

# Permit Fact Sheet

## General Information

Permit Number	WI-0036749-07-0
Permittee Name and Address	VILLAGE OF BOAZ P O Box 143, Richland Center, WI 53581
Permitted Facility Name and Address	Boaz Wastewater Treatment Facility 26404 JACKSON ROAD, BOAZ, WISCONSIN
Permit Term	April 01, 2026 to March 31, 2031
Discharge Location	West end of lagoon effluent manhole roughly 125 feet in to Mill Creek. SE ¼ of the NE ¼ of Section 30, T10N, R1W, Town of Dayton, Richland County
Receiving Water	Mill Creek in Mill and Indian Creek Watershed of Wisconsin River (lower) Basin in Richland County
Stream Flow (Q <sub>7,10</sub> )	14 cfs
Stream Classification	Warm water sport fishery, non-public water supply
Discharge Type	Existing, permitted to be continuous but functions as intermittent with most discharge periods in October.
Annual Average Design Flow (MGD)	0.015 MGD
Industrial or Commercial Contributors	None
Plant Classification	A4 - Ponds, Lagoons and Natural Systems; SS - Sanitary Sewage Collection System
Approved Pretreatment Program?	N/A

## Facility Description

The Village of Boaz WWTF serves a population of approximately 150 with no industries and some commercial businesses. The Village is served by private wells. Treatment consists of a three-cell stabilization lagoon system with seasonal fill and draw discharge to Mill Creek. Boaz has historically discharged in the spring and fall but has indicated plans to only discharge in October in future years. The facility is designed to treat an average daily flow of 15,000 gallons per day and presently receives an average of 11,000 gallons per day for treatment.

## Substantial Compliance Determination

After a desk top review of all discharge monitoring reports, CMARs, land application reports, compliance schedule items, and a site visit on 9/16/2025, this facility has been found to be in substantial compliance with their current permit.

**Compliance determination made by Tanner Connors on 9/25/25.**

## Sample Point Descriptions

Sample Point Designation		
Sample Point Number	Discharge Flow, Units, and Averaging Period	Sample Point Location, Waste Type/Sample Contents and Treatment Description (as applicable)
701	0.009 MGD (2024)	Influent: Grab sample collected from the influent manhole before the ponds. Flow meter located in the influent manhole. Flow data shall be reported daily during periods of discharge.
001	0.008 MGD (2024)	Effluent: Grab samples collected from the effluent manhole, prior to discharge to Mill Creek. Flow meter located in the effluent manhole at the end of the ponds. Modified fill and draw operation with monitoring at the listed sample frequency required only during discharge periods.
002		Representative composite grab lagoon sludge samples shall be taken from each lagoon and then combined for one sample. The required sampling shall be completed once in the permit term. Department approval is required prior to removal of sludge from any of the lagoons. Additional sampling and requirements apply prior to land application of sludge.

## Permit Requirements

### 1 Influent – Monitoring Requirements

#### 1.1 Sample Point Number: 701- INFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate		MGD	Daily	Continuous	
BOD5, Total		mg/L	2/Week	Grab	
Suspended Solids, Total		mg/L	2/Week	Grab	

##### 1.1.1 Changes from Previous Permit:

Influent limitations and monitoring requirements were evaluated for this permit term and the follow changes were required in this permit section. The sample frequency for BOD and TSS are updated to be set equal to the effluent sampling frequency.

##### 1.1.2 Explanation of Limits and Monitoring Requirements

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

## 2 Surface Water - Monitoring and Limitations

### 2.1 Sample Point Number: 001- EFFLUENT

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Flow Rate	Daily Max	0.125 MGD	Daily	Continuous	
BOD5, Total	Weekly Avg	45 mg/L	2/Week	Grab	
BOD5, Total	Monthly Avg	30 mg/L	2/Week	Grab	
Suspended Solids, Total	Weekly Avg	45 mg/L	2/Week	Grab	
Suspended Solids, Total	Monthly Avg	30 mg/L	2/Week	Grab	
pH Field	Daily Max	9.0 su	5/Week	Grab	
pH Field	Daily Min	6.0 su	5/Week	Grab	
Nitrogen, Ammonia Variable Limit		mg/L	2/Week	Grab	Look up the variable ammonia limit from the 'Variable Ammonia Limitation' table and report the variable limit in the Ammonia Variable Limit column on the eDMR.
Nitrogen, Ammonia (NH3-N) Total	Daily Max - Variable	mg/L	2/Week	Grab	Monitoring year round. Limit effective October - May. Report the daily maximum Ammonia result in the Nitrogen, Ammonia (NH3-N) Total column of the eDMR. See Ammonia Limitation Section.
Chloride		mg/L	4/Month	Grab	Monitoring 4 consecutive days once a month during periods of discharge. Sampling until 11 samples have been collected.
Copper, Total Recoverable	Daily Max	54 ug/L	2/Week	Grab	Monitoring upon effective date. Limit effective 4/1/2030. See Copper Schedule.
Copper, Total Recoverable	Daily Max	0.037 lbs/day	2/Week	Calculated	Monitoring upon effective date. Limit effective

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					4/1/2030. See Copper Schedule.
Hardness, Total as CaCO <sub>3</sub>		mg/L	2/Week	Grab	Monitor on the same day copper samplings are collected.
Phosphorus, Total	Monthly Avg	3.7 mg/L	2/Week	Grab	This is an interim MDV limit effective through 3/31/2030. See the MDV/Phosphorus subsections and phosphorus schedules.
Phosphorus, Total	Monthly Avg	1.0 mg/L	2/Week	Grab	This is an interim MDV limit effective on 4/1/2030. See the MDV/Phosphorus subsections and phosphorus schedules.
Phosphorus, Total		lbs/month	Monthly	Calculated	Report the total monthly phosphorus discharged in lbs/month on the last day of the month on the DMR. See Standard Requirements for 'Appropriate Formulas' to calculate the Total Monthly Discharge in lbs/month.
Phosphorus, Total		lbs/yr	Annual	Calculated	Report the sum of the total monthly discharges (for the months that the MDV is in effect) for the calendar year on the Annual report form.
Nitrogen, Total Kjeldahl		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Nitrite + Nitrate Total		mg/L	See Listed Qtr(s)	24-Hr Flow Prop Comp	Annual in rotating quarters. See Nitrogen Series Monitoring section.
Nitrogen, Total		mg/L	See Listed Qtr(s)	Calculated	Annual in rotating quarters. See Nitrogen Series Monitoring section. Total Nitrogen shall be calculated as the sum of reported values for Total Kjeldahl Nitrogen and Total Nitrite +

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
					Nitrate Nitrogen.
Acute WET		TUa	See Listed Qtr(s)	24-Hr Flow Prop Comp	See WET section.

### 2.1.1 Changes from Previous Permit

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

- **Ammonia-** Limits added.
- **pH-** Sample frequency increased to 5/week.
- **Chloride-** Sampling frequency changed to 4/month until 11 samples are collected.
- **Phosphorus MDV-** The permittee has applied for a multi-discharger variance (MDV) for phosphorus for this permit term and the application has been approved by the Department. An MDV interim limit of 3.7 mg/L upon reissuance and 1.0 mg/L has been added that goes into effect per a compliance schedule. The permittee is now required to report the total amount of phosphorus discharged in lbs/month and lbs/year. By March 1 of each year while using the county payment method the permittee shall make a payment(s) to participating county(s) of \$68.40 per pound of phosphorus discharged during the previous year in excess of the target value of 0.2 mg/L. The permittee has been approved to implement a blended MDV with the MDV Watershed approach requirements beginning May 1, 2028 or as indicated by the compliance schedules.
- **Copper & Hardness-** Copper limits added with a schedule and hardness monitoring added.
- **Nitrogen series-** Nitrogen series monitoring required once a year, if discharge occurs outside of October the permittee shall notify the department to determine when nitrogen series monitoring should occur.

### 2.1.2 Explanation of Limits and Monitoring Requirements

Detailed discussions of limits and monitoring requirements can be found in the attached water quality-based effluent limits (WQBEL) memo dated **November 7, 2025**.

**Monitoring Frequencies-** The Monitoring Frequencies for Individual Wastewater Permits guidance (April 12, 2021) recommends that standard monitoring frequencies be included in individual wastewater permits based on the size and type of the facility, in order to characterize effluent quality and variability, to detect events of noncompliance, and to ensure consistency in permits issued across the state. Guidance and requirements in administrative code were considered when determining the appropriate monitoring frequencies for pollutants that have final effluent limits in effect during this permit term. The sample frequency for pH is increased to 5/week which is the standard sampling frequency for pH for all facilities. Chloride sampling changed to 4/month as this sampling method of 4 days in a row once a month provides higher quality data that will better represent Boaz discharge which is not currently every day.

The permittee plans to discharge only once a year in October but may discharge other times of the year. The permit is set up with the assumption that October discharge will continue but allows for discharge other times of the year. For parameters like the nitrogen series and WET testing if discharge happens other times of the year the department will require sampling during those periods to have rotating quarters to account for seasonal differences. For chloride the sampling frequency is set to obtain 11 sample points. Once 11 sample points have been collected during discharge periods the permittee may request discontinuation of chloride monitoring.

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

**Phosphorus** – Phosphorus rules became effective December 1, 2010 per NR 217, Wis. Adm. Code, that required the permittee to comply with water quality based effluent limits (WQBELs) for total phosphorous. The final phosphorus WQBELs are 0.255 mg/L monthly average and 0.075 mg/L 6-month average along with 0.078 lbs/day 6-month average and were to become effective as scheduled unless a variance was granted. For this permit term, the permittee has applied for the Multi-Discharger Variance (MDV) for phosphorus as provided for in s. 283.16, Wis. Stats., and approved by USEPA on February 6, 2017 for a 10-year duration. The permittee qualifies for the MDV because it is an existing source and a major facility upgrade is needed to comply with the applicable phosphorus WQBELs, thereby creating a financial burden. The interim effluent limit for total phosphorus is 3.7 mg/L upon reissuance and 1.0 mg/L as an average monthly limit will become effective per the compliance schedule. These limits were derived using DMR data and based on the permittees approved blended MDV approach. The permittee does not currently have treatment and therefore the current interim limit of 3.7 mg/L is maintained upon reissuance.

Conditions of the MDV require the permittee to optimize phosphorus removal throughout the proposed permit term, comply with interim limits and implement a plan that is designed to result in annual phosphorus reductions from other sources in the basin based on the pounds of phosphorus discharged during the previous year in excess of the specified target value. A reopener clause is included in the permit to address the current MDV’s expiration date, as a permit action may be required to update or remove variance provisions if the MDV is altered or unavailable after February 6, 2027.

**Copper-** The effluent data provided indicates that the facility has reasonable potential to exceed calculated copper limits. The department has included a compliance schedule to provide time for the permittee to identify the sources of copper and/or determine required actions for meeting copper effluent limits. Hardness sampling is required on the same day copper sampling occurs but at a reduced sampling frequency. If throughout the compliance schedule the permittee believes new data indicates there is not reasonable potential to exceed limits, then the permittee may request the department re-evaluate the additional data.

### 3 Land Application - Monitoring and Limitations

Municipal Sludge Description						
Sample Point	Sludge Class (A or B)	Sludge Type (Liquid or Cake)	Pathogen Reduction Method	Vector Attraction Method	Reuse Option	Amount Reused/Disposed (Dry Tons/Year)
002	B	Liquid	N/A	N/A	Land Application	Lagoons – no plans to desludge
Does sludge management demonstrate compliance? <b>Yes</b>						
Is additional sludge storage required? <b>No</b>						
Is Radium-226 present in the water supply at a level greater than 2 pCi/liter? <b>Unknown, private wells</b> If yes, special monitoring and recycling conditions will be included in the permit to track any potential problems in landapplying sludge from this facility						
Is a priority pollutant scan required? <b>Yes</b> Priority pollutant scans are required once every 10 years at facilities with design flows between 5 MGD and 40 MGD, and once every 5 years if design flow is greater than 40 MGD.						

### 3.1 Sample Point Number: 002- LAGOON SLUDGE

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Solids, Total		Percent	Once	Composite	
Arsenic Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Arsenic Dry Wt	High Quality	41 mg/kg	Once	Composite	
Cadmium Dry Wt	Ceiling	85 mg/kg	Once	Composite	
Cadmium Dry Wt	High Quality	39 mg/kg	Once	Composite	
Copper Dry Wt	Ceiling	4,300 mg/kg	Once	Composite	
Copper Dry Wt	High Quality	1,500 mg/kg	Once	Composite	
Lead Dry Wt	Ceiling	840 mg/kg	Once	Composite	
Lead Dry Wt	High Quality	300 mg/kg	Once	Composite	
Mercury Dry Wt	Ceiling	57 mg/kg	Once	Composite	
Mercury Dry Wt	High Quality	17 mg/kg	Once	Composite	
Molybdenum Dry Wt	Ceiling	75 mg/kg	Once	Composite	
Nickel Dry Wt	Ceiling	420 mg/kg	Once	Composite	
Nickel Dry Wt	High Quality	420 mg/kg	Once	Composite	
Selenium Dry Wt	Ceiling	100 mg/kg	Once	Composite	
Selenium Dry Wt	High Quality	100 mg/kg	Once	Composite	
Zinc Dry Wt	Ceiling	7,500 mg/kg	Once	Composite	
Zinc Dry Wt	High Quality	2,800 mg/kg	Once	Composite	
Nitrogen, Total Kjeldahl		Percent	Per Application	Composite	Multiple samples may be needed if land spreading. Please contact DNR representative before land spreading.
Nitrogen, Ammonia (NH3-N) Total		Percent	Per Application	Composite	Multiple samples may be needed if land spreading. Please contact DNR representative before land spreading.
Phosphorus, Total		Percent	Per Application	Composite	Multiple samples may be needed if land spreading. Please contact DNR representative before land spreading.

Monitoring Requirements and Limitations					
Parameter	Limit Type	Limit and Units	Sample Frequency	Sample Type	Notes
Phosphorus, Water Extractable		% of Tot P	Per Application	Composite	Multiple samples may be needed if land spreading. Please contact DNR representative before land spreading.
Potassium, Total Recoverable		Percent	Per Application	Composite	Multiple samples may be needed if land spreading. Please contact DNR representative before land spreading.
PCB Total Dry Wt	Ceiling	50 mg/kg	Once	Composite	Once in 2027.
PCB Total Dry Wt	High Quality	10 mg/kg	Once	Composite	Once in 2027.
PFOA + PFOS		ug/kg	Once	Calculated	Report the sum of PFOA and PFOS. See PFAS Permit Sections for more information.
PFAS Dry Wt			Once	Grab	Perfluoroalkyl and Polyfluoroalkyl Substances based on updated DNR PFAS List. See PFAS Permit Sections for more information.

### 3.1.1 Changes from Previous Permit:

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

**PCB-** Monitoring year updated.

**PFAS** –Monitoring is required once pursuant to s. NR 204.06(2)(b)9, Wis. Adm. Code.

### 3.1.2 Explanation of Limits and Monitoring Requirements

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

**PFAS-** The presence and fate of PFAS in municipal and industrial sludges is an emerging public health concern. EPA has developed a draft risk assessment to determine future land application rates and released this risk assessment in January of 2025. The department is evaluating this new information. Until a decision is made, the “Interim Strategy for Land Application of Biosolids and Industrial Sludges Containing PFAS” should be followed.

Collecting sludge data on PFAS concentrations from a wide range of wastewater treatment facilities will help protect public health from exposure to elevated levels of PFAS and determine the department’s implementation of EPA’s

recommendations. To quantitate this risk, PFAS sampling has been included in this WPDES permit pursuant to ss. NR 214.18(5)(b) and NR 204.06(2)(b)9, Wis. Adm. Code.

## 4 Schedules

### 4.1 Chemical Specific Toxic Pollutants - Copper

This compliance schedule requires the permittee to achieve compliance by the specified date.

Required Action	Due Date
<b>Report on Effluent Discharges:</b> Submit a report on effluent discharges of copper with conclusions regarding compliance.	04/01/2027
<b>Action Plan:</b> Submit an action plan for complying with the effluent limitation. If construction is required, include plans and specifications with the submittal.	04/01/2028
<b>Initiate Actions:</b> Initiate actions identified in the plan.	04/01/2029
<b>Complete Actions:</b> Complete actions necessary to achieve compliance with the effluent limitations.	03/31/2030

### Explanation of Schedule

The schedule provides time for the permittee to determine appropriate compliance options and take additional copper samples.

### 4.2 Phosphorus Schedule - Continued Optimization and Compliance Planning

The permittee is required to optimize performance to control phosphorus discharges per the following schedule.

Required Action	Due Date
<p><b>Optimization and Compliance Planning:</b> The permittee shall implement a phosphorus discharge optimization plan to control phosphorus discharges to the greatest extent practicable. Submit a progress report that summarizes the approach to phosphorus removal at the facility, the resulting concentration and mass loading for the last 12-month period, and any changes that were or are needed to optimize removal of phosphorus by the due date.</p> <p>The permittee shall also evaluate alternative phosphorus compliance options such as water quality trading and adaptive management. The progress report submitted on the date due shall also detail any outreach activities undertaken to evaluate these options, any communications with credit generators, brokers/clearinghouse, and any potential water quality trading or adaptive management projects that may lead to compliance with phosphorus WQBELs.</p> <p>Financial alternatives evaluation: If the permittee intends to seek a renewed variance at the end of this permit term, the permittee may complete a financial evaluation to support ongoing variance eligibility. The report must evaluate financial mechanisms that have the potential to make compliance with phosphorus WQBELs economically feasible. Include an assessment of the feasibility and financial outcomes of the following opportunities: variable rate structures, grants through USDA or other sources, and DNR's Clean Water Fund Program. The assessment of the DNR's Clean Water Fund program should take into account subsidized interest rate loans, principal forgiveness, and other options as outlined in EPA's March 2024 Financial Capabilities Assessment Guidance, Appendix C.</p>	03/31/2027
<b>Progress Report #2:</b> Submit a progress report per the above for the prior calendar year.	03/31/2028

<b>Progress Report #3:</b> Submit a progress report per the above for the prior calendar year.	03/31/2029
<b>Progress Report #4:</b> Submit a progress report per the above for the prior calendar year.	03/31/2030
<b>Final MDV Optimization and Compliance Alternatives Report:</b> Submit a progress report per the above for the prior calendar year. If water quality trading or adaptive management will be used to comply with phosphorus limitations during the next permit term, submit a draft water quality trading plan, adaptive management plan, or executed clearinghouse credit purchase agreement. The financial alternatives evaluation as described above must be submitted by the date due if the facility chooses to seek renewal of the variance.	10/01/2030

### Explanation of Schedule

Per s. 283.16(6)(a), Wis. Stats. the Department may include a requirement that the permittee optimize the performance of a point source in controlling phosphorus discharges, which may be necessary to achieve compliance with applicable effluent limits. This compliance schedule requires the permittee to prepare an optimization plan with a schedule for implementation and submit it for Department approval. The schedule also includes a compliance planning element focused on economically feasible solutions to low-level phosphorus effluent limits such as water quality trading or adaptive management. The permittee shall take the steps called for in the optimization plan and submit annual progress reports on optimizing the removal of phosphorus and establishing a water quality trade or adaptive management project. Should the permittee intend to reapply for a subsequent term of variance coverage, a financial alternatives analysis will need to be completed. Report elements are listed in the schedule, and more information can be found in [EPA's March 2024 Financial Capabilities Assessment Guidance, Appendix C](#).

### 4.3 Phosphorus Multi-Discharger Variance Interim Limit (1.0 mg/L)

The permittee shall comply with the 1.0 mg/L MDV interim effluent limit by the end of this compliance schedule.

Required Action	Due Date
<b>Submit Final Compliance Plan:</b> The permittee shall submit Facility Plan per s. NR 110.09, Wis. Adm. Code. The permittee may submit an abbreviated facility plan if the modifications are determined to be minor according to the Department].	09/01/2026
<b>Submit Plans &amp; Specifications:</b> The permittee shall submit final construction plans to the Department for approval pursuant to s. 281.41, Wis. Stats., specifying treatment plant upgrades that must be constructed to achieve compliance with the interim phosphorus effluent limit and a schedule for completing construction of the upgrades by the 'Complete Construction' date specified below.	04/01/2027
<b>Treatment Plant Upgrade:</b> Upon approval of the final construction plans and schedule by the Department and pursuant to s. 281.41, Wis. Stats., the permittee shall initiate construction of the treatment plant upgrades in accordance with the approved plans and specifications.	04/01/2028
<b>Construction Upgrade Progress Report:</b> The permittee shall submit a progress report on construction upgrades.	04/01/2029
<b>Complete Construction and Achieve Compliance:</b> The permittee shall complete construction and achieve compliance with the phosphorus interim effluent limit of 1.0 mg/L.	04/01/2030

### Explanation of Schedule

Subsection 283.16(6), Wis. Stats., establishes required interim phosphorus effluent limits that must be met for multi-discharger variance (MDV) eligibility. Subsection 283.16(6)(am), Wis. Stats., allows a technology based phosphorus limit of 1.0 mg/L as the MDV interim limit if a permittee certifies that its treatment facility cannot achieve compliance with the

MDV interim limit without a major facility upgrade. The permittee qualifies for a 1.0 mg/L total phosphorus MDV interim limit and the schedule above provides the permittee with four years to comply with that limit.

#### 4.4 Phosphorus Payment per Pound to County

The permittee is required to make annual payments for phosphorus reductions to the participating county or counties in accordance with s. 283.16(8), Wis. Stats, and the following schedule. The price per pound will be set at the time of permit reissuance and will apply for the duration of the permit.

Required Action	Due Date
<p><b>Annual Verification of Phosphorus Payment to County:</b> The permittee shall make a total payment to the participating county or counties approved by the Department by March 1 of each calendar year. The amount due is equal to the following: [(lbs of phosphorus discharged minus the permittee’s target value) times (\$68.40 per pound)] or \$640,000, whichever is less. See the payment calculation steps in the Surface Water section.</p> <p>The permittee shall submit Form 3200-151 to the Department by March 1 of each calendar year indicating total amount remitted to the participating counties to verify that the correct payment was made. The first payment verification form is due by the specified Due Date.</p> <p>Note: The applicable Target Value is 0.2 mg/L as defined by s. 283.16(1)(h), Wis. Stats. The “per pound” value is \$50.00 adjusted for CPI.</p>	03/01/2027
<p><b>Annual Verification of Payment #2:</b> Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.</p>	03/01/2028
<p><b>Annual Verification of Payment #3:</b> Submit Form 3200-151 to the Department indicating total amount remitted to the participating counties.</p>	03/01/2029

#### Explanation of Schedule

Subsection 283.16(6)(b), Wis. Stats., requires permittees that have received approval for the multi-discharger variance (MDV) to implement a watershed project that is designed to reduce nonpoint sources of phosphorus within the HUC 8 watershed in which the permittee is located. The permittee has selected the “Payment to Counties” watershed option described in s. 283.16(8), Wis. Stats. Under this option the permittee shall make annual payment(s) to participating county(s) that are calculated based on the amount of phosphorus actually discharged during a calendar year in pounds per year less the amount of phosphorus that would have been discharged had the permittee discharged phosphorus at a target value 0.2 mg/L. The pounds of phosphorus discharged in excess of the target value is multiplied by a per pound phosphorus charge that will equal \$68.40 per pound. This schedule requires the permittee to submit Form 3200-151 to the Department indicating the total amount remitted to the participating county(s). The permittee is using a blended MDV approach where the permittee will transition from the county payment to the watershed project. It is anticipated that the transition to the watershed project MDV will begin May 1, 2028 therefore the county payments schedule extends to the final payment for the calendar year 2027 on 3/1/2029.

#### 4.5 Phosphorus Watershed Project Requirements

The permittee is required to submit annual watershed project reports in accordance with the following schedule.

