr are significantly lower than the mass values predicted by SNAP + from agricultural fields in the targeted areas of MI-16 and MI-17 of 121,000 lb/yr.

2.4 IDENTIFY WHERE REDUCTION WILL OCCUR

The adaptive management plan would consist of targeting phosphorus reductions throughout the action area and upstream from the action area including:

- Improvements to agricultural operations (within the Greater Milwaukee River Reaches MI-16 & MI-17)
- Improvements along the Milwaukee River throughout the action area
- Continued optimization of the WWTP

The reductions necessary to return the Milwaukee River to the TP instream criterion of 0.075 mg/L would involve the following three areas for reductions.

Area 1 – **Improvements Along the Milwaukee River Impacting Reach MI-17**

The first area for improvements involves phosphorus runoff reductions along the Milwaukee River throughout the MI-17 reach. These improvements will likely include riverbank reconstruction and stabilization, fish habitat restoration, filter strips, grassed waterways, cover crop, bioswales, and other storm water green infrastructure total suspended solids (TSS) reduction techniques.

Area 2 – **Agricultural Improvements Within Reaches MI-16 and MI-17**

The Village of Grafton will need to invest money in supporting improvements to ag operations, specifically cash grain and dairy within the MI-17 reach and upriver within the MI-16 reach. As presented in the watershed inventory sections of this plan, preliminary modeling suggests that baseline phosphorus runoff from 25,000 acres of agricultural lands in the targeted areas of MI-16 and MI-17 far exceed the needed reductions target of 6,700 lb/yr. The Village of Grafton, working together with regional partners Ozaukee County and Milwaukee River Watershed Clean Farm Families (MRWCFF) will assist farmers with implementing and maintaining best management practices that support phosphorus reductions to the watershed. Jim Melichar, current President of the Milwaukee River Watershed Clean Farm Families and farmer, provided the following note of support to the Village:

DATE: May 13, 2019

TO: Village of Grafton, WI

FROM: Jim Melichar, Owner of Melichar Broad Acres and Chairperson of the Milwaukee River Watershed Clean Farm Families Board of Directors.

RE: Working with the Village of Grafton to improve water quality in our watershed.

As a farmer and resident in the Milwaukee River Watershed, I have a keen interest in the water quality in the area. For this reason, I and the Milwaukee River Clean Farm Families farmer-led watershed group have dedicated ourselves to making strides to improve the soil and water quality in the watershed.

I am very interested in working with the Village of Grafton to find ways to improve the soil health and water quality in the area and to meet both the Village's and my farm's needs. I will also be glad to further discuss this topic with the Clean Farm Families group and try and develop a working relationship between the Village and the farmer group.

Thanks,

Jim Melichar

Jim owns approximately 1,200 acres of farmland within the target area that could benefit from various improvements for reducing soil and phosphorus runoff. Other farmers like Mike Paulas farm over 300 acres within the target area. Mr. Paulas is very active with implementing BMPs within his farm operation, going so far as to host a June 4, 2019 tour of the BMPs that are currently being practiced within Ozaukee County. The Village intends to partner and support the efforts of Jim, Mike, and others with improvements that reduce phosphorus runoff.

SNAP+ modeling was performed for typical cash grain and dairy ag operations to determine the impact of the most probable BMPs for phosphorus reductions. The following table lists the BMPs that were included in the modeling for each ag practice.

Table 2-4.
Most Probable Best Management Practices for Phosphorus Reduction

Cash Grain Ag Operation	Dairy Ag Operation
Reduction in tillage (e.g., chisel plow-disc to strip or no-till)	Reduction in tillage (e.g., chisel plow-disc to strip or no-till
Addition of cover crops	Addition of cover crops
Addition of in field designed filter strips	Addition of in field designed filter strips
Addition of edge of field designed filter strips	Addition of edge of field designed filter strips
Reduction in fertilizer application rates	Reduction in manure application rates
Conservation crop rotation use	Conservation crop rotation use
Change in timing of tillage (e.g., fall to spring)	Change in timing of tillage (e.g., fall to spring)
	Change in the timing of manure applications

The modeling results are summarized in the following table from the baseline condition in Table 2-3.

Table 2-5.
SNAP + Modeling P Mass Reduction Projections

Type of Ag Operation	Baseline P (lb)	P Release After Implementing BMPs (lb)	% Reduction
Cash Grain	70,066.6	45,567	35%
Dairy	30,672.9	18,673	39%
Total	**100,739.5**	**64,240**	**36%**

The results from the modeling indicate that reductions of phosphorus runoff are possible, approximately 2.45 lb/ac for cash grain operations and 1.2 lb/ac for dairy operations if all of the BMPs listed in Table 2-4 are implemented. The Village has received signed contracts from nine farmers, including Mr. Melichar and Mr. Paulus, to maintain cover crop and no-till practices. Cover crop will be planted on a total of 318 acres. No-till farming will be implemented on 134 acres. SNAP + modeling of each field is underway to quantify the phosphorus reductions of these contracts. Both the farmers and Ozaukee County have signed contracts, showing 100% support for the Village's involvement with implementation and maintenance of agricultural best management field practices. But this is only a start. The Village is committed to increasing investment in future years dependent on river monitoring results as outlined in Section 2.5.

Area 3 – Improvements to the Wastewater Treatment Plant

It will be necessary for the Village of Grafton to commit to reductions in the effluent phosphorus concentration that go beyond the interim effluent phosphorus limits associated with adaptive management. The most likely investment for the Village will be to install a second coagulant addition point within the treatment trains. Full-scale pilot testing indicated that effluent phosphorus

concentrations approaching 0.3 mg/L may be possible. An average effluent TP concentration of approximately 0.3 mg/L would yield almost 1,280 lb reduction from the current levels, helping to contribute toward the 6,700 lb annual target.

Target Reductions

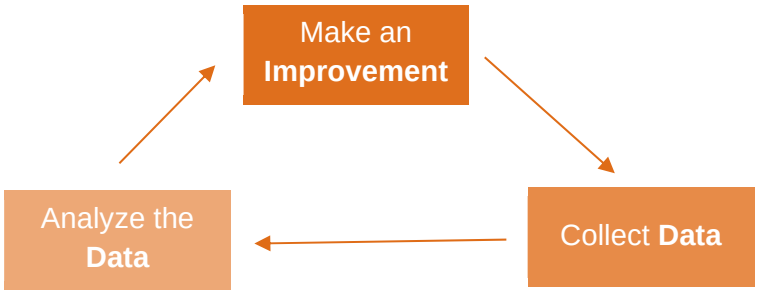
This plan targets phosphorus reductions along the Milwaukee River and at the treatment plant. The initial target reductions are:

Table 2-6.
Initial Phosphorus Reduction Targets

Location	Reduction Target (lb/yr)
Greater Milwaukee River Non-point Area within MI-17 and MI-16	5,420
Treatment Plant	1,280
Total	**6,700**

The phosphorus targets in Table 2-6 go well beyond the minimum load reduction necessary based on the Village proportional share. As shown in Section 2.3, the Village's proportional share of TP in the river is 4.8%. The minimum necessary to be eligible to continue the adaptive management plan into the second permit term is 4.8% of 6,700 lb or 321.6 lb. The Village has every expectation of surpassing this minimum requirement through the current 318 acres of cover crop, 134 acres of no-till farming, and adding a second coagulant addition point at the WWTP.

These initial target reductions may need to be adjusted as more data is collected through river monitoring. The Village of Grafton will review the river monitoring data, consult with partners to identify areas for reductions, develop projects that achieve reductions, implement projects and monitor the results. This iterative approach to achieving compliance will allow the Village to adjust as needed:



If the data indicates that the water quality criterion has been achieved, watershed improvement work will be suspended in order to continue to collect more data.

2.5 DESCRIBE MANAGEMENT MEASURES

The initial discussions that have taken place with Ozaukee County and MRWCFF have focused on cover crop and no-till farming practices. Some farmers in the region have experience with these soil health land management practices, making it easier to get other farmers in the region

to implement. The level of participation with the Village's initial effort is a sign that this approach is being received well by MRWCFF members.

Table 2-4 from the preceding section highlights several other practices that are being considered. These practices include:

- Reduction in tillage (e.g., chisel plow-disc to strip or no-till)
- Addition of in field designed filter strips
- Addition of edge of field designed filter strips
- Reduction in fertilizer or manure application rates
- Conservation crop rotation use
- Change in timing of tillage (e.g., fall to spring)
- Change in the timing of manure applications

2.6 ESTIMATE LOAD REDUCTIONS DURING PERMIT TERM

The Village of Grafton has the goal of lowering the median phosphorus concentration in the river to below the WQBEL criterion by the end of the first 5-year permit term. It is estimated that a 6,700 lb reduction is needed. The following preliminary schedule outlines the annual goals for the Village:

Table 2-7.
Tentative Project Schedule

Year	Activities	Projected Annual Phosphorus Reduction (lb/yr)	Accumulated Total Annual Phosphorus Reduction (lb/yr)
1	Action area sampling and improvements in the Greater Milwaukee River non-point Area within reaches MI-16 and MI-17.	250	250
2	Action area sampling, improvements in the Greater Milwaukee River non-point area within reaches MI-16 and MI-17, and improvements to the WWTP.	1,780	2,030
3	Action area sampling and improvements in the Greater Milwaukee River non-point area within reaches MI-16 and MI-17	1,000	3,030
4	Action area sampling and improvements in the Greater Milwaukee River non-point area within reaches MI-16 and MI-17	1,000	4,030
5	Action area sampling and improvements in the Greater Milwaukee River non-point area within reaches MI-16 and MI-17	2,670	6,700

By the end of this 5-year project schedule, the Village will be responsible for phosphorus reductions within the Greater Milwaukee River reaches MI-16 and MI-17 of 6,700 lb per year.

The Village plans to revise this project schedule based on the results from the monitoring program.

Some examples of adjustments include:

- Data showing that projects in the Greater Milwaukee River reaches MI-16 and MI-17 not achieving the phosphorus reductions could result in increasing ag improvements.
- Data showing that the Milwaukee River is in compliance with water quality criterion could result in suspending the project schedule and continuing to monitor the river.

2.7 IDENTIFY HOW SUCCESS WILL BE MEASURED

The goal is to lower the in-river phosphorus concentration to meet the applicable water quality criterion at the down-river monitoring location (designated as sample location 4). Success will be determined when the annual median phosphorus concentration is at or below the water quality criterion. The water quality criterion is:

- The State standard value of 0.075 mg/L for this section of the Milwaukee River, or
- A State and U.S. EPA approved site-specific criterion based on biological metrics in accordance with new rule making being promoted by the Department, or
- Any change to the State standard value for this section of the Milwaukee River

Interim successes will be measured under the following:

- Phosphorus concentration decreases throughout the action area, but perhaps not all the way to the water quality criterion.
- Improved biological metrics or water clarity measurements support improving aquatic habitat.
- Improved soil health resulting from improvements to ag operations. Improved soil health has been linked to water quality improvements.
- SNAP + modeling results demonstrate that implemented agricultural best management reduce phosphorus runoff.

Annual reports will summarize all activities that have occurred over the preceding year along with identifying interim successes, SNAP + modeling investigations, and any quantitative measurements of water quality improvements.

If the Village collects data that shows the median phosphorus concentration is at or below the criterion, the Village intends to suspend all future project work but complete work that is already in progress. Monitoring will continue in order to confirm that the water quality criterion is being met. The Village will resume project work should additional monitoring show that the criterion is being exceeded. The Village will assume two years of achieving the water quality criterion will be evidence that the river is meeting water quality and the Village's adaptive plan is successful.

2.8 DESCRIBE FINANCIAL SECURITY

The Village of Grafton prepared financial estimates for the cost of adaptive management as part of the Final Compliance Alternatives Plan assuming 5, 10, and 15 years to achieve the water quality TP goal. Table 2-8 represents the present value of the costs as found in the final plan.

Table 2-8.
Preliminary Alternatives Present Value Summary
as Found in the Final Compliance Alternative Plan

Capital Cost	Tertiary Treatment	Adaptive Management		
		Compliance in 5 Years	Compliance in 10 Years	Compliance in 15 Years
Initial Capital Cost	-$3,787,000	$0	$0	$0
Additional Costs Over 20 Years	$0	-$462,000	-$594,000	-$726,000
Operating Costs - Sum of Operating Costs Over 20 Years at 3% Inflation	-$3,832,300	-$4,175,300	-$5,324,300	-$6,723,309
Total Present Value of 20 Years of Costs at 4%	**-$7,220,000**	**-$3,350,000**	**-$4,370,000**	**-$5,340,000**

The Village estimated that the capital cost of adaptive management in the first five years is over $460,000. The Village completed budgeting for fiscal year 2020. Copies of the budget for the Wastewater utility are included in the Appendix. The Village has set aside the following:

1. $52,500 to cover engineering costs of treatment plant improvements for phosphorus control
2. $190,000 to cover costs for phosphorus adaptive management

2.9 IMPLEMENTATION SCHEDULE WITH MILESTONES

The Village is prepared to implement this adaptive management plan beginning in 2020, with the goal of bringing the Milwaukee River within the action area into compliance with phosphorus water quality standards by 2025. The sample of the initial schedule for achieving compliance is as follows:

Table 2-9.
Sample of the Initial Implementation Schedule

Date	Activities	Notes
May 1, 2020	Begin monitoring of the Milwaukee River throughout action area.	This activity will be performed by the Village in accordance with the sampling plan. This activity will continue through October.
September 1, 2020	Complete the installation of non-point source BMPs within the Greater Milwaukee River reaches M16 or M17.	This activity will be performed in conjunction with the Village and Ozaukee County.
Fall 2020	Provide support to ag for installation of cover crop and to practice no-till.	
February 1, 2021	Submit annual report for 2020.	This report will summarize the results of the first-year monitoring along with any BMP installation within the Greater Milwaukee River reaches M16 and M17. The report will identify projects to be implemented in 2021.
May 1, 2021	Resume monitoring of the Milwaukee River throughout action area.	

Date	Activities	Notes
Summer 2021	Continue implementing improvements to Greater Milwaukee River reaches M16 and M17.	
Fall 2021	Provide support to ag for installation of cover crop and to practice no-till.	
February 1, 2022	Submit annual report for 2021.	

This sample schedule covers the first 2 years of the initial five-year plan. The annual report will include a schedule for the preceding year until the end of the five-year permit term.

APPENDIX A

WPDES Permit

Effective date: September 1, 2019

WPDES PERMIT

STATE OF WISCONSIN
DEPARTMENT OF NATURAL RESOURCES

PERMIT TO DISCHARGE UNDER THE WISCONSIN POLLUTANT DISCHARGE ELIMINATION SYSTEM

Grafton Village Water and Wastewater Utility

is permitted, under the authority of Chapter 283, Wisconsin Statutes, to discharge from a facility located at
1900 9th Avenue, Grafton WI
to
the Milwaukee River (South) (Milwaukee River (South) watershed, Milwaukee River basin) in Ozaukee County

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 _____
Bryan Hartsook
Wastewater Field Supervisor

8/20/2019
Date Permit Signed/Issued

PERMIT TERM: EFFECTIVE DATE - July 01, 2015 **EXPIRATION DATE - June 30, 2020**
PERMIT MODIFICATION: EFFECTIVE DATE -- September 01, 2019

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	INFLUENT: 24-hr flow proportional composite sampler, located in the north service building MIP room with intake in the headworks building after the bar screen and prior to grit chamber. Influent flow measured with an 18-inch Parshall flume located immediately upstream of influent lift pumps and dowstream of grit chamber. Plant sidestreams are not included in influent flow measure or sample.

1.2 Monitoring Requirements

The permittee shall comply with the following monitoring requirements.

1.2.1 Sampling Point 701 - INFLUENT PLANT

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Flow Rate		MGD	Daily	Continuous	
BOD_5, Total		mg/L	4/Week	24-Hr Flow Prop Comp	
Suspended Solids, Total		mg/L	4/Week	24-Hr Flow Prop Comp	
Nitrogen, Ammonia (NH_3-N) Total		mg/L	Weekly	24-Hr Flow Prop Comp	
Phosphorus, Total		mg/L	Weekly	24-Hr Flow Prop Comp	
Mercury, Total Recoverable		ng/L	Annual	24-Hr Flow Prop Comp	See 'Mercury' subsection below.

1.2.1.1 Mercury Monitoring

The permittee shall collect and analyze all mercury samples according to the data quality requirements of ss. NR 106.145(9) and (10), Wisconsin Administrative Code. The limit of quantitation (LOQ) used for the effluent and field blank shall be less than 1.3 ng/L, unless the samples are quantified at levels above 1.3 ng/L. The permittee shall collect at least one mercury field blank for each set of mercury samples (a set of samples may include combinations of influent, effluent or other samples all collected on the same day). The permittee shall report results of samples and field blanks to the Department on Discharge Monitoring Reports.

2 In-Plant Requirements

2.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
107	Collect the mercury field blank using standard sample handling procedures.

2.2 Monitoring Requirements and Limitations

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

2.2.1 Sampling Point 107 - Mercury Field Blank

Monitoring Requirements and Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Mercury, Total Recoverable		ng/L	Annual	Blank	See 'Mercury' subsection below.

2.2.1.1 Mercury Monitoring

The permittee shall collect and analyze all mercury samples according to the data quality requirements of ss. NR 106.145(9) and (10), Wisconsin Administrative Code. The limit of quantitation (LOQ) used for the effluent and field blank shall be less than 1.3 ng/L, unless the samples are quantified at levels above 1.3 ng/L. The permittee shall collect at least one mercury field blank for each set of mercury samples (a set of samples may include combinations of influent, effluent or other samples all collected on the same day). The permittee shall report results of samples and field blanks to the Department on Discharge Monitoring Reports.

3 Surface Water Requirements

3.1 Sampling Point(s)

Sampling Point Designation	
Sampling Point Number	**Sampling Point Location, WasteType/Sample Contents and Treatment Description (as applicable)**
001	EFFLUENT: 24-hr flow proportional composite sampler located immediately prior to UV disinfection process. Grab samples taken after aeration and UV disinfection.