Required Action	Due Date
<p><b>Annual Watershed Report:</b> Submit an annual report by May 1 of each year that documents:</p> <p>1)The calculated monthly discharge of phosphorus in lbs/month and the calculated monthly target value in lbs/month for the previous calendar year. See the calculation steps in the Surface Water</p>	05/01/2028

<p>section of this permit.</p> <p>2)The calculated Annual Offset to be generated by the approved Watershed Plan for the previous calendar year. See the calculation steps in the Surface Water section of this permit.</p> <p>3)Verification that Watershed Plan # MDV-2026-01 was implemented as approved and practices are operated and maintained consistent with the approved plan.</p> <p>4)The pounds of phosphorus reduction achieved through the approved Watershed Plan for the previous calendar year.</p> <p>5)The source of the phosphorus reductions with a reference to the approved Watershed Plan used to generate the offset.</p> <p>6)Identification of any non-compliance or failure to implement the approved Watershed Plan.</p> <p>The first report is due by the specified Due Date.</p>	
<b>Annual Watershed Report #2:</b> Submit an annual report (as described above) by May 1.	05/01/2029
<b>Annual Watershed Report #3:</b> Submit an annual report (as described above) by May 1.	05/01/2030
<p><b>Agreement Modification:</b> If the required offset of phosphorus is not generated by the approved Watershed Plan in any year, the permittee shall propose a modification to the binding written agreement or seek alternative compliance or variance options allowed under state law.</p> <p>Note: Failure to propose a modification to achieve compliance with the offset requirements may result in termination of the binding written agreement.</p>	
<p><b>Continued Coverage:</b> If the permittee intends to seek a renewed variance, an application for the MDV (Multi Discharge Variance) shall be submitted as part of the application for permit reissuance in accordance with s. 283.16(4)(b), Wis. Stats.</p>	

### Explanation of Schedule

Subsection 283.16(6)(b), Wis. Stats., requires permittees that have received approval for the multi-discharger variance (MDV) to implement a watershed project that is designed to reduce non-point sources of phosphorus within the HUC 8 watershed in which the permittee is located. The permittee has selected the “Watershed Project” watershed option described in s. 283.16(8m), Wis. Stats. Under this option the permittee shall implement a plan that is designed to result in annual reductions from other sources in the basin based on the pounds of phosphorus discharged during the previous year in excess of the specified target value. This schedule requires the permittee to submit annual reports to the Department indicating adherence to the approved watershed plan starting in 2028 based on the dates provided by the permittee for transition to the watershed project MDV.

### 4.6 Desludging Management Plan

Required Action	Due Date
<p><b>Submit Desludging Management Plan:</b> The permittee shall submit a management plan for approval if removal of sludge will occur during the life of this permit. At a minimum, the plan shall address how the sludge will be sampled, removed, transported and disposed of. No desludging may occur unless approval of the Department is obtained. Daily logs shall be kept that record where the sludge has been disposed. The plan is due sixty days prior to desludging.</p>	

### Explanation of Schedule

Subsection 283.16(6)(b), Wis. Stats., requires permittees that have received approval for the multi-discharger variance (MDV) to implement a watershed project that is designed to reduce non-point sources of phosphorus within the HUC 8 watershed in which the permittee is located. The permittee has selected the “Watershed Project” watershed option described in s. 283.16(8m), Wis. Stats. Under this option the permittee shall implement a plan that is designed to result in annual reductions from other sources in the basin based on the pounds of phosphorus discharged during the previous year in excess of the specified target value. This schedule requires the permittee to submit annual reports to the Department indicating adherence to the approved watershed plan.

#### 4.7 Land Application Management Plan

A management plan is required for the land application system.

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

#### Explanation of Schedule

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

#### Other Comments

None

#### Attachments

Water Quality Based Effluent Limits dated 11/7/2025

MDV Checklist dated 1/8/2026

MDV Approval Letter dated

#### Justification Of Any Waivers From Permit Application Requirements

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

#### Prepared By:

Jennifer Jerich, Wastewater Specialist

**Date:** 12/4/2025; 1/7/2026, 1/14/2026

**Date amended post Fact Check:** 2/12/2026 updated MDV finalized information.

**Date amended post Public Notice:**

# CORRESPONDENCE/MEMORANDUM

DATE: October 6, 2025

TO: Jennifer Jerich – SCR/Fitchburg

FROM: Zainah Masri – WY/3

SUBJECT: Water Quality-Based Effluent Limitations for the Boaz Wastewater Treatment Facility  
 WPDES Permit No. WI-0036749-07-00

This is in response to your request for an evaluation of the need for water quality-based effluent limitations (WQBELs) using chapters NR 102, 104, 105, 106, 207, 210, 212, and 217 of the Wisconsin Administrative Code (where applicable), for the discharge from the Boaz Wastewater Treatment Facility in Richland County. This municipal wastewater treatment facility (WWTF) discharges to the Mill Creek located in the Mill and Indian Creek Watershed in the Lower Wisconsin River Basin (LW10). The evaluation of the permit recommendations is discussed in more detail in the attached report.

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

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate						1
BOD <sub>5</sub>			45 mg/L	30 mg/L		1
TSS			45 mg/L	30 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Ammonia Nitrogen April– May October– March	Variable Variable					3
Bacteria						
Final Limit <i>E. coli</i>				126 #/100 mL geometric mean		4
Chloride						5
Hardness						2,6
Copper Concentration Limit Mass Limit	54 µg/L 0.037 lbs/day					7
Phosphorus LCA Interim Limit HAC Interim Limit Final WQBEL				2.0 mg/L 1.0 mg/L 0.225 mg/L	0.075 mg/L 0.078 lbs/day	8
TKN, Nitrate+Nitrite, and Total Nitrogen						9
Acute WET						10

Footnotes:

1. No changes from the current permit.
2. Monitoring only.

3. The variable daily maximum ammonia nitrogen limit table corresponding to various effluent pH values may be included in the permit in place of the single limit. These limits apply year-round.

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	108	7.0 < pH ≤ 7.1	66	8.0 < pH ≤ 8.1	14
6.1 < pH ≤ 6.2	106	7.1 < pH ≤ 7.2	59	8.1 < pH ≤ 8.2	11
6.2 < pH ≤ 6.3	104	7.2 < pH ≤ 7.3	52	8.2 < pH ≤ 8.3	9.4
6.3 < pH ≤ 6.4	101	7.3 < pH ≤ 7.4	46	8.3 < pH ≤ 8.4	7.8
6.4 < pH ≤ 6.5	98	7.4 < pH ≤ 7.5	40	8.4 < pH ≤ 8.5	6.4
6.5 < pH ≤ 6.6	94	7.5 < pH ≤ 7.6	34	8.5 < pH ≤ 8.6	5.3
6.6 < pH ≤ 6.7	89	7.6 < pH ≤ 7.7	29	8.6 < pH ≤ 8.7	4.4
6.7 < pH ≤ 6.8	84	7.7 < pH ≤ 7.8	24	8.7 < pH ≤ 8.8	3.7
6.8 < pH ≤ 6.9	78	7.8 < pH ≤ 7.9	20	8.8 < pH ≤ 8.9	3.1
6.9 < pH ≤ 7.0	72	7.9 < pH ≤ 8.0	17	8.9 < pH ≤ 9.0	2.6

4. Bacteria limits apply during the disinfection season of May through September. Additional, final limit: No more than 10 percent of *E. coli* bacteria samples collected in any calendar month may exceed 410 count/100 mL.
5. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
6. Hardness monitoring is recommended because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.
7. These are the WQBELs for copper. The limit is based on reasonable potential comparing the mean effluent result to 1/5<sup>th</sup> of the calculated effluent limit.
8. Under the phosphorus MDV, a level currently achievable (LCA) interim limit of 2.0 mg/L should be effective upon permit reissuance. A compliance schedule may be included in the permit until the highest attainable condition (HAC) limit of 1.0 mg/L can be met. The final WQBELs remain at 0.225 mg/L as a monthly average and 0.075 mg/L as a six-month average, as well as a respective mass limit.
9. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in Wastewater Permits, annual total nitrogen monitoring is recommended for all minor municipal permittees. Nitrogen is the sum of nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), and total kjeldahl nitrogen (TKN) (all expressed as N).
10. After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above, acute WET testing 2 times throughout the permit term is recommended in the reissued permit. Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).

Please consult the attached report for details regarding the above recommendations. If there are any questions or comments, please contact Zainah Masri at [Zainah.Masri@wisconsin.gov](mailto:Zainah.Masri@wisconsin.gov) or Diane Figiel at [Diane.Figiel@wisconsin.gov](mailto:Diane.Figiel@wisconsin.gov).

Attachments (3) – Narrative, Lagoon Volumetric Capacity Information and Map

PREPARED BY: Zainah Masri, Water Resources Engineer *Zainah Masri*

APPROVED BY: *Diane Figiel* Date: *10/6/2025*  
 Diane Figiel, PE,  
 Water Resources Engineer

E-cc: Tanner Conners, Wastewater Engineer – SCR/Fitchburg  
Lisa Creegan, Regional Wastewater Supervisor – SCR/Fitchburg  
Diane Figiel, Water Resources Engineer – WY/3  
Kari Fleming, Natural Resources Program Manager– WY/3  
Nate Willis, Environmental Engineer Manager– WY/3

**Water Quality-Based Effluent Limitations for  
Boaz Wastewater Treatment Facility**

**WPDES Permit No. WI-0036749-07-00**

Prepared by: Zainah Masri – WY/3

**PART 1 – BACKGROUND INFORMATION**

**Facility Description –**

Boaz operates a three-cell stabilization lagoon system with seasonal fill and draw discharge to Mill Creek. The facility is designed to treat an average daily flow of 15,000 gallons per day and presently received an average of 10,000 gallons per day for treatment. Outfall 001 is in the SW ¼ of NE ¼ of Section 30, T10-9N-R1W, Richland County on the east bank of Mill Creek.

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

**Existing Permit Limitations**

The current permit, expired on March 31, 2025, and includes the following effluent limitations and monitoring requirements.

Parameter	Daily Maximum	Daily Minimum	Weekly Average	Monthly Average	Six-Month Average	Footnotes
Flow Rate	0.125 MGD					
BOD <sub>5</sub>			45 mg/L	30 mg/L		1
TSS			45 mg/L	30 mg/L		1
pH	9.0 s.u.	6.0 s.u.				1
Ammonia Nitrogen						2
Chloride						3
Phosphorus						4
Interim				3.7 mg/L		
Final				0.225 mg/L	0.075 mg/L 0.078 lbs/day	
TKN, Nitrate+Nitrite, and Total Nitrogen						5

Footnotes:

1. These limitations are not being evaluated as part of this review. Because the water quality criteria (WQC), reference effluent flow rates, and receiving water characteristics have not changed, limitations for these water quality characteristics do not need to be re-evaluated at this time.
2. Monitoring only.
3. Monitoring at a frequency to ensure that 11 samples are available at the next permit issuance.
4. A compliance schedule is in the current permit to meet the final WQBEL by March 31, 2029.
5. As recommended in the Department's October 1, 2019 Guidance for Total Nitrogen Monitoring in WPDES Permits, annual total nitrogen (ammonia, organic and nitrate/nitrite) monitoring is

Attachment #1

recommended for all minor municipal permittees. Total Nitrogen is the sum of nitrate (NO<sub>3</sub>), nitrite (NO<sub>2</sub>), organic nitrogen and ammonia (all expressed as N).

**Receiving Water Information**

- Name: Mill Creek
- Waterbody Identification Code (WBIC): 1215600
- Classification used in accordance with chs. NR 102 and 104, Wis. Adm. Code: Warm Water Sport Fish (WWSF) community, non-public water supply.
- Low flows used in accordance with chs. NR 106 and 217, Wis. Adm. Code: The following 7-Q<sub>10</sub> and 7-Q<sub>2</sub> values are from USGS for Station SW ¼ of NW ¼ of Section 20, T10N-R1W, Richland County, upstream of outfall 001.
  - 7-Q<sub>10</sub> = 14 cfs (cubic feet per second)
  - 7-Q<sub>2</sub> = 16 cfs
  - Harmonic Mean Flow = 28.8 cfs
- Hardness = 180 mg/L as CaCO<sub>3</sub>. Effluent hardness is used in place of receiving water because there is no hardness data available for Mill Creek. A review of other similar sized water bodies shows a hardness higher than 180 mg/L, and using a lower hardness gives a more conservative estimate.
- % of low flow used to calculate limits in accordance with s. NR 106.06(4)(c)5., Wis. Adm. Code: 25%
- Source of background concentration data: Metals data from the Kickapoo River at Oil City is used for this evaluation because there is no data available for Mill Creek. The Kickapoo River is within the same ecological landscape so ambient water quality characteristics are expected to be similar. The numerical values are shown in the tables below. If no data is available, the background concentration is assumed to be negligible and a value of zero is used in the computations. Background data for calculating effluent limitations for ammonia nitrogen are described later.
- Multiple dischargers: None
- Impaired water status: Mill Creek is listed as impaired for total phosphorus at the point of discharge, and the Wisconsin River, located approximately 11 miles downstream, is listed as impaired for PCBs.

**Effluent Information**

- Design flow rate(s):
  - Annual average\* = 0.015 MGD (Million Gallons per Day)
  - Daily flow limit\* = 0.125 MGD
  - Daily Maximum Design Flow\*\* = 0.165 MGD

*Note:*

  - \*The facility is designed to treat an average daily flow of 0.015 MGD, and previous limits were calculated using the design flow rate of 0.015 MGD. However, since the facility is permitted to discharge up to 0.125 MGD per day, it was determined that using the flow limit of 0.125 MGD in calculations should be used to be protective of the receiving water.*
  - \*\*The Daily Maximum Design Flow was calculated using the Estimating Muni Design Flows Worksheet*

For reference, the actual average flow from May 2019 to November 2024 was 0.07 MGD.

- Hardness = 180 mg/L as CaCO<sub>3</sub>. This value represents the geometric mean of data (n=4) found in the permit application from May 2024 to June 2024.
- Acute dilution factor used in accordance with s. NR 106.06(3)(c), Wis. Adm. Code: Not applicable –

Attachment #1

this facility does not have an approved Zone of Initial Dilution (ZID).

- Water source: Domestic wastewater with water supply from public and private wells.
- Additives: None.
- Effluent characterization: This facility is categorized as a minor municipality, so the permit application required effluent sample analyses for a limited number of common pollutants, as specified in s. NR 200.065, Table 1, Wis. Adm. Code, primarily metal substances plus ammonia, chloride, hardness and phosphorus.
- Effluent data for substances for which a single sample was analyzed is shown in the tables in Part 2 below, in the column titled “MEAN EFFL. CONC.”. Otherwise, substances with multiple effluent data are shown in the tables below or in their respective parts in this evaluation.

**Effluent Copper Data**

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
05/15/2024	<3.2	05/28/2024	66	06/10/2024	<3.2
05/18/2024	100	05/31/2024	80	06/12/2024	70
05/22/2024	40	06/02/2024	27	06/15/2024	<3.2
05/25/2024	76	06/07/2024	<3.2		
Mean = 42 µg/L					

“<” means that the pollutant was not detected at the indicated level of detection. The mean concentration was calculated using zero in place of the non-detected results.

**Effluent Chloride Data**

	Chloride mg/L
1-day P <sub>99</sub>	123
4-day P <sub>99</sub>	99
30-day P <sub>99</sub>	85
Mean	78
Std	16
Sample size	22
Range	59 - 126

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

**Parameter Averages with Limits**

	Average Measurement	Average Mass Discharged
BOD <sub>5</sub>	10.5 mg/L	-
Flow Rate	0.07 MGD	-
TSS	18 mg/L	-
pH field	7.3 s.u.	-
Phosphorus	2.6 mg/L	1.8 lbs/day
Chloride	78.45 mg/L	-
Ammonia Nitrogen	4.8 mg/L	-

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

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

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

**Acute Limits based on 1-Q<sub>10</sub>**

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

$$\text{Limitation} = \frac{(\text{WQC}) (Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)}{Q_e}$$

Where:

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

Q<sub>s</sub> = average minimum 1-day flow which occurs once in 10 years (1-day Q<sub>10</sub>)  
if the 1-day Q<sub>10</sub> flow data is not available = 80% of the average minimum 7-day flow which occurs once in 10 years (7-day Q<sub>10</sub>).

Q<sub>e</sub> = Effluent flow (in units of volume per unit time) as specified in s. NR 106.06(4)(d), Wis. Adm. Code.

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

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

If the receiving water is effluent dominated under low stream flow conditions, the 1-Q<sub>10</sub> method of limit calculation produces the most stringent daily maximum limitations and should be used while making reasonable potential determinations. This is not the case for Boaz Wastewater Treatment Facility and the limits are set based on two times the acute toxicity criteria.

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

**Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

RECEIVING WATER FLOW = 11.2 cfs, (1-Q<sub>10</sub> (estimated as 80% of 7-Q<sub>10</sub>)), as specified in s. NR 106.06(3)(bm), Wis. Adm. Code.

SUBSTANCE	REF. HARD.* mg/L	ATC	MAX. EFFL. LIMIT**	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	1-day P <sub>99</sub>	1-day MAX. CONC.
Arsenic		340	680	136	1.1		
Cadmium	180	20	41	8.1	<0.098		
Chromium	180	2,918	5,836	1,167	<3.3		
Copper	180	27	54	11	42		100
Lead	180	189	377	76	<5.4		
Nickel	180	771	1,543	309	<4.7		
Zinc	180	201	403	81	<2		
Chloride (mg/L)		757	1,514			123	126

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

\*\* The 2 × ATC method of limit calculation yields a more restrictive limit than consideration of ambient concentrations and 1-Q<sub>10</sub> flow rates per the changes to s. NR 106.07(3), Wis. Adm. Code, effective 09/01/2016.

**Weekly Average Limits based on Chronic Toxicity Criteria (CTC)**

RECEIVING WATER FLOW = 3.5 cfs (1/4 of the 7-Q<sub>10</sub>), as specified in s. NR 106.06(4)(c), Wis. Adm. Code

SUBSTANCE	REF. HARD.* mg/L	CTC	MEAN BACK-GRD.	WEEKLY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.	4-day P <sub>99</sub>
Arsenic		152	-	2,906	581	1.1	
Cadmium	175	3.8	-	73	15	<0.098	
Chromium	180	214	0.23	4,079	816	<3.3	
Copper	180	17	-	327	65	42	
Lead	180	49	0.51	935	187	<5.4	
Nickel	180	86	0.03	1,638	328	<4.7	
Zinc	180	201	1.23	3,821	764	<2	
Chloride (mg/L)		395	-	7,543	1,509		98.8

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

**Monthly Average Limits based on Wildlife Criteria (WC)**

The effluent characterization did not include any effluent sampling results for substances for which Wildlife Criteria exist.

**Monthly Average Limits based on Human Threshold Criteria (HTC)**

RECEIVING WATER FLOW = 7.2 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HTC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Cadmium	370	0.00	14,144	2,829	<0.098
Chromium (+3)	3,818,000	0.23	145,950,219	29,190,044	<3.3
Lead	140	0.51	5333	1,067	<5.4
Nickel	43,000	0.03	1,643,755	328,751	<4.7

**Monthly Average Limits based on Human Cancer Criteria (HCC)**

RECEIVING WATER FLOW = 7.2 cfs (¼ of Harmonic Mean), as specified in s. NR 106.06(4), Wis. Adm. Code.

SUBSTANCE	HCC	MEAN BACK-GRD.	MO'LY AVE. LIMIT	1/5 OF EFFL. LIMIT	MEAN EFFL. CONC.
Arsenic	13	-	508	102	1.1

**Conclusions and Recommendations**

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

Copper – Considering available effluent data from the permit application from May 2024 to June 2024, the mean concentration is 42 µg/L, with a maximum concentration of 100 µg/L. There were 11 samples reported in the permit application, however 4 of the samples were below the level of detection (LOD). Therefore, the copper limit is based on reasonable potential comparing the mean effluent result to 1/5<sup>th</sup> of the calculated effluent limit. The maximum effluent concentration and the mean concentration of the effluent data exceed the calculated daily maximum limit. Based on this information, **acute concentration and mass limits, as well as monitoring, are required.**

**Copper Effluent Data**

Sample Date	Copper µg/L	Sample Date	Copper µg/L	Sample Date	Copper µg/L
05/15/2024	<3.2	05/28/2024	66	06/10/2024	<3.2
05/18/2024	100	05/31/2024	80	06/12/2024	70
05/22/2024	40	06/02/2024	27	06/15/2024	<3.2
05/25/2024	76	06/07/2024	<3.2		
Mean = 42 µg/L					

Additional data may be considered in the calculations of the 1-day P<sub>99</sub>, however because 4 of the samples were greater than the calculated limit, it would need to be shown that these samples were unrepresentative of the discharge for the limit to be dropped.

**The acute mass limitation of 0.056 lbs/day** is based on the concentration limit and the peak daily design flow rate of 0.125 MGD ( 54 µg/L \* 0.125 MGD \* 8.34/1000) in accordance with s. NR 106.07(2)(a), Wis. Adm. Code.

**Quarterly hardness monitoring is also recommended** because of the relationship between hardness and daily maximum limits based on acute toxicity criteria.

Chloride – Considering available effluent data from the current permit term November 2020 to May 2023 the 1-day P<sub>99</sub> chloride concentration is 123 mg/L, and the 4-day P<sub>99</sub> of effluent data is 99 mg/L.

These effluent concentrations are below the calculated WQBELs for chloride, therefore no effluent limits are needed. **Chloride monitoring is recommended to ensure that 11 sample results are available at the next permit issuance to meet the data requirements of s. NR 106.85, Wis. Adm. Code.**

Mercury – The permit application did not require monitoring for mercury because the Boaz Wastewater Treatment Facility is categorized as a minor facility as defined in s. NR 200.02(8), Wis. Adm. Code. In accordance with s. NR 106.145(3)(a)3, Wis. Adm. Code, a minor municipal discharger shall monitor, and report results of influent and effluent mercury monitoring once every three months if, “there are two or more exceedances in the last five years of the high-quality sludge mercury concentration of 17 mg/kg specified in s. NR 204.07(5), Wis. Adm. Code.” A review of the past five years of sludge characteristics data reveals that all the sample results are within expected analytical ranges and well below the 17 mg/kg level. The average concentration in the sludge from December 8, 2021 was 1.2 mg/kg. Therefore, **no mercury monitoring is recommended at Outfall 001.**

PFOS and PFOA – The need for PFOS and PFOA monitoring is evaluated in accordance with s. NR 106.98(2), Wis. Adm. Code. Based on the type of discharge, the effluent flow rate, and the types of indirect dischargers contributing to the collection system **PFOS and PFOA monitoring is not recommended.**

The Department may re-evaluate the need for sampling at the next permit reissuance if new information becomes available that suggests PFOS or PFOA may be present in the discharge.

### **PART 3 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR AMMONIA NITROGEN**

The State of Wisconsin promulgated revised water quality standards for ammonia nitrogen in ch. NR 105, Wis. Adm. Code, effective March 1, 2004 which includes criteria based on both acute and chronic toxicity to aquatic life. Given the fact that the Boaz Wastewater Treatment Facility does not currently have ammonia nitrogen limits, the need for limits is evaluated at this time.

#### **Daily Maximum Limits based on Acute Toxicity Criteria (ATC)**

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

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

Where:

A = 0.411 and B = 58.4 for a Warm Water Sport fishery  
pH (s.u.) = that characteristic of the effluent.

Boaz Wastewater Treatment Facility

Attachment #1

The effluent pH data was examined as part of this evaluation. A total of 75 sample results were reported from May 2019 to November 2024. The maximum reported value was 8.1 s.u. (Standard pH Units). The effluent pH was 8.1 s.u. or less 99% of the time. The 1-day P<sub>99</sub>, calculated in accordance with s. NR 106.05(5), Wis. Adm. Code, is 8.2 s.u. The mean plus the standard deviation multiplied by a factor of 2.33, an estimate of the upper ninety ninth percentile for a normally distributed dataset, is 8.2 s.u. Therefore, a value of 8.1 s.u. is believed to represent the maximum reasonably expected pH, and therefore most appropriate for determining daily maximum limitations for ammonia nitrogen. Substituting a value of 8.1 s.u. into the equation above yields an ATC = 7.0 mg/L.

**Daily Maximum Ammonia Nitrogen Effluent Limitations Calculation Method**

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

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

**Daily Maximum Ammonia Nitrogen Determination**

	Ammonia Nitrogen Limit mg/L
2×ATC	14
1-Q <sub>10</sub>	3,331

The 2×ATC method yields the most stringent limits for Boaz Wastewater Treatment Facility.

Presented below is a table of daily maximum limitations corresponding to various effluent pH values. Use of this table is not necessarily recommended in the permit, but it is presented herein for informational purposes.

**Daily Maximum Ammonia Nitrogen Limits – WWSF**

Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L	Effluent pH s.u.	Limit mg/L
6.0 ≤ pH ≤ 6.1	108	7.0 < pH ≤ 7.1	66	8.0 < pH ≤ 8.1	14
6.1 < pH ≤ 6.2	106	7.1 < pH ≤ 7.2	59	8.1 < pH ≤ 8.2	11
6.2 < pH ≤ 6.3	104	7.2 < pH ≤ 7.3	52	8.2 < pH ≤ 8.3	9.4
6.3 < pH ≤ 6.4	101	7.3 < pH ≤ 7.4	46	8.3 < pH ≤ 8.4	7.8
6.4 < pH ≤ 6.5	98	7.4 < pH ≤ 7.5	40	8.4 < pH ≤ 8.5	6.4
6.5 < pH ≤ 6.6	94	7.5 < pH ≤ 7.6	34	8.5 < pH ≤ 8.6	5.3
6.6 < pH ≤ 6.7	89	7.6 < pH ≤ 7.7	29	8.6 < pH ≤ 8.7	4.4
6.7 < pH ≤ 6.8	84	7.7 < pH ≤ 7.8	24	8.7 < pH ≤ 8.8	3.7
6.8 < pH ≤ 6.9	78	7.8 < pH ≤ 7.9	20	8.8 < pH ≤ 8.9	3.1
6.9 < pH ≤ 7.0	72	7.9 < pH ≤ 8.0	17	8.9 < pH ≤ 9.0	2.6

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

Weekly average and monthly average limits for ammonia nitrogen are based on chronic toxicity criteria in ch. NR 105, Wis. Adm. Code.

The 30-day chronic toxicity criterion (CTC) for ammonia in waters classified as a Warm Water Sport Fish Community is calculated by the following equation, according to subchapter IV of NR 106, Wis. Adm. Code.

$$CTC = E \times \{ [0.0676 \div (1 + 10^{(7.688 - pH)})] + [2.912 \div (1 + 10^{(pH - 7.688)})] \} \times C$$

Where:

pH = the pH (s.u.) of the receiving water,

E = 0.854,

C = the minimum of 2.85 or  $1.45 \times 10^{(0.028 \times (25 - T))}$  – (Early Life Stages Present), or

C =  $1.45 \times 10^{(0.028 \times (25 - T))}$  – (Early Life Stages Absent), and

T = the temperature (°C) of the receiving water – (Early Life Stages Present), or

T = the maximum of the actual temperature (°C) and 7 - (Early Life Stages Absent)

The 4-day criterion is equal to the 30-day criterion multiplied by 2.5. The 4-day criteria are used in a mass-balance equation with the 7-Q<sub>10</sub> (4-Q<sub>3</sub>, if available) to derive weekly average limitations. And the 30-day criteria are used with the 30-Q<sub>5</sub> (estimated as 85% of the 7-Q<sub>2</sub> if the 30-Q<sub>5</sub> is not available) to derive monthly average limitations. The stream flow value is further adjusted to temperature; 100% of the flow is used if the Temperature ≥ 16 °C, 25% of the flow is used if the Temperature < 11 °C, and 50% of the flow is used if the Temperature ≥ 11 °C but < 16 °C.

Section NR 106.32 (3), Wis. Adm. Code, provides a mechanism for less stringent weekly average and monthly average effluent limitations when early life stages (ELS) of critical organisms are absent from the receiving water. This applies only when the water temperature is less than 14.5 °C, during the winter and spring months. Burbot, an early spawning species, are believed to be present in the Mill Creek, based on raw fish data in the Fisheries Management Information System. So “ELS Absent” criteria apply from October through March, and “ELS Present” criteria will apply from April through September for a warm water sport fish classification.

The “default” basin assumed values are used for Temperature, pH and background ammonia concentrations, because minimum ambient data is available. These values are shown in the table below, with the resulting criteria and effluent limitations.

**Weekly and Monthly Ammonia Nitrogen Limits – WWSF**

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
<b>Effluent Flow</b>	Qe (MGD)	0.125	0.125	0.125
<b>Background Information</b>	7-Q <sub>10</sub> (cfs)	14	14	14
	7-Q <sub>2</sub> (cfs)	16	16	16
	Ammonia (mg/L)	0.06	0.06	0.09
	Temperature (°C)	12	19	4
	Maximum Temperature (°C)	14	21	10

Attachment #1

		Spring	Summer	Winter
		April & May	June – Sept.	Oct. - March
	pH (s.u.)	7.5	7.5	7.5
	% of Flow used	50	100	25
	Reference Weekly Flow (cfs)	7	14	4.0
	Reference Monthly Flow (cfs)	7.0	14	3.4
<b>Criteria mg/L</b>	4-day Chronic			
	Early Life Stages Present	11	7.4	-
	Early Life Stages Absent	-	-	15
	30-day Chronic			
	Early Life Stages Present	4.4	3.0	-
	Early Life Stages Absent	-	-	6.0
<b>Effluent Limitations mg/L</b>	Weekly Average			
	Early Life Stages Present	404	538	-
	Early Life Stages Absent	-	-	277
	Monthly Average			
	Early Life Stages Present	156	207	-
	Early Life Stages Absent	-	-	107

**Effluent Data**

The following table evaluates the statistics based upon ammonia data reported from May 2020 to November 2024 with those results being compared to the calculated limits to determine the need to include ammonia limits in the Boaz Wastewater Treatment Facility permit for the respective month ranges. That need is determined by calculating 99<sup>th</sup> upper percentile (or P<sub>99</sub>) values for ammonia during each of the month ranges and comparing the daily maximum values to the daily maximum limit.

**Ammonia Nitrogen Effluent Data**

Ammonia Nitrogen mg/L	April - May	June - September	October - March
1-day P <sub>99</sub>	16	2.4	14
4-day P <sub>99</sub>	9.4	1.6	9.0
30-day P <sub>99</sub>	6.3	1.2	6.4
Mean	4.8	0.95	5.2
Std	3.1	0.43	2.6
Sample size	35	3	27
Range	1.0 - 10	0.45 - 1.3	1.5 - 10

Based on this comparison, **daily maximum limits are required in for the months of April – May and October – March.**

**Conclusions and Recommendations**

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

Attachment #1

**Final Ammonia Nitrogen Limits**

	Daily Maximum mg/L	Weekly Average mg/L	Monthly Average mg/L
April – May	14 mg/L	-	-
June – September	-	-	-
October – March	14 mg/L	-	-

**PART 4 – WATER QUALITY-BASED EFFLUENT LIMITATIONS FOR BACTERIA**

Section NR 102.04(5), Wis. Adm. Code, states that all surface waters shall be suitable for supporting recreational use and shall meet *E. coli* criteria during the recreation season. Section NR 102.04(5)(b), Wis. Adm. Code, allows the Department to make exceptions when it determines, in accordance with s. NR 210.06(3), Wis. Adm. Code, that wastewater disinfection is not required to meet *E. coli* limits and protect the recreational use. Section NR 210.06(3), Wis. Adm. Code, tasks the Department with determining the need for disinfection using a site-specific analysis based on potential risk to human or animal health. It sets out the factors that must be considered in determining the necessity to disinfect municipal wastewater or to change the length of the disinfection season.

It is recognized the Boaz Wastewater Treatment Facility potentially has a detention time of at least 180 days, in which the resulting discharged effluent is thought to not pose a risk to human and animal health, as described in s. NR 210.06(3)(h), Wis. Adm. Code.

The maximum 180-day rolling average flowrate for the facility is 0.020 MGD (May 2019 – November 2024) including days discharge did not occur. The volumetric capacity of the lagoons is approx. 5.75 MG, calculated based on dimensions provided by the compliance engineer included in attachment #2. Therefore, the estimated shortest detention time for the facility is approximately 5.75 MG / 0.020 MGD = 282 days and is greater than the 180-day minimum. This detention time would essentially be providing disinfection where additional disinfection treatment is not expected to be needed and **therefore, disinfection is not required.**

**PART 5 – PHOSPHORUS**

**Technology-Based Effluent Limit**

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

Because Boaz Wastewater Treatment Facility does not currently have an existing technology-based limit, the need for this limit in the reissued permit is evaluated. The data demonstrates that the annual monthly average phosphorus loading is less than 150 lbs/month, which is the threshold for municipalities in accordance to s. NR 217.04(1)(a)1, Wis. Adm. Code and therefore **no technology-based limit is required.**

**Annual Average Mass Total Phosphorus Loading**

Month	Average Phosphorus Concentration (mg/L)	Total Effluent Flow (Million Gallons)	Calculated Mass (lbs/month)
April 2023	1.8	2.9	43
May 2023	1.0	3.4	28
November 2023	0.61	3.1	16
May 2024	1.7	2.0	29
June 2024	0.73	1.2	7.3
October 2024	0.34	1.19	3.4
November 2024	1.0	1.4	12
<b>Average</b>			<b>20</b>

Total P (lbs/month) = Monthly average (mg/L) × total flow (MG/month) × 8.34 (lbs/gallon)  
 Where total flow is the sum of the actual (not design) flow (in MGD) for that month

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

**Water Quality-Based Effluent Limits (WQBEL)**

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

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

The conservation of mass equation is described in s. NR 217.13(2)(a), Wis. Adm. Code, for phosphorus WQBELs and includes variables of water quality criterion (WQC), receiving water flow rate (Q<sub>s</sub>), effluent flow rate (Q<sub>e</sub>), and upstream phosphorus concentrations (C<sub>s</sub>) provided below.

$$\text{Limitation} = [(WQC)(Q_s + (1-f) Q_e) - (Q_s - f Q_e) (C_s)] / Q_e$$

Where:

WQC = 0.075 mg/L for Mill Creek.

Q<sub>s</sub> = 100% of the 7-Q<sub>2</sub> of 16 cfs

C<sub>s</sub> = background concentration of phosphorus in the receiving water pursuant to s. NR 217.13(2)(d), Wis. Adm. Code

Q<sub>e</sub> = effluent flow rate = 0.125 MGD = 0.193 cfs

f = the fraction of effluent withdrawn from the receiving water = 0

Section NR 217.13(2)(d), Wis. Adm. Code, specifies that the background phosphorus concentration used in the limit calculation formula shall be calculated as a median using the procedures specified in s. NR

Attachment #1

102.07(1)(b) to (c), Wis. Code. All representative data from the most recent 5 years shall be used, but data from the most recent 10 years may be used if representative of current conditions.

A previous evaluation resulted in a WQBEL of 0.075 mg/L using a background concentration of 0.096 mg/L. Section NR 217.13(2)(d), Wis. Adm. Code, states that the determination of upstream concentrations shall be evaluated at each permit reissuance. Additional data were considered in estimating the background phosphorus concentration.

A review of all available in stream total phosphorus data stored in the Surface Water Integrated Monitoring System database indicates the median background total phosphorus concentration in Mill Creek near Boaz, WI is estimated to be 0.096 mg/L, which is the median of all available background data. Below is a summary of the available background data.

SWIMS ID	533072	10012604
Station Name	Monitoring station at East Branch Mill Creek - Near Boaz WI	Monitoring station at Mill Creek – State Highway 60
Waterbody	East Branch Mill Creek	Mill Creek
Sample Count	5	4
First Sample	06/18/2001	05/22/2007
Last Sample	10/17/2001	09/16/2007
Mean	0.059 mg/L	0.198
Median	0.037 mg/L	0.154

Substituting a median value of 0.096 mg/L into the limit calculation equation above, the calculated limit is 0.075 mg/L.

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

**Effluent Data**

The following table summarizes effluent total phosphorus monitoring data from May 2020 to November 2024.

**Total Phosphorus Effluent Data**

Phosphorus mg/L	Total	January 2024 – November 2024
1-day P <sub>99</sub>	5.9	2.7
4-day P <sub>99</sub>	4.0	2.1
30-day P <sub>99</sub>	3.07	1.8
Mean	2.60	1.6
Std	1.03	0.40
Sample size	65	14
Range	0.76 - 4.96	1.02 - 2.26

Boaz Wastewater Treatment Facility

**Reasonable Potential Determination**

**The Boaz Wastewater Treatment Facility discharge has reasonable potential to cause or contribute to an exceedance of the water quality criterion** because the 30-day P<sub>99</sub> of reported effluent total phosphorus data is greater than the calculated WQBEL. Therefore, **a WQBEL is required.**

**Limit Expression**

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

**Mass Limits**

A mass limit is also required, pursuant to s. NR 217.14(1)(a), Wis. Adm. Code, because the discharge is to a surface water that is to or upstream of a phosphorus -impaired receiving water. **This final mass limit shall be 0.075 mg/L × 8.34 × 0.125 MGD = 0.078 lbs/day expressed as a six-month average.**

**Multi-Discharge Variance Interim Limit**

With the permit application, Boaz Wastewater Treatment Facility has applied for the phosphorus multi-discharger variance (MDV). Conditions of the phosphorus MDV require the facility to comply with an interim phosphorus limit in lieu of meeting the final WQBEL. A review of effluent phosphorus data indicates that Boaz Wastewater Treatment Facility will be unable to comply with the 0.8 mg/L phosphorus limits required under s. 283.16 (6) (a) 1., Wis. Stats. Therefore, the recommended interim limit, pursuant to s. 283.16 (6) (am), Wis. Stats., is 1.0 mg/L as a monthly average. A compliance schedule may be appropriate to meet this interim limit but compliance with 1.0 mg/L shall be no later than the end of the reissued permit.

The effluent data indicates that 4-day P<sub>99</sub> value of **2.0 mg/L is a level currently achievable (LCA)** for the discharge. A limit of 2.0 mg/L as a monthly average should not be exceeded during the compliance schedule.

**PART 5 – WATER QUALITY-BASED EFFLUENT LIMITATIONS  
FOR THERMAL**

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

Due to the amount of upstream flow available for dilution in the limit calculation (Q<sub>s</sub>:Q<sub>e</sub> = 151:1), the lowest calculated limitation is 120° F (s. NR 106.55(6)(a)). For lagoon treatment systems of domestic waste, there is no reasonable potential for the discharge to exceed this limit. **No limits or monitoring are recommended to be included in the reissued permit for temperature.**

## PART 6 – WHOLE EFFLUENT TOXICITY (WET)

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

- Acute tests predict the concentration that causes lethality of aquatic organisms during a 48 to 96-hour exposure. To assure that a discharge is not acutely toxic to organisms in the receiving water, WET tests must produce a statistically valid LC<sub>50</sub> (Lethal Concentration to 50% of the test organisms) greater than 100% effluent, according to s. NR 106.09(2)(b), Wis. Adm Code.
- Chronic testing is usually not recommended where the ratio of the 7-Q<sub>10</sub> to the effluent flow exceeds 100:1. For the Boaz Wastewater Treatment Facility that ratio is approximately 151:1. With this amount of dilution, there is believed to be little potential for chronic toxicity effects in the Mill Creek associated with the discharge from the Boaz Wastewater Treatment Facility so the need for chronic WET testing will not be considered further.
- According to the *State of Wisconsin Aquatic Life Toxicity Testing Methods Manual* (s. NR 219.04, Table A, Wis. Adm. Code), a synthetic (standard) laboratory water may be used as the dilution water and primary control in acute WET tests, unless the use of different dilution water is approved by the Department prior to use. The primary control water must be specified in the WPDES permit.

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

**WET Checklist Summary**

	<b>Acute</b>
<b>AMZ/IWC</b>	Not Applicable. <b>0 Points</b>
<b>Historical Data</b>	No Data Available from the past 5 years. <b>5 Points</b>
<b>Effluent Variability</b>	Little variability, no violations or upsets, consistent WWTF operations. <b>0 Points</b>
<b>Receiving Water Classification</b>	WWSF <b>5 Points</b>
<b>Chemical-Specific Data</b>	Reasonable potential for limits for copper and ammonia nitrogen based on ATC; Arsenic and Chloride detected. <b>8 Points</b>
<b>Additives</b>	No Biocides and No Water Quality Conditioners added. <b>0 Points</b>
<b>Discharge Category</b>	0 Industrial Contributors. <b>0 Points</b>
<b>Wastewater Treatment</b>	Secondary or Better <b>0 Points</b>
<b>Downstream Impacts</b>	No impacts known <b>0 Points</b>
<b>Total Checklist Points:</b>	<b>18 Points</b>
<b>Recommended Monitoring Frequency (from Checklist):</b>	2 tests during permit term
<b>Limit Required?</b>	No
<b>TRE Recommended? (from Checklist)</b>	No

- After consideration of the guidance provided in the Department's WET Program Guidance Document (2022) and other information described above **acute WET testing 2 times throughout the permit term is recommended in the reissued permit.** Tests should be done in rotating quarters to collect seasonal information about this discharge. WET testing should continue after the permit expiration date (until the permit is reissued).

**Lagoon Volumetric Capacity Information:**

<b><i>Pond No. 1 (Primary)</i></b>	
No. of Units	1
Type	Primary Pond
Size, Acres	2.10
Typical Operating Depth, ft.	5.0
Total Pond Volume, MG	3.10
Detention at Design Flow, Days	254
<b><i>Pond No. 2 (Mid-Secondary)</i></b>	
No. of Units	1
Type	Secondary Pond
Size, Acres	0.84
Depth, ft.	6.0
Pond Volume, MG	1.34
Detention at Design Flow, Days	109
<b><i>Pond No. 3 (Lower-Secondary)</i></b>	
No. of Units	1
Type	Secondary Pond
Size, Acres	0.82
Depth, ft.	6.0
Pond Volume, MG	1.31
Detention at Design Flow, Days	107

Site Map:



# Boaz Wastewater Treatment Facility



- Legend:**
- ▲ Surface Water Outfalls
  - Latest Leaf On Index
  - Latest Leaf On Imagery

**Notes:**



Service Layer Credits:  
Latest Leaf On, Permits & Determinations, WI DNR Bureau of Watershed Management

Map projection: NAD 1983 NAD83 Wisconsin TM

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Date Printed: 9/4/2025 9:38 AM





2/6/2026

Susan Hauri  
17010 State Hwy 171  
Richland Center, WI 53581

Subject: Conditional approval of a multi-discharger phosphorus variance  
Receiving Stream: Mill Creek in Richland County  
Permittee: Village of Boaz, WPDES WI-0036749

Dear Ms. Hauri:

In accordance with s. 283.16 of the Wisconsin Statutes, you have requested coverage under Wisconsin's multi-discharger phosphorus variance for the Boaz Wastewater Treatment Facility in an application dated 9/9/2025. Wisconsin's multi-discharger phosphorus variance was approved by EPA on September 3, 2025. Coverage under the multi-discharger phosphorus variance may only be granted to an existing source that demonstrates a major facility upgrade is necessary to achieve phosphorus compliance and the upgrade will result in economic hardship as defined in the federally approved variance. The water quality criterion for which you are seeking a variance is contained in s. NR 102.06, Wis. Adm. Code.

After review of the application materials, the Department is tentatively approving coverage under the phosphorus multi discharger variance because the applicant has demonstrated that a major facility upgrade would be required to comply with the phosphorus water quality-based effluent limitation, and the applicant meets the economic hardship eligibility criteria delineated in the federally approved variance. In addition, the permitted facility has agreed to comply with the interim limitations that will be included in the WPDES permit, and has agreed to reduce the amount of phosphorus entering surface waters by entering into a binding, written agreement with another person under which the permittee constructs a project or implements a plan to make annual reduction of phosphorus pollution pursuant to s. 283.16(6)(b)3., Wis. Stats. The Village of Boaz is completing streambank restoration to reduce 108 lbs/year of phosphorus entering surface waters. Implementation of the MDV watershed plan, dated January 29 2026, will become a permit requirement, referenced was MDV-2026-01 in the reissued permit.

Public comment on this decision will be solicited at the time of permit reissuance after which a final decision will be made. The Department appreciates your attention and interest in Wisconsin's multi-discharger phosphorus variance. Should you have further questions regarding this matter, please contact me at (608) 400 – 5596 or by email at [matthew.claucherty@wisconsin.gov](mailto:matthew.claucherty@wisconsin.gov).

Sincerely,

Matt Clacherty, MDV Point Source Coordinator  
Bureau of Water Quality

e-cc David Huth, Village of Boaz  
Carson Hackett, Davy Engineering  
Betsyjo Howe, WDNR  
Jennifer Jerich, WDNR  
Tanner Connors, WDNR  
Michelle Woods, EPA Region 5  
Tim Elkins, EPA Region 5

**MDV WATERSHED PLAN  
WASTEWATER TREATMENT LAGOON  
BOAZ, WI**



**REVISED JANUARY 29, 2026**

**1690-005.010**

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## **1 EXECUTIVE SUMMARY**

The WPDES Permit for the Boaz wastewater treatment plant (WWTP) proposes a future phosphorus effluent limit of 0.075 mg/L. The current limit is 3.7 mg/L and the WWTP averaged an effluent TP of 2.5 mg/L from 2020-2025. The 2024 Final Compliance Alternatives Plan (Facility Plan) proposes complying with the WPDES permit by implementing Water Quality Trading (WQT) to offset the phosphorus mass from 2.5 mg/L to the 0.075 mg/L final WQBEL. The Village of Boaz has identified some credits, but not enough credits have been found to satisfy a full WQT. A Multi Discharge Variance (MDV) Watershed Plan is proposed.

From 2020-2025, the average annual discharge from the Boaz WWTP averaged 2.695 MG/year which will be used for calculating the credits required for Water Quality Trading (WQT). The annual average design flow for the WWTP is 0.015 MGD, or 5.475 MG/year. The WWTP operates well below the design capacity.

The WPDES phosphorus limit is currently 3.7 mg/L. From 2020-2025, the effluent phosphorus concentration averaged approximately 2.5 mg/L. At the Average Annual Discharge, the effluent phosphorous mass loading at 2.5 mg/L is 57 lbs/year. At the same 2.695 MG flow, the future final limit of 0.075 mg/L will reduce the allowable phosphorous mass loading to 1.7 lbs/year, a reduction of 55 lbs/year, which is the base trade amount.

If the MDV Watershed Plan is applied, the effluent target limit of 0.2 mg/L would result in a required discharge mass load of 52 lbs/year using the same annual average flow of 2.695 MG and average effluent phosphorus of 2.5 mg/L.

The MDV Watershed Plan recommends implementing the streambank restoration projects described herein, on property owned by private landowners to obtain enough offset credits to meet the MDV threshold of 0.2 mg/L, at the annual average discharge flow. Future projects will be developed to ultimately meet the full water quality trade (WQT) for the at the determined trade ratio. A separate report will detail those projects.

## **2 BACKGROUND SUPPORTING THE WATER QUALITY TRADE PLAN**

### **2.1 Purpose of Water Quality Trading**

The purpose of this WQT Plan is to describe how the Boaz WWTP will utilize WQT to comply with the phosphorus limits of WPDES permit WI-0036749-06-0, which expired on March 31, 2025. WQT will require Water Quality Trade Agreements with the landowners. The agreements are being developed pursuant to a Notice of Intent (form 3400-206) to conduct WQT. The Notice of Intent (NOI) was filed in November 2024 and is included in **Appendix 2-1**. The County Land Conservation Department is assisting in obtaining trade agreements.

### **2.2 Background of the Total Phosphorous Permit Requirements for the WWTP Outfall**

The WWTP outfall is located at Mill Creek (Mill & Indian Creek Watershed, LW10 – Lower Wisconsin River Basin) and is authorized to discharge through WPDES permit WI-0036749-06-0. The permit is effective from April 1, 2020, to March 31, 2025. The phosphorus limits in the Permit are summarized as follows:

- April 1, 2020, to March 31, 2025                      3.7 mg/L
- March 31, 2025, to June 30, 2030                      0.075 mg/L

The existing Permit does not include a Phosphorus Variance but a variance may be requested within 60 days of the next permit reissuance. The Village has requested a variance to continue with the

current limit of 3.7 mg/L, allowing time to implement WQT projects to achieve final compliance with the stringent, final 0.075 mg/L limit.