3.2 Monitoring Requirements and Effluent Limitations

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

3.2.1 Sampling Point (Outfall) 001 - EFFLUENT

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
BOD_5, Total	Weekly Avg	45 mg/L	4/Week	24-Hr Flow Prop Comp	Effective November - April annually
BOD_5, Total	Weekly Avg	33 mg/L	4/Week	24-Hr Flow Prop Comp	Effective May - October annually
BOD_5, Total	Monthly Avg	30 mg/L	4/Week	24-Hr Flow Prop Comp	Year round limit
Suspended Solids, Total	Weekly Avg	45 mg/L	4/Week	24-Hr Flow Prop Comp	Effective November - April annually
Suspended Solids, Total	Weekly Avg	33 mg/L	4/Week	24-Hr Flow Prop Comp	Effective May - October annually
Suspended Solids, Total	Monthly Avg	30 mg/L	4/Week	24-Hr Flow Prop Comp	Year round limit
Phosphorus, Total	Monthly Avg	1.0 mg/L	4/Week	24-Hr Flow Prop Comp	This is an interim limit. The final TMDL-derived water quality based effluent limits are listed in section 3.2.1.2 below and go into effect per the schedule in section 5.1. See Phosphorus sections below.
Phosphorus, Total		lbs/day	Monthly	Calculated	Final TMDL-derived water quality based effluent limits take effect in accordance with the schedule in section 5.1. See section 3.2.1.2 below for final limits.
Nitrogen, Ammonia (NH_3-N) Total	Daily Max	20 mg/L	4/Week	24-Hr Flow Prop Comp	Effective November - April annually

Monitoring Requirements and Effluent Limitations					
Parameter	**Limit Type**	**Limit and Units**	**Sample Frequency**	**Sample Type**	**Notes**
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	16 mg/L	4/Week	24-Hr Flow Prop Comp	Effective November - March annually
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	10 mg/L	4/Week	24-Hr Flow Prop Comp	Effective April annually
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	17 mg/L	4/Week	24-Hr Flow Prop Comp	Effective May - September annually
Nitrogen, Ammonia (NH_3-N) Total	Weekly Avg	14 mg/L	4/Week	24-Hr Flow Prop Comp	Effective October annually
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	10 mg/L	4/Week	24-Hr Flow Prop Comp	Effective November - March annually
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	6.3 mg/L	4/Week	24-Hr Flow Prop Comp	Effective April annually
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	12 mg/L	4/Week	24-Hr Flow Prop Comp	Effective May - September annually
Nitrogen, Ammonia (NH_3-N) Total	Monthly Avg	9.0 mg/L	4/Week	24-Hr Flow Prop Comp	Effective October annually
pH Field	Daily Max	9.0 su	5/Week	Grab	Year round limit
pH Field	Daily Min	6.0 su	5/Week	Grab	Year round limit
Dissolved Oxygen	Daily Min	6.0 mg/L	5/Week	Grab	Effective May - October annually
Fecal Coliform	Geometric Mean	400 #/100 ml	Weekly	Grab	Effective May - September annually
Mercury, Total Recoverable		ng/L	Annual	Grab	See Mercury subsection below.
Chloride		mg/L	4/Month	24-Hr Flow Prop Comp	Monitor in calendar year 2019 (January 1, 2019 - December 31, 2019). Sampling shall be done on four consecutive days each month. See Chloride subsection below.
Temperature Maximum		deg F	3/Week	Continuous	Monitor in calendar year 2019 (January 1, 2019 - December 31, 2019). See Temperature subsection below.
Acute WET		TU_a	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annually in rotating quarters. See 'WET' subsection below.
Chronic WET		rTU_c	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annually in rotating quarters. See 'WET' subsection below.

3.2.1.1 Average Annual Design Flow

The average annual design flow of the permittee's wastewater treatment facility is 2.50 MGD.

3.2.1.2 Total Maximum Daily Load (TMDL) Limitations

Approved TMDL: The Milwaukee River TMDL Waste Load Allocation (WLA) for Total Phosphorus was approved by the U.S. Environmental Protection Agency in March 2018. The approved TMDL WLA limits for Grafton are:

- **Total Phosphorus:** The final TMDL water quality based effluent limits for phosphorus are shown in the table below. Refer to the schedule in permit section 5.1 for the date of compliance with these total phosphorus WQBEL and TMDL limits as applicable.

Month	Monthly Ave Total P Effluent Limit (lbs/day)
January	2.94
February	3.41
March	2.81
April	2.95
May	3.11
June	3.22
July	2.80
August	2.71
September	2.88
October	2.33
November	2.95
December	2.66

3.2.1.3 Phosphorus Water Quality Based Effluent Limitation(s)

The final TMDL-derived water quality based effluent limits for phosphorus as described in section 3.2.1.2 above, will take effect per the Schedule in section 5.1, 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 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.

3.2.1.4 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.

3.2.1.5 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.

3.2.1.6 Mercury Monitoring

The permittee shall collect and analyze all mercury samples according to the data quality requirements of ss. NR 106.145(9) and (10), Wisconsin Administrative Code. The limit of quantitation (LOQ) used for the effluent and field blank shall be less than 1.3 ng/L, unless the samples are quantified at levels above 1.3 ng/L. The permittee shall collect at least one mercury field blank for each set of mercury samples (a set of samples may include combinations of influent, effluent or other samples all collected on the same day). The permittee shall report results of samples and field blanks to the Department on Discharge Monitoring Reports.

3.2.1.7 Chloride Sampling

A sample frequency of 4/month requires that sample be collected on four consecutive days 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. The weekly average discharge shall be calculated and reported for any week that samples are collected.

3.2.1.8 Effluent Temperature Monitoring

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.

3.2.1.9 Whole Effluent Toxicity (WET) Testing

Primary Control Water: Milwaukee River (South) upstream and out of the influence of the mixing zone of Outfall 001, and any other known discharges.

Instream Waste Concentration (IWC): 39%

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

- **Acute:** 100, 50, 25, 12.5, 6.25% and any additional selected by the permittee.
- **Chronic:** 100, 75, 50, 25, 12.5% and any additional selected by the permittee.

WET Testing Frequency:

Acute tests shall be conducted once each year, in rotating quarters in order to collect seasonal information about the discharge. Tests are required during the following quarters.

- **Acute:** October – December 2015; July – September 2016; April – June 2017; January – March 2018; and October – December 2019

Acute WET testing shall continue after the permit expiration date (until the permit is reissued) in accordance with the WET requirements specified for the fourth calendar year of this permit. For example, the next test would be required in October - December 2020.

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

- **Chronic:** October – December 2015; July – September 2016; April – June 2017; January – March 2018; and October – December 2019

Chronic WET testing shall continue after the permit expiration date (until the permit is reissued) in accordance with the WET requirements specified for the fourth calendar year of this permit. For example, the next test would be required in October - December 2020.

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: An acute toxicity test shall be considered positive if the Toxic Unit - Acute (TU_a) is greater than 1.0 for either species. The TU_a shall be calculated as follows: If $LC_{50} \geq 100$, then $TU_a = 1.0$. If LC_{50} is < 100, then $TU_a = 100 \div LC_{50}$. A chronic toxicity test shall be considered positive if the Relative Toxic Unit - Chronic (rTU_c) is greater than 1.0 for either species. The rTU_c shall be calculated as follows: If $IC_{25} \geq$ IWC, then $rTU_c = 1.0$. If $IC_{25} <$ IWC, then $rTU_c = IWC \div IC_{25}$.

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).

4 Land Application Requirements

4.1 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)**
002	Anaerobically digested, gravity belt thickened, Class B, liquid sludge. Representative samples shall be taken from Grafton's offsite storage tank (Martin Biese tank) with adequate mixing prior to sampling. Sludge samples shall be collected prior to land application and test results shall be reported on Form 3400-49 'Waste Characteristics Report'. Hauled sludge reports shall be submitted on Form 3400-52 'Other Methods of Disposal or Distribution Report' following each year that the sludge is hauled.

4.2 Monitoring Requirements and Limitations

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

4.2.1 Sampling Point (Outfall) 002 - Hauled 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	
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	
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2016
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2016

4.2.1.1 Sludge Analysis for PCBs

The permittee shall analyze the sludge for Total PCBs one time during **2016**. 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.

5 Schedules

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

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 July 1, 2018. The report shall provide a plan and schedule for implementation of the measures, improvements, and modifications as soon as possible, but not later than July 1, 2018 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 July 1, 2018 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 July 1, 2024.	06/30/2016
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.	06/30/2017
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 report. If the plan concludes Adaptive Management will be used, the submittal shall include a completed	06/30/2018

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.	09/30/2019
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.	06/30/2020
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.	06/30/2021
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.	09/30/2021
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.	09/30/2022
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.	06/30/2023
Complete Construction: The permittee shall complete construction of wastewater treatment system upgrades. Note: See 'Alternative Approaches to Phosphorus WQBEL Compliance' in the Surface Water section of this permit.	05/31/2024

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.	07/01/2024

5.2 CMOM (Capacity, Management, Operation and Maintenance) Program Development

Required Action	Due Date
Complete Program Development: Complete development of CMOM Program by August 1, 2016. See CMOM requirements in the Standard Requirements section.	08/01/2016

6 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).

6.1 Reporting and Monitoring Requirements

6.1.1 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 principal executive officer, a ranking elected official or other duly authorized representative. 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.

6.1.2 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.

6.1.3 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.

6.1.4 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.

6.1.5 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 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.

A separate CMAR certification document, that is not part of the electronic report form, shall be mailed to the Department at the time of electronic submittal of the CMAR. The CMAR certification shall be signed and submitted by an authorized representative of the permittee. The certification shall be submitted by mail. The certification shall verify the electronic report is complete, accurate and contains information from the owner's treatment works.

6.1.6 Records Retention

The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings 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.

6.1.7 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.

6.2 System Operating Requirements

6.2.1 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.**

6.2.2 Flow Meters

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

6.2.3 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 500-536, Wis. Adm. Code.

6.2.4 Sludge Management

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

6.2.5 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.

6.2.6 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.

6.2.7 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.

6.2.8 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.

6.2.9 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. The wastewater treatment facility shall be under the direct supervision of a state certified operator as required in s. NR 108.06(2), Wis. Adm. Code. 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.

6.3 Sewage Collection Systems

6.3.1 Sanitary Sewage Overflows and Sewage Treatment Facility Overflows

6.3.1.1 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.

6.3.1.2 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.

6.3.1.3 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.

6.3.1.4 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.

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

- The permittee shall by August 1, 2016 submit to the Department verification that a CMOM program for the sewage collection system has been developed which is consistent with the requirements of NR 210.23, Wis. Adm. Code.
- The permittee shall develop and maintain written documentation of the CMOM program components, and shall verify each year with the submittal of the Compliance Maintenance Annual Report required under the 'Compliance Maintenance Annual Reports' section of this permit that the CMOM program documentation is current and meets the requirements in NR 210.23, Wis. Adm. Code.
- The permittee shall implement a CMOM program consistent with the permittee's program documentation and with the requirements of NR 210.23, Wis. Adm. Code.
- The permittee shall annually conduct a self-audit of activities to ensure the CMOM program is being implemented as necessary to meet the requirements contained in the CMOM program documentation.
- The permittee shall make available CMOM program documentation, a record of implementation activities and the results of the self-audit to the Department on request.

6.3.3 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.

6.4 Surface Water Requirements

6.4.1 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.

6.4.2 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.

6.4.3 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.

6.4.4 Visible Foam or Floating Solids

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

6.4.5 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.

6.4.6 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.

6.4.7 Fecal Coliforms

The limit for fecal coliforms shall be expressed as a monthly geometric mean.

6.4.8 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.

6.4.9 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.

6.4.10 Whole Effluent Toxicity (WET) Identification and Reduction

This standard requirement applies only to acute or chronic WET monitoring that is not accompanied by a WET limit. 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.

6.5 Land Application Requirements

6.5.1 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.

6.5.2 General Sludge Management Information

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

6.5.3 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.

6.5.4 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 principal executive officer, ranking elected official or duly authorized representative. 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.

6.5.5 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

6.5.6 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

6.5.7 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 principal executive officer, ranking elected official or duly authorized representative. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

6.5.8 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 principal executive officer, ranking elected official or duly

authorized representative. The 'eReport Certify' page certifies that the electronic report form is true, accurate and complete.

6.5.9 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.

6.5.10 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.

6.5.11 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.

6.5.12 Sludge Hauling

If sludge is hauled to another facility, the permittee is required to submit Form 3400-52 to the Department. Information shall include the quantity of sludge hauled, the name, address, phone number, contact person, and permit number of the receiving facility. Form 3400-52 shall be submitted annually by January 31 following each year sludge is hauled.

7 Summary of Reports Due

FOR INFORMATIONAL PURPOSES ONLY

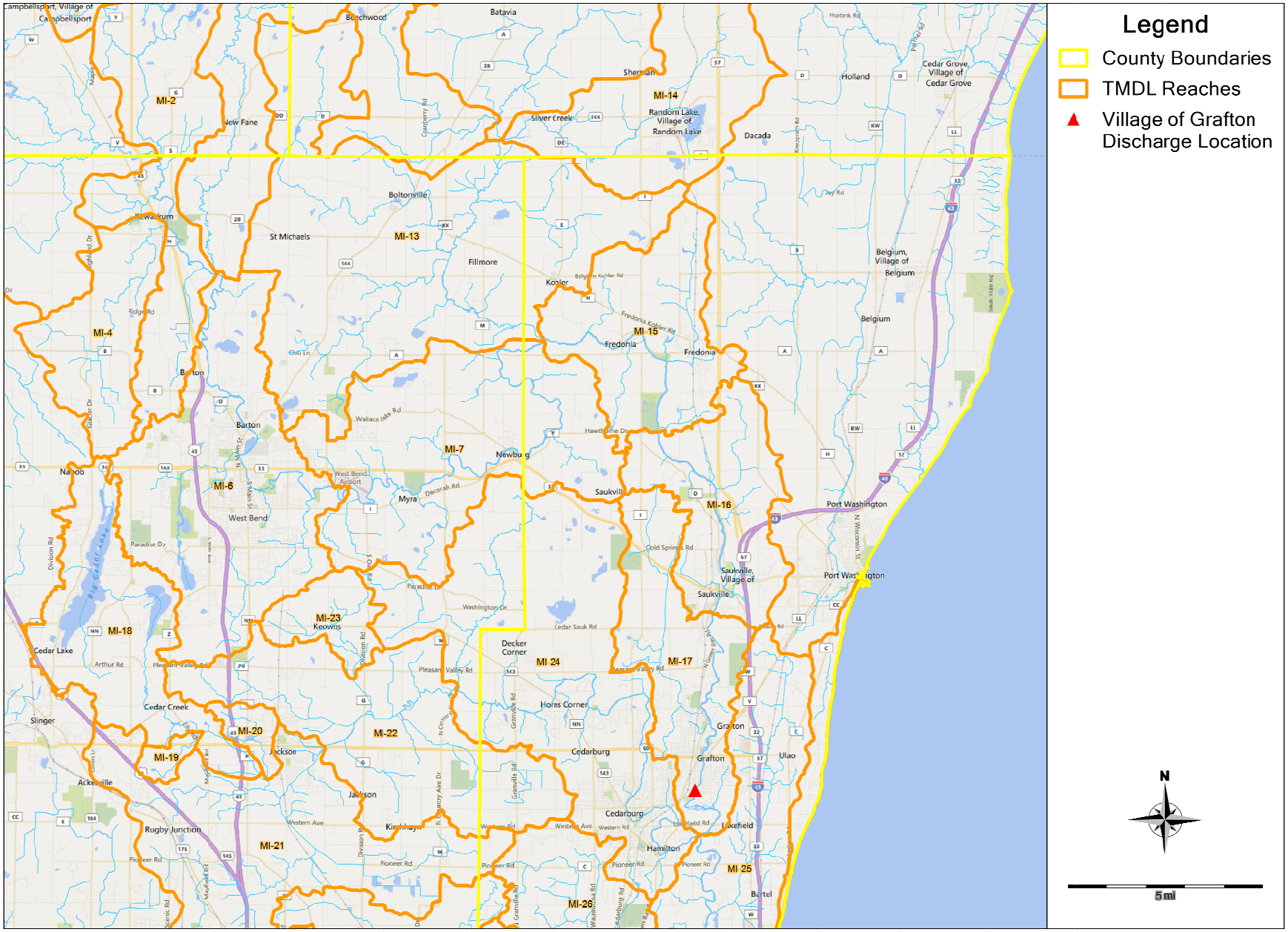
Description	Date	Page
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Operational Evaluation Report	June 30, 2016	11
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Compliance Alternatives, Source Reduction, Improvements and Modifications Status	June 30, 2017	11
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Preliminary Compliance Alternatives Plan	June 30, 2018	11
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Final Compliance Alternatives Plan	September 30, 2019	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Progress Report on Plans & Specifications	June 30, 2020	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Final Plans and Specifications	June 30, 2021	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Treatment Plant Upgrade to Meet WQBELs	September 30, 2021	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Construction Upgrade Progress Report #1	September 30, 2022	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Construction Upgrade Progress Report #2	June 30, 2023	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Complete Construction	May 31, 2024	12
Water Quality Based Effluent Limits (WQBELs) for Total Phosphorus - Achieve Compliance	July 1, 2024	13
CMOM (Capacity, Management, Operation and Maintenance) Program Development -Complete Program Development	August 1, 2016	13
Compliance Maintenance Annual Reports (CMAR)	by June 30, each year	15
General Sludge Management Form 3400-48	prior to any significant sludge management changes	23
Characteristic Form 3400-49 and Lab Report	by January 31 following each year of analysis	23
Land Application Report Form 3400-55	by January 31, each year whether or not non-exceptional quality sludge is land applied	24

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	24
Wastewater Discharge Monitoring Report	no later than the date indicated on the form	14

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:
Southeast Region - Plymouth, 1155 Pilgrim Road, Plymouth, WI 53073

APPENDIX B

TMDL Reaches for the Milwaukee River Watershed from the Final TMDL Report


Legend
County Boundaries
TMDL Reaches
Village of Grafton Discharge Location
N
5 mi
MI-2
MI-4
MI-6
MI-7
MI-13
MI-14
MI-15
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MI-18
MI-19
MI-20
MI-21
MI-22
MI-23
MI 24
MI 25
MI-26
Batavia
Sherman
Holland
Cedar Grove, Village of Cedar Grove
New Fane
Silver Creek
Random Lake, Village of Random Lake
Dacada
Boltonville
St Michaels
Fillmore
Kohler
Belgium, Village of Belgium
Belgium
Fredonia
Barton
Newburg
Saukville
Port Washington
West Bend
Myra
Saukville, Village of
Keowns
Decker Corner
Horns Corner
Cedar Lake
Cedar Creek
Slinger
Jackson
Cedarburg
Grafton
Ulao
Lakefield
Hamilton
Rugby Junction
Bartel

APPENDIX C

Quality Assurance and Quality Control Project Plan for the Adaptive Management Phosphorus Monitoring Program

Quality Assurance and Quality Control Project Plan for the Adaptive Management River Monitor Program of Total Phosphorus

Village of Grafton, Wisconsin

Issued January 2020
Symbiont Project No. W190209

TABLE OF CONTENTS

APPENDIX A - FIGURES

APPENDIX B -TABLES

APPENDIX C – MISCCELLANEOUS

Section 1.0
PROJECT MANAGEMENT

This document has been prepared according to the United States Environmental Protection Agency publication *EPA Requirements for Quality Assurance Project Plans* dated March 2001 (QA/R-5).