### **2.3 Location of WWTP Outfall**

The outfall discharges to Mill Creek, approximately 200 feet west of the WWTP. The outfall location is located directly west of the WWTP. It is approximately 900 feet west of Jackson Drive and approximately 700 feet southeast of Hill Road. This is in the Mill & Indian Creek Watershed of the Lower Wisconsin River Basin in Richland County. Mill Creek flows to the south and discharges to the Wisconsin River approximately 9 miles south of the Boaz WWTP outfall location. See **Appendix 2-2** for the Boaz WWTP Outfall Location Map.

### **2.4 Location of Restoration Project in Comparison to the WWTP Outfall**

Richland County identified seven (7) WQT projects which are located on Mill Creek, the East Branch Mill Creek, and Core Hollow Creek, all upstream of the WWTP. The seven sites for streambank restoration projects are on the Halink, Killoy/Village View Dairy, Newberry, Eness, Olson, Luttig, and Barelli (BFF Real Estate LLC) properties. See **Appendix 2-2** for a location map of the seven locations relative to the WWTP outfall.

## **3 DESCRIPTION OF EXISTING LAND USES IN VICINITY OF WQT PROJECTS**

### **3.1 Mill Creek, East Branch of Mill Creek, & Core Hollow Creek**

Mill Creek is 15.45-mile long creek and is designated as a Class II trout stream above Boaz and is considered exceptional resource water. The East Branch of Mill Creek is a 5.41-mile long creek and is designated as a Class II trout stream with natural reproduction of brook and brown trout. Core Hollow Creek is a 3.4-mile long creek that is tributary to Mill Creek. Mill Creek and the East Branch of Mill Creek are both ranked high for nonpoint source pollution reduction and are listed as impaired due to phosphorus.

The streams are all within Richland County. Mill Creek is considered a Cool-Cold Mainstem, Cool-Cold Headwater under the state's Natural Community Determinations. The East Branch of Mill Creek is considered a Cool-Cold Mainstem, Cool-Cold Headwater under the state's Natural Community Determinations. Core Hollow Creek is considered a Cool-Cold Headwater stream. Per the WI DNR Surface Water Data Viewer website, "This watershed is ranked High for runoff impacts on streams, Low for runoff impacts on lakes and High for runoff impacts on groundwater and therefore has an overall rank of High. This value can be used in ranking the watershed or individual waterbodies for grant funding under state and county programs. However, all waters are affected by diffuse pollutant sources regardless of initial water quality. Applications for specific runoff projects under state or county grant programs may be pursued."

Per the DNR Surface Water Data Viewer website under Watershed Characteristics, "Mill Creek, (East Branch Mill Creek, and Hollow Creek) are located in the Mill and Indian Creeks watershed which is 130.32 mi<sup>2</sup>. Land use in the watershed is primarily forest (53.20%), grassland (22.40%) and a mix of agricultural (19.20%) and other uses (5.10%). This watershed has 313.19 stream miles, 179.45 lake acres and 1,834.87 wetland acres."

The main soil types at the project sites are identified as Churchtown Silt Loam and Orion Silt Loam, see **Appendix 3-1** for the Soils Map.





Figure 2: Halink Sites along East Branch of Mill Creek (CTH Z).

**Killoy/Village View Dairy (2 sites)**



Figure 3: Killoy / Village View Dairy Sites along Mill Creek.

**Eness (1 site)**



Figure 4: Eness Site along Mill Creek.

**Olson (3 sites)**



Figure 5: Olson Sites along Core Hollow Creek north of STH 14/61.

**Newberry (8 Sites)**



*Figure 6: Newberry Sites A-F along East Branch Mill Creek.*

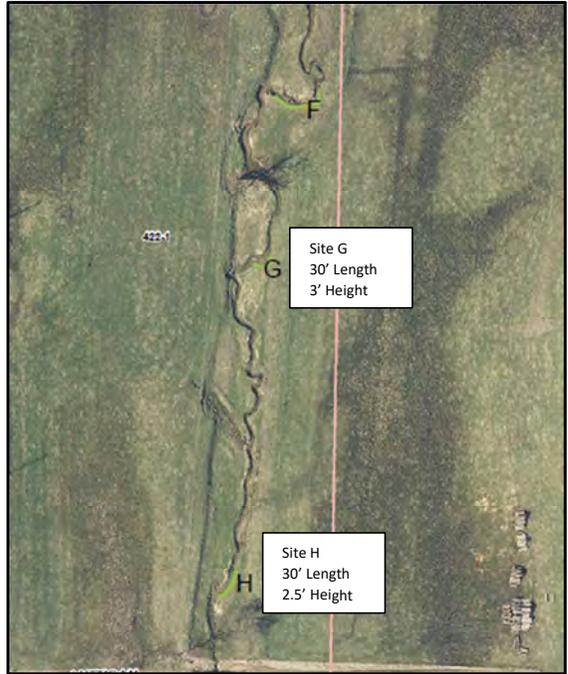


Figure 7: Newberry Sites G-H along East Branch Mill Creek.

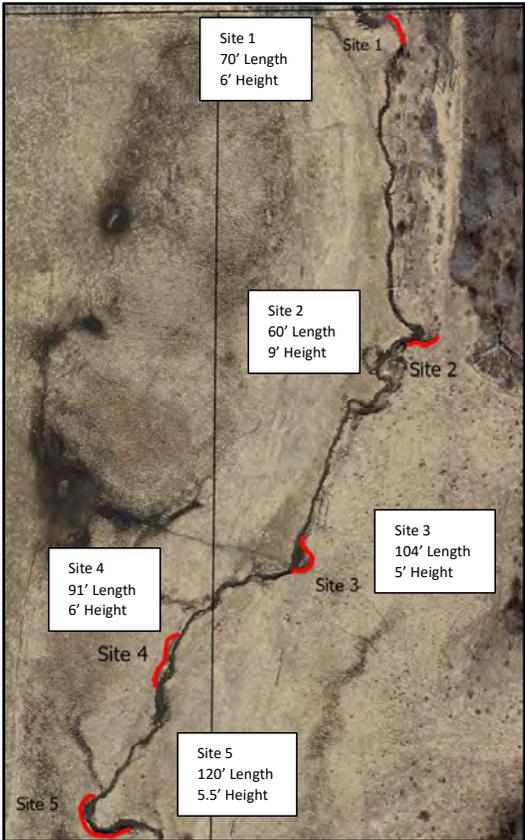


Figure 8: Luttig Sites 1-5 along East Branch Mill Creek.



Figure 9: BFF Real Estate Sites 1-3 along East Branch Mill Creek.

#### 4 MANAGEMENT PRACTICES USED TO GENERATE CREDITS

##### Streambank Stabilization

There is approximately 2,300 feet of streambank to stabilize between the seven identified sites. The projects were chosen as good sites to generate WQT credits through bank stabilization BMPs, as these sections of streambank are where very high-velocity waters rapidly erode the banks during flood events. Recession rates vary between each of the sites ranging from 0.1 to 0.5 feet per year, but over the last few years these sites have lost many feet of streambank during flood events, according to the property owners. The method for determining the recession rate is defined by NRCS, see **Appendix 4-1** for the NRCS recession rate reference material used. A visual inspection of the streambanks showed bare banks with noticeable vegetative overhang. **Appendix A** shows photographs provided by Richland County for each of the streambank sections. Each section was field measured by the Richland County LCD to determine section length and eroded bank height. Photo evidence was used to estimate recession rates based on visual observations. These sites also have high levels of nonpoint source pollutants entering from farm practices. The County LCD determined that using riprap and vegetation on the creek banks to permanently armor the banks are the preferred BMPs for the bank erosion problems.

The proposed BMPs and approximate areas of streambank stabilization are shown in **Appendix 4-2**. The maps indicate the areas of riprap and/or vegetative cover, which are the proposed treatment techniques to eliminate erosion. Longer streambank sections will be stabilized by shaping and vegetative cover on sections with shorter bank heights. Streambanks where a tributary enters a mainstem stream, like on the

Killooy property, will be stabilized with a combination of riprap and vegetative cover. Areas where riprap is placed will also be provided with soil and vegetative cover overtop the riprap. The maps show proposed root wads and log deflectors to be constructed into the streambanks to provide trout habitat. In sections where only root wads are proposed, a series of 3-5 root wads will be placed together to create a root wad complex where habitat currently does not exist.

#### **4.1 Duration of Management Practice**

The duration of the streambank restoration management practice can be 50+ years if maintained properly and no extreme wet weather events occur. The construction will require shaping of the streambank and placement of properly sized riprap with revegetation of the site. The landowner will enter into an agreement with the County and the Village, which requires the landowner to maintain the streambank protection. The operation and maintenance are discussed in more detail in Section 13 of this plan.

#### **4.2 Description of Best Management Practices Used**

The streambank stabilization BMPs will be implemented at each project site and designed by the County LCD following the NRCS 580 Code. The bends where higher tractive forces are required to maintain vegetation will implement riprap armor. The design will follow NRCS standards by including geotextile fabric under the riprap and properly sized stones. The BMPs will be designed such that the riprap should not migrate due to the flow of the stream. Vegetated cover will be used in low-risk areas. Habitat enhancement features will be implemented into the design as each project is located on a Class II trout stream.

### **5 AMOUNT OF CREDIT BEING GENERATED**

This Water Quality Trading Plan is to trade for the pollutant of phosphorus. Throughout the year, sediment is transported in the stream from erosion of the streambanks. The sediment contains phosphorus, which causes poor water quality. NRCS has developed a spreadsheet that estimates the annual runoff of erosion from an impaired streambank, gully, and ephemeral gully. The estimated annual sediment volume is converted to an amount of phosphorus based upon the percent of leachable phosphorus in the soil, as determined by soil sample testing results. After installing BMPs, such as revegetation of a streambank or an armored riprap streambank, the sediment transport from the erosion has been theoretically eliminated. The estimated existing amount of annual phosphorus due to erosion can be calculated to determine the amount of credit generated by the BMPs.

Calculations show that an estimated 108 pounds of phosphorus per year would be prevented from entering Mill Creek, the East Brank of Mill Creek, and Core Hollow Creek by constructing the BMP projects. See **Appendix 5-1** for the Phosphorus Loss Calculations.

Additional credit can be generated in future with a "Habitat Adjustment" on the streambank restoration projects as further described in Section 6.5.

### **6 DESCRIPTION OF APPLICABLE TRADE RATIO PER AGREEMENT/MANAGEMENT PRACTICE**

This watershed plan is part of the Multi Discharger Variance (MDV) submittal package. The intent of this watershed plan in conjunction with the MDV is that the trade ratios will be 1:1 during the permit term. During the first permit term, the Village will continue to work with the County or others to identify additional WQT projects to develop for additional phosphorus credits. The intent is that the Village will eventually go into a full WQT to maintain a 3.7 mg/L effluent limit at the WWTP.

The Wisconsin Department of Resources will make the ultimate decision on the Trade Ratio to be applied to the project. The estimated ratio is derived from the following formula:

$$\text{Trade Ratio} = (\text{Delivery} + \text{Downstream} + \text{Equivalency} + \text{Uncertainty} - \text{Habitat Adjustment}):1$$

### **6.1 Delivery Factor**

The delivery factor is determined by the following equation:

$$\text{Delivery Factor} = (1 / \text{SPARROW delivery fraction}) - 1$$

The SPARROW delivery fraction is determined by a model developed for the USGS. The WDNR has implemented the Sparrow trade factors onto the Surface Data Viewer on their website. Upon review of the website the delivery factor was not shown to be a 1:1 ratio (a zero in the trade ratio equation). The delivery fraction for the credit user site at the WWTP is 0.95.

#### **Mill Creek, East Branch of Mill Creek, & Core Hollow Creek.**

The credit user and most of the credit generators are in the same HUC 12 basin. The credit generators are upstream of the credit user. The distance along Mill Creek is approximately 3.75 miles from the furthest credit generator project site (Newberry) to the credit user discharge point (outfall) at Mill Creek. Per the *Guidance for Implementing Water Quality Trading in WPDES Permits*, the Delivery Factor in Section 3.4 states “The delivery factor accounts for the distance between trading partners and the impact that this distance has on the fate and transport of the traded pollutant in surface waters” (pg. 26). The delivery factor is often zero when in the same HUC 12, see **Appendix 6-1** for the HUC 12 Watershed Basin Map. The site for the Mill Creek project is within the same HUC 12. The discharge point of the credit user is downstream of the credit generators.

The delivery fraction for the credit user is 0.95. The delivery factor for each project site was determined using the calculations described in Appendix G of the *Guidance for Implementing Water Quality Trading in WPDES Permits*. The delivery factor for each of the project sites is as follows:

Site	Delivery Fraction	Delivery Factor
Halink	0.95	0
Killoy / Village View Dairy	0.95	0
Newberry	0.91	0.09
Eness	0.95	0
Olson	0.95	0
Luttig	0.91	0.09
Barelli (BFF Real Estate LLC)	0.91	0.09

Most of the WQT projects have the same delivery fraction as the credit user, therefore the delivery factor is 0. The Newberry, Luttig, and Barelli properties have a delivery fraction of 0.91 and a delivery factor of 0.09.

The Delivery Factor is zero (0) for all other sites.

### **6.2 Downstream Factor**

The DNR WQT Guidance (2020) states, “The downstream factor is used to help prevent a violation of water quality criteria in the receiving water between the credit user and generator.” (pg. 27). The downstream factor is only measured when the credit generator is downstream of the credit user. If the credit generator is upstream of the user, then the downstream factor is zero.

The credit generators are all upstream of the credit user (WWTP); therefore, the downstream factor is eliminated from the trade equation.

The Downstream Factor is zero (0) for all sites.

### **6.3 Equivalency Factor**

The WQT for the credit user is based upon total phosphorus (TP). According to the Guidance for Implementing Water Quality Trading in WPDES Permits (6/1/2020), when accounting for the equivalency factor for TP, the equivalency factor is zero. This is because the differences between the soluble and sediment-bound P have been accounted for in the delivery factor (pg. 28).

The Equivalency Factor is zero (0).

### **6.4 Uncertainty Factor**

The uncertainty factor is used to compensate for the uncertainty of the effectiveness of the WQT project/plan. The uncertainty, especially with non-point discharges, is because many factors which are not controllable determine the effectiveness of the implementation, such as climate, potential inaccuracies from field testing or the reliability of the management practice to perform under various hydrological conditions. The WDNR has established a table to help assign values to the uncertainty variable of the equation. The table is on pages 149-152 in Appendix H of the *Guidance for Implementing Water Quality Trading in WPDES Permits*.

#### **6.4.1 Bank Stabilization**

For bank stabilizations, WDNR has assigned a value of a two (2) with aquatic habitat restoration (this accounts for the subtraction of the habitat adjustment) and a three (3) without aquatic habitat restoration; therefore, this project has an uncertainty value of three (3). The habitat adjustment will be described and implemented in the following section.

The Uncertainty Factor is three (3).

### **6.5 Habitat Adjustment**

#### **Mill Creek, East Branch of Mill Creek , & Core Hollow Creek.**

The habitat adjustment factor results from the habitat restoration discussed in Section 6.4 above. To be eligible to claim credit for habitat restoration, the surface water where the project work is taking place must be listed by WDNR as an impaired water body due to the pollutant which the credit user is attempting to mitigate.

Per the WDNR Surface Water Data View website, Mill Creek, the East Branch of Mill Creek, and Core Hollow Creek are considered an impaired system due to phosphorus. The total phosphorus data for each stream exceeds the WisCALM listing criteria for Fish and Aquatic Life use. Because the total phosphorus exceeds the WisCALM criteria, these streams qualify for the Aquatic Habitat Adjustment.

In order to obtain habitat adjustment, habitat best management practices must be implemented and established as part of the project. Per Appendix H of the Guidance for Implementing Water Quality Trading in WPDES Permits, the uncertainty factor for Mill Creek and the East Branch of Mill Creek can be reduced from a three (3) to a two (2) with aquatic habitat restoration. Restoring aquatic habitat can come in many forms.

The following habitat structure alternatives are from the NRCS Companion Document 580-15, Engineering Field Handbook Notice 210-WI-119 (February 2009).

- **Random Boulder Placement.** This type of structure is placed within the streambed and will create micro habitat for several species of fish, but primarily it benefits trout. Boulders will create mini scour holes, but care needs to be taken with the placement of the boulders, because if they are placed ineffectively then the currents can be deflected toward the streambanks causing erosion.
- **Cross-Channel Logs.** Logs and rock placed perpendicular to the stream flow create a pool area (scour holes) which provides habitat for all species of fish and can potentially provide for snakes and turtles as well. This practice is best situated downstream of a riffle area and fit best for slow moving areas within the stream. The rock will need to be hauled to the site and the layout needs to be precise; therefore, the installation can be labor intensive which drives up the cost.
- **Trout Lunker & Mini-Trout Lunker.** Lunkers are a built habitat, intended to benefit trout. Lunkers is essentially a shelter on the side of the stream bank. These structures are best suited for corners and stream bends but can be placed anywhere if there is enough stream velocity to prevent sedimentation build up within the structure. These structures need to be incorporated during the streambank stabilization work, as the habitat is incorporated into the bank.
- **Root Wads.** Root wads are a structure placed at the bank toe to provide additional microhabitat and cover for several species including fish, amphibians, and reptiles. Root wads provide toe support for bank revegetation and collect sediment and debris that will enhance the streambank structure over time. Root wads are comprised of approximately 10' long tree trunks (boles) buried into the streambank with treetops removed. Boles are placed perpendicular to the flow channel with root fans still attached and oriented parallel to the channel. Due to their size, root wads typically require the use of heavy equipment for collection, transport, and installation.

Habitat structures will be included in the proposed projects to lower the trade ratio when converted to WQT in the future. A DNR fish biologist was contacted to discuss which structures are suitable for the present trout populations and the appropriate locations for the structures. A copy of the DNR fish biologist correspondence is included in **Appendix 6-2**.

On Mill Creek, the recommended option is to use large root wads in deeper sections to provide fish habitat where the only habitat seems to be overhanging vegetation and downed trees. A survey was completed in 2025 along the mainstem of Mill Creek which indicated only Brown Trout.

Both Core Hollow Creek and the East Branch of Mill Creek contain mixed populations of both Brook and Brown Trout. The unnamed tributary that flows into East Branch Mill Creek has high natural reproduction of Brook Trout. DNR recommends in stream wooded habitat and to avoid overhead bank structures such as lunkers that may give Brown Trout the advantage. Brook Trout benefit more from smaller woody structures such as log deflectors and smaller root wads.

The locations of the proposed fish habitat structures are shown in the BMP location map in **Appendix 4-2**. The BMPs will incorporate root wads to provide trout habitat, with larger root wads along the mainstem of Mill Creek and smaller root wads along the East Branch of Mill Creek and Core Hollow Creek.

The Habitat Adjustment is one (1), a credit to the Uncertainty Factor.

Table 6.1 below summarizes the calculated Trade Ratios for the Boaz WQT Projects.

**TABLE 6.1: WATER QUALITY TRADING FACTORS**

	Project	Delivery Factor	Downstream Factor	Equivalency Factor	Uncertainty Factor	Habitat Adjustment	Trade Ratio
1	Halink	0	0	0	3	-1	2
2	Killoy/Village View Dairy	0	0	0	3	-1	2
3	Newberry	0.09	0	0	3	-1	2.09
4	Eness	0	0	0	3	-1	2
5	Olson	0	0	0	3	-1	2
6	Luttig	0.09	0	0	3	-1	2.09
7	Barelli (BFF Real Estate LLC)	0.09	0	0	3	-1	2.09

**Core Hollow Creek Reforestation Plan.**

The Olson property along Core Follow Creek will require a riparian reforestation plan along the stabilized streambanks to provide overhead canopy cover and shade for brown and brook trout populations. DNR recommends planting of central hardwood trees such as swamp white oak, burr oak, or red oak. Per the soils map of the Olson project areas, soils are primarily Orion silt loam which are occasionally flooded and poorly drained. Swamp white oak is most suitable for poorly drained soils and is ideal for lowland areas near streams.

Locations of proposed swamp white oak saplings to be planted along Core Hollow Creek are shown in Appendix 4-2 with the other fish habitat improvements.

**7 LOCATIONS WHERE CREDITS WILL BE GENERATED**

All the credits will be generated in the same HUC 12 as the Boaz WWTP. Mill Creek, the East Branch of Mill Creek, and Core Hollow Creek will be used to generate credits in this plan.

**Mill Creek, East Branch of Mill Creek, and Core Hollow Creek.**

The multiple project sites are best described as streambanks on the three streams. The project has been broken into seven sites, with 26 separate sections. Halink has four sites of lengths 30, 75, 75, and 90 feet. Killoy/Village View Dairy has two sites of lengths 210 and 240 feet. Newberry has eight sites that are 25, 35, 25, 30, 32, 43, 30, and 40 feet in length. Eness has one 500 foot site. Olson has three sites of lengths 86, 123, and 93 feet. Barelli (BFF Real Estate) has three sites of lengths 50, 65, and 70 feet. Luttig has 5 sites of lengths 70, 60, 104, 91, and 120 feet. The locations of each of these sites is shown in **Appendix 2-2**. Aerial views of each site are shown in Section 3.1.

**8 TIMELINE FOR CREDITS AND AGREEMENTS**

Construction of the BMPs must be completed before credits are generated. The credit generation must occur before the credit user can claim the credit, per the *Water Quality Trading How To Manual* (pg. 32). Construction is planned for 2026 or 2027. Credits will be available later in 2026 following completion of construction. A tentative schedule is shown as follows:

Description	Date
Submit Revised MDV Report to DNR	February 2026
DNR Comments/MDV Report Approval	February 2026
Begin Design and Chapter 30 Submittals*	March 2026
Submit Chapter 30 Submittals*	May 2026
DNR Approve Chapter 30 Permits*	July 2026
Solicit Contractors for Construction*	March 2027
Begin Construction*	May 2027
Complete Construction*	September 2027
Identify Additional WQT Projects	Ongoing

\*Indicates applicable for all projects.

DNR will be informed upon completion of the projects. While performing as designed, the streambank stabilization BMPs will continue to generate credit on an annual basis. Regular inspection and maintenance of the BMPs is necessary to confirm the projects remained stabilized and are free from damage.

The three-party WQT Agreements with the Village of Boaz, the County LCD and the landowners are included in **Appendix 8-1**. This includes draft agreements for Luttig and Barelli which are in the process of being signed and executed.

## 9 **METHOD FOR QUANTIFYING CREDITS**

### **Streambank Stabilization.**

Existing phosphorus loss for the streambank project areas were produced using the NRCS Soil Loss Spreadsheet recommended by the DNR, which can be seen in **Appendix 5-1**. Richland County LCD representatives collected data for the streambank project, including the linear feet and the average stream bank height in feet. Composite soil samples were collected for testing for total soil phosphorus concentration (% P) (see **Appendix 9-1** for soil test lab report from the University of Wisconsin Soil Science Laboratory) to determine the phosphorus loss in pounds per year. Soil samples were collected throughout 2023 and in 2025. Soil samples were gathered by taking a number of individual grab samples and combining them into one composite soil sample. The average % P over the samples varies between the sites. In total, the projects would withhold **108 pounds of phosphorus** from entering Mill Creek, the East Branch of Mill Creek, and Core Hollow Creek each year that riprap is in place. The 26 individual sites were calculated separately and added together to determine the total pounds of phosphorus prevented from eroding.

To specify further, soil samples were collected by the Richland County Land Conservation Department using the protocol developed in the WQT Guidance:

*"Soil Sampling Protocol By measuring length, width, and lateral recession rate of an erosion site, the amount of soil entering a stream can be determined. Once the phosphorus concentration of the soil is known, the amount of phosphorus entering a stream can be calculated. Composite soil samples must be taken to represent an average phosphorus concentration for each site. Subsamples should be taken from each soil horizon, ensuring that variability in soil texture is captured, then combined into one composite sample per site. Mix, bag, and transport samples in accordance with lab procedures. Samples must be analyzed for total phosphorus. This is also known as total leachable P or P2O5. The Bray-1 soil or other soil phosphorus tests are inappropriate for this purpose and will underestimate total phosphorus contributions resulting from erosion. Samples should be analyzed at a certified laboratory."*

Samples were taken at numerous locations along the streambanks from the toe to the top of bank using a soil probe. Samples were taken from about 4-6 inches into the bank. Each of these samples were combined in a bucket to create the composite soil sample.