1.1 PROJECT/TASK ORGANIZATION

The Village of Grafton, Wisconsin (Village) is implementing a program to monitor water quality in the Milwaukee River upstream and downstream of the Village's wastewater treatment plant (WWTP) as part of the Village's Adaptive Management plan to lower the phosphorus concentration within this section of the Milwaukee River to meet water quality standards. The monitoring program will be conducted during the growing season on a yearly basis until such time as water quality is achieved for a two-year period. Organizing and implementing the monitoring program is a joint effort between the Village of Grafton and its Adaptive Management plan administrator.

The Village will be responsible for performing the following activities to collect samples and analyze phosphorus concentrations at four locations in the Milwaukee River and one location in Mole Creek:

- Obtain sample bottles before each sample event and arrange for delivery of the samples to the Village's WWTP laboratory for analysis in accordance with the approved Quality Assurance Project Plan (QAPP).
- Obtain and use a boat for sample collection and means of transport between sample locations, as necessary.
- Collect the required surface water samples as described in Section 2.0.
- Transport the samples under proper chain-of-custody to the WWTP laboratory for analysis.
- Analyze the samples for the parameters described in Section 1.3 following the procedures included in Appendix C.
- Record in a Microsoft Excel spreadsheet or equivalent the data collected during each sampling event.

The administrator will be responsible for the following activities:

- Prepare a QAPP for water quality monitoring program.
- Analyze the resultant data and provide the Village with an annual letter report that describes the results of the monitoring program.

The Village of Grafton will provide a sampling team consisting of field technicians who will collect the required samples. Field technicians will be responsible for equipment preparation, sample collection, field measurements and sample transportation.

All Village WWTP laboratory personnel shall be responsible for the laboratory analysis and the maintenance of their internal QA/QC procedures (Appendix C).

1.2 PROBLEM DEFINITION/BACKGROUND

The Village of Grafton owns a WWTP that discharges to the Milwaukee River. Discharges from the plant must comply with a Wisconsin Pollution Discharge Elimination System (WPDES) permit. The permit requires the Village to reduce phosphorus discharges to the river to meet water quality regulations. The Village elected to implement an Adaptive Management plan to restore in river total phosphorus concentrations to water quality standards at the most down river location of the Adaptive Management planning action area. The action area is Milwaukee River TMDL reach MI-17 shown on Figure 3 in Appendix A.

The monitoring program will benchmark total phosphorus concentrations throughout the action area. This monitoring program will help establish current phosphorus concentration in the river and quantify reductions achieved by various phosphorus runoff reducing practices.

1.3 PROJECT/TASK DESCRIPTION

A map showing the proposed monitoring locations is included as Figure 2 in Appendix A. Section 2 further identifies each sample location site. All sample locations will be georeferenced using GPS technology.

The parameters listed below will be analyzed monthly during the growing season at normal flow conditions as defined by the United States Geological Survey (USGS) at flow monitoring station 04086600.

- Total Suspended Solids (TSS)
- Total Phosphorous
- Filtered Phosphorus (Orthophosphate)

Sample collection and analysis will begin the process of building a data set that will quantify the impact phosphorus reduction practices have on in river total phosphorus concentrations.

1.4 DATA QUALITY OBJECTIVES

Data Quality Objectives (DQOs) are qualitative and quantitative statements, which specify the quality of the data required to support decisions made during the project and are based on the end uses of the data to be collected. As such, different data uses may require different levels of data quality. There are five analytical levels, which address various data uses and the QA/QC effort and methods required to achieve the desired level of quality. These levels are as follows:

Screening (DQO Level 1): This level provides the lowest data quality but the most rapid results. It is often used for health and safety monitoring at the site, initial site characterization to locate areas for subsequent and more accurate analyses and for engineering screening of alternatives. These types of data include those generated on-site through the use of pH, DO, ORP, temperature and specific conductance probes, as well as other real-time monitoring equipment at the site.

Field Analysis (DQO Level 2): This level provides rapid results and better quality than in DQO Level 1. This level may include mobile laboratory generated data depending on the level of quality control exercised.

Engineering (DQO Level 3): This level provides an intermediate level of data quality and is used for site characterization. Engineering analyses may include mobile laboratory generated data and some analytical laboratory methods (e.g., laboratory data with quick turnaround used for screening but without full quality control documentation).

Confirmational (DQO Level 4): This level provides the highest level of data quality and is used for purposes of risk assessment and evaluation of remedial alternatives.

Non-Standard (DQO Level 5): This level refers to analyses by non-standard protocols, for example, when exacting detection limits or analysis of an unusual chemical compound is required. These analyses often require method development or adaptation. The level of quality control is usually similar to DQO Level 4 data.

The analytical data generated by the phosphorus monitoring activities for the Milwaukee River will be DQO Level 4.

1.5 QUALITY ASSURANCE OBJECTIVES FOR MEASUREMENT DATA

The overall QA objective of this project is to develop and implement procedures for field sampling, chain-of-custody, laboratory analysis, and reporting that will provide results that are legally defensible in a court of law. The purpose of this section is to address the specific objectives for completeness, representativeness and comparability.

1.5.1 Completeness

Completeness is a measure of the amount of valid data obtained from a measurement system compared to the total data obtained over the course of the project. Site access, sampling protocol problems, analytical problems, and the data validation process can all contribute to missing or suspect data. It is expected that the data will meet QA/QC acceptance criteria for 95% or more for all samples tested. If the completeness objective is not met, actions will be taken to improve performance. This may take the form of an audit to evaluate the methodology and procedures used as possible sources for the difficulty and/or may result in the recommendation of a different method.

1.5.2 Representativeness

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or

an environmental condition. Representativeness is a qualitative parameter, which is dependent upon the proper design of the sampling program and proper laboratory protocol. The sampling network was designed to provide data representative of site conditions. The rationale for the sampling locations is discussed in Section 2.1.1 and Table 2 of Appendix B. Representativeness will be satisfied by ensuring that the proper sampling techniques are used, proper analytical procedures are followed, and holding times of the samples are not exceeded in the laboratory. Representativeness will be assessed by the analysis of field duplicated samples.

1.5.3 Comparability

Comparability expresses the confidence with which one set of data can be compared with another. Comparability can be related to precision and accuracy, as these quantities are measures of data reliability.

Quantitatively, data subjected to strict QA/QC procedures will be deemed more reliable than other data. Field data will be obtained following a given procedure and will be reported in consistent units to allow for easy comparisons.

1.6 DOCUMENTS AND RECORDS

Sampling collection records, field notebooks and all records of field activities shall be retained by the Village for five years. Sample collection records shall document proper sampling protocol performed in the field. In addition, the Project Managers, defined in Table 1 of Appendix B, shall retain all laboratory analytical results and all laboratory correspondence associated with the project. Chain-of-custody forms submitted to the laboratory shall also be retained along with the analytical results. The Village's Project Manager and the Symbiont Project Manager, defined in Table 1 of Appendix B, shall be made aware of any problems encountered during any phase of the project.

The Village shall retain copies of all management reports and memorandums.

Section 2.0
DATA GENERATION AND ACQUISITION

2.1 SAMPLING PROCESS DESIGN

The following section discusses the sampling process design.

2.1.1 Site Identification and Sampling Rationale

Data sampling stations are shown in Figure 2. Sample location sites were selected according to the following criteria:

Site 1: Determines the total phosphorus concentration of the Milwaukee River flowing into the action area.

Site 2: Determines the total phosphorus concentration of the Milwaukee River near the mid-point location in the action area. This location is upstream from a dam and may offer insight regarding phosphorus release that may occur from sediments trapped by the dam.

Site 3: Determines the total phosphorus concentration of the Milwaukee River at a location just down river from the WWTP outfall. This location was selected as it corresponds to a point of sample collection in earlier testing.

Site 4: Determines the total phosphorus concentration of the Milwaukee River that is exiting the action area. This is the critical sample location for compliance.

Additional sampling stations may be added or removed based on data evaluation by the plan administrator.

2.1.2 Sampling Frequency

Samples will be collected monthly during the growing season and under normal flow conditions as determined by USGS. The growing season is defined as May through October. USGS defines normal flow conditions as flow between the 25 and 75 percentile of flow over the last 30 years or more. USGS Station 04086600 will be used to monitor flow. This station has over 36 years of flow records.

Samples will only be collected when conditions are safe. Sample collection will be postponed when unsafe conditions exist, such as high flow or storms. The Village plans to collect one or more samples during each month of the growing season. Data from samples collected within a 30-day period within a calendar month will be averaged to obtain a single value for the month. A total of six representative data points, one for each month of the growing season, will be reported by the Village, along with the median value of the six data points. The median value will be used to determine compliance of the river with the water quality standards. All data will

be included in the annual report that will be provided to the Wisconsin Department of Natural Resources (DNR).

2.2 SAMPLING METHODS

Surface water grab samples will be collected at the locations specified in Section 2.1.1. Water quality samples will be collected from each location using the direct method or the Kemmerer bottle method. Sample bottles will be filled, labeled and packed on ice. A clean pair of latex gloves will be worn for each water quality sample collected by the sampling team. All samples will be delivered to and/or picked up by the laboratory with sufficient time to meet holding times.

2.3 SAMPLE HANDLING AND CUSTODY

The collected samples will be labeled appropriately, custody seals applied, placed in coolers, and stored on ice at approximately 4°C immediately after collection and kept on ice during transport to or pick up by the laboratory within the prescribed holding times. The lead technician for each sampling team will be responsible for contacting the laboratory and coordinating sample delivery. Samples will be delivered to or released to a representative of the laboratory defined under the chain-of-custody procedures within 24 hours of collection. Preservatives, if necessary, will be provided in the containers provided by the laboratory. Table 3 describes field collection containers, preservation and holding times.

The laboratory will record temperature upon arrival at the laboratory. Samples that require thermal preservation will be refrigerated after sample acceptance at the laboratory.

When received by the laboratory, the samples will be logged into the laboratory logbook and/or laboratory database. Maximum holding times before analysis, as stated in applicable laboratory method standard operating procedures (SOPs), provided in Appendix C, will be followed.

2.4 ANALYTICAL METHODS

All methods used by the laboratory for data analysis will be USEPA-approved methods listed in 40 CFR Part 136. Table 3 describes holding times as established in 40 CFR Part 136 and the detection limits of the Village of Graton WWTP laboratory to be used in this study.

2.5 LEVEL OF QUALITY CONTROL EFFORT

QA/QC procedures are necessary both in the field and in the laboratory to ensure that the data collected in environmental monitoring programs are of known quality, useful and reliable. QA/QC procedures can be divided into two categories: field QA/QC procedures and laboratory QA/QC procedures.

2.5.1 Field Quality Control

All field personnel will be responsible for ensuring that proper sampling methods, sample preservation and sample custody of the delivered samples to the designated laboratory are followed. Refer to Appendix C for additional sample collection and field procedures. A sample data sheet is also included in Appendix C.

Duplicate samples are typically collected and analyzed to assess the quality of data resulting from a monitoring program. Duplicate samples are analyzed to check for sampling and analytical reproducibility. The scope of QA/QC samples is dependent on project objectives. The general level of the QA/QC effort for this monitoring program will be one field duplicate for every ten or fewer monitoring samples.

In the event of a quality control or noncompliance issue, an investigation and corrective action report prepared by the Project Manager. The Project Manager will then forward this report to the Project QAO. The accuracy and precision of all data measurements must be quantifiable. Analytical procedures used for data analysis must be performed according to approved standard methods. Data measurements should be recorded in a controlled environment in which a quality control program can be maintained.

2.5.2 Laboratory Quality Control

Laboratory QA/QC procedures ensure analyses of known and documented quality through instrument calibration and the processing of samples. Precision of laboratory findings refers to the reproducibility of results. In a laboratory QA/QC program, a sample is independently analyzed more than once, using the same methods and set of conditions. The precision is estimated by the variability between repeated measurements. Accuracy refers to the degree of difference between observed values and known or true values. The accuracy of a method may be determined by analyzing samples to which known amounts of reference standards have been added.

The laboratory is responsible for the accuracy and reliability of analytical methods and final data reports according to their QA/QC Manual. The Project Manager will work closely with the Laboratory Project Manager to implement QA/QC procedures in accordance with the QAPP from in Appendix C.

A failure of an internal QA/QC limit will result in an investigation and a corrective action report by the Laboratory Project Manager. A copy of the corrective action report will be submitted to the Project Manager(s) and will be filed by date. Samples that have failed any QA/QC limit will be retested, if possible. The laboratory will maintain the QA/QC records for the analytical runs for the samples of interest.

2.6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION AND MAINTENANCE

All laboratory equipment will be routinely maintained according to the manufacturer's manuals. Any equipment used for field data measurements will be tested, calibrated and inspected prior to sampling events and after the equipment returns from the field.

2.7 INSTRUMENT CALIBRATION AND FREQUENCY

Instruments used in the laboratory will be calibrated prior to use according to the manufacturer's manual. The laboratory shall calibrate instruments according to internal QA/QC Manual and SOPs. The laboratory shall also keep adequate records of equipment calibration and to US National Institute of Standards and Technology (NIST) traceable standards when possible.

2.8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Supplies and consumables used in the field shall be inspected by the field teams to guarantee their usability. Supplies and consumables used in laboratory procedures shall be inspected by laboratory managers to confirm compliance with laboratory QA/QC manuals and SOPs.

2.9 NONDIRECT MEASUREMENTS

Nondirect measurements will not be obtained for the project.

2.10 DATA MANAGEMENT

Field books, field measurement records, and other data gathered in the field shall be maintained for five years in project files by the Project Managers. The laboratory will convey all laboratory analytical data to the Project Managers in the laboratory's standard report form.

Section 3.0
ASSESSMENT AND OVERSIGHT

3.1 ASSESSMENT AND RESPONSE ACTIONS

Performance evaluations of the sampling teams will be conducted by the Village's Project Manager. The sampling team will be evaluated to determine if sampling protocol is followed, and evaluations will be documented by the Project Manager. Quality control and noncompliance issues related to field activities will require an investigation and corrective action plan by the Project Manager.

The WWTP Laboratory performing data analysis shall maintain internal quality assurance programs as described in their quality assurance plans. Most laboratories maintain quality control checks for procedures. When the possibility of quality control problems or noncompliance issues arise that may affect the usability of data, an investigation and corrective action report will be submitted by Project Manager.

In addition, the Project Manager shall make certain that the project data associated with any quality control or other nonconformance issue is made available to data users with the appropriate data qualification. When data previously released to data users may have been affected by a quality control problem or other nonconformance issue, the Project Manager shall notify other data users of the problem.

3.2 REPORTS TO MANAGEMENT

The Project Manager will receive investigation and corrective action reports in case of any quality control or noncompliance issue. Any QA problems affecting the final reported values shall be reported to all data users.

Section 4.0
DATA VALIDATION AND USABILITY

4.1 DATA REVIEW, VALIDATION, AND VERIFICATION REQUIREMENTS

The Project Managers will review final analytical data reports and address any issue related to data reliability as mentioned in pertinent investigation and corrective action plans. Qualified laboratory data will be listed as such in any reports or data submitted. The quality assurance objectives including methods of analysis, matrix precision percentage, matrix accuracy percentage, laboratory control sample (LCS) accuracy percentage, method detection limit (MDL), quality limit (QL) and laboratory information management system (LIMS) for various parameters are included as Appendix C.

4.2 VERIFICATION AND VALIDATION METHODS

Sample collection and field measurement records shall be verified by field technicians and the records shall be kept by the Project Manager(s). Laboratory data shall be verified by the Project Manager. Field and laboratory records shall be archived by each Project Manager.

In the case of data verification resulting in a change to data, the Project Manager shall inform all data users and make corrections.

The Project Manager shall be informed if data accuracy, reliability, or usability has been reduced as the result of errors in stored data or corrupted data files. All data users shall be notified of the problems and corrections made.

4.3 RECONCILIATION WITH USER REQUIREMENTS

The execution of the project shall follow the procedures outlined in this QAPP. Village personnel and the Adaptive Management plan administrator are responsible for implementation of the quality control measures during each stage of the project.