The recession rate varies greatly between each site and was determined based on visual observation of the severity of erosion and compared to the chart in in **Appendix 4-1**. A recession rate of 0.5 was determined for some of the sites which indicates severe or very severe recession. These sites had bare banks with noticeable vegetation or tree roots overhanging and exposed. Some locations are also nearly vertical due to the high erosion. Other sites had recession rates ranging from 0.1-0.3 and were not as severe as other sites but still had evidence of predominantly bare banks with some vegetative overhang.

## **10 TRACKING PROCEDURES**

This project will be tracked with photography before, during, and after BMP installation. The project will also be monitored with inspections and documented in a logbook, to ensure the preservation of the project site and BMP installations. The landowner will inspect the bank stabilization site after flood events and annually. The Richland County Land Conservation Department will annually inspect the sites to document that the banks are stable, and phosphorus was prevented from entering the water each year. At that time, the County will note debris that may have gathered in the stream and make assessments as to whether the debris is impeding flow or has become a fish habitat. The impeding debris will be removed, as discussed in Section 13. Inspection reports will include the following:

- Inspection date
- Name of inspector
- Condition of structural practices
- Condition of vegetation
- Condition of habitat features
- Photo(s) of each project site
- Presence of erosion
- Issues identified
  - How/when will be addressed
  - Verification of completion
- Recommendation to prevent issues in future

Inspections will be conducted annually each fall via visual inspection of the lengths of the banks and habitat features. Inspection will consist of checking the condition of riprap, vegetation, habitat features, and determining if any damage has occurred. Inspection will also include the condition of trees planted as part of the reforestation. Photo documentation of the inspections will be required. The county will notify the Village and landowner of any damage and request a timeline of repairs.

Any failures of the BMPs observed by the landowner will require them to notify the County LCD and Village. DNR will also be notified by Village. County and landowner are required by the trade agreement to develop a remediation action plan.

## **11 CONDITIONS UNDER WHICH THE MANAGEMENT PRACTICES MAY BE INSPECTED**

The BMP should be inspected immediately after flood events and at least once per year. The velocity of the streams increases greatly during flood events, and portions of the streambanks have been eroding during heavy rains. The landowners should work with the Richland County LCD to ensure that these sites are properly maintained and should obtain County LCD technical assistance if there are any concerns regarding the projects. Also, DNR personnel should be allowed access to the site for inspections.

## **12 REPORTING REQUIREMENTS SHOULD THE MANAGEMENT PRACTICE FAIL**

If the BMPs were to fail at these sites, the landowners should immediately report the situation to the Richland County LCD and Village of Boaz to develop a remediation action plan as required by the trade agreements. Village will notify DNR of any BMP failures.

## **13 OPERATION AND MAINTENANCE PLAN FOR EACH MANAGEMENT PRACTICE**

### **13.1 Bank Stabilization**

NRCS Standards will be followed for construction as well as operating and maintenance of the proposed projects. Bank stabilization projects will follow NRCS 580 for streambank and shoreline protection. A copy of the NRCS 580 standard is shown in **Appendix 13-1**. Maintenance of the BMPs is the responsibility of the landowners with technical assistance from the Richland County LCD. Ultimately, the Village is responsible for ensuring practices are maintained and erosion is not occurring. Maintenance will consist of the following:

1. Inspect riprap annually and after heavy storms for any erosion or displacement of rocks. Repairs should be made immediately.
2. Debris will be removed to prevent clogging or rerouting of water in the channel. Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall only be performed when they are causing or could cause unacceptable bank erosion, flow restriction, or damage to structures. Habitat forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to the extent possible.
3. Check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and re-vegetated as soon as possible.
4. Periodically cut grass to control weeds and invading brush.
5. Restore or add riprap as needed.
6. Eliminate burrowing animals and repair damage.
7. Document BMPs with photographs.

### **13.2 Rotational Grazing & Stream Crossing**

Streambank projects on properties with presence of livestock will be required to follow a rotational grazing NRCS 528 standard which is included in **Appendix 13-2**. None of the properties have plans to reduce livestock. Stream crossings will be installed on the Killoy/Village View Dairy, Newberry, Luttig, Olson, and Barelli (BFF Real Estate) properties to allow livestock access into creeks while also preventing cattle from damaging the newly stabilized streambanks. The NRCS standards will be followed for construction as well as operation and management of the stream crossings. Crossings will follow NRCS 578, which is for stream crossings to provide controlled access for people, livestock, equipment, or vehicles. A copy of the NRCS 578 standard can be seen in **Appendix 13-3**. Maintenance of the stream crossing will be the responsibility of the landowner with technical assistance from the Richland County LCD. If livestock continue damaging streambanks, fencing must also be used to prevent cattle activity on streambanks. The operation & maintenance will consist of the following:

1. Ensure rotational grazing plan is implemented and followed to deter livestock from streambanks. Grazing management shall be managed in accordance with NRCS Standard 528.
2. Minimum forage height shall be 6-8 inches before livestock begin grazing a paddock.
3. Grazing shall be terminated when forage reaches a height of 2.5-3 inches.
4. If fencing is installed, ensure that fencing is in place and undamaged to restrict livestock from entering stabilized streambank areas. Repair damaged fencing immediately when identified.
5. Document BMPs with photographs.

Following is a summary of animal units per acre for properties with livestock present. Estimates of animal units were provided by the Richland County Land Conservation Department. The number of animal units on each property are not expected to fluctuate significantly over the next 5-year period.

Property	No. of Animals	Area (ac)	Animal Units/Acre
Barelli (BFF Real Estate LLC)	5	15.5	0.32
Luttig	14	33.1	0.42
Newberry	45	50.1	0.89
Olson	60	41.5	1.33
Killoy (Village View Dairy)	25	20.1	1.24

DNR personnel will be allowed access to all project sites for inspections with advanced written notice provided to the Village of Boaz, Richland County LCD, and individual property owners.

### **13.3 Reforestation Plan**

Tree establishment on the Olson property along Core Hollow Creek shall be monitored during annual inspections. In the event of a tree which has been planted as part of this WQT plan falls over, dies, or has been removed for any reason will be required to be replaced immediately with a tree of the same species.

## **14 LOCATION OF CREDIT GENERATOR IN PROXIMITY TO RECEIVING WATER AND CREDIT USER**

The seven (7) WQT project locations are located directly upstream of and in the same HUC 12 watershed as the Boaz WWTP outfall discharge to Mill Creek. See **Appendix 2-2** for a Location Map showing project locations and the WWTP discharge.

## **15 PRACTICE REGISTRATION DOCUMENTS, IF AVAILABLE**

The construction of the BMP projects has not yet begun. Registration documents will be completed by the County and submitted to the DNR upon completion of construction anticipated in 2027 depending on the timeline for design completion and obtaining construction permits.

## **16 HISTORY OF PROJECT SITE(S) AND EXISTING LANDS**

**Appendix A** shows site photographs for all of the proposed projects listed below.

**Halink.** This project site is privately owned by the Halink family. Based upon aerial imagery through Google Earth, the project site appears to have been cropland as long as Google Earth has maintained imagery (1992). The streambanks of Mill Creek have seen an exponential increase of erosion problems due to an increasing number of flood events and heavy rainfalls, which is evident in the photographs seen in **Appendix A**. Mill Creek forms the eastern boundary line of Sites 1 and 2, with the remaining property being cropland. Sites 3 and 4 are along the East Branch of Mill Creek with the surrounding area being cropland.

**Killoy/Village View Dairy.** This project site is privately owned by the Killoys and is operated as a small dairy farm. Based upon aerial imagery, the project site appears to have been pastured for decades. Mill Creek and Core Hollow Creek both flow through the property. The area surrounding the Killoy property is entirely cropland.

**Newberry.** This project site is privately owned by the Newberry family. Based upon aerial imagery, the project site appears to have been pastured since at least 1992. The East Branch of Mill Creek bisects the property which is presently pastured.

**Eness.** This project site is privately owned by the Eness family. Based on discussions with the property owner, the property appears to have been cropland since at least the 1980s. Mill Creek forms the eastern property boundary. The adjacent areas west and south of the property are entirely cropland.

**Olson.** This project site is privately owned by the Olson family. Based upon aerial imagery, the project site appears to have been cropland since at least 1992. Core Hollow Creek flows directly through the property and the area south of the property is entirely forested.

**Luttig.** This project site is privately owned by the Arthur Luttig Family Trust. Based upon aerial imagery, the project site appears to have been historically pastured. The East Branch of Mill Creek bisects the property which is presently pastured.

**Barelli (BFF Real Estate LLC).** This project site is privately owned by the BFF Real Estate LLC. Based upon aerial imagery, the project site appears to have been historically pastured. The East Branch of Mill Creek bisects the property which is presently pastured.

## 17 REQUIRED PHOSPHORUS CREDITS

At the 2020-2025 Average Annual Flow of 7,385 GPD (2.695 MG/year), the phosphorus mass loadings and the required WQT are summarized in the following Table 17.1:

**TABLE 17.1: REQUIRED PHOSPHORUS MASS OFFSET FOR WQT**

Description	Units	Quantity
Boaz Average Annual Flow (2020-2025)	MGD	2.695
Existing Effluent Phosphorus Concentration	mg/L	2.5
WQT Target Concentration	mg/L	0.075
Annual Mass of Phosphorus	lbs/year	57
WQT Target Mass of Phosphorus	lbs/year	1.7
<b>Baseline Mass (Existing - Target)</b>	<b>lbs/year</b>	<b>55</b>

The total credits generated from each site are summarized in the following Table 17.2:

**TABLE 17.2: TOTAL CREDITS GENERATED**

Project Description	BMP Type	Trade Ratio (TR)	P lbs/year	P/TR lbs/year
Halink	Streambank Stabilization	2	6.9	3.5
Killoy/Village View Dairy	Streambank Stabilization	2	41.1	20.6
Newberry	Streambank Stabilization	2.09	5.3	2.5
Eness	Streambank Stabilization	2	20.4	10.2
Olson	Streambank Stabilization	2	8.7	4.4
Luttig	Streambank Stabilization	2.09	8.3	3.9
Barelli (BFF Real Estate LLC)	Streambank Stabilization	2.09	17.5	8.4
<b>Total</b>			<b>108</b>	<b>53.5</b>

The WQT Projects will generate 108 lbs/year in P credits, less than what is required to meet the estimated trade ratios. Additional credits are needed for a full WQT. Based on Table 17.2, the Village needs to apply for the MDV and work with Richland County to identify future trade projects to meet the required credits for WQT. Table 17.3 shows the required phosphorus mass offset for the MDV to the target limit of 0.2 mg/L.

**TABLE 17.3: REQUIRED PHOSPHORUS MASS OFFSET FOR MDV**

Description	Units	Quantity
Boaz Average Annual Flow	MGD	2.695
Existing Effluent Phosphorus Concentration	mg/L	2.5
MDV Target Concentration	mg/L	0.2
Annual Mass of Phosphorus	lbs/year	56.5
MDV Target Mass of Phosphorus	lbs/year	4.5
<b>Baseline Mass (Existing - Target)</b>	<b>lbs/year</b>	<b>52</b>

Sufficient credits have been identified to comply with the MDV Watershed Plan requirements and will generate approximately 56 lbs/year more than required to meet the 0.2 mg/L target limit.

### **17.1 Summary**

The Boaz wastewater stabilization pond (lagoon) cannot meet the new phosphorus limits with the treatment method currently employed at the WWTP, as discussed in the Facility Plan. Water Quality Trading is the most cost-effective, environmentally sound solution to maintaining compliance with the new regulations. Because not enough credits have been identified, an MDV Watershed Plan using WQT phosphorus credits is proposed for now while the Village, in conjunction with Richland County LCD, identifies additional projects to satisfy a full WQT.

## **18 COMPLIANCE WITH WATER QUALITY TRADING CHECKLIST**

This Water Quality Trading Plan was produced in accordance with the Wisconsin Department of Natural Resources, Guidance for Implementing Water Quality Trading in WPDES Permits based upon Table 5 (Revised 2023, p. 45). Table 5 contains several columns of checklist items, but this plan must adhere to column (e), which states “credits are obtained from a construction project or implementation of a plan undertaken by the credit user for sources other than that covered by the credit user’s WPDES permit.” The Village of Boaz will be installing riprap bank stabilization at several locations to generate phosphorus credits for the WWTP.

Below is a list of the requirements to be included in a WQT plan per column (e) of Table 5 on page 45 of the WQT Guidance. This list includes a brief statement of where to find the information in this plan.

- Permittee’s / credit user’s WPDES Permit number. The Boaz WWTP WPDES permit number is WI-0036749-06-0 and is referenced in Section 2.
- Pollutants for which credits will be generated. Phosphorus, as discussed in Section 5.
- Amounts of credits available from each location / management practice / local governmental unit when acting as a broker. The estimated credits available is discussed in Section 17.
- Certification that the content of the trading application is accurate and correct. The certification is included in Section 19.
- Signature and date of the permittee’s / credit user’s authorized representative. The signature of the authorized representative is included in Section 19.

- Location where credits will be generated (i.e. map of site where management practice will be applied including major drainage ways from the project). The location where credits are generated are discussed in Section 7 and 14. A map is located in both Section 7 and **Appendix 2-2**.
- Identification of method(s) including management practice(s) that will be used to generate credits at each location. Streambank stabilization BMPs, discussed in Section 9.
- Duration of agreement (i.e. the design life of the management practice) with each credit generator. 20 years, discussed in Section 4.1.
- Schedule for installation / construction of each management practice. BMP construction in 2026, discussed in Section 8.
- Operation and maintenance plan for each management practice used to generate credits. The operation and maintenance plans are discussed in Section 13.
- Date when credits become available for each management practice (i.e. when practice is established and effective). The date when the credits become effective is in 2026 when projects are constructed and the permit is modified, and this date is referenced in Section 8.
- Models are used to derive the amount of credits using a scientific equation for phosphorus loss and is the approved spreadsheet from WDNR and NRCS. This is discussed in Section 9.
- The applicable trade ratio for each management practice including supporting technical basis (see p. 26 of the WQT Guidance). The applicable trade ratio is 2:1 and the technical basis and calculation of the trade ratio is discussed in Section 6. The habitat adjustment reduces the trade ratio to a 2:1, which is also discussed in Section 6.

## 19 CERTIFICATION OF WATER QUALITY TRADING PLAN

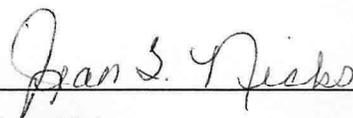
This plan was prepared by Davy Engineering Co., Inc. This Water Quality Trading Plan is complete, accurate and correct, to the best of our knowledge and belief.

Prepared By: Davy Engineering Co., Inc.

Owner: Village of Boaz

By:  \_\_\_\_\_

Carson R. Hackett, P.E.  
Project Engineer  
Davy Engineering Co.  
115 6<sup>th</sup> Street South  
La Crosse, WI 54601  
Telephone: 608-782-3130

By:  \_\_\_\_\_

Jean Nicks  
President  
Village of Boaz  
17010 STH 171  
Richland Center, WI 53581  
Telephone: 608-536-3466

## References

United States Department of Agriculture. (August 2011). *Stream Habitat Development, Companion Document 580-15*. Natural Resources Conservation Services. doi:EFH Notice 210-WI-122

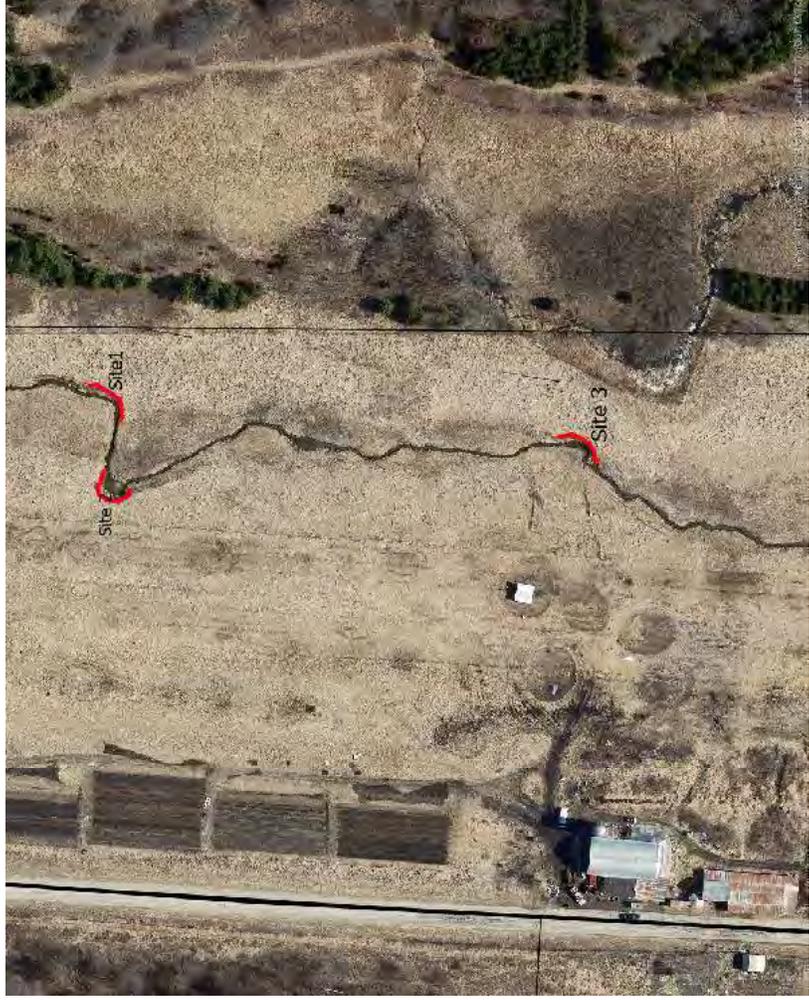
Wisconsin Department of Natural Resources. (2013). *A Water Quality Trading How To Manual*. doi:Guidance Number: 3400-2013-03

Wisconsin Department of Natural Resources. (2013). *Guidance for Implementing Water Quality Trading in WPDES Permits*. doi:Guidance Number: 3800-2013-04

# **APPENDIX A**

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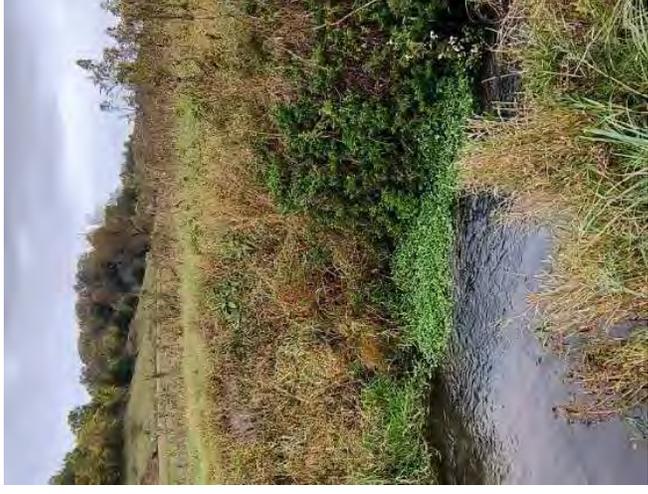
# Barelli (BFF Real Estate LLC) – 3 Sites



# Barelli – Site 1



# Barelli – Site 2



# Barelli – Site 3



# Luttig – 5 Sites



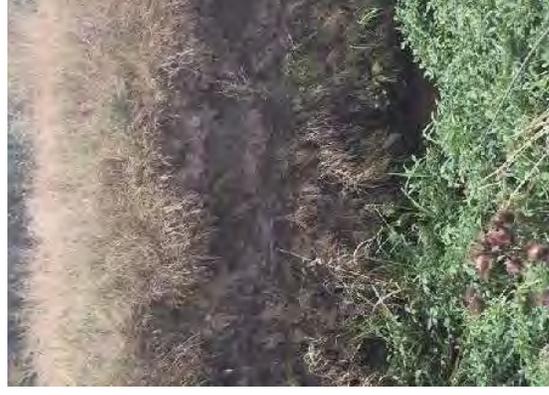
# Luttig – Site 1



# Luttig – Site 2



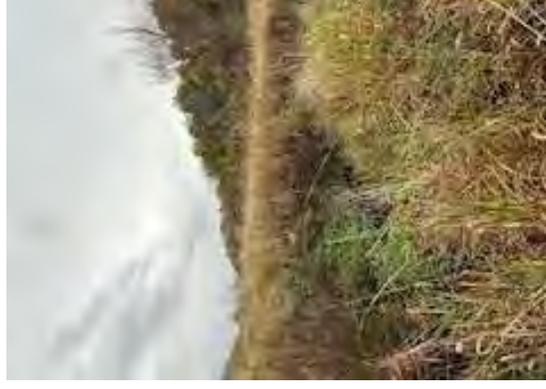
# Luttig – Site 3



# Luttig – Site 4



# Luttig – Site 5



# Newberry – 8 Sites



# Newberry – Site A



# Newberry – Site B



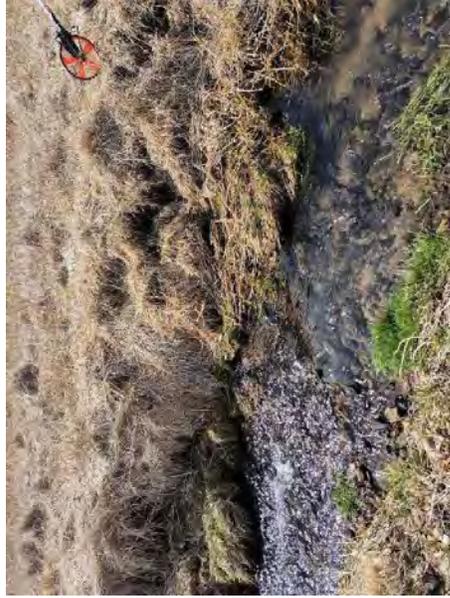
# Newberry – Site C



# Newberry – Site D



# Newberry – Site E



# Newberry – Site F



# Newberry – Site G



# Newberry – Site H



# Olson – 3 Sites



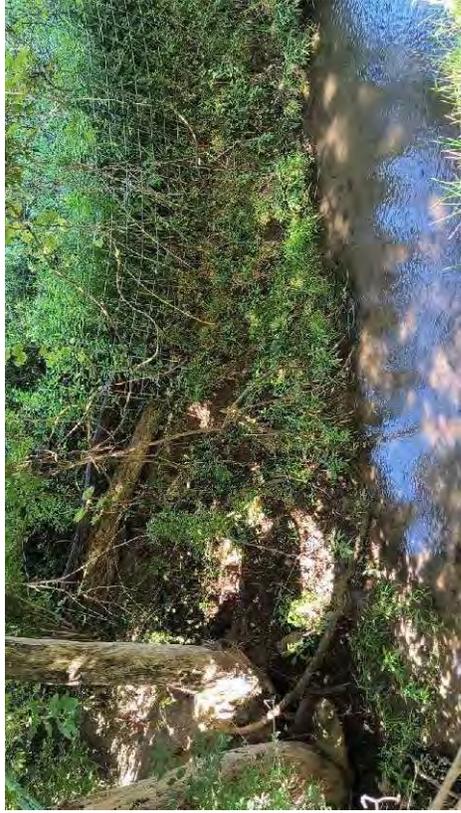
# Olson – Site 1



# Olson – Site 2



# Olson – Site 3



# Eness – 1 Site



# Eness – Site 1





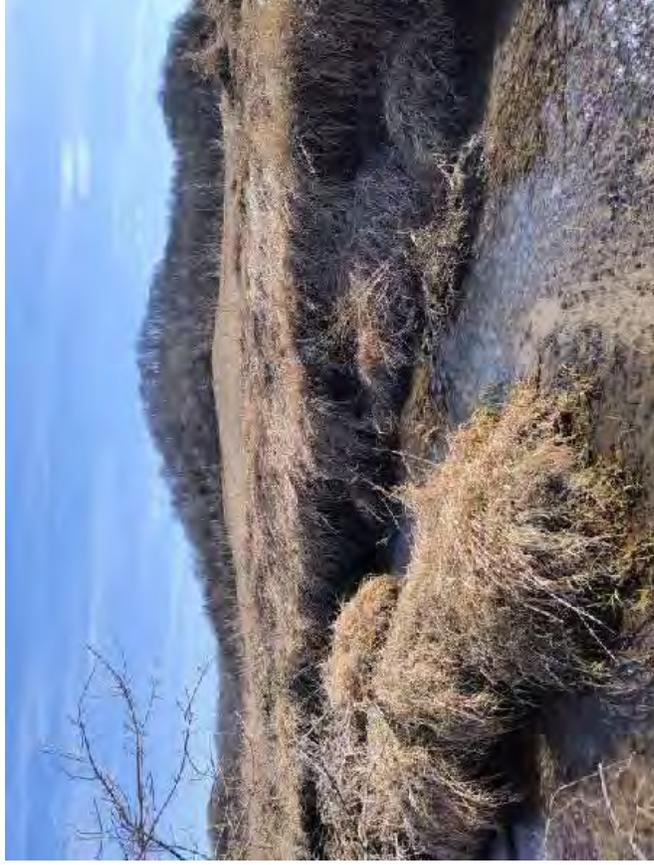
# Halink – Site 1



# Halink – Site 2



# Halink – Site 3



# Halink – Site 4



# Killoy/Village View Dairy – 2 Sites



# Killoy/Village View Dairy – Site 1



# Killoy/Village View Dairy – Site 2



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# **APPENDIX 2-1**

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

Applicant Information				
Permittee Name Village of Boaz		Permit Number WI- 0036749-06		Facility Site Number
Facility Address 26404 Jackson Road			City Boaz	State WI
Project Contact Name (if applicable) Susie Hauri			Address 17010 State Highway 171	City Boaz
			State WI	ZIP Code 53581
Project Name Village of Boaz Streambank Stabilization				
Receiving Water Name Mill Creek		Parameter(s) being traded Phosphorus		HUC 12(s) 070700051302

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

**Credit Generator Information**

Credit generator type (select all that apply):

<input type="checkbox"/> Permitted Discharge (non-MS4/CAFO)	<input type="checkbox"/> Urban nonpoint source discharge
<input type="checkbox"/> Permitted MS4	<input checked="" type="checkbox"/> Agricultural nonpoint source discharge
<input type="checkbox"/> Permitted CAFO	<input type="checkbox"/> Other - Specify: _____

Are any of the credit generators in a different HUC 12 than the applicant?  Yes; HUC 12: \_\_\_\_\_  
 No  
 Unsure

Are any of the credit generators downstream of the applicant?  Yes  
 No  
 Unsure

Will a broker/exchange be used to facilitate trade?  Yes; Name: Richland County Land Conservation  
 No  
 Unsure

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

Discharge Type	Permit Number	Name	Contact Address	Is the point source credit generator currently in compliance with their permit requirements?
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure
<input type="radio"/> Traditional <input type="radio"/> MS4 <input type="radio"/> CAFO				<input type="radio"/> Yes <input type="radio"/> No <input type="radio"/> Unsure

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

List the practices that will be used to generate credits:

Streambank stabilization with habitat features.

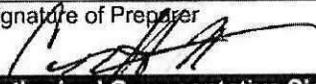
Method for quantifying credits generated:  Monitoring  
 Modeling, Names: NRCS soil loss modeling  
 Other: \_\_\_\_\_

Projected date credits will be available: 09/15/2025

**The preparer certifies all of the following:**

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

Signature of Preparer



Date Signed

11/1/2024

**Authorized Representative Signature**

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

Signature of Authorized Representative

Susan Hauri

Date Signed

11-1-2024

# **APPENDIX 2-2**

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# Surface Water Data Viewer Map



## Legend

- Municipality
- State Boundaries
- County Boundaries
- Major Roads**
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads**
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

1.0 0 0.50 1.0 Miles

1: 31,680

NAD\_1983\_HARN\_Wisconsin\_TM

DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

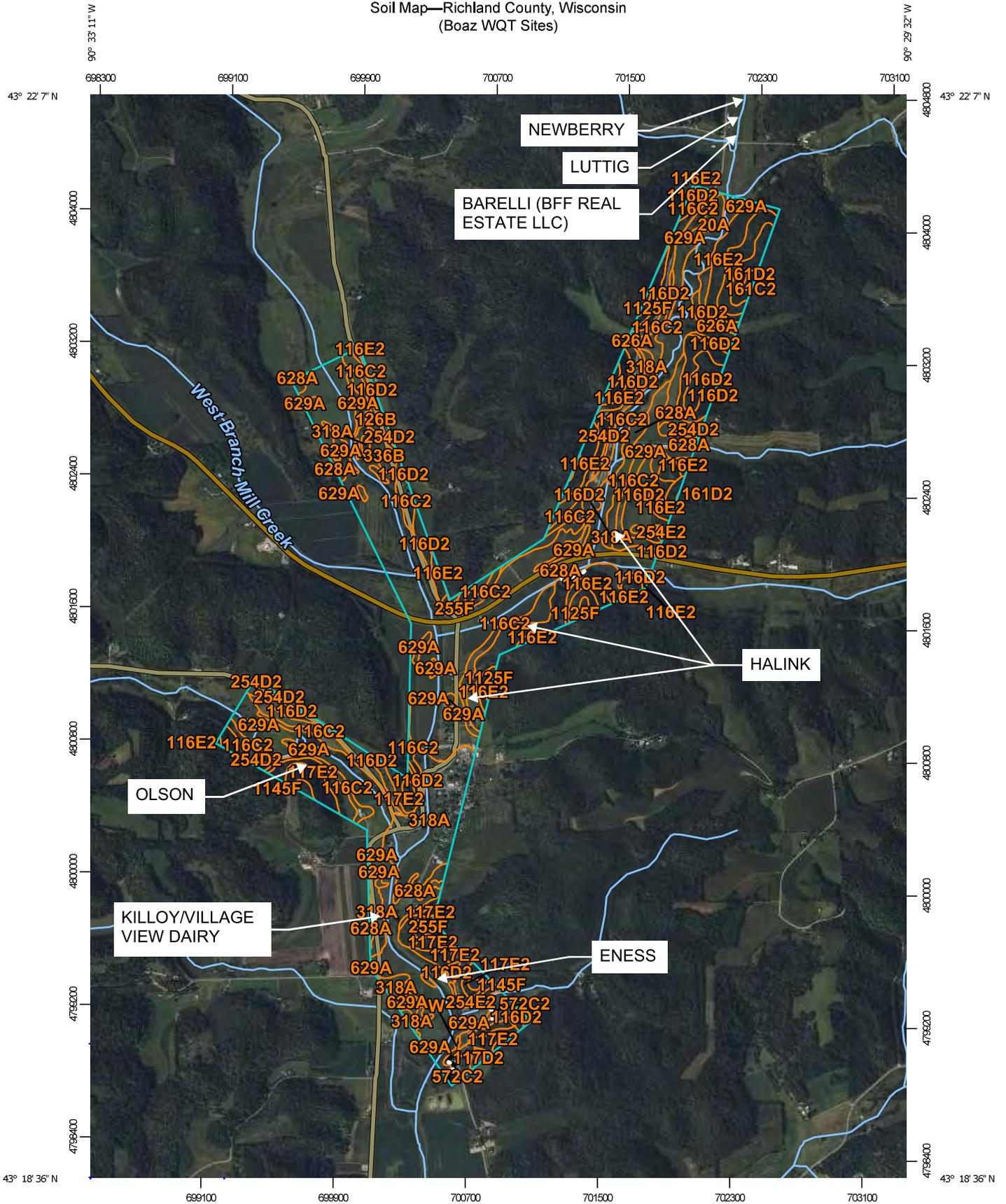
Notes

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# **APPENDIX 3-1**

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Soil Map—Richland County, Wisconsin  
(Boaz WQT Sites)



Map Scale: 1:31,800 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84



## MAP LEGEND

 Area of Interest (AOI)	 Spoil Area
 Soils	 Stony Spot
 Soil Map Unit Polygons	 Very Stony Spot
 Soil Map Unit Lines	 Wet Spot
 Soil Map Unit Points	 Other
 Special Point Features	 Special Line Features
 Blowout	 Streams and Canals
 Borrow Pit	 Transportation
 Clay Spot	 Rails
 Closed Depression	 Interstate Highways
 Gravel Pit	 US Routes
 Gravelly Spot	 Major Roads
 Landfill	 Local Roads
 Lava Flow	 Background
 Marsh or swamp	 Aerial Photography
 Mine or Quarry	
 Miscellaneous Water	
 Perennial Water	
 Rock Outcrop	
 Saline Spot	
 Sandy Spot	
 Severely Eroded Spot	
 Sinkhole	
 Slide or Slip	
 Sodic Spot	

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

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

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

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

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

Soil Survey Area: Richland County, Wisconsin  
Survey Area Data: Version 19, Sep 8, 2023

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

Date(s) aerial images were photographed: Aug 2, 2022—Sep 28, 2022

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

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
20A	Palms and Houghton mucks, 0 to 1 percent slopes	4.8	0.5%
116C2	Churchtown silt loam, 6 to 12 percent slopes, moderately eroded	90.7	8.6%
116D2	Churchtown silt loam, 12 to 20 percent slopes, moderately eroded	147.4	13.9%
116E2	Churchtown silt loam, 20 to 30 percent slopes, moderately eroded	62.4	5.9%
117D2	Brownchurch sandy loam, 12 to 20 percent slopes, moderately eroded	4.9	0.5%
117E2	Brownchurch sandy loam, 20 to 30 percent slopes, moderately eroded	45.6	4.3%
126B	Barremills silt loam, 1 to 6 percent slopes	2.7	0.3%
161C2	Fivepoints silt loam, 6 to 12 percent slopes, moderately eroded	1.6	0.1%
161D2	Fivepoints silt loam, 12 to 20 percent slopes, moderately eroded	11.8	1.1%
254D2	Norden silt loam, 12 to 20 percent slopes, moderately eroded	15.1	1.4%
254E2	Norden silt loam, 20 to 30 percent slopes, moderately eroded	14.9	1.4%
255F	Urne fine sandy loam, 30 to 45 percent slopes	2.5	0.2%
284D2	Gillingham loamy fine sand, 12 to 20 percent slopes, moderately eroded	4.2	0.4%
318A	Bearpen silt loam, 0 to 3 percent slopes, rarely flooded	97.5	9.2%
336B	Toddville silt loam, 1 to 6 percent slopes	5.8	0.6%
572C2	Windward loamy fine sand, 6 to 12 percent slopes, moderately eroded	11.9	1.1%
626A	Arenzville silt loam, 0 to 3 percent slopes, occasionally flooded	4.4	0.4%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
628A	Orion silt loam, 0 to 3 percent slopes, occasionally flooded	368.6	34.8%
629A	Ettrick silt loam, 0 to 2 percent slopes, frequently flooded	65.4	6.2%
743D2	Council fine sandy loam, 12 to 20 percent slopes, moderately eroded	1.5	0.1%
1125F	Dorerton, very stony-Elbaville complex, 30 to 60 percent slopes	27.1	2.6%
1145F	Gaphill-Rockbluff complex, 30 to 60 percent slopes	15.8	1.5%
1648A	Northbend-Ettrick silt loams, 0 to 3 percent slopes, frequently flooded	48.5	4.6%
1743F	Council-Elevasil-Norden complex, 20 to 45 percent slopes, rocky	0.4	0.0%
2013	Pits, gravel	1.3	0.1%
W	Water	1.3	0.1%
<b>Totals for Area of Interest</b>		<b>1,058.1</b>	<b>100.0%</b>

# **APPENDIX 4-1**

# **RAP-M**

**Rapid Assessment, Point Method**

**&**

# **BATHMASTER**

**Bathymetric Depth Mapping**



**Erosion and Sediment  
Inventory Procedures  
Illinois**  
*August 2002*



William J. Gradle, State Conservationist

## Lateral Recession Rates

### Streambank Erosion

Lateral Recession Rate (ft/yr)	Ave. (ft/yr)	Category	Description
0.01 - 0.05	0.03	Slight	Some bare bank but active erosion not readily apparent. No vegetative overhang. No exposed tree roots. Bank height minimal.
0.06 - 0.2	0.13	Moderate	Bank is predominantly bare with some vegetative overhang. Some exposed tree roots. No slumping evident.
0.3 - 0.5	0.40	Severe	Bank is bare with very noticeable vegetative overhang. Many tree roots exposed and some fallen trees. Slumping or rotational slips are present. Some changes in cultural features, such as missing fence posts and realignment of roads.
0.5 - 2.0	1.5	Very Severe	Bank is bare and vertical or nearly vertical. Soil material has accumulated at base of slope or in water. Many fallen trees and/or extensive vegetative overhang. Cultural features exposed or removed or extensively altered. Numerous slumps or rotational slips present. Generally silty or sandy bank material, NOT glacial till or exposed shale bedrock.
2.0 - 5.0	3.5	Extremely Severe	Bank is bare and vertical. Soil material has accumulated at base of slope and oftentimes still contains living grass or other vegetative material. Extensive cracking of the earth parallel to the exposed face above the bank. Generally evidence of "block-size" material that has either recently fallen in or is about to fall in. Can be "pillars" of soil materials that have already been loosened by stream and indicate imminent failure into the stream. Trees have been undercut and lie in stream, often with root balls intact. Silty or sandy bank material, NOT glacial till or exposed shale bedrock. (These rates should be verified with several observations or with actual streambank monitoring.)

# **APPENDIX 4-2**

# Barelli WQT Sites



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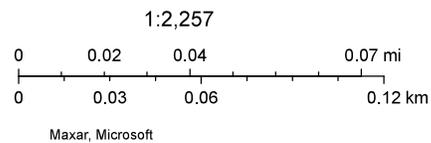


# Eness WQT



9/22/2025, 2:51:11 PM

- |                           |                   |
|---------------------------|-------------------|
| Municipalities            | <b>Roads</b>      |
| Sections                  | Town Roads        |
| Section Quarter Quarters  | County Highway    |
| Parcel Lines              | City Streets      |
| Proposed Riprap           | Proposed Root Wad |
| Proposed Vegetative Cover |                   |

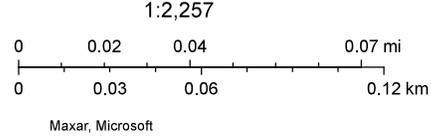


# Halink WQT Site 1



9/22/2025, 2:59:14 PM

- |                           |                   |
|---------------------------|-------------------|
| Municipalities            | <b>Roads</b>      |
| Sections                  | US Hwy            |
| Section Quarter Quarters  | State Highway     |
| Parcel Lines              | Proposed Root Wad |
| Proposed Riprap           |                   |
| Proposed Vegetative Cover |                   |

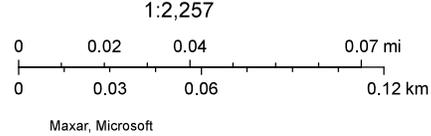


# Halink WQT Site 2

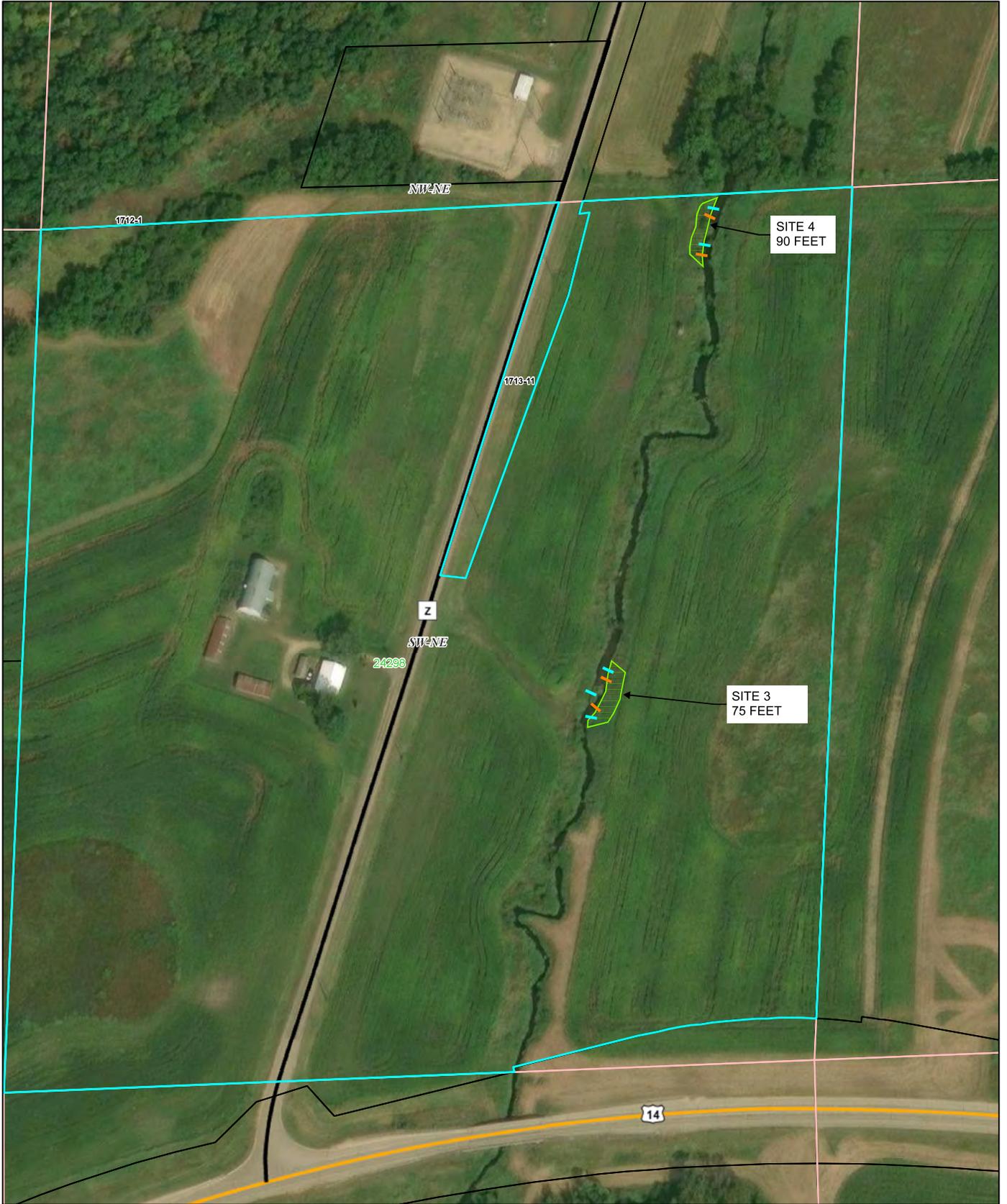


9/22/2025, 3:00:36 PM

- |                           |                   |
|---------------------------|-------------------|
| Municipalities            | <b>Roads</b>      |
| Sections                  | Town Roads        |
| Section Quarter Quarters  | US Hwy            |
| Parcel Lines              | County Highway    |
| Proposed Riprap           | State Highway     |
| Proposed Vegetative Cover | Proposed Root Wad |

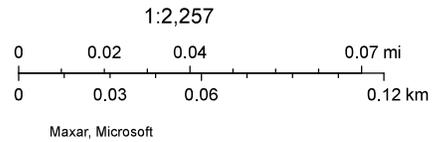


# Halink WQT Site 3 & 4

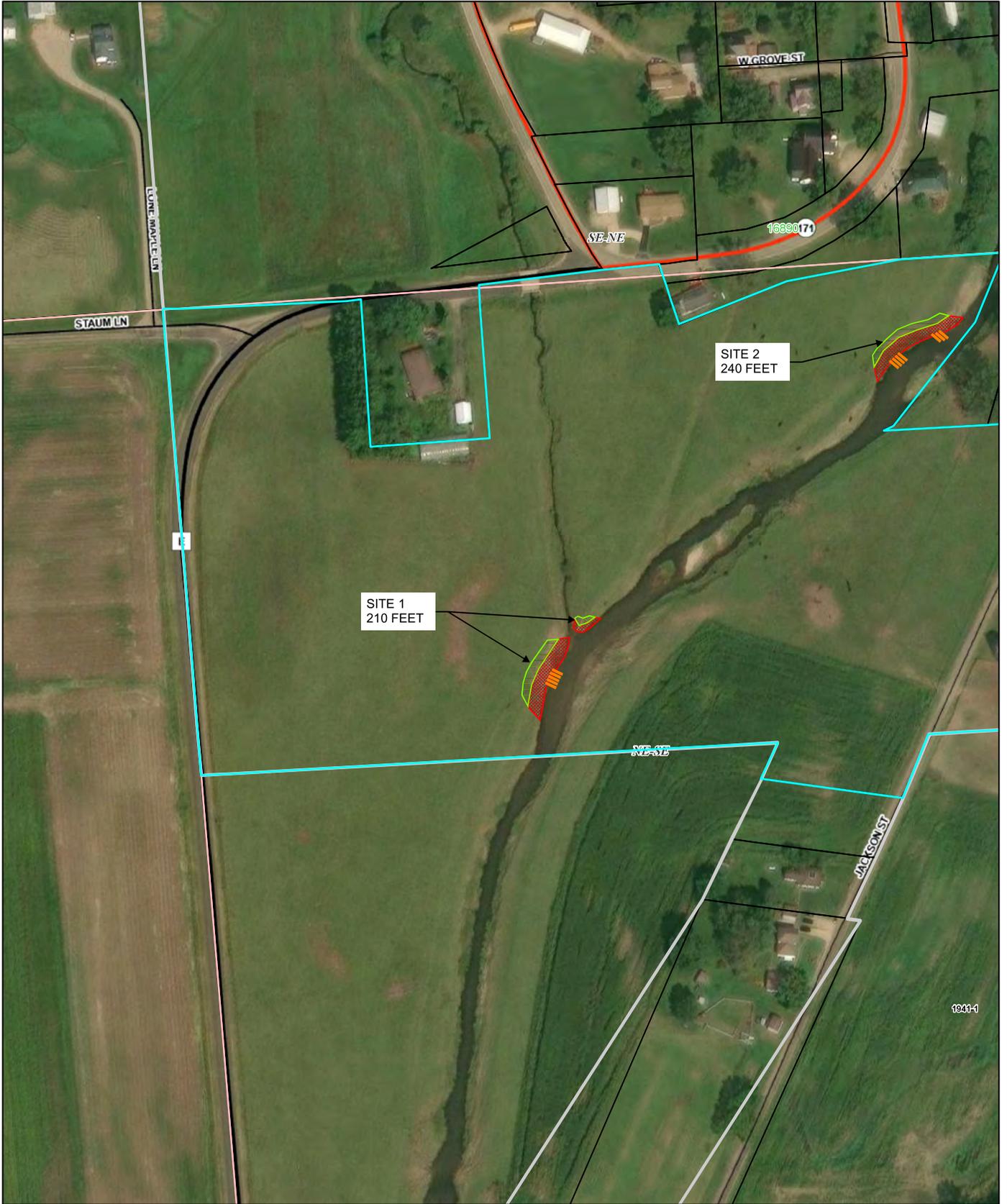


9/22/2025, 3:01:36 PM

- |                           |                        |
|---------------------------|------------------------|
| Municipalities            | <b>Roads</b>           |
| Sections                  | US Hwy                 |
| Section Quarter Quarters  | County Highway         |
| Parcel Lines              | Proposed Root Wad      |
| Proposed Riprap           | Proposed Log Deflector |
| Proposed Vegetative Cover |                        |

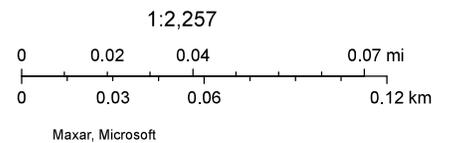


# Killoy/Village View Dairy WQT



9/22/2025, 2:56:09 PM

- |                           |                   |
|---------------------------|-------------------|
| Municipalities            | <b>Roads</b>      |
| Sections                  | Town Roads        |
| Section Quarter Quarters  | County Highway    |
| Parcel Lines              | State Highway     |
| Proposed Riprap           | City Streets      |
| Proposed Vegetative Cover | Proposed Root Wad |