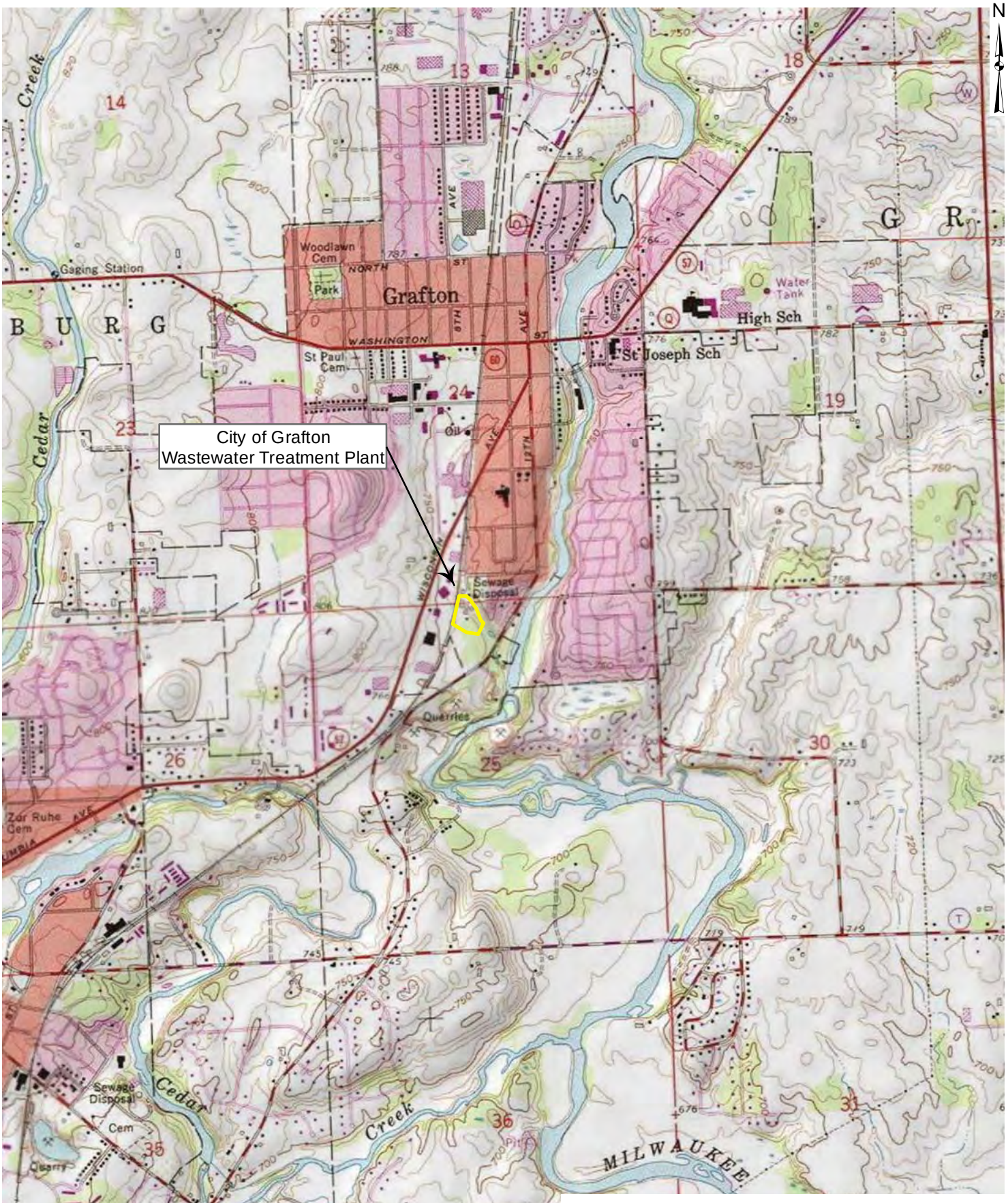
The QAPP shall be reviewed annually by the Village's project team. The review shall determine issues to be addressed as the project progresses. Issues to be discussed may include:

1. The number and location of sampling stations.
2. The frequency of sampling.
3. Sampling procedures.
4. Parameters measured.
5. Data quality objectives and minimum measurement criteria.
6. Analytical procedures.
7. Project reporting.
8. Corrective actions taken.

The QAPP shall be modified as directed and approved by the Village of Grafton Project Manager. The Village of Grafton Project Manager shall update the QAPP after review and keep a separate record of changes.

APPENDIX A

Figures:
Figure 1 – WWTP location and topography
Figure 2 – Sampling locations
Figure 3 – TMDL sub-watersheds for the Milwaukee River



Legend

Wastewater Treatment Plant Boundary

SYMBIONT
6737 West Washington Street
Suite 3440
West Allis, Wisconsin 53214
P: 414.291.8840
F: 414.291.8841

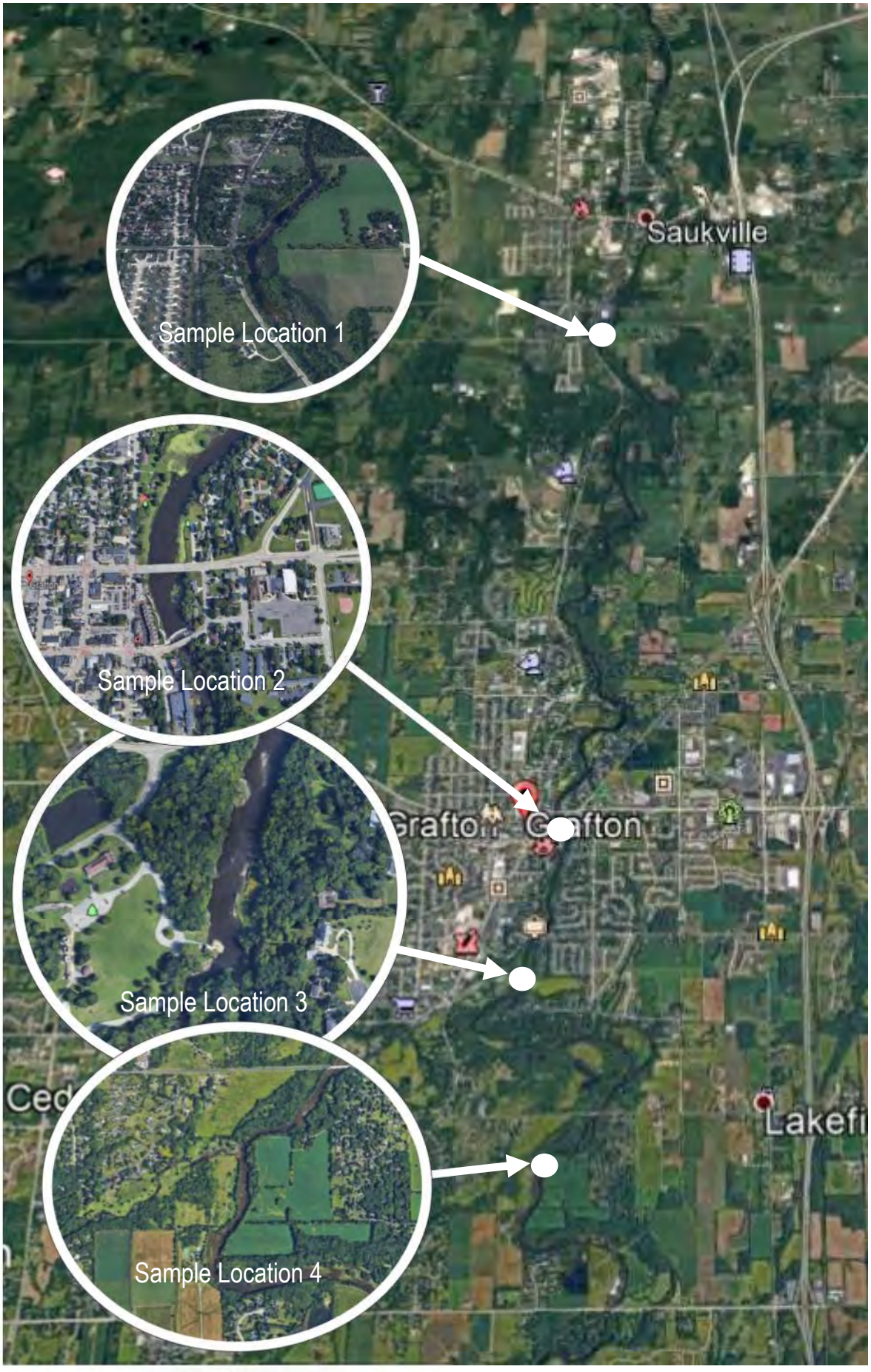
DSGN:	CHK:
DR: MJM	APVD:

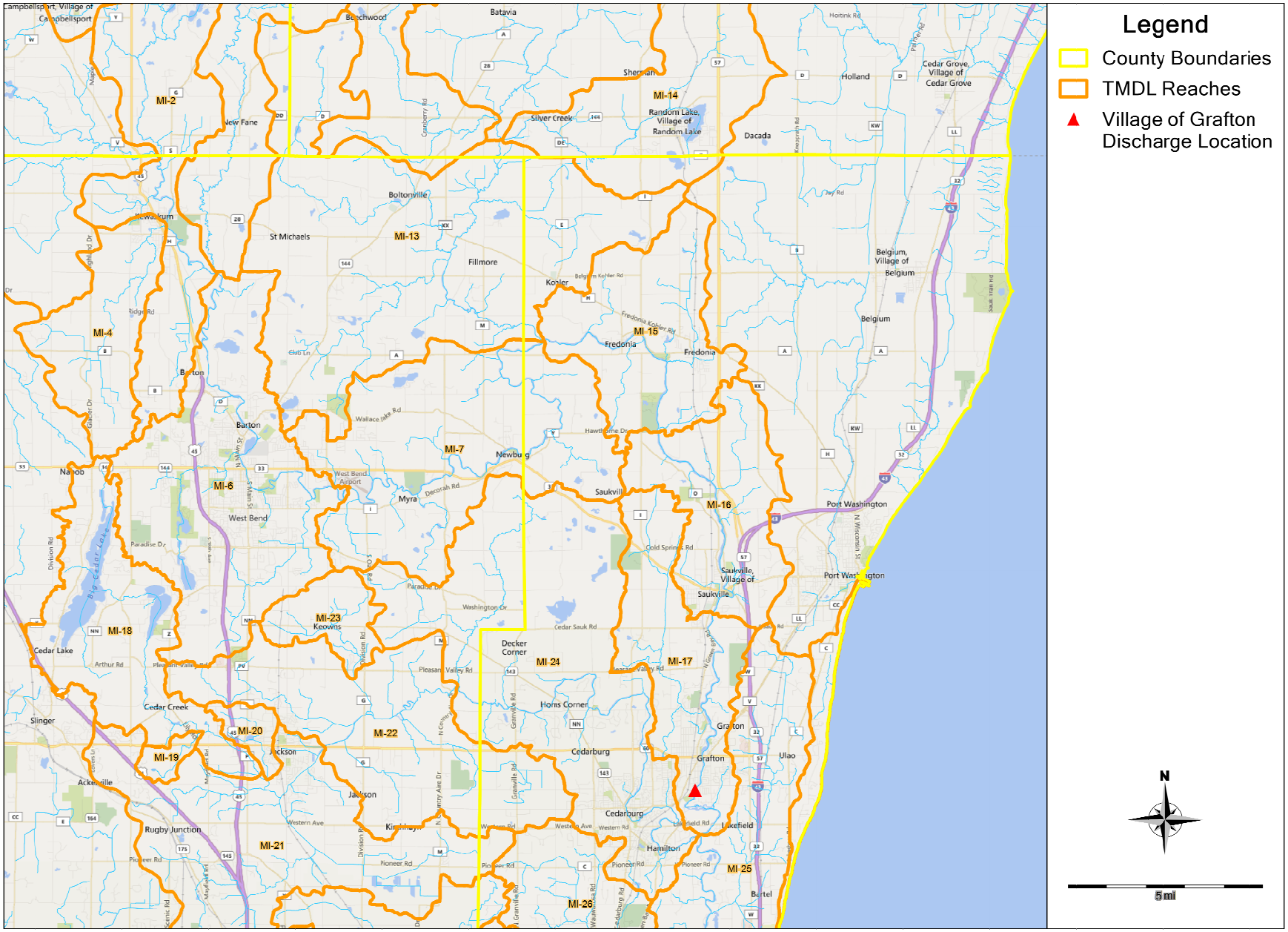
G:\Projects\City of Grafton\Map Documents\1.mxd

City of Grafton
Wastewater Treatment Plant

Figure 1
Site Location and Local Topography

SCALE 1 inch = 2,000 feet
DWG
DATE April 2012
PROJ NO.


Sample Location 1
Saukville
Sample Location 2
Grafton
Grafton
Sample Location 3
Ced
Lakefi
Sample Location 4


Legend
County Boundaries
TMDL Reaches
Village of Grafton Discharge Location
N
5 mi
MI-2
MI-4
MI-6
MI-7
MI-13
MI-14
MI-15
MI-16
MI-17
MI-18
MI-19
MI-20
MI-21
MI-22
MI-23
MI 24
MI 25
MI-26
Batavia
Sherman
Holland
Cedar Grove, Village of Cedar Grove
New Fane
Silver Creek
Random Lake, Village of Random Lake
Dacada
Boltonville
St Michaels
Fillmore
Kohler
Belgium, Village of Belgium
Belgium
Fredonia
Barton
Newburg
Saukville
Port Washington
West Bend
Myra
Saukville, Village of
Keowns
Decker Corner
Horns Corner
Cedar Lake
Cedar Creek
Slinger
Jackson
Cedarburg
Grafton
Ulao
Lakefield
Hamilton
Rugby Junction
Bartel

APPENDIX B

Tables:
Table 1: Project Personnel
Table 2: Sampling Locations
Table 3: Sample Container, Field Preservation, Holding Time and Detection Limits

TABLE 1. PROJECT PERSONNEL

Entity	Project Role	Staff
Symbiont	Project Manager	Jonathan R. Butt
	Project Quality Assurance Officer Regulatory Interface	Patrick W. Carnahan
	Sampling and Analysis Plan	Jonathan R. Butt
	Data Analysis Report Preparation	Jonathan R. Butt
Village of Grafton	Project Manager	Larry Roy
	Project Advisor	Tim Nennig
Village of Grafton WWTP Laboratory	Quality Control Chemist	Eric Nierode Viktor Petrov

TABLE 2. SAMPLING LOCATIONS

Sample Type	Label for Type of Sample	Sample Location No.	Sample Description	River Stage	Sampling frequency	Sample Name
Surface Water		**-1**	Determines the total phosphorus concentration of the Milwaukee River flowing into the action area.	**Normal flow conditions defined as 25% to 75% of the measured flow through USGS monitoring station 04086600 over the last 30 years.**	**A minimum of 1 sample collected each month starting in May and extending through October.**	**1**
Surface Water		**2**	Determines the total phosphorus concentration of the Milwaukee River at a mid-point location in the action area.			**2**
Surface Water		**3**	Determines the total phosphorus concentration of the Milwaukee River at a location just down river from the WWTP outfall			**3**
Surface Water		**4**	Determines the total phosphorus concentration of the Milwaukee River that is exiting the action area.			**4**

*Sample locations will be georeferenced using GPS technology.

TABLE 3. SAMPLE CONTAINER, FIELD PRESERVATION, HOLDING TIME AND DETECTION LIMITS

Parameter	Container and Preservation[1]	Holding Time[2]	Detection Limits/Accuracy
Orthophosphate	Filter, 1L plastic bottle, chill with ice	48 hours, Refrigerate	0.008 mg/L
Total Suspended Solids (TSS)	1L plastic bottle, chill with ice.	7 days, Refrigerate	2.5 mg/L
Total phosphorus	1L plastic bottle, H_2SO_4 to pH<2, chill with ice	28 days, Refrigerate	0.008 mg/L

Notes:
mg/L = milligrams per liter
L = Liter
H_2SO_4 = sulfuric acid
°C = degrees Celsius
+/- = plus and/or minus

1. All preservatives if necessary come in the containers provided by the recommended laboratory.
   * After preservatives, if necessary, are added.

2. Holding time is defined as from time and date of collection to time and date of analysis.

APPENDIX C

Sample Log Sheet

Village of Grafton WWTP
Laboratory
Certification and
Standard Operating Procedures

Village of Grafton Data Summary Sheet

			Laboratory Parameters		
Sample Location	**Month**	**Sample Date**	**TSS (mg/L)**	**Total Phosphorus (mg/L)**	**Orthophosphate (mg/L)**
1	May				
	June				
	July				
	August				
	September				
	October				
2	May				
	June				
	July				
	August				
	September				
	October				
3	May				
	June				
	July				
	August				
	September				
	October				
4	May				
	June				
	July				
	August				
	September				
	October				
5	May				
	June				
	July				
	August				
	September				
	October				

State of Wisconsin
Department of Natural Resources

recognizes

Wisconsin Registration under NR 149

of

Grafton Wastewater Treatment Plant

Laboratory Id: **246003010**

as a laboratory licensed to perform environmental sample analysis in support of covered environmental programs (ch. NR149.02 Note) for the parameter(s) specified in the attached Scope of Accreditation.

August 31, 2020

Expiration Date

August 1, 2019

Issued on

Steven Geis, Chief
Environmental Science Services

Preston D. Cole Secretary
Department of Natural Resources

This certificate does not guarantee validity of data generated, but indicates the methodology, equipment, quality control practices, records, and proficiency of the laboratory have been reviewed and found to satisfy the requirements of ch. NR 149, Wis. Adm. Code.

PREFACE

Revision 3/2014

The Village of Grafton
facility is a small to medium sized (about 2 mgd of combined domestic and industrial wastewater).
Please note that, where details are provided, they are specific to Village of Grafton.
In addition to an application and payment of fees, NR 149 requires:

1. Following standard operating procedures (SOPs) based on approved methods of analysis.

2. Using approved methods for sample collection, handling, and preservation and performing all testing within regulatory holding times.

3. Analyzing and passing at least one reference sample per year for tests that require them.

4. Preparation and adherence to a written Quality Manual. (This manual can also be called a Quality Assurance Manual or any other applicable title)

5. Performance of quality control samples including analysis of blanks, Laboratory Control Samples (LCS), second source standards (i.e., Initial Calibration Verification (ICV), and continuing calibration verification (CCV))

6. Documentation which substantiates those requirements is being met. Records must be retained for at least three years.

Table of Contents

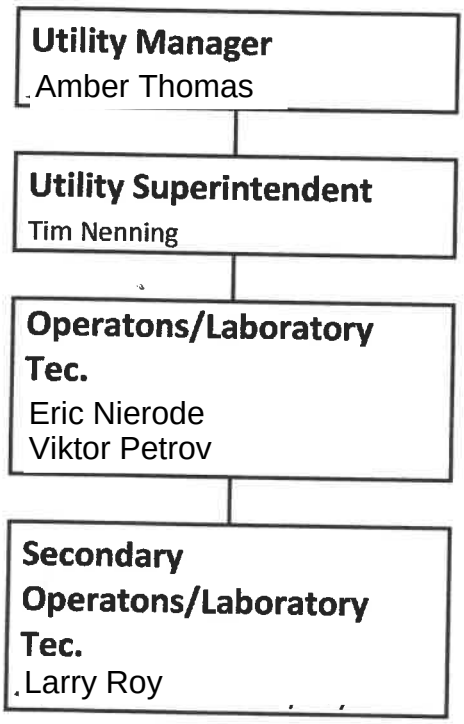
10. **PROCEDURES FOR REVIEWING ANALYTICAL DATA AND REPORTINGANALYTICAL RESULTS**

1. INTRODUCTION

The laboratory at the Village of Grafton Wastewater Treatment Facility performs analyses necessary both for compliance with
requirements specified by the plant's WPDES permit and process control. The lab may also be used to run tests for charge-back of treatment costs to industrial users . Quality Assurance (QA) is critical in
producing sound, defensible data. These data provide the empirical evidence upon which decisions are based. The purpose of this manual is to outline QA activities performed in the lab and to fulfill the requirements set forth in NR 149.37.

2. LABORATORY ORGANIZATION AND RESPONSIBILITY

Organizational Structure of the Village of Grafton **Wastewater Treatment Plant (WWTP)**



a. The individuals listed below are responsible for ensuring the production of valid laboratory measurements and the routine assessment of measurement systems for precision and accuracy.

i. Superintendent- Highly experienced plant operator with supervisory experience that is responsible for overall plant performance and compliance with WPDES permit. This includes affective wastewater treatment as well as the generation of valid and legally defensible data by the plant's internal analytical laboratory. The manager is trained and has extensive knowledge related to federal, state, and local laws which regulate wastewater treatment and discharge.

ii. Laboratory Technician- Individual with a sufficient combination of education, experience, and training to competently generate valid and legally defensibly analytical data. This person understands the fundamental conceptual theory behind the procedures performed. The person is familiar with and follows this QA manual, NR 149, and has intimate knowledge of all analytical methods. The primary lab analyst demonstrates these traits for all methods through the successful performance of Initial Demonstration of Capability (IDC), by ongoing success in the analysis of Proficiency Testing (PT) samples, and in regularly meeting all method quality control specifications.

iii. Backup Laboratory Technician - The backup analyst does the laboratory work for the primary laboratory analyst on the weekends, or when primary laboratory personnel is sick or on vacation. The same requirements of the main analyst are required of any backup, weekend, or fill-in analysts.

b. All analysts are required to perform an IDC for each method. Because the source methods (i.e., Standard Methods) upon which the analytical procedures performed at Village of Grafton **Wastewater Treatment Plant** do not contain specific IDC
procedures, laboratory management has instituted the following IDC methodology: The IDC consists of documenting that data generated by each new analyst meets all QC parameters for two consecutive analyses. The IDC analytical runs include a Laboratory Control Sample (LCS), where applicable, which is prepared by a second analyst. The LCS concentration is unknown to the analyst in training, when possible. At **the** Village of Grafton **Wastewater Treatment Plant**, the
results of the LCS for the IDC need to be + 15% to be acceptable. Copies of IDC documentation are permanently maintained in the Laboratory Quality Manaul note book. The IDC is a one-time requirement per method for each analyst.

3. PROCEDURES FOR RETENTION, CONTROL AND MAINTENANCE OF DOCUMENTS USED IN OR ASSOCIATED WITH ANALYSES

a. Records and Documents retention and control procedures.

i. All records of equipment calibration and maintenance, QC tests, sampling, standard and reagent preparation, and sample analysis are retained for at least three years (five years for sludge data) at the treatment facility office in fire resistant file cabinets.

ii. All raw data is kept, no matter how rough in appearance. If data contained on any record is transcribed to facilitate summarizing or neatness, the original record is also be kept.

iii. All observations are recorded in ink.

iv. Errors made in documentation are corrected by drawing a single line through the entry. The correct observation is then written next to original observation.

v. Records are available only to authorized laboratory staff.

b. Administrative records maintained

i. The laboratory's accreditation certificate from the Wisconsin Laboratory Certification program is conspicuously displayed on the wall near the laboratory entrance.

ii. Personnel records are maintained for all lab staff. These records include qualification, experience, training, and IDC documentation.

c. Analytical Records.

i. The Village of Grafton Laboratory maintains all records containing raw data and calculations which are needed to reconstruct all results reported on the DMR for which the laboratory is registered.

ii. The laboratory has developed benchsheets for all routine analyses and documentation. Other data are recorded in applicable logbooks.

iii. The laboratory documents at least the following:

1. Sample ID- samples are identified by the sample site (i.e., influent or effluent) and collection date.

2. Analysis Time- unless the sample is not analyzed on the day the sample is collected by the lab, the analysis time and date is noted on the benchsheet.

3. Preservation status- samples arrive to the laboratory immediately after collection from refrigerated autosamplers. Therefore, samples by Village of Grafton personnel are known to be thermally preserved when they arrive at the laboratory. Samples for which pH preservation is required are acid preserved as soon as possible after arrival at the laboratory. The preservation status of acid preserved samples is verified for each sample.

4. Analyst- the bench sheets indicate the analyst performing the testing as well as the intended analysis.

5. Analytical Procedure- all steps for which the samples are subjected are written out or referenced from the applicable method SOP.

6. Chemical Used- all standards and reagents used in the analysis are referenced on the benchsheet.
7. Data- raw data for both standards and samples are collected.

4. PROCEDURES FOR ACHIEVING TRACEABILITY OF STANDARDS, REAGENTS AND REFERENCE MATERIALS USED TO DERIVE ANY RESULTS OR MEASUREMENTS

a. Analytical Reagent and Standards
i. Purchased Materials

1. Only analytical grade reagents are used. Labels on all chemical reagents are marked with the date received, date opened, and expiration date. The reagent name, lot number, manufacturer, date of receipt, the date of expiration of purchased stock reagents are documented in a logbook .

2. Standards are labeled and logged-in in the same manner as reagents.

ii. Prepared Materials

1. All in-lab prepared reagents and standards are labeled with the date they were prepared, the material's identity, expiration date, preparer's initials and Village Grafton assigned lot number. All standards and reagents prepared are assigned a unique lot number and an expiration date. All standards and reagent preparation is documented in a logbook. These records serve to link intermediate and working standards and reagents (children) to their respective originating stocks or neat compounds (parent material). The material name, Village of Grafton assigned lot number, and expiration date of all raw substances used to prepare the material are documented. The procedure used to make the reagent or standard is described. Alternatively, the preparation procedure is referenced from the applicable SOP.

b. Reagent Water Quality

i. Reagent grade water is produced in the lab using a Barnstead Model MP-3A still. Water used for ammonia measurements is also passed through a mixed-bed ion exchange column (Barnstead Bantam Deionizer).

Only freshly prepared reagent water is used for ammonia testing to prevent the water from picking up ammonia from the air. Reagent water used to make dilution water for BOD analyses is stored in glass bottle stoppered with clean cotton plugs. Reagent water for tests other than ammonia and BOD is stored in tightly stoppered plastic carboys.

5. PROCEDURES FOR HANDLING SAMPLES

a. Samples are collected to fulfill permit requirements for testing plant influent, effluent, and hauled sludge as well as for industrial and process control monitoring. Wastewater testing requirements are summarized below. Schematic reference numbers correspond to those on the plant schematic (page IV).

Table 1 - WPDES Permit Requirements

Sample Locaation	Sample Type	Schematic Referance	Parameters Tested	Monitiring Frequency
Influent	Continuous	3	Flow	Totalized Daily
Influent	24-hr composite (flow proportional)	1	Biochemical Oxygen Demand Total Suspended Solids	4 / Week
Influent	24-hr composite (flow proportional)	1	Ammonia-Nitrogen Total Phosphorus	Weeky
Effluent	24-hr composite (flow proportional)	2	Biochemical Oxygen Demand Total Suspended Solids Ammonia-Nitrogen Total Phosphorus	4 / Week
Effluent	Grab	15	Dissolved Oxygen	5/week
Effluent	Grab	15	pH	Daily
Effluent	Grab	14	Fecal Coliform #	Weeky
Primary Effluent	24-hr composite (flow proportional)	13	Biochemical Oxygen Demand Total Suspended Solids Ammonia-Nitrogen Total Phosphorus	3/Month

- Disinfection only required during the period from May 1 to September 30 in any given year.
* Dissolved Oxygen monitoring required May –Oct. only.

i. The permit also requires that a sludge characteristic report be submitted annually for quarterly analyses. Sludge analyses for non-routine parameters are performed by a certified commercial laboratory.

b. Sample Handling

i. Samples are identified by collection site and date of collection.

ii. All samples for ammonia and phosphorous are acid preserved when brought into the laboratory.

iii. If analysis is not initiated immediately, samples are refrigerated.

Table 2 - Process Control Monitoring

SAMPLE LOCATION	SAMPLE TYPE	SCHEMATIC REFERENCE	PARAMETERS TESTED	MONITORING FREQUENCY
Aeration Tank	Outlet grab	4 & 5	Settleability (30 min.) Total Suspended Solids	Daily
Aeration Tank	Contents in-place	4 & 5	Dissolved Oxygen	Continuous
Digester Contents	Grab	6 & 7	Percent solids Volatile Solids Volatile Acids Alkalinity	Weeky
Clarifier	Grab	8 ,9,10,11,16,17	Blanket Depth	Daily
Return Sludge	Grab	18 & 19	Total Suspended Solids	Daily

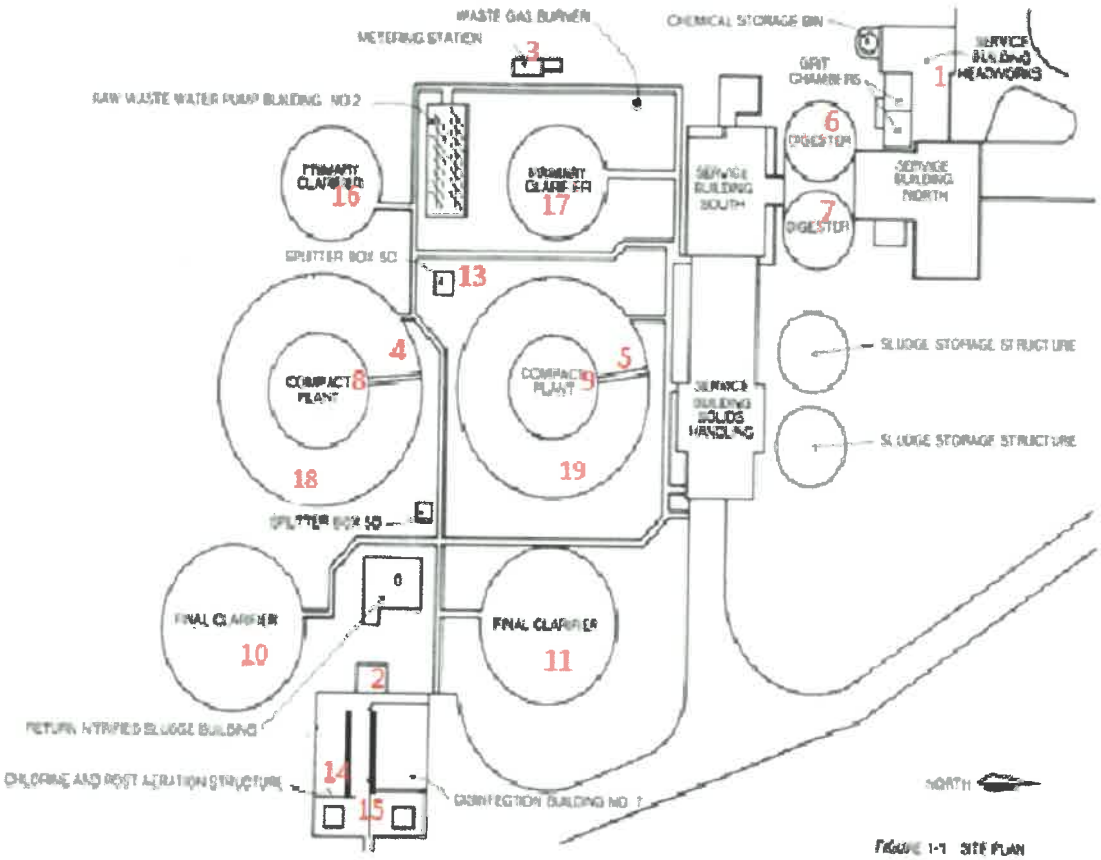


FIGURE 1-1 SITE PLAN

c. Sampling

i. A flow-proportional automatic sampler is used to obtain sample from the influent channel upstream of both the raw pumps. These samplers receive signals from the influent flow meter so that sampling is done in a flow proportional mode. Samplers have refrigeration units that maintain sample temperatures at ≤ 6 °C.

ii. The operator collects samples from the automatic samplers at approximately 8:00 a.m. by replacing the filled polyethylene sample containers with clean containers and transporting samples directly to the lab. Temperature of the automatic sampler are recorded when samples are collected.

Samples are uniquely identified by the sample date (date the majority of the 24 hour composite sample is collected),collection date (date sample is collected), collection site (i.e., influent or effluent), by sample type, and exact sample collection time. The hold time is calculated by the collection date, but the sample date is the date for which the results are reported. All sample bottles are clearly labeled with a durable marking with the sample identification, time and date of collection, chemical preservation, initials of sampler, and the intended analysis.

iii. Samples are allowed to equilibrate to room temperature while calibration checks are performed. Analyses begin at approximately 8:30 a.m.

iv. Grab samples are collected by the operator in plastic bottles for direct transport to the lab. Samples for pH are tested as soon as they are brought back into the laboratory. Samples for fecal

coliform are collected in a sterilized plastic jar containing a drop . Testingis initiated shortly thereafter.

v. Processed sludge for the required quarterly Sludge Characteristic Report is collected from a mixed storage tank. Sludge samples
collected for the analysis of percent solids, pH, and nutrients (ammonia-nitrogen, Total Kjeldahl Nitrogen [TKN], total phosphorus) are exempted from the requirement that they be performed by a registered/certified laboratory as outlined in NR 219.07. Samples for metals and other non-routine analyses are composited into a polyethylene container provided by the commercial lab, refrigerated, and transported to the commercial lab the following day. The commercial laboratory provides sample bottles containing required preservative. Samples are stored in coolers within the refrigerator until they are delivered to the commercial laboratory. Sample delivery is done in person or by a shipping company. Typical analyses required include: arsenic, cadmium, chromium, copper, lead, mercury, nickel and zinc.

vi. All sludge (Solids Matrix) results must be reported on a dry weight basis. If data are received "as is" or calculated based on "wet weight", they can be converted to dry weight using the following formula:

vii. On occasion, the DNR region may require the analysis of additional parameters from the list of Conventional Priority Pollutants. These analyses are also performed by a properly certified commercial laboratory which will, in many cases, supply sample bottles containing required preservatives and sampling guidance.

viii. Sample bottles for analyses performed at the wastewater facility are permanently labeled for their appropriate use. Any departure from standard sampling protocol is noted on appropriate bench sheets. Care is taken to ensure that samples are well mixed prior to aliquot withdrawal. All sample bottles are washed using a scrub brush with hot tap water and non-phosphate detergent or lab dich washer after each use . Bottles are rinsed with cold tap water until the suds come up to the top of the neck and spills out
into the drain to insure that detergent residue is removed. Then the bottles are triple rinsed with distilled water. Bottles for phosphorus samples are washed with a non-phosphate detergent and rinsed with 1:10 hydrochloric acid. Bottles for fecal coliform are sterilized before use.

Analyte (dry weight in mg/kg) = Analyte (wet weight in mg/kg)
(% solids / 100)

For example: zinc = 2.5 mg/kg (dry), 80% solids

Therefore…

2.5 mg/kg (dry) = 3.1 mg/kg (wet)
(80% / 100)

ix. Sample handling/preservation requirements for wastewaters are in Table 3. Sample handling and preservation methods required by state and federal laws are followed (see NR 219, Table F).