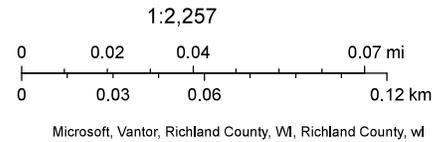


# Luttig WQT Sites

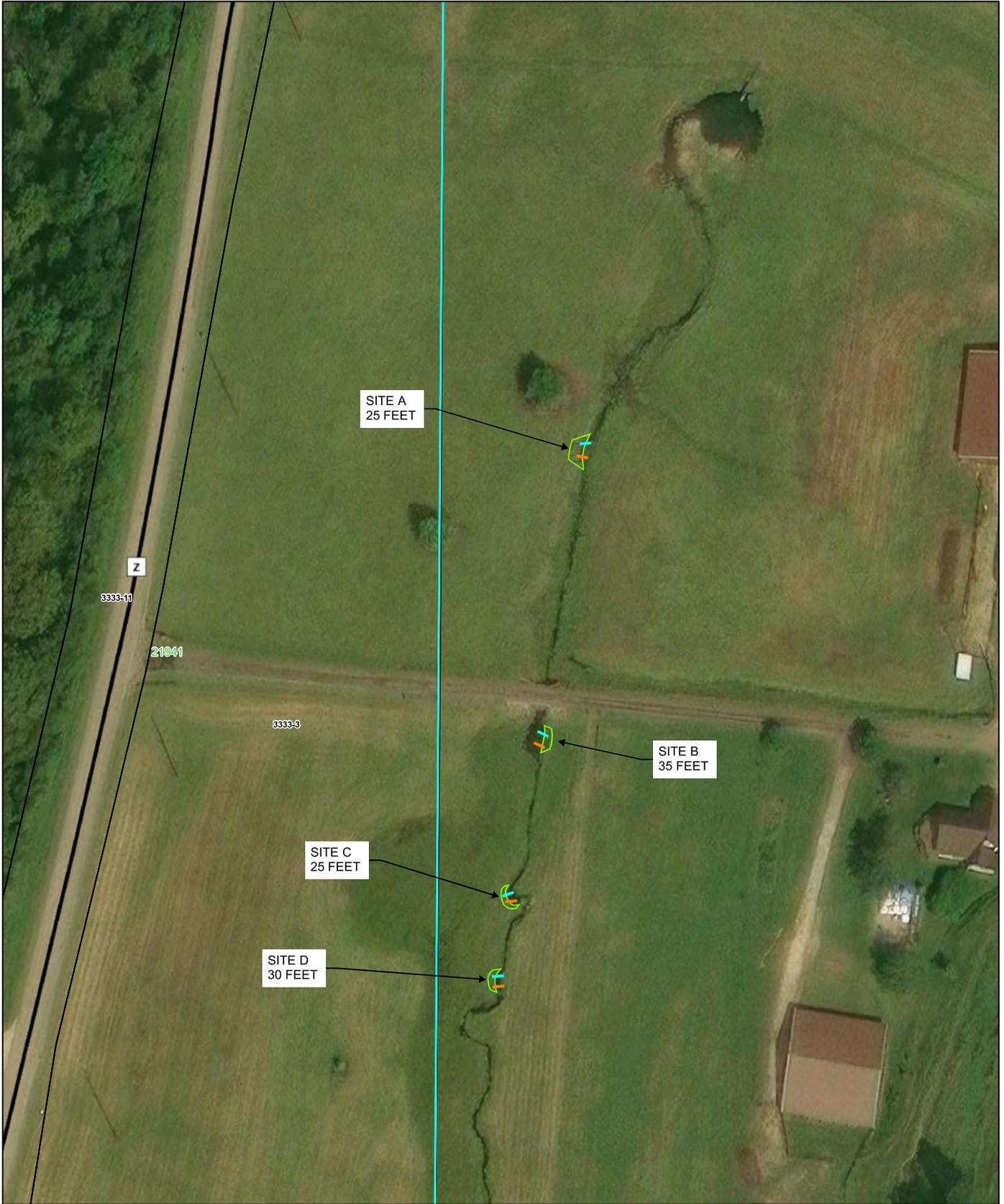


12/30/2025, 12:02:38 PM

- |                           |                      |                        |
|---------------------------|----------------------|------------------------|
| Municipalities            | <b>Roads</b>         | <b>2020 Aerial</b>     |
| Sections                  | County Highway       | Red: Band_1            |
| Section Quarter Quarters  | Richland_Co_2025.sid | Green: Band_2          |
| Parcel Lines              | Red: Band_1          | Blue: Band_3           |
| Proposed Riprap           | Green: Band_2        | Proposed Root Wad      |
| Proposed Vegetative Cover | Blue: Band_3         | Proposed Log Deflector |

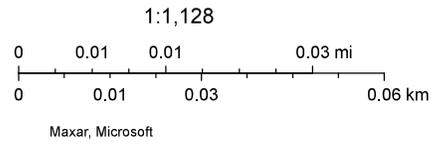


# Newberry WQT Site A-D



9/22/2025, 3:05:39 PM

- Municipalities
- Sections
- Section Quarter Quarters
- Parcel Lines
- Roads
- County Highway
- Proposed Riprap
- Proposed Vegetative Cover
- Proposed Root Wad
- Proposed Log Deflector

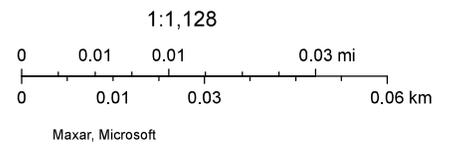


# Newberry WQT Site E-F

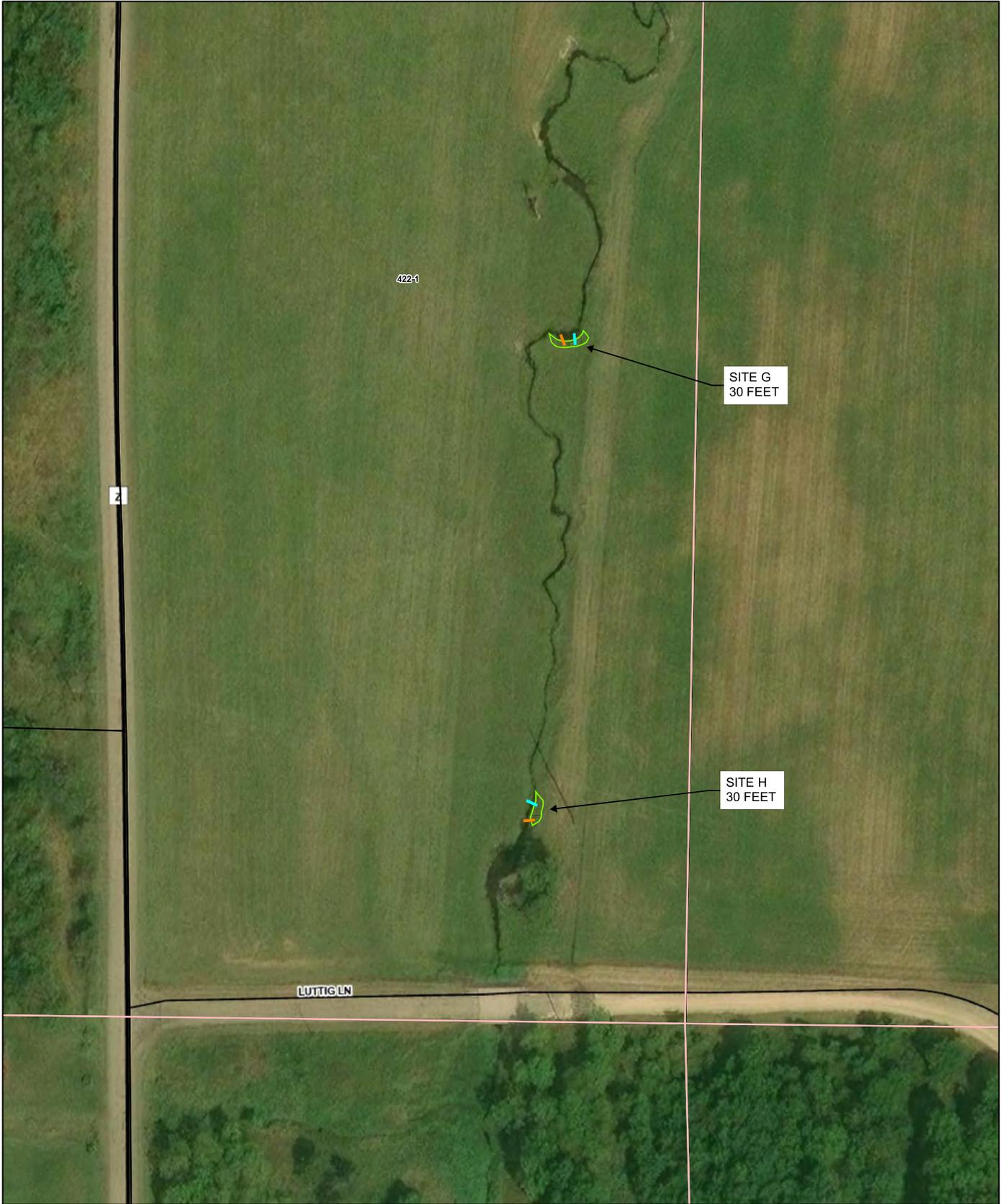


9/22/2025, 3:08:35 PM

- |   |  |
|---|--|
|  Municipalities            | <b>Roads</b>   |
|  Sections                  |  Town Roads             |
|  Section Quarter Quarters  |  County Highway         |
|  Parcel Lines              |  Proposed Root Wad      |
|  Proposed Riprap           |  Proposed Log Deflector |
|  Proposed Vegetative Cover |  |

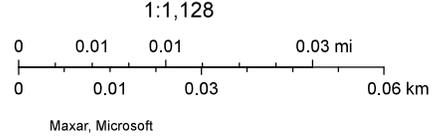


# Newberry WQT Site G-H



9/22/2025, 3:12:21 PM

- |  |                           |  |                        |
|--|---------------------------|--|------------------------|
|  | Municipalities            |  | Town Roads             |
|  | Sections                  |  | County Highway         |
|  | Section Quarter Quarters  |  | Proposed Root Wad      |
|  | Parcel Lines              |  | Proposed Log Deflector |
|  | Proposed Riprap           |  |                        |
|  | Proposed Vegetative Cover |  |                        |



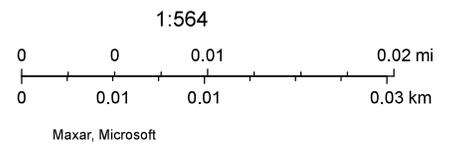
# Olson WQT Site 1



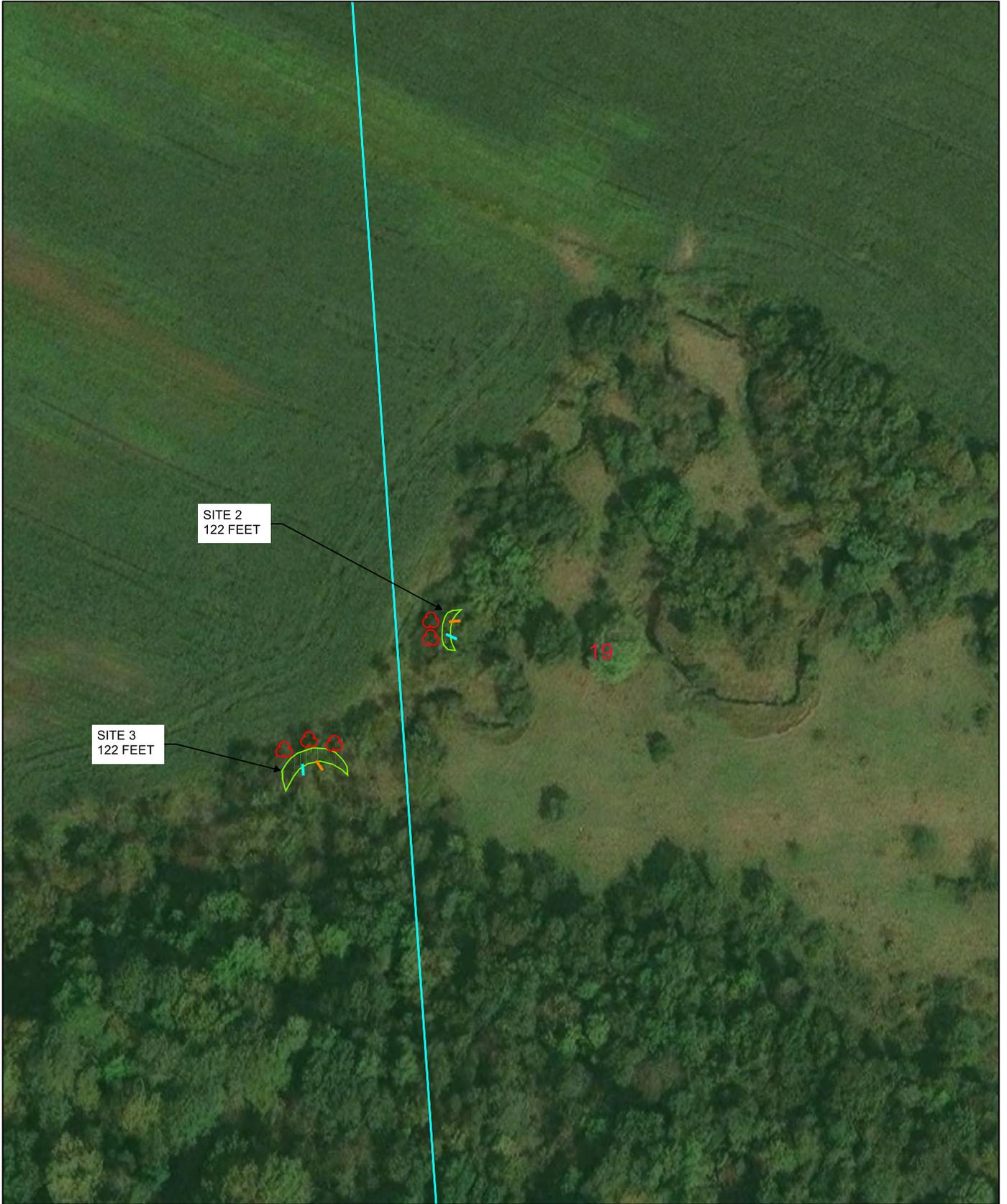
SITE 1  
86 FEET

9/22/2025, 3:14:31 PM

- Municipalities
- Sections
- Section Quarter Quarters
- Parcel Lines
- Proposed Riprap
- Proposed Vegetative Cover
- Proposed Root Wad
- Proposed Log Deflector
- Proposed Swamp White Oak Tree

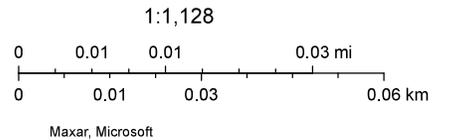


# Olson WQT Site 2 & 3



9/22/2025, 3:16:00 PM

- Municipalities
- Sections
- Section Quarter Quarters
- Parcel Lines
- Proposed Riprap
- Proposed Vegetative Cover
- Proposed Root Wad
- Proposed Log Deflector
- Proposed Swamp White Oak Tree



# **APPENDIX 5-1**

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**NRCS Streambank and Irrigation Ditch Erosion Estimator (Direct Volume Method)**

Farmer / Cooperator Name: Village of Boaz Water Quality Trade      Evaluated By: CRH  
 Tract Number: December 23, 2025

Field Number	Eroding Streambank Reach #; or Ditch Side/Bottom	Eroding Bank or Ditch Length (Feet)	Eroding Bank Height; or Ditch Bottom Width* (Feet)	Area of Eroding Streambank or Ditch (FT <sup>2</sup> )	Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)	Estimated Volume (FT <sup>3</sup> ) Eroded Annually	Soil Texture	Approximate Pounds of Soil per FT <sup>3</sup>	Estimated Soil Loss (Tons/Year)	% Leachable Phosphorus in the Soil	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons)	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):
Halink	1	30.0	5.0	150	0.15	22.5	Silt Loam	85	1.0	0.03%	0.000	0.6
	2	20.0	5.0	100	0.20	20.0	Silt Loam	85	0.9	0.03%	0.000	0.5
	3	75.0	5.0	375	0.30	112.5	Silt Loam	85	4.8	0.03%	0.001	2.9
	4	90.0	6.5	585	0.30	175.5	Silt Loam	85	7.5	0.02%	0.001	3.0
												6.9

Field Number	Eroding Streambank Reach #; or Ditch Side/Bottom	Eroding Bank or Ditch Length (Feet)	Eroding Bank Height; or Ditch Bottom Width* (Feet)	Area of Eroding Streambank or Ditch (FT <sup>2</sup> )	Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)	Estimated Volume (FT <sup>3</sup> ) Eroded Annually	Soil Texture	Approximate Pounds of Soil per FT <sup>3</sup>	Estimated Soil Loss (Tons/Year)	% Leachable Phosphorus in the Soil	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons)	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):
Killroy / Village View Dairy	1	210.0	8.5	1,785	0.50	892.5	Silt Loam	85	37.9	0.03%	0.011	22.8
	2	240.0	6.0	1,440	0.50	720.0	Silt Loam	85	30.6	0.03%	0.009	18.4
												41.1

Field Number	Eroding Streambank Reach #; or Ditch Side/Bottom	Eroding Bank or Ditch Length (Feet)	Eroding Bank Height; or Ditch Bottom Width* (Feet)	Area of Eroding Streambank or Ditch (FT <sup>2</sup> )	Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)	Estimated Volume (FT <sup>3</sup> ) Eroded Annually	Soil Texture	Approximate Pounds of Soil per FT <sup>3</sup>	Estimated Soil Loss (Tons/Year)	% Leachable Phosphorus in the Soil	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons)	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):
Newberry	<del>1 (New)</del>	<del>30.0</del>	<del>6.5</del>	<del>396</del>	<del>0.50</del>	<del>297.0</del>	<del>Silt Loam</del>	<del>85</del>	<del>1.7</del>	<del>0.03%</del>	<del>0.000</del>	<del>1.6</del>
	2 (New) A	25.0	4.0	100	0.20	20.0	Silt Loam	85	0.9	0.04%	0.000	0.6
	3 (New) B	35.0	2.0	70	0.15	10.5	Silt Loam	85	0.4	0.03%	0.000	0.2
	4 (New) C	25.0	3.5	88	0.20	17.5	Silt Loam	85	0.7	0.03%	0.000	0.4
	5 (New) D	30.0	3.0	90	0.20	18.0	Silt Loam	85	0.8	0.02%	0.000	0.4
	6 (New) E	32.0	3.0	96	0.25	24.0	Silt Loam	85	1.0	0.02%	0.000	0.5
	7 (New) F	43.0	3.0	129	0.25	32.3	Silt Loam	85	1.4	0.03%	0.000	0.7
	8 (New) G	30.0	3.0	90	0.40	36.0	Silt Loam	85	1.5	0.03%	0.000	1.0
	9 (New) H	40.0	2.5	100	0.50	50.0	Silt Loam	85	2.1	0.04%	0.001	1.5
												5.3

Field Number	Eroding Streambank Reach #; or Ditch Side/Bottom	Eroding Bank or Ditch Length (Feet)	Eroding Bank Height; or Ditch Bottom Width* (Feet)	Area of Eroding Streambank or Ditch (FT <sup>2</sup> )	Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)	Estimated Volume (FT <sup>3</sup> ) Eroded Annually	Soil Texture	Approximate Pounds of Soil per FT <sup>3</sup>	Estimated Soil Loss (Tons/Year)	% Leachable Phosphorus in the Soil	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons)	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):
Eness	1	500.0	8.0	4,000	0.15	600.0	Silt Loam	85	25.5	0.04%	0.010	20.4
												20.4

Field Number	Eroding Streambank Reach #; or Ditch Side/Bottom	Eroding Bank or Ditch Length (Feet)	Eroding Bank Height; or Ditch Bottom Width* (Feet)	Area of Eroding Streambank or Ditch (FT <sup>2</sup> )	Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)	Estimated Volume (FT <sup>3</sup> ) Eroded Annually	Soil Texture	Approximate Pounds of Soil per FT <sup>3</sup>	Estimated Soil Loss (Tons/Year)	% Leachable Phosphorus in the Soil	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons)	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):
Olson	1	86.0	6.0	516	0.30	154.8	Silt Loam	85	6.6	0.05%	0.003	6.6
	2	75.0	5.0	375	0.10	37.5	Silt Loam	85	1.6	0.03%	0.000	1.0
	3	93.0	5.0	465	0.10	46.5	Silt Loam	85	2.0	0.03%	0.001	1.2
												8.7

Field Number	Eroding Streambank Reach #; or Ditch Side/Bottom	Eroding Bank or Ditch Length (Feet)	Eroding Bank Height; or Ditch Bottom Width* (Feet)	Area of Eroding Streambank or Ditch (FT <sup>2</sup> )	Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)	Estimated Volume (FT <sup>3</sup> ) Eroded Annually	Soil Texture	Approximate Pounds of Soil per FT <sup>3</sup>	Estimated Soil Loss (Tons/Year)	% Leachable Phosphorus in the Soil	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons)	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):
Barelli	1	50.0	6.5	325	0.40	130.0	Silt Loam	85	5.5	0.03%	0.001	2.8
	2	85.0	6.5	423	0.15	63.4	Silt Loam	85	2.7	0.04%	0.001	2.3
	3	70.0	6.0	420	0.35	147.0	Silt Loam	85	6.2	0.03%	0.002	3.3
												8.3

Field Number	Eroding Streambank Reach #; or Ditch Side/Bottom	Eroding Bank or Ditch Length (Feet)	Eroding Bank Height; or Ditch Bottom Width* (Feet)	Area of Eroding Streambank or Ditch (FT <sup>2</sup> )	Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)	Estimated Volume (FT <sup>3</sup> ) Eroded Annually	Soil Texture	Approximate Pounds of Soil per FT <sup>3</sup>	Estimated Soil Loss (Tons/Year)	% Leachable Phosphorus in the Soil	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons)	Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):
Luttig	1	70.0	6.0	420	0.20	84.0	Silt Loam	85	3.6	0.04%	0.001	2.8
	2	60.0	9.0	540	0.40	216.0	Silt Loam	85	9.2	0.03%	0.003	6.2
	3	104.0	5.0	520	0.30	156.0	Silt Loam	85	6.6	0.03%	0.002	4.6
	4	91.0	6.0	546	0.10	54.6	Silt Loam	85	2.3	0.03%	0.001	1.2
	5	120.0	5.5	660	0.15	99.0	Silt Loam	85	4.2	0.03%	0.001	2.7
												17.5

**Total Phosphorus Loss for sum of reaches (lbs/yr): 108**

\* Eroding bank height is measured along the bank, not the vertical height of bank.