Table 3. Sampling Handling Guidelines

PARAMETER	SAMPLE TYPE	PRESERVATION	CONTAINER	@MAXIMUM HOLDING TIME	*ANALYTICAL METHOD
Biochemical Oxygen Demand	24-hr composite [flow proportional]	Cool, ≤ 6°C	Polyethylene	48 hours	5210 B
Total Suspended Solids	24-hr composite [flow proportional]	Cool, ≤ 6°C	Polyethylene	7 days	2540 D
Ammonia-Nitrogen	24-hr composite [flow proportional]	Cool, ≤ 6°C; H_2SO_4 to pH <2	Polyethylene	28 days	4500-NH_3 F
Total Phosphorus	24-hr composite [flow proportional]	Cool, ≤ 6°C; H_2SO_4 to pH <2	Polyethylene	28 days	4500-P B(5) & 4500-P E
pH	Grab	None	Polyethylene	immediately	4500-H^+ B
Dissolved Oxygen (DO)	Grab	None	None *	immediately	4500-O G
Fecal Coliform Bacteria	Grab	Cool, ≤ 10°C;	Polypropylene or sterilazable	6 hours	9221 E

* Field Probe is used

6. MAJOR ANALYTICAL INSTRUMENTS AND SUPPORT EQUIPMENT

a. The Village of Grafton Laboratory is outfitted with all with the equipment required to correctly perform the testing for which
it is registered. All equipment is kept in working order by adherence to routine and preventative maintenance schedules. Non-routine maintenance is performed as needed and is usually associated with a corrective action (see section 9).

b. Laboratory Equipment
i. YSI 5100 Dissolved Oxygen Meter
1. Self-stirring Dissolved Oxygen probe YSI 5010
ii. Orion 720Aplus Advanced Ion Selective Meter
1. Orion 9512HPBNWP Ammonia Electrode
2. Orion 9157BN PerpHecT® ROSS® Combination pH Electrode
iii. Genesys 20 Spectrophotometer
c. Laboratory Support Equipment

i. Market Forge Autoclave (STM-EL Model)– Front Loading Autoclave
ii. Barnstead Glass Still Model MP-3A still
iii. ISCO Model 103B Refrigerated Autosampler (x2)
iv. Thermo Electron BOD incubator Model 815
v. General Electric Refrigerator
vi. Rice Lake Analytical Balance Model TA-220
vii. Trermo Scientific Drying Oven Model OMH60

7. PROCEDURES FOR CALIBRATION, VERIFICATION, AND MAINTENANCE OF MAJOR ANALYTICAL INSTRUMENTS SUPPORT EQUIPMENT

a. Sampler Cleaning
i. The sampler tubing is changed at least once every 3 monthly and is documented in maintenance logbook:
.
.
b. Equipment Maintenance
i. A file is kept for each piece of equipment in the lab. Each file contains the owner's manual, a preventative maintenance schedule.Rrecords of all maintenance and repairs performed including the exact nature of the problem, the date of the repair, what was done, who did it, and the cost is kept in a note book. To determine if an instrument malfunction affected analysis results, the dates of breakdown and subsequent repair are considered particularly important. The analytical balance is serviced at least annually. The DO and ammonia probe membranes are replaced every two to four weeks or more frequently if readings become erratic.

c. Labware Cleaning
i. After each use, glassware is washed with non-phosphate detergent, rinsed with tap water, triple rinsed with distilled water, allowed to dry, and stored in a cabinet. The appropriate glassware cleaning procedures depend on the analysis to be performed. Glassware for Phosphorus testing is washed with a non-phosphate detergent, rinsed with tap water by allowing the detergent suds to spill over the top of the container to insure detergent removal, acid-washed after each use with a 10 % hydrochloric acid solution, triple rinsed with distilled water, and then filled with distilled water. Glassware is stored full of distilled water until the test is run. When the total phosphorus test is run, the distilled water is dumped out and the glassware is rinsed with a small amount of distilled water; just enough to coat the inside surface. This distilled water is then discarded. The glassware used for phosphorus is stored segregated from other lab glassware. Even though the phosphorus glassware is segregated, the same piece of glassware is not used for the blank, influent, and effluent sample each time. Any markings on the phosphorus glassware are removed after testing with water or acetone. BOD bottles are always stored dry. Bottle used for B.O.D. dilution water are filled with a 25% bleach solution left in over night then rinsed with hot tap water and then with distilled water. All reagent water carboys are cleaned monthly with dilute hydrochloric acid.

d. Instrument Calibration
i. The pH meter, DO meter, and ammonia selective electrode are calibrated each day they are used. If these instruments are used over the course of a day, calibration checks are repeated every 2 hours. The temperatures of the BOD incubator ,solid drying oven, fecal coliform incubations and sample storage refrigerator are measured using non-mercury liquid in glass thermometers with their bulbs immersed in water. On each analysis day that the incubator, solid drying oven fecal , coliform incubations, or storage refrigerator is used, their temperatures are recorded on log sheets. Both the temperature, correction factor, and adjusted temperature are documented on a central log for all thermometers. The temperatures of the
solids drying oven, and fecal coliform incubations are recorded on the bench sheets
when they are used for analyses. If the temperature is outside of the required range, the thermostat is adjusted and the adjustments are noted on the log sheet. The results of testing associated with out of specification temperatures are noted on the DMR.

ii. Thermometers used in the lab to measure the temperature of the BOD and fecal coliform incubators are calibrated annually against a thermometer traceable to an NIST (National Institute of Standards and Technology, formerly National Bureau of Standards, NBS). Once a year each NIST traceable thermometer is calibrated against a NIST certified thermometer (borrowed from a neighboring wastewater treatment lab

or a Rural Water Circuit Rider). The calibrated thermometers are tagged with their correction factors, and the appropriate factors are applied when documenting any temperatures in the laboratory. If the liquid column in the thermometer splits, it will no longer provide an accurate measurement and is retired.

iii. Thermometers used to record the temperature of influent and effluent 24-hour composite samplers are factory certified traceable to NIST and are sealed in a clear glass bottle filled with ethylene glycol. Each thermometer has a unique serial number and a certificate of NIST traceability. These are replaced or calibrated annually. A record is kept with the serial number on the thermometer and its corresponding correction factor.
iv. The analytical balance is serviced and calibrated by an outside vendor at least annually. Additionally, the analytical balance is put through its internal calibration sequence daily. Balance calibration is verified at least monthly using two S-class weights (100 mg and 1g). The weights used and the mass values obtained are noted in a log book by the balance table. If the balance calibration is off by more than the tolerance provided by the weight manufacturer, the balance is serviced by a manufacturer's representative. The class-S weights are stored with foam rubber padding so that the weights do not hit each other or the side of the container. This is done to maximize the life of the class S weight. The class-S weights are sent out for calibration at least every 5 years.

v. Other specific maintenance and calibration requirements are described applicable SOP's

8. PROCEDURES FOR EVALUATING QUALITY CONTROL SAMPLES

a. Quality Control Analyses
i. Routine analysis of blanks, second-source Initial Calibration Verification (ICV) standards, primary source Continuing Calibration Verification (CCV) standards, and Laboratory Control Samples (LCS) are performed according to the frequency shown in Table 3. When corrective action does not resolve an LCS failure a nonconformance (formerly called a QC exceedance) is noted on the DMR. At the Village of Grafton wastewater laboratory, replicates and matrix spikes are sometimes used for initial demonstration of capability training purposes. Alternatively, matrix spikes may be run in conjunction with corrective action measures. Results from matrix spike analyses are treated in the manner specified in the following section. Results of the known standard (glucose/glutamic acid) for BOD must be 167.5 – 228.5 mg/L. Records of all of quality control analyses are kept on daily bench sheets and in a separate quality control log book.

1. Method Blanks

a. Method blank (MB) means a sample of clean matrix (i.e., reagent water) that does not contain the analytes of interest. It is processed with and under same conditions as the associated samples in a preparation batch. Method blanks must be processed at least one per preparation batch. If the method does not require a preparation step, a blank different from the calibration blank is still required once per batch. Whenever a method blank contains analytes of interest above the detection limit of an analysis, the laboratory evaluates the nature of the interference and its effect on each sample in a preparation batch. A sample in a batch associated with a method blank that fails criteria is reanalyzed or qualified on the DMR. NR 149 specifies that the method blank be below the highest of the LOD, 5% of the permit limit for that analyte, or 10% of the sample concentration.

2. Initial Calibration Verification (ICV) and Quality Control Standards (QCS) for total phosphorus

a. A second source ICV standard is evaluated when total phosphorus analysis is performed. Two different manufacturer's lots are requested from the laboratory supply company whenever a new total phosphorus standard is purchased. The first lot of standard is used for the initial calibration, and the second lot of the standard is used to verify the initial calibration (the ICV). After the initial calibration curve for total phosphorus is generated, (once a year, or as needed), an ICV from a different

manufacturer's lot is analyzed immediately to verify that the calibration is valid. Since the Village of Grafton laboratory uses a 0.5 mg/L ICV, the ICV must fall within 0.45 -0.55 mg/L (± 10 % of the true value). By running a second source standard for phosphorus, the Village of Grafton laboratory does not need to purchase or analyze Quality Control Standards (QCS) standards. QCS standards are also not required for BOD, TSS and ammonia.

3. Continuing Calibration Verification (CCV) for Total Phosphorusa.
A CCV is analyzed on days other than calibration days (Note: this assumes that batches over 20 samples are never analyzed by the Village of Grafton laboratory). The concentration of the CCV must be within ± 10 % of the expected value. For example, if a 0.6 mg/L CCV is used, then the concentration must be between 0.54 – 0.66 mg/L for the CCV to be acceptable. If the CCV does not meet acceptance criteria, another is CCV is measured. If the results of the second CCV do not pass, then the Village of Grafton laboratory takes corrective action, as required by NR 149.44 (7). After corrective action, Village of Grafton is required to pass two CCVs in a row. If these consecutive CCVs do not pass, a new calibration curve is measured and the analysis of all samples is repeated. Alternatively, Village of Grafton laboratory may report sample results from a run including a failed CCV, but the results are qualified appropriately on the DMR. (Note: CCVs are not needed for ammonia because the instrument is calibrated on each analysis day, assuming less than 20 samples are analyzed in a single analytical batch).

3. Laboratory Control Samples (LCS) *…formerly known as "Known Standards"*

b. These standards are prepared by or acquired by the lab with a known concentration of the contained analyte. They are used to verify the accuracy of the system. Control charts generated from the previous quarter's LCS data are used by the laboratory to evaluate the acceptability of LCS results.

4. Replicates and Matrix Spikes (MS)

a. Normally, the Village of Grafton Wastewater Laboratory analyzes LCS samples rather than replicates or matrix spikes.

b. When the Village of Grafton WWTP laboratory obtains ammonia and phosphorus compliance sample concentrations that are significantly different what is expected, the laboratory chooses to optionally analyze replicates and MS as soon as possible. Village of Grafton will analyze an MS and replicate on the same analysis day if sample volume is sufficient. When optional replicates are analyzed, they are compared against in-house precision limits. When optional MS are analyzed, these are compared against the LCS limits. If the optional replicates and MS pass their respective control limits, then the laboratory is reassured that the sample results are valid and corrective action is not needed. When the laboratory chooses to analyze replicates and MS it follow up with corrective action if the replicates and matrix spikes exceed acceptance criteria.

c. If the optional replicate fails its precision limit, then a replicate LCS may be analyzed. Replicate LCS are evaluated against a relative percent difference (RPD) criteria.

5. Proficiency Testing (PT) Samples *… formerly known as Reference Samples*

a. A PT sample is a standard, obtained from approved external sources, whose concentration is unknown to the laboratory. For many tests, at least one set of PT samples must be analyzed every year to renew the lab's registration. At least one set of acceptable results must be obtained. Follow-up PT samples are analyzed if the provider acceptance limits are exceeded.

b. This laboratory chooses to use the State Laboratory of Hygiene PT sample subscription service. The State Lab of Hygiene ships PT samples several times a year. For each study, the laboratory analyzes and reports results by a deadline. For the State Lab of Hygiene PT samples, the laboratory receives a final report with the true values and acceptable ranges 30 days after the results deadline. If all the results are acceptable, the laboratory does not need to do anything else since results are electronically loaded into the lab certification computer system. If one or more failures occur, then the lab automatically receives the next round of PT samples from the State Lab of Hygiene. The Village of Grafton facility obtains annual PT samples from the State Laboratory of Hygiene for ammonia, phosphorus, TSS and BOD.

-

Table 4. Minimum QC Requirements by Method.

B.O.D. GGA weekly Replicate 4 times weekly.
Phosphorus LCS of 1.00 mg/l weekly Replicate 4 times weekly.
Ammonia LCS of 0.50 mg/l weekly Replicate weekly.
TSS Replicate 4 times weekly.

9. PROCEDURES FOR INITIATING, FOLLOWING UP ON AND DOCUMENTING CORRECTIVE ACTION ADDRESSING QUALITY ASSURANCE AND QUALITY CONTOL FAILURES, DISCREPANCIES OR NONCONFORMANCE

a. Corrective action is initiated when any situations become apparent which may affect data quality (i.e., consistent QC
parameter failure, or failure of a PT sample). When it has been determined that a corrective action is needed the analyst documents the cause in the corrective action log (see example in table 6).

Table 6. Example format of corrective action log.

Describe the problem. Reference data and
specific analytical runs. Note if problem
reported on DMR
Describe corrective action initiated
Date and Initials
Describe quality of data after corrective action
implemented. Reference data and specific
analytical runs
Has the situation improved to acceptable level?
Will further corrective action be needed?
Date and Initials

b. The action taken in hopes of fixing the problem are documented in the log

c. Data affected over time by the corrective action are referenced in the log. The situation is monitored for improvement and notes are made in the corrective action logbook. If the situation does not improve as expected, a new corrective action is undertaken and documented in the same manner as the initial attempt. This cycle continues until the situation has reached a state of acceptability. The process is graphically depicted in figure 1.

Figure 1. Graphical depiction of corrective action process.

d. Operators report those analytical results that are associated with any analytical run in which one or more of the quality control samples failed to meet acceptance criteria. These data are flagged on the DMR reports by placing a capital " Y " in the "QC Exceedance" box for any column that has been referred to in the "Laboratory Quality Control Comments" box. The date or dates of the analysis which had a quality control exceedence are also documented in the "Laboratory Quality Control Comments" section of the electronic DMR (eDMR). Comments include a narrative that describe which date or dates of the analyses are affected, and specific details regarding the reason for qualification of the data. The operator must also decide whether or not to include the analytical results when calculating weekly or monthly average values. If the decision is made to exclude the values in question from calculating weekly/monthly averages, an explanation for the exclusion(s) also is to be provided.

10. PROCEDURES FOR REVIEWING ANALYTICAL DATA AND REPORTING ANALYTICAL RESULTS

a. A number of reports are required to be filed to document compliance with the requirements of the WPDES permit. In each case, the data which must be included in the specific report is subject to appropriate review to ensure the accuracy of the data and compliance with effluent limitations (Table 5). Generally, when analytical results are completed by a Lab Technician, the data is reviewed by another individual familiar with the analysis, such as another Lab Technician, or the superintendent who as a supervisor of the laboratory operations. Once incorporated into the report, the superintendent (or director of the facility) reviews the compiled data against permit requirements and provide any necessary qualifications to the data, such as results that exceed permit limits or results for which the associated QC sample(s) failed to meet control limits. Monitoring reports are signed by the Village of Grafton Utility Manager. (orprincipal executive officer, a ranking elected official, or other duly authorized representative).
b. All DMR reports are electronically submitted to the Department.

mple Collecting 1/25/2011 Rev.3/4/2014

e influent sample .

Take the 20 liter bottle labeled RAW to the influent sampler located in the Grit Room.
Remove the bottle from the refrigerator and Place the empty bottle in the refrigerator making sure the tube is in the bottle. Check refrigerator Temp and record.
Turn off the sample if no sample is needed for that day. Or reset sampler to take a sample for that day.
By pressing the (stop) button follow by the (start sampling) button then the (entry) button.

The Primary Effluent Sample

Take the 15 liter bottle labeled RAW to the influent sampler located outside next to Primary splitter box.
Remove the bottle from the refrigerator and Place the empty bottle in the refrigerator making sure the tube is in the bottle. Check refrigerator Temp and record.
Turn off the sample if no sample is needed for that day. Or reset sampler to take a sample for that day.
By pressing the (stop) button follow by the (start sampling) button then the (entry) button.

The effluent sample .

Take the 20 liter bottle labeled FINAL to the influent sampler located in the U.V. Room.
Remove the bottle from the refrigerator and Place the empty bottle in the refrigerator making sure the tube is in the bottle. Check refrigerator Temp and record.
Turn off the sample if no sample is needed for that day. Or reset sampler to take a sample for that day.
By pressing the (stop) button follow by the (start sampling) button then the (entry) button.

ting influent sample

Mix the 20 Liter Bottle Well. Then pour sample into a 1 liter bottle. The bottle is labeled Raw and the day of The week . This sample will be stored for Phosphorus and ammonia test. By adding 1ml of H_2SO_4 and record on bench sheet.
The pH of the sample should be 2 or lower. Check with pH Paper and record on bench sheet. degrees C.
Then Refrigerate at 0-4 degrees C.

Mix the 20 Liter Bottle Well. Then pour sample into a 2 liter bottle. The bottle is labeled Raw .
This sample will be used for B.O.D. and S.S. Testing . Check the temp. and record on bench sheet.

Splitting Primary effluent sample Same as influent sample.

Splitting effluent sample

Mix the 20 Liter Bottle Well. Then pour 1 lite of sample into a 2.5 liter glass bottle. The bottle is labeled Final and the day of The week . This sample will be stored for Phosphorus and Ammonia test. Add 1ml of H_2SO_4 and record on bench sheet.
The pH of the sample should be 2 or lower. Check with pH Paper and record on bench sheet.
Then Refrigerate at 0-4 degrees C. until needed

Mix the 20 Liter Bottle Well. Then pour sample into a 2 liter bottle. The bottle is labeled Final .
sample will be used for B.O.D. and S.S. Testing . Check the temp. and record on bench sheet.

Village of Grafton W.W.T.P. Lab

B.O.D. Testing 1/25/2011 Rev.1/26/2016

Method Code SM 5210 B-2001

Equipment needed.

1. D.O. Meter YSI model 4010-2
2. D.O. Probe YSI Model ProOBOD
3. Incubator at 20 degrees C +or- 1 degree. Thermo Elector model 815
4. B.O.D. Bottles.300mls WITH STOPPERS. washed in dish washer after each time used(scientist setting)
5. Pipets with large openings.
6. Graduated Cylinders
7. Dilution Water Bottle(1 gallon)
8. Thermometer. Traceable model 4352

3 per sample
1 for blank

Chemicals Needed

1. Distilled water
2. Calcium Chorine From NCL C-5
3. Ferric Chlorine From NCL F-10
4. Magnesium Sulfate From NCL M-10
5. Phosphate Buffer From NCL P-30
6. B.O.D. Standard From NCL 198 ppm or made in lab with Glucose and Glutamic Acid.
7. B.O.D. Seed From settable solid test 250 ML of supernatant and 2 ML of sludge.

Steps Begin test within 2hours of collection. stored in BOD incubator

1. Dilution Water in Dilution Water Bottle ~~Add 1ml per Liter of Calcium Chorine, Ferric Chlorine, Magnesium Sulfate to distilled water cooled to room temp~~. (most times 3 Liters) ~~Stored in Incubator.~~ 3 to 7 days Then just before using add 1ml per Liter of Phosphate Buffer.

2. Calibrate D.O. Meter using ~~instation~~ on chipboard near Meter

Calibration D.O. Meter instructions

3. Warm samples up in water bath in sink with hot water to 20 to 22 degrees C. (use yellow thermometers in cabinet above DO meter)

4. Check and record pH of samples. The pH needed to between 6.0 and 8.0. If not adjust to pH 7.0 to 7.2with H_2SO_4 or NaOH . All sample that the pH was adjusted needed to be seeded.

using pH strip (located in cabinet above DO meter)

5. Set up dilutions Using B.O.D. Bottles(~~At least~~ 3 dilutions per sample. ~~Fill 1 bottles up with~~ Dilution Water ~~for Blanks.~~

randomly selected use and 1 for blank)

Effluent sample shake vigorously and let sit without cap for at least 3 minutes to reduce D.O. Add 1 ml/liter of Calcium Chorine,Ferric Chlorine, Magnesium Sulfate, Effluent fill 2 or 3 bolted 1/4 full with and Phosphate buffer

Blank Fill up blank bottle

Prep blank and samples

Add nutrients to Dilution water and final sample.

→ Dilution Water then add sample then fill with Dilution Water. Sample size most of the time is
Final →100,200,300mls. 300 ml sample size no dilution water added.

For influent sample fill 3 Bottles 2/3 full with Dilution Water add the sample. Sample size most of the time is 2,4and 6mls. Then fill with Dilution Water.

Raw → 3, 6, 9 Primary → 4, 8, 12.

Volume of sample can be changed for stronger or weaker samples.

Day 1

6. Run a D.O. on each bolltes. And record on bench sheet. Also record time ,date and who run D.O.

If D.O. is 0.4 mg/l high then D.O. situition start over at step 4.(use chart for D.O. situition.)

7. Place Stopper in bottles and check for air bubbles. If there is air bubbles add little distilled water and try again. Then add a little distilled water in the rim of bolltes and place plastic cap on bottles.

8. On bench sheet record bollte #, mls of sample used,D.O.,Who started test,data,time.

9. Put bottles in Incubator. For 5 days +or-6hours.

Day5

10. Take bottles out of Incubator.

11. Run a D.O. on each. And record on bench . Also record time ,date,who run D.O.

12. Calculate B.O.D. and record in computer.(D.O. After 5 day only use bottle that depleted 2.0 mg/l or more and have at least 1.0 mg/l left.)

13. The ending D.O. of the Blank needed to be +or- 0.2 mg/l of the starting D.O. . If not a corrective action form needs to be filled out.

14. Once a week also run a GG/A using a Seed and B.O.D. Standard See direction on chipboard by D.O. Meter. B.O.D. of GG/A 198 +or - 30.5 mg/l. Record in computer in LCS sheet. (use 6 mls of standard and 2 ml of seed) Seed use sample from selltable solid test. Pour 250mls of water into a beaker than add 2mls of sludge from bottom of settlemeter. Mix well and stir with stir bar went withdrawing samples.

First Bottle	Second Bottle	Third	Fourth
6 ml GGA	9 ml Seed	10 ml Seed	15 ml Seed
2 ml Seed	Fill Rest with Dilution	Fill Rest w/ Dilution	Fill Rest w/ Dilution
Fill Rest w/ Dilution Water			

Calibrating D.O. Meter

1. WIPE DRY BOTTOM OF D.O. PROBE
2. TURN ON METER (PRESS POWER BUTTON) 
3. WAIT 10 MINUTS
4. PRESS MODE BUTTON (M) SO % SHOWS ON SCREEN.
5. PRESS CALIBRATIN BUTTON (CAL)
6. PRESS ENTER BUTTON (ENTER)
7. PRESS F1
8. PRESS MODE BUTTON (M) UNTIL D. O. mg/l SHOWS ON SCREEN.
9. WRIGHT DOWN TEMP. , BAROMETER PREESSURE (FROM BAROMETER NO WALL), D.O. mg/l

TO RUN D.O. ON B.O.D BOTTLES

1. PRESS AUTOMATIC READ BUTTON (AR) WILL BE DISPLACED ON SCREEN.
2. TURN ON MIXER.
3. PRESS ENTER BUTTON (ENTER)
4. WAIT TO HEAR BEEP AND SEE HOLD ON SCREEN.
5. RECORD ON BENCH SHEET.
6. REPETE STEPS 2,3 AND 4

D.O. CALIBRATION USING AIR SATURATED WATER

STEPS

1 TURN ON D. O. METER AND LET WARM UP FOR 15 MINUTES.

2 MIX WATER BOTTLE WELL. FILL B.O.D. BOTTLE WITH WATER.

3 PLACE D.O. PROBE IN FILLED B.O.D. BOTTLE AND TURN ON MIXER.

4 HIT CALIBRATE BUTTON.

5 READ AND RECORD BAROMETER READING.

6 READ AND RECORD TEMP. FROM D.O. METER.

7 USING BAROMETER READING AND TEMP. FIND D.O. ON CHART AND RECORD

8 HIT D.O. CAL BUTTON

9 HIT THE NEXT BUTTON ON D.O. METER.

10 USE THE UP OR DOWN BUTTON TO ADJUST D.O. READING TO CHART D.O.

11 HIT THE ENTER BUTTON.

12 HIT THE MODE BUTTON.

13 VERIFFY D.O. CALIBRATION BY REPEATING STEP 2
THEN CHECK D.O. OF WATER.
D.O. READING SHOULD BE +OR- 0.1 OF STEP 11.
IF NOT REPEAT D.O. METER CALIBRATION.

ph Meter Calibration

1 Press Power  wait for meter to show main screen.

2 Press Cal Put probe in pH 7 buffer.
3 When meter shows Ready press Cal again.
4 Put probe in pH 10 buffer.
5 When meter shows Ready press Mode (enter).
6 Slope will show on screen.Wrtie down the Slope and Temp.

If you need to see the slope again
Press setup then the up arrow until you see The # 6 top of screen. Peres enter the slope will show on screen. To return to main screen press Measure(ESC)

Samples

1 If meter is off Press the power 
If meter is on press the Measure button
2 Place probe in sample with a stir bar turn on mixer wait for meter to show ready.
3 Write down pH and Temperature.

For other sample repeat steps 1, 2 & 3

The Meter will turn off it self.

pH 2/10/2010

Equipment needed.

1 pH Meter Orion 420A
2 pH Probe Thermo Electron Corp. Model 9157BN
3 Magnetic Mixer
4 Stirrer Bars
5 Small Beakers
6 Distilled Water Wash Bottle

Chemicals Needed

1 pH 4.0 Buffer.
2 pH 7.0 Buffer.
3 pH 10.0 Buffer.
4 Distilled Water
5 pH probe Filling Solution Thermo Electron Corp.900011

Steppes

1 Rinse of probe with distilled water. Repeat have each step.

2 Calibrate pH Meter. Follow instruction on chip board next to Meter. using pH buffers 7.0 & 10.0 or 7.0 & 4.0

3 Place sample in beaker .

4 Put probe in beaker.

5 Press measure wait for ready hold is displayed.

6 Record pH and Temperature

S.S. Testing 1/25/2011 R.W. Rev1/26/2016

Method Code SM 254 D-1997

1 Equipment needed.

2	Drying Oven at 102-104 degrees C.	Thermo Scientific Laboratory Over Model OMH60
3	Vacuum Pump	Gast Manufacturing Corp. Model 0322-V3
4	Fitter funnel 47 mm	Gelman
5	Glass fiber filters 47 mm	Pall Life Science Type A/E
6	Balance	Dever Instrument model PI-214
7	Distilled Water	
8	Aluminum Weighing Dishes	57mm
9	Filer Manifold	
10	Desiccator	WM. Boekel & CO. Inc.
	Desiccant	Dririte Indicating (Dry weekly in oven at 190 degrees C for 2 to 3 hours)

Steppes

1 Prewash Filters by placing on fitter funnel apply a little distilled water from a wash bottle to seat fitter. Turn on vacuum pump and pour 25ml of distilled though the fitter repeat water two more times. Place fitter in a Aluminum Weighing Dish Then place fitter and Aluminum Weighing dish in oven. For two Hourer or more

2 Take weighing dish with fitter in it and place it in the Desiccator. Cool for 15 to 30 minutes.

3 Weigh weighing dish with fitter in it. Record on bench sheet weight and dish number. This is W1

4 Place fitter on funnel and seat with distilled water from wash bottle. Turn on vacuum pump and fitter sample though fitter.(Raw & Primary sample 50 ml with volumetric pipet.)(final 1000ml using a graduated cylinder) Rinse volumetric pipet or graduated cylinder with distilled water 2 times. Then rinse funnel with distilled water 2 times.

5 Then place fitter and Aluminum Weighing dish in oven. Record time in. Dry for 1 hour or more. Record time out.

6 Take weighing dish with fitter in it and place it in the Desiccator. Cool for 15 to 30 minutes.

7 Weigh weighing dish with fitter in it. Record on bench sheet weight . This is W2a

8 Repeat steppes 5-7 This is W2b The weighs need to with in 0.5mg of each other. If not repeat steppes 5-7

9 Calculate S.S. using the lower weigh of W2a and W2b SS=(W2-W1)*1000000/ml of sample record on bench

10 Enter numbers in computer.

Filter Funnel Screen Cleaning 1 Time per Month

Place screen in a 250 ml beaker add hot water and10 mls LiQui-Nox Detergent.
Soak over night .
Rinse off with hot water and blow out with 100 psi air.
Record in maintains log book.

Phosphourous Testing. Method Code SM 450-P E-1999 Rev. 8/13/2018

A. Equipment needed.
1. Spectrophotometer:Genesys 20.
2. Refrigerator.
3. Distilled water.
4. Autoclave:Market forge sterilmatic.
5. Test tube rack.
6. Pipete rack.
7. Scale:Rice Lake.

B. Glassware.
1. Bottle with glass stopper.
A. One liter. (3).
1. Standard phosphourous (50mg/L.)
2.Sulfuric acid for digestion.
3. Sulfuric acid (5N.)
B. Volumetric Flasks.
1. 100ml.(1).
2. 50ml.(1).
C. Bottle with eye dropper. (50mls.)
D. Test tubes. 25mm.x150mm.(31)
1. Stored with distilled water.
E
1. Volumetric
A. Wide tip.
1. 20ml.(1).
2. 10ml.(1).
B. Narrow tip.
1. Standards.
A. 1ml.(1).
B. 2ml.(1).
C. 4ml.(1).
F Reagent
A. Volumetric.
1. 5ml.(1).
2. 15ml.(1).
3. 30ml.(1).
4. 50ml.(1).
G. Graduated pipete.
1. 5ml.(1).
H. Round cuvette.

C. Plasticware.
1 Bottle.
A. 1 lite .
5N. Sodium hydroxide.
B. .5 liter. Wide Mouth.

Reagent.

C. .5 liter. Squeeze.

5N. Sodium hydroxide.

D. 30ml. Squeeze.

1. Phenolphthlein indicator solution.

Blank Prim LC
Std
Final
Raw

D. Chemicals.

1. Potassium persulfate.
2. Phenolphthein indicator solution.
3. Potassium phosphate monobasic.,A.C.S.
   A. Standard phosphorous. 50mg./L. 0.2195g./L.
   B. Standard Phosphorous. 2.5mg/L. 25mls./L. of 50mg./L.
4. Sodium hydroxide. A.C.S.
   A. 5N.200gms./L.
5. Sulfuric Acid.
   A. Strong Acid. Digestion. 300mls./L.
   B. 5N.140mls./L.
6. Ascorbic Acid. A.C.S.
   A. Ascorbic Acid solution. 0.1N. 1.76g./100Mls.
7. Potassium antimonyl tartrate solution. Made up.
8. Ammonium molybdate. 4%. Made up.

Phosphorous Procedures.

Note: Allow combined reagent chemicals to reach room temperature before making reagent.

FILL W/SMALL AMOUNT OF H_2O → ADD, SHAKE/CAP THOW FILL TO GRATOO LEVEL SURFACE

1. Rack setup.
   A. Blanks. (2).
   B. Standards. (6). 1ml. 2ml. 4ml. 8ml. 12ml. ,and 16ml.
   C. Finals.(4). 20mls in each
   D. Primary. (1). 2ml.
   E. Raws. (4). 2mls. In each
   F: Lab Controlled sample (1) 10mls 1 ppm standard

NPHOS STANDARD

2. Step 1.
   A. Rinse all test tubes and pipets with distilled water.

3. Test tubes.
   A. 2 blanks. (about 30 mls.)
   B. 1ml.,2ml., 4ml., 8ml.,12ml.,and16ml.respectively and add 2.5 mg. phosphours standard to six tubes.

THEN FILL W/DI UP TO

   C. Four sets of final composite samples.
      1. One 20 ml. for each day.
   D. Four sets of raw composite samples.
      1. One 2mls of sample per day
   E. One set of primary effluent sample.
      ~~1. Take 10mls. Volumetric pipete (wide tip) and add sample to a 50ml. Volumetric flask. Fill to line with distilled water,then add 10mls. To two test tubes with one one tube of sample and 4mls. Phosphorous standard.~~

2ml per Tube, usually just 1 Sample for primary

   F. Top all samples to top of bar with distilled water

4. Step 2.
   A. Add 1ml. Strong acid solution to each sample.
   B. Add 0.5g.(measuring spoon) of potassium persulfate to each sample.
   C. Cap each tube with aluminum foil.
5. Step 3.
   A. Add distilled water to bottom of autoclave.
   B. Set temperature at 245 degrees F.
   C. Place samples in autoclave. Close door. Set timer to 40 minutes.
   D. After 40 minutes, remove tubes. Cool to room temperature.
   E. Put in water bath to cool. Also you could print off benchsheet for results.
6. Step 4.
   A. Add one drop of phenolphthalein indicator solution to each tube.
   B. Add 5N. Sodium hydroxide solution dropwise to each test tube until a pink color appears. (3ml's) use pipette
   C. Add 5N. Sulfuric acid solution dropwise to to each tube until sample turns clear.
   D. Make up Ascorbic Acid. Weigh up 1.76 g and mix with 100 ml's of distilled water.
Make sure the weight for Ascorbic acid is documented on your spreadsheet calculation page
   E. Add 8mls. Of combined reagent to each tube. Combined reagent is made following the next step in that order.
   2. To make up combined reagent.
      A.(2) 50 ml. 5N. Sulfuric acid.
      B.(2) 5ml. Antimonyl potassium tartrate.
      C. (2) 15ml. Ammonium molybdate.
      D. (2) 30ml. Ascorbic acid.
      F. Let stand 10 to 20 minutes.
      G. Run sample tubes,(blanks, standards, samples) in spectrophotometer at 880nm. In absorbance mode using a cuvette.
      H. Set to 0 percent absorbance using distilled water. Run two blank that where digested.
      I. Run standards, least to most.
      J. Run samples: final, primary, and raw.
      K. Compute absorbance values.
         1. Absorbance/mg./L.=slope.
         2. Multiply the sample absorbance values by the value to obtain mg./L. curve P, then multiply the mg./L. curve P. value by the dilution value which is 50ml./ml. of sample. To obtain mg./L. total P.
      L. Clean up, rinse P analysis tubes and pipets with distilled water. Refill tubes and pipets with distilled water and store in storage cabinet.

Send Final and raw results off to Larry and Tim (Bottom of the calculation page). Via email.
Document results in termserver and Laboratory data

Jan-11

Rev. Aug-18

APPENDIX D

SNAP + Modeling Output for Typical Ag Operations in Target Area

WQ1: P Trade Report

Reported For	Grafton CashCrop Baseline
Printed	2019-09-24
Plan Completion/Update Date	2019-02-14
SnapPlus Version 18.1 built on 2019-01-15	
C:\SnapPlus2\MySnapPlusData\Grafton\Grafton CashCrop Baseline.snapDb	

Prepared for:
Grafton CashCrop Baseline
attn:Grafton CAFO Baseline

The P Trade Report estimates the annual pounds of phosphorus (P) in surface runoff from cropland entering surface waters. These P loss calculations are based on a field's soil test P concentration, crops, tillage, nutrient management practices and estimates of average runoff and sheet and rill erosion for the predominant soil type. Losses from concentrated flow channel or gully erosion with a field are not included in these calculations. Field runoff losses are calculated for each year as **PTP** (lb P/field/yr). Fields are only included if there are at least 2 years of crops before the selected start year. Before using this report as part of a Water Quality Trade activity, phosphorus losses (PTP) must be converted into 'P credits' according to DNR guidance.

For more information go to **http://dnr.wi.gov/** and type keyword: **Water Quality Trading**

Questions? Please contact DNRphosphorus@wisconsin.gov

This report was developed for Wisconsin DNR Water Quality Trading and Adaptive Management purposes and cannot be used to demonstrate compliance with NR 151 or NRCS 590 NM plan requirements.

P Trade Report				PTP			
Field Name	Soil Series	Soil Symbol	Acres	2019	2020	2021	2022
1	CASCO	CeB2	10	61	22	58	22
10	CASCO	HsC2	10	101	35	95	35
2	CASCO	CeC2	10	124	42	118	43
3	CASCO	CrD2	10	86	219	81	219
4	CASCO	CrD2	10	226	79	214	79
5	FABIUS	FaA	10	50	16	29	43
6	FOX	FoA	10	21	27	11	20

P Trade Report				PTP			
Field Name	Soil Series	Soil Symbol	Acres	2019	2020	2021	2022
7	HOCHHEIM	HmB2	10	19	35	18	45
8	HOCHHEIM	HmC2	10	95	33	88	33
9	CASCO	HsB2	10	17	43	16	43
Total			**100**	**801**	**550**	**727**	**581**

APPENDIX E

SNAP + Modeling Output for Cover Crop and No Till Ag Practices in Target Area

WQ1: P Trade Report

Reported For	Grafton CashCrop 2019 Cash-grain NT-CC
Printed	2019-09-24
Plan Completion/Update Date	2019-02-14
SnapPlus Version 18.1 built on 2019-01-15	
C:\SnapPlus2\MySnapPlusData\Grafton\Grafton CashCrop Fall 2019 NT-CC.snapDb	

Prepared for:
Grafton CashCrop 2019 Cash-grain NT-CC
attn:Grafton CAFO Baseline

The P Trade Report estimates the annual pounds of phosphorus (P) in surface runoff from cropland entering surface waters. These P loss calculations are based on a field's soil test P concentration, crops, tillage, nutrient management practices and estimates of average runoff and sheet and rill erosion for the predominant soil type. Losses from concentrated flow channel or gully erosion with a field are not included in these calculations. Field runoff losses are calculated for each year as **PTP** (lb P/field/yr). Fields are only included if there are at least 2 years of crops before the selected start year. Before using this report as part of a Water Quality Trade activity, phosphorus losses (PTP) must be converted into 'P credits' according to DNR guidance.

For more information go to **http://dnr.wi.gov/** and type keyword: **Water Quality Trading**

Questions? Please contact DNRphosphorus@wisconsin.gov

This report was developed for Wisconsin DNR Water Quality Trading and Adaptive Management purposes and cannot be used to demonstrate compliance with NR 151 or NRCS 590 NM plan requirements.

P Trade Report				PTP			
Field Name	Soil Series	Soil Symbol	Acres	2019	2020	2021	2022
1	CASCO	CeB2	10	47	21	58	22
10	CASCO	HsC2	10	79	34	95	35
2	CASCO	CeC2	10	95	42	118	43
3	CASCO	CrD2	10	91	216	81	219
4	CASCO	CrD2	10	175	78	214	79
5	FABIUS	FaA	10	40	15	29	43
6	FOX	FoA	10	10	9	9	19

P Trade Report				PTP			
Field Name	Soil Series	Soil Symbol	Acres	2019	2020	2021	2022
7	HOCHHEIM	HmB2	10	20	35	18	45
8	HOCHHEIM	HmC2	10	74	33	89	33
9	CASCO	HsB2	10	18	42	16	43
Total			**100**	**649**	**526**	**727**	**580**

APPENDIX F

Stakeholders Letters of Support

OZAUKEE COUNTY
LAND & WATER MANAGEMENT DEPARTMENT

Andy Holschbach, Director
Edward J. Pfister, Sanitation & Zoning Coordinator
Jeffrey P. Bell, Land & Water Coordinator
www.co.ozaukee.wi.us

December 17, 2019

To: Department of Natural Resources

From: Andy Holschbach, Director
Ozaukee County Land & Water Management Department

Re: Partnering with the Village of Grafton on Milwaukee River Watershed Phosphorus Reductions

Ozaukee County has been working on reducing phosphorus runoff for many years. The County welcomes the Village of Grafton as a regional partner to assist with this effort.

The County Land & Water Management Department recently collaborated with the Village on a recent project that will continue implementing cover crops and no till farming to improve soil health, resulting in more water infiltration and less runoff.

The County continues to discuss other projects with the Village and looks forward to future collaboration in the effort to reduce phosphorus and improve water quality.

121 W. Main Street, P.O. Box 994, Port Washington, WI 53074
Phone: (262) 284-8270 Metro: (262) 238-8313 Fax: (262) 284-8367 Metro Fax: (262) 238-8367

DATE: May 13, 2019

TO: Village of Grafton, WI

FROM: Jim Melichar, Owner of Melichar Broad Acres and Chairperson of the Milwaukee River Watershed Clean Farm Families Board of Directors.

RE: Working with the Village of Grafton to improve water quality in our watershed.

As a farmer and resident in the Milwaukee River Watershed, I have a keen interest in the water quality in the area. For this reason, I and the Milwaukee River Clean Farm Families Farmer led watershed group have dedicated ourselves to making strides to improve the soil and water quality in the watershed.

I am very interested in working with the Village of Grafton to find ways to improve the soil health and water quality in the area and to meet both the Village's and my farm's needs. I will also be glad to further discuss this topic with the Clean Farm Families group and try and develop a working relationship between the Village and the farmer group.

Thanks,

Jim Melichar

APPENDIX G

USGS River Flow Letter

United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Water Resources Discipline
8505 Research Way
Middleton, WI 53562-3586
Phone: (608) 828-9901
Fax: (608) 821-3817
http://wi.water.usgs.gov

Mr. Timothy Nennig
Utility Superintendent
Village of Grafton
Water and Wastewater Utility
1900 Ninth Ave.
Grafton, WI 53024

2/28/2019

Dear Mr. Nennig,

I have calculated the mean annual flow that you requested for the Milwaukee River at Grafton, WI (USGS station # 04086411) to be 378 cubic feet per second (cfs).

Streamgage data from Milwaukee River locations at Waubeka and Cedarburg (04086360 and 04086600) as well as from Cedar Creek at Cedarburg (04086500) were used to determine the mean annual flow at Grafton.

The USGS will bill the Village of Grafton $400 for these calculations in accordance with the signed agreement. Please feel free to contact me if you have any questions.

Thanks,

Rob Waschbusch

US Geological Survey – Hydrologist
(608) 821-3868

APPENDIX H

2020 Utility Capital Plan & Wastewater Budget

Department Purpose
To upgrade, replace and add water and sewer facilities and infrastructure as needed to maintain, promote and advance safe, efficient and effective water and sewer operations and service and to also address compliance issues relative to emerging EPA and WDNR regulations.

Department Description
The Water and Wastewater Utility is responsible for the day-to-day operations, maintenance, planning and administration of the Utility and its water and wastewater facilities. A Utility Administration group is specifically responsible for ensuring full compliance with all regulatory requirements in effect and is further responsible for the general Utility planning, budgeting and project management required to ensure continuous compliance of its water and wastewater systems.

2020 Budget Highlights
- Headworks facility construction to replace the existing facility. Engineering cost $491,900 in 2019 and $324,575 in 2020. Construction cost $1,593,000 in 2019 and $6,177,000 in 2020.
- AMI Conversion – 2020 cost $199,000
- Treatment Plant Improvements for Phosphorus Control - $52,500
- Seventeenth Avenue Lift Station construction in 2020 - $600,000
- Entry door replacements at Wells #5 & #7 - $24,500
- First Avenue sewer relining from Washington St to Highland Dr - $55,800
- Green Bay Rd Lift Station Service Area Sewer Rehabilitation - $250,000
- Sidewalk to sludge storage tanks - $5,000
- Replacement Dissolved Oxygen Monitoring System - $14,000
- Digester Control Flow Meters - $16,400

Expenditures	2017 Actual	2018 Actual	2019 Adopted	2019 Estimated	2020 Requested
Capital Outlay	2,063,343	1,681,244	4,789,069	5,764,021	7,903,417
Total Expenditures	2,063,343	1,681,244	4,789,069	5,764,021	7,903,417

SIGNIFICANT CAPITAL IMPROVEMENT PROJECT COST CHANGES

The following is a list of projects by category:

WATER / WASTEWATER FACILITY AND LIFT STATION IMPROVEMENTS

1. Engineering – WWTP Headworks Facility ****

Project Description: Replacement of the existing headworks facility
Project Origin/Background: The existing headworks building was constructed in 1982, and is in need of replacement. This upgrade will provide better waste handling and improve hydraulic loading to the plant.
2020 Project Cost: $6,537,412
Total Project Cost: $8,622,312
Estimated 5 Year Maintenance and Operating Impact: No additional personnel or increase in operating costs are anticipated as this is equivalent to an original replacement project.

Operating Impact	2020	2021	2022	2023	2024	Total
	$0	$0	$0	$0	$0	$0

*Project will be initiated and completed in 2020 Budgeted Year.
**Project will span beyond 2020 Budget Year.
***Project was initiated in prior Budget Years and will be completed in 2020.
**** Project was initiated in prior budget years and will span beyond the 2020 budget year.

2. 17th Avenue Lift Station Replacement ***

Project Description: Construction of the replcement lift station will occur in 2020. Engineering will have been done in 2018.
Project Origin/Background: The 17th Avenue lift station has been in service since 1964 and has generally exceeded its acceptable service life. Although the station continues to function acceptably, its equipment and controls have become quite antiquated and securing maintenance parts and service is becoming problematic.The Utility's current program is to replace its oldest 'below ground' lift stations with 'above ground' stations that would eliminate the routine 'confined space' entry requirement and improve the station's reliability. It is proposed to replace this Smith & Loveless 'below ground' lift station in 2020 with a submersible pump lift station.
2020 Project Cost: $600,000
Total Project Cost: $643,265
Estimated 5 Year Maintenance and Operating Impact: No additional personnel or increase in operating costs in this infrastructure replacement project. This project will provide for lower labor costs with eliminated confined space entry operations.

Operating Impact	2020	2021	2022	2023	2024	Total
	-$3900	-$3900	-$3900	-$3900	-$3900	-$19500

3. Wells #5 & #7 Entry Door Replacement *

Project Description: Entry doors at these buildings will be replaced due to age or damage.
Project Origin/Background: Doors will be replaced at Well #5, and Well #7.
2020 Project Cost: $24,500
Total Project Cost: $24,500
Estimated 5 Year Maintenance and Operating Impact: No additional personnel or increase in operating costs in this replacement project.

Operating Impact	2020	2021	2022	2023	2024	Total
	$0	$0	$0	$0	$0	$0

4. Sludge Storage Tank Sidewalk *

Project Description: Sidewalk will be installed for access to the Utility's two sludge storage tanks.
Project Origin/Background: Access to these two locations are difficult in winter, so sidewalks will provide a safe walkway.
2020 Project Cost: $5,000
Total Project Cost: $5,000
Estimated 5 Year Maintenance and Operating Impact: No additional personnel or increase in operating costs in this project.

Operating Impact	2020	2021	2022	2023	2024	Total
	$0	$0	$0	$0	$0	$0

*Project will be initiated and completed in 2020 Budgeted Year.
**Project will span beyond 2020 Budget Year.
***Project was initiated in prior Budget Years and will be completed in 2020.
**** Project was initiated in prior budget years and will span beyond the 2020 budget year.

5. Phosphorus Treatment Facility Improvements ****

Project Description: Additional chemical treatment options need to be installed at the wastewater treatment plant to more effectively reduce the amount of phosphorus discharged to the river.
Project Origin/Background: This project originated by the Utility's WPDES permit requirements
2020 Project Cost: $52,500
Total Project Cost: No estimates are available at this time
Estimated 5 Year Maintenance and Operating Impact: Operating impact estimates are not available at this time.

Operating Impact	2020	2021	2022	2023	2024	Total
	$0	$0	$0	$0	$0	$0

6. WWTP Dissolved Oxygen Monitoring System Replacement *

Project Description: Replacement of the existing WWTP Dissolved Oxygen Monitoring System with an updated system that will work with a future planned plant monitoring and control system.
Project Origin/Background: The current DO system is past it's useful life, and is in need of replacement.
2020 Project Cost: $14,000
Total Project Cost: $14,000
Estimated 5 Year Maintenance and Operating Impact: No additional personnel or increase in operating costs in this equipment replacement project.

Operating Impact	2020	2021	2022	2023	2024	Total
	$0	$0	$0	$0	$0	$0

7. Digester Control Flow Meters*

Project Description: Installation of two new flow meters to measure sludge volumes sent to the digesters.
Project Origin/Background: The installtion of these two flow meters will allow operators to assess accurate mass loading, so the system can be operated efficiently.
2020 Project Cost: $16,400
Total Project Cost: $16,400
Estimated 5 Year Maintenance and Operating Impact: No additional personnel or increase in operating costs in this project.

Operating Impact	2020	2021	2022	2023	2024	Total
	$0	$0	$0	$0	$0	$0

*Project will be initiated and completed in 2020 Budgeted Year.
**Project will span beyond 2020 Budget Year.
***Project was initiated in prior Budget Years and will be completed in 2020.
**** Project was initiated in prior budget years and will span beyond the 2020 budget year.

WATER AND SEWER MAIN CONSTRUCTION

8. First Avenue Sewer Relining – Washington Street to Highland Drive*

Project Description: . Relining of approximately 1,142 feet sewer main is proposed for 2020.
Project Origin/Background: This project alignes with the DPW road replacement project in First Avenue. Water main in these sections were replaced in 2008 and 2009.
2020 Project Cost: $55,800
Total Project Cost: $55,800
Estimated 5 Year Maintenance and Operating Impact: No additional personnel or increase in operating costs in this infrastructure project.

Operating Impact	2020	2021	2022	2023	2024	Total
	$0	$0	$0	$0	$0	$0

9. Green Bay Road Lift Station Sewer Service Area Rehabilitation ****

Project Description: Rehabilitation of leaking sewer main that leads to the Green Bay Road Lift Station
Project Origin/Background: An Infiltration and Inflow study is onging in 2019 to identify sewer rehabilitation needs. Project costs are rough estimates at this time.
2020 Project Cost: $250,000
Total Project Cost: $1,250,000
Estimated 5 Year Maintenance and Operating Impact: No additional personnel or increase in operating costs in this infrastructure replacement project.

Operating Impact	2020	2021	2022	2023	2024	Total
	$0	$0	$0	$0	$0	$0

10. AMI Meter Conversion ****

Project Description: Replacing existing recycled meters with new meters and replacing existing Orion radio heads with new technology radio heads
Project Origin/Background: This meter program will replace the existing equipment and make the meter reading opration more efficient.
2020 Project Cost: $199,000
Total Project Cost: $1,036,135
Estimated 5 Year Maintenance and Operating Impact: 5 year maintenance cost = $500

Operating Impact	2020	2021	2022	2023	2024	Total
	$-1436	$-1828	$-1204	$-1697	$-1149	$-7314

*Project will be initiated and completed in 2020 Budgeted Year.
**Project will span beyond 2020 Budget Year.
***Project was initiated in prior Budget Years and will be completed in 2020.
**** Project was initiated in prior budget years and will span beyond the 2020 budget year.

Department Purpose
To provide all Village residents, businesses and visitors to Grafton with reliable and cost efficient wastewater collection and treatment services that meet or exceed all federal and state standards for water pollution control operations.

Department Description
The Water and Wastewater (W&WW) Utility is responsible for the day-to-day operations, maintenance, planning and administration of the Utility and its water and wastewater facilities. The Wastewater Division is comprised of a Field Operations group responsible for sewer lift stations and sewer collection system operations and maintenance; and a Wastewater Treatment group responsible for treatment plant operations, maintenance and laboratory services.

2020 Budget Highlights
- Bridge Street Lift Station Tributary Sanitary Sewer Evaluation Survey - $40,000
- Contracted Sewer Televising - $40,000
- Phosphorus Adaptive Management – 190,000
- Anaerobic Digester Cleaning and Inspection - $57,000
- Rebuild Digester Recirculation Pumps - $8,000
- Digester Hallway Repainting - $48,000
- Replacement UV Bulbs - $30,500
- Rebuild Sludge Load-out Pump - $6,000

Revenues	2017 Actual	2018 Actual	2019 Adopted	2019 Estimated	2020 Requested
Non-Operating	434,620	74,585	166,968		
Operating Revenues	2,351,607	2,731,650	2,852,792		
Total Revenues	2,786,227	2,806,235	3,253,160		

Expenditures	2017 Actual	2018 Actual	2019 Adopted	2019 Estimated	2020 Requested
Personnel	523,828	464,769	530,313		
Operating	1,921,069	1,978,551	1,990,703		
Total Expenditures	2,444,897	2,443,320	2,521,016		

Areas of Emphasis: Ensure quality public health and safety services.

Goal: To provide wastewater collection and treatment to all Grafton customers in a cost efficient manner.

Objective: 1. To monitor increases in wastewater system costs and maintain the O&M cost per 1,000 gallons at less than $3.00 per 1,000 gallons treated.

Measurements	2017 Actual	2018 Actual	2019 Adopted	2019 Estimated	2020 Adopted
Workload					
Total WW operating costs **	$1,319,407	1,296,974	$1,402,667	$1,424,059	$1,513,042
Number customer accounts	4,798	4,794	4,822	4,810	4,960
Total gallons treated	580,873,000	585,544,000	544,826,000	647,407,000	604,608,000
Operating costs/1000 gallons	$2.27	$2.21	$2.57	$2.19	$2.50
Operating costs/customer	$274.99	$270.54	$290.89	$296.06	$305.05

** Excludes depreciation

Areas of Emphasis: Ensure quality public health and safety services.

Goal: To provide high quality services to the residents and businesses of the Village of Grafton.

Objective: 1. To achieve an 80 percent or greater satisfaction (average, good or excellent) survey rating from citizens who live in the Village of Grafton.
2. To minimize the number of customer complaints related to sewer main back-ups and odor complaint issues to less than 1% of total customers served (1% equals 45 complaints).

Measurements	2017 Actual	2018 Actual	2019 Adopted	2019 Estimated	2020 Adopted
Efficiency					
Resident satisfaction rating	xx%	xx%	80%	80%	80%
Odor and other complaints	6	6	5	6	5

Areas of Emphasis: Ensure quality public health and safety services.

Goal: To comply with all DNR regulations and CMOM requirements regarding 'capacity assurance, management, operations, and maintenance of the wastewater collection and treatment system.

Objective: 1. To achieve a CMAR (compliance maintenance annual report) score of greater than 3.00 (range is 0-4).

Measurements	2017 Actual	2018 Actual	2019 Adopted	2019 Estimated	2020 Adopted
Effectiveness					
CMAR point total/GPA	4.00	4.00	4.00	4.00	4.00