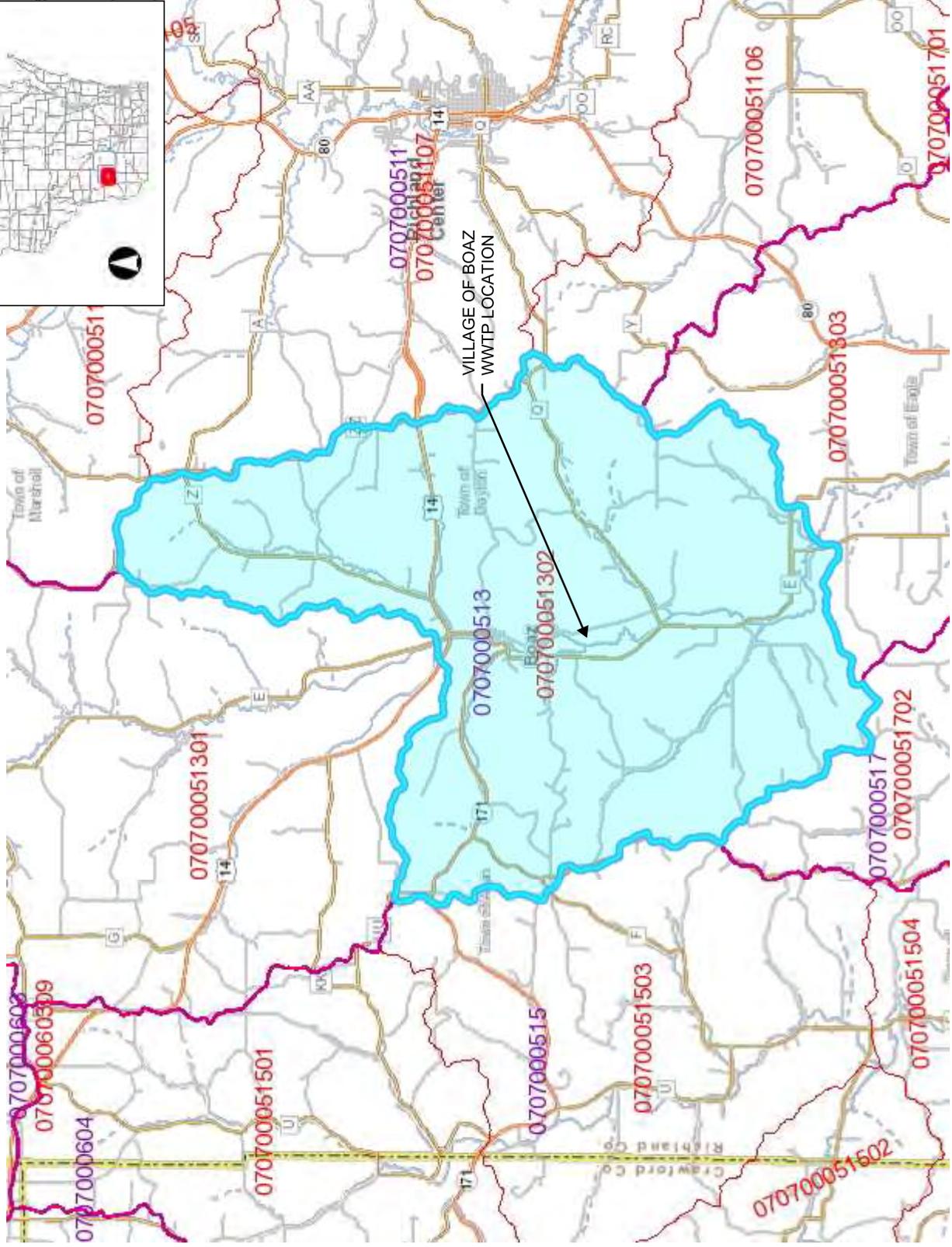
Streambank or Ditch Erosion Calculation Formula:

$$\frac{\text{Eroding Bank/Ditch Length} \times \text{Eroding Bank Height} \times \text{Ditch Bottom Width} \times \text{Lateral or Ditch Bottom Recession Rate} \times \text{Soil Weight (lbs/ft}^3\text{)}}{2000} = \text{Estimated Soil Loss Per Year (Tons)}$$

# **APPENDIX 6-1**



# HUC 12 WATERSHED



## Legend

- 12-digit HUCs (Subwatersheds)
- 10-digit HUCs (Watersheds)
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

## Notes

DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No warranty, expressed or implied, is made regarding accuracy, applicability for a particular use, completeness, or legality of the information depicted on this map. For more information, see the DNR Legal Notices web page: <http://dnr.wi.gov/legal/>

4.0 Miles



1: 126,720

NAD\_1983\_HARN\_Wisconsin\_TM

# **APPENDIX 6-2**

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## Hackett, Carson

---

**From:** Haglund, Justin M - DNR <JustinM.Haglund@wisconsin.gov>  
**Sent:** Monday, September 22, 2025 9:52 AM  
**To:** Hackett, Carson  
**Cc:** Jaeger, Rachel  
**Subject:** RE: Boaz WI Fish Habitat Projects

**Follow Up Flag:** Follow up  
**Flag Status:** Flagged

Good morning,

From what I can remember on the Mill Creek sites, typically the substrate is pretty soft with a majority of sand/silt and high eroded banks. For these locations I would recommend sloping and stabilizing the banks to reduce further erosion and excessive siltation. These sections tend to be a bit deeper and could benefit from large root wads that would provide habitat for fish where the only habitat seems to be overhanging vegetation and downed trees. Only Brown Trout were observed in the mainstem of Mill Creek during 2025 surveys.

Both Core Hollow and East Branch Mill Creek contain mixed populations of both Brook and Brown Trout. In fact, the unnamed tributary that flows into East Branch Mill Creek has high natural reproduction of Brook Trout (currently unclassified trout water). In these streams I would once again focus on areas of the bank that need sloping and stabilization to reduce excess siltation. I would also focus on in stream woody habitat and avoid overhead bank covers such as lunkers that give brown trout the advantage. Brook trout seem to benefit more from smaller woody structures such as log deflectors and smaller root wads. They also seem to do well in slower moving pools rather than faster moving water. Bundling root wads together to create brush bundles may also be a nice feature to include for these streams. Also, not sure if overhead canopy cover is a concern in some locations, but planting trees to provide overhead shading is also a priority that we are focusing on with our habitat restoration projects.

Hope this helps!

**Justin Haglund**

Cell Phone: 608-341-9465  
JustinM.Haglund@Wisconsin.gov

Our core values include professionalism, integrity, and customer service.  
Please visit our [survey](#) to provide feedback on your experience interacting with any DNR employee.

---

**From:** Hackett, Carson <chackett@davyinc.com>  
**Sent:** Thursday, September 18, 2025 3:05 PM  
**To:** Haglund, Justin M - DNR <JustinM.Haglund@wisconsin.gov>  
**Cc:** Jaeger, Rachel <rjaeger@davyinc.com>  
**Subject:** Boaz WI Fish Habitat Projects

**CAUTION: This email originated from outside the organization.  
Do not click links or open attachments unless you recognize the sender and know the content is safe.**

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# **APPENDIX 8-1**

# Water Quality Trading Agreement: Village of Boaz and BFF Real Estate LLC

**Permittee Information**

Credit User Name (Permittee) Village of Boaz	Permit Number WI-0036749-06-0
---	----------------------------------

Credit User Address 26404 Jackson Drive, Muscodia, WI 53573
--

Broker Name Richland County Land Conservation Division	Trade Agreement Number
---	------------------------

Broker Address			
Street Address 181 W Seminary Street	City Richland Center	State WI	ZIP Code 53581

Project Name BFF Real Estate LLC Bank Stabilization
--

Name of Credit Generator (Landowner/Operator) (Last, First, M.I.) BFF Real Estate LLC
--

Street Address 18196 Tuckaway Valley Road	City Richland Center	State WI	ZIP Code 53581
--	-------------------------	-------------	-------------------

**Property Information**

Name of Landowner(s) (if not Operator) (Last, First, M.I.) BFF Real Estate LLC
---

Street Address 18196 Tuckaway Valley Road	City Richland Center	State WI	ZIP Code 53581
--	-------------------------	-------------	-------------------

Legal Description of Property - Contiguous sites under the same ownership: (add additional sheets if necessary)

Parcel Identification Numbers (PIN): 00804331000

Parcel ID(s):  
**00804331000**

**Site Locator for Construction Projects**

County	Township	Range	E/ W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Richland	10N	01W		04	SE 1/4 SW 1/4 LOT 4 OF CSM 1236
	N	W			
	N	W			

**Agreement**

The property described above is enrolled in a Water Quality Trading Agreement. Funding is provided by the credit user to pay for the installation of best management practices (BMPs) on the described property which are designed to reduce phosphorous, a nonpoint source of pollution. This agreement commits the landowner/operator, their heirs or successors and assigns to maintain the BMPs and fulfill the trade agreement in perpetuity or release is filed by the credit user, whichever occurs first.

**Plans which describe the BMPs, costs, installation schedule, and conditions are hereby incorporated into this agreement, are on file with the credit user and may be given to Wisconsin Department of Natural Resources (DNR) upon request by the DNR.**

Landowner/Operator

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20 26.

Signature of Operator

Signature of Landowner/Operator

Typed Name of Operator

**BFF Real Estate LLC, Landowner**

Typed Name of Landowner/Operator

STATE OF WISCONSIN ) Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_ County ) ss. The above named \_\_\_\_\_ to me known to be  
 ) the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Landowners (if not operator)

If the landowner section is not completed, check (X) one or both of the following that apply

Landowner is also operator

Trade agreement contains only high residue management, nutrient management, pesticide management, cropland protection cover (green manure)

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Signature of Landowner (if not operator)

Signature of Landowner (if not operator)

Typed Name of Landowner (if not operator)

Typed Name of Landowner (if not operator)

STATE OF WISCONSIN ) Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20 26.

\_\_\_\_\_ County ) ss. The above named \_\_\_\_\_ to me known to be  
 ) the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Credit User

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 2026.

Signature of credit user

**Village of Boaz**

Typed Name of credit user/broker/exchange

STATE OF WISCONSIN ) Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Richland County ) ss. The above named \_\_\_\_\_ to me known to be  
 ) the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: **Richland County – Broker**

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20<sup>26</sup>.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

Cathy Cooper, Richland County  
Typed Name

\_\_\_\_\_  
Typed Name

STATE OF WISCONSIN  
Richland County

) Personally, came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20<sup>26</sup>.  
) ss. The above named \_\_\_\_\_ to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.

\_\_\_\_\_  
Signature of Notary Public

\_\_\_\_\_  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Typed Name

\_\_\_\_\_  
Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

) Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.  
) ss. The above named \_\_\_\_\_ to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.

\_\_\_\_\_  
Signature of Notary Public

\_\_\_\_\_  
Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Typed Name

\_\_\_\_\_  
Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

) Personally, came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.  
) ss. The above named \_\_\_\_\_ to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.

\_\_\_\_\_  
Signature of Notary Public

\_\_\_\_\_  
Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Check this box if this page is purposely left blank.

## Section A – General Requirements

1. The following relationship has been established for this Water Quality Trading Agreement:
  - The **Village of Boaz** will hereby be known as the **Credit User**.
  - The **Richland County Land Conservation Division** will be known as the **Broker**.
  - **BFF Real Estate LLC** will be known as the **Landowner/Operator**.
2. This contract may be amended, by written mutual agreement of the parties, during the installation or maintenance period, if the proposed changes will provide equal or greater control of water pollution. For any changes in practice components or costs, the broker will determine eligibility and whether to approve such changes. Any increases to the project cost shall be approved in advance in writing by the Credit User.
3. The Village of Boaz reserves the right to terminate this agreement if the Wisconsin Department of Natural Resources (DNR) does NOT approve the Water Quality Trading Plan (WQT). The WQT identifies this project for phosphorus credits to help the Village of Boaz's wastewater treatment facility (WWTF). These credits are established in the WQT and has been analyzed as a cost-effective project. Should the DNR either deny or reduce the project credits which results in a higher cost per pound of phosphorus credit, then the Village of Boaz may terminate the agreement.
4. The Village of Boaz reserves the right to terminate this agreement if the Village is unable to procure funding to cover the cost of the project, which would provide reasonable terms to the Village and their users.
5. The Broker reserves the right to enter the property to verify the information on the inspection report is accurate.
6. Any duly authorized officer, employee or representative of WDNR shall have the right to access and inspect the practices pursuant to Wis. Stat. 283.55(2) so long as this Agreement remains in effect.
7. **Hold Harmless.** The Credit User shall defend, indemnify and hold the Broker, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the negligence of the Broker.

## Section B – Credit User

1. The Credit User is responsible for all monetary costs incurred with the BMP practice installation, which includes but is not limited to site preparation, clearing, ensuring planned grades; stream shaping; rock riprap and installation; liming, fertilizing, seeding and mulching.
2. The Credit User shall have the right to access the property for inspection or maintenance. If a natural disaster impacts the BMPs and causes damage that reduces phosphorus credits, the credit user has the option of paying the cost of repairs or releasing this agreement.

## Section C – Landowner/Operator Shall:

1. If any land covered by this agreement is transferred or otherwise changes ownership, this agreement will be held in obligation with the land in perpetuity and the new owners will be obligated to comply with this agreement. Landowners are obligated to notify any prospective buyers of this agreement and their responsibilities under this agreement and applicable law.
2. The Landowners agree to repay all project costs to the credit user, upon demand by the Broker, if the Landowner fails to comply with the terms of this agreement. Repayment shall not be required if a practice(s) is rendered ineffective due to circumstances which are beyond the control of the Landowner, such as changes in regulations directly related to water quality trades for phosphorus.
3. The Landowner/Operator shall inspect riprap and streambank at least annually and after heavy storms. Any minor erosion or displacement of rocks shall be repaired at the cost of the landowner. The Broker should be contacted immediately and directly if any damage has occurred.
4. The Operator shall develop and implement a Rotational Grazing Plan to control and limit livestock access to the restored streambanks. Ensure that debris is removed from the channel and that vegetation is controlled around the channel only when the vegetation or obstructions are threatening stream function. Invasive vegetation should be controlled, and channel obstructions deemed harmful may be removed. Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall only be performed when they are causing or could cause unacceptable bank erosion, flow restriction, or damage to structures. Habitat forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to the extent possible.
5. Check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and replanted by Landowner as soon as possible with a seed mix pre-approved by the broker.
6. Periodically mow the vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 20-foot buffer from the top of the bank.
7. Eliminate all burrowing rodents and repair damage caused by them.
8. Maintain the project consistent with NRCS technical standard 580.

9. Installation of these practices brings the Landowner into compliance with the applicable state and local performance standards listed below. Compliance with these performance standards shall be in perpetuity. These practices must be maintained or replaced with a practice which ensures continued compliance with the following N.R. 151 performance standards:
- N.R. 151.03 Tillage Setback
  - N.R. 151.06 Clean Water Diversion
  - N.R. 151.08 Manure Management Prohibitions

**Section D. Broker**

1. The Broker will be responsible for the oversight of BMP practice design, project bidding, contractor construction agreements, inspection of site preparation, project design, BMP installation oversight, regulation of applicable performance standards, annual inspections and monitoring of landowners' obligations in the form of performing on-site checks as needed. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.
2. The Broker will ensure the contract is recorded in the Richland County Register of Deeds office.
3. The Broker agrees to complete annual inspections and submit any reports to the Credit User and Landowner/Operator.

TA Number	Typed Name of Landowner/Operator BFF Real Estate LLC	Initials of Landowner/Operator	Date
-----------	---	--------------------------------	------

Estimated Cost for Water Quality Trading Project - BFF Real Estate LLC Property						
DNR BMP Code	Practice Name	Quantity	Unit	Unit Cost	Estimated Total Cost	Estimated Year to be Installed
All	Mobilization	1	EA	\$ 2,000.00	\$ 2,000.00	2026
NRCS 580	Site Preparation, clearing, and grading	1	EA	\$ 5,000.00	\$ 5,000.00	2026
NRCS 580	Bank Shaping	185	Lin Ft	\$ 20.00	\$ 3,700.00	2026
NRCS 580	Riprap - Type Heavy (18")	70	cu. yd.	\$ 40.00	\$ 2,800.00	2026
NRCS 580	Geotextile Fabric	135	sq. yd.	\$ 4.00	\$ 540.00	2026
NRCS 580	Liming, fertilizing, seeding and mulching	1	acre	\$ 5,000.00	\$ 5,000.00	2026
					\$ -	
					\$ -	
	<b>Sub-Total</b>				<b>\$ 19,040.00</b>	
	Contingencies (10%)				\$ 1,900.00	
Note: These are estimates based on preliminary review of the site with no design nor specific numbers calculated. The exact values in the field may differ from above.				<b>TOTALS</b>	<b>\$ 20,940.00</b>	
Typed Name of Landowner / Operator BFF Real Estate LLC						

# Water Quality Trading Agreement: Village of Boaz and Arthur Luttig Trust

## Permittee Information

Credit User Name (Permittee) Village of Boaz	Permit Number WI-0036749-06-0
---	----------------------------------

Credit User Address  
26404 Jackson Drive, Muscodia, WI 53573

Broker Name Richland County Land Conservation Division	Trade Agreement Number
---	------------------------

## Broker Address

Street Address 181 W Seminary Street	City Richland Center	State WI	ZIP Code 53581
---	-------------------------	-------------	-------------------

Project Name  
Arthur Luttig Trust Bank Stabilization

Name of Credit Generator (Landowner/Operator) (Last, First, M.I.)  
Luttig, Arthur (Trust)

Street Address 18898 Luttig Lane	City Richland Center	State WI	ZIP Code 53581
-------------------------------------	-------------------------	-------------	-------------------

## Property Information

Name of Landowner(s) (if not Operator) (Last, First, M.I.)  
Luttig, Arthur (Trust)

Street Address County Road Z (south of Luttig Lane)	City Richland Center	State WI	ZIP Code 53581
--	-------------------------	-------------	-------------------

Legal Description of Property - Contiguous sites under the same ownership: (add additional sheets if necessary)

Parcel Identification Numbers (PIN): 00804321000, 00804310000, 00804241000

Parcel ID(s):

**00804321000, 00804310000, 00804241000**

## Site Locator for Construction Projects

County	Township	Range	E/ W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Richland	10N	01W		04	NW ¼ OF THE SW ¼ E OF CTRLN OF COUNTY HWY Z
Richland	10N	01W		04	NE ¼ OF THE SW ¼
Richland	10N	01W		04	S ½ OF THE NW ¼ S OF CTRLN OF LUTTIG LANE & E OF CTRLN OF HWY Z

## Agreement

The property described above is enrolled in a Water Quality Trading Agreement. Funding is provided by the credit user to pay for the installation of best management practices (BMPs) on the described property which are designed to reduce phosphorous, a nonpoint source of pollution. This agreement commits the landowner/operator, their heirs or successors and assigns to maintain the BMPs and fulfill the trade agreement in perpetuity or release is filed by the credit user, whichever occurs first.

**Plans which describe the BMPs, costs, installation schedule, and conditions are hereby incorporated into this agreement, are on file with the credit user and may be given to Wisconsin Department of Natural Resources (DNR) upon request by the DNR.**

Landowner/Operator

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20 26.

Signature of Operator

Signature of Landowner/Operator

Typed Name of Operator

**Arthur Luttig Trust, Landowner**

Typed Name of Landowner/Operator

STATE OF WISCONSIN

)  
)

Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_ County

) ss.  
)  
)

The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Landowners (if not operator)

If the landowner section is not completed, check (X) one or both of the following that apply

Landowner is also operator

Trade agreement contains only high residue management, nutrient management, pesticide management, cropland protection cover (green manure)

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Signature of Landowner (if not operator)

Signature of Landowner (if not operator)

Typed Name of Landowner (if not operator)

Typed Name of Landowner (if not operator)

STATE OF WISCONSIN

)  
)

Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20 26.

\_\_\_\_\_ County

) ss.  
)  
)

The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Credit User

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 2026.

Signature of credit user

**Village of Boaz**

Typed Name of credit user/broker/exchange

STATE OF WISCONSIN

)  
)

Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Richland County

) ss.  
)  
)

The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: **Richland County – Broker**

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20<sup>26</sup>.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

Cathy Cooper, Richland County  
Typed Name

\_\_\_\_\_  
Typed Name

STATE OF WISCONSIN  
Richland County

) Personally, came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20<sup>26</sup>.  
) ss. The above named \_\_\_\_\_ to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.  
)

\_\_\_\_\_  
Signature of Notary Public

\_\_\_\_\_  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Typed Name

\_\_\_\_\_  
Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

) Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.  
) ss. The above named \_\_\_\_\_ to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.  
)

\_\_\_\_\_  
Signature of Notary Public

\_\_\_\_\_  
Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Typed Name

\_\_\_\_\_  
Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

) Personally, came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.  
) ss. The above named \_\_\_\_\_ to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.  
)

\_\_\_\_\_  
Signature of Notary Public

\_\_\_\_\_  
Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Check this box if this page is purposely left blank.

## Section A – General Requirements

1. The following relationship has been established for this Water Quality Trading Agreement:
  - The **Village of Boaz** will hereby be known as the **Credit User**.
  - The **Richland County Land Conservation Division** will be known as **the Broker**.
  - **Arthur Luttig Trust** will be known as the **Landowner/Operator**.
2. This contract may be amended, by written mutual agreement of the parties, during the installation or maintenance period, if the proposed changes will provide equal or greater control of water pollution. For any changes in practice components or costs, the broker will determine eligibility and whether to approve such changes. Any increases to the project cost shall be approved in advance in writing by the Credit User.
3. The Village of Boaz reserves the right to terminate this agreement if the Wisconsin Department of Natural Resources (DNR) does NOT approve the Water Quality Trading Plan (WQT). The WQT identifies this project for phosphorus credits to help the Village of Boaz's wastewater treatment facility (WWTF). These credits are established in the WQT and has been analyzed as a cost-effective project. Should the DNR either deny or reduce the project credits which results in a higher cost per pound of phosphorus credit, then the Village of Boaz may terminate the agreement.
4. The Village of Boaz reserves the right to terminate this agreement if the Village is unable to procure funding to cover the cost of the project, which would provide reasonable terms to the Village and their users.
5. The Broker reserves the right to enter the property to verify the information on the inspection report is accurate.
6. Any duly authorized officer, employee or representative of WDNR shall have the right to access and inspect the practices pursuant to Wis. Stat. 283.55(2) so long as this Agreement remains in effect.
7. **Hold Harmless.** The Credit User shall defend, indemnify and hold the Broker, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the negligence of the Broker.

## Section B – Credit User

1. The Credit User is responsible for all monetary costs incurred with the BMP practice installation, which includes but is not limited to site preparation, clearing, ensuring planned grades; stream shaping; rock riprap and installation; liming, fertilizing, seeding and mulching.
2. The Credit User shall have the right to access the property for inspection or maintenance. If a natural disaster impacts the BMPs and causes damage that reduces phosphorus credits, the credit user has the option of paying the cost of repairs or releasing this agreement.

## Section C – Landowner/Operator Shall:

1. If any land covered by this agreement is transferred or otherwise changes ownership, this agreement will be held in obligation with the land in perpetuity and the new owners will be obligated to comply with this agreement. Landowners are obligated to notify any prospective buyers of this agreement and their responsibilities under this agreement and applicable law.
2. The Landowners agree to repay all project costs to the credit user, upon demand by the Broker, if the Landowner fails to comply with the terms of this agreement. Repayment shall not be required if a practice(s) is rendered ineffective due to circumstances which are beyond the control of the Landowner, such as changes in regulations directly related to water quality trades for phosphorus.
3. The Landowner/Operator shall inspect riprap and streambank at least annually and after heavy storms. Any minor erosion or displacement of rocks shall be repaired at the cost of the landowner. The Broker should be contacted immediately and directly if any damage has occurred.
4. The Operator shall develop and implement a Rotational Grazing Plan to control and limit livestock access to the restored streambanks. Ensure that debris is removed from the channel and that vegetation is controlled around the channel only when the vegetation or obstructions are threatening stream function. Invasive vegetation should be controlled, and channel obstructions deemed harmful may be removed. Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall only be performed when they are causing or could cause unacceptable bank erosion, flow restriction, or damage to structures. Habitat forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to the extent possible.
5. Check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and replanted by Landowner as soon as possible with a seed mix pre-approved by the broker.
6. Periodically mow the vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 20-foot buffer from the top of the bank.
7. Eliminate all burrowing rodents and repair damage caused by them.
8. Maintain the project consistent with NRCS technical standard 580.

9. Installation of these practices brings the Landowner into compliance with the applicable state and local performance standards listed below. Compliance with these performance standards shall be in perpetuity. These practices must be maintained or replaced with a practice which ensures continued compliance with the following N.R. 151 performance standards:
  - N.R. 151.03 Tillage Setback
  - N.R. 151.06 Clean Water Diversion
  - N.R. 151.08 Manure Management Prohibitions

**Section D. Broker**

1. The Broker will be responsible for the oversight of BMP practice design, project bidding, contractor construction agreements, inspection of site preparation, project design, BMP installation oversight, regulation of applicable performance standards, annual inspections and monitoring of landowners' obligations in the form of performing on-site checks as needed. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.
2. The Broker will ensure the contract is recorded in the Richland County Register of Deeds office.
3. The Broker agrees to complete annual inspections and submit any reports to the Credit User and Landowner/Operator.

TA Number	Typed Name of Landowner/Operator Arthur Luttig Trust	Initials of Landowner/Operator	Date
-----------	---	--------------------------------	------

Estimated Cost for Water Quality Trading Project - Lutttig Property						
DNR BMP Code	Practice Name	Quantity	Unit	Unit Cost	Estimated Total Cost	Estimated Year to be Installed
All	Mobilization	1	EA	\$ 2,000.00	\$ 2,000.00	2026
NRCS 580	Site Preparation, clearing, and grading	1	EA	\$ 5,000.00	\$ 5,000.00	2026
NRCS 580	Bank Shaping	450	Lin Ft	\$ 20.00	\$ 9,000.00	2026
NRCS 580	Riprap - Type Heavy (18")	210	cu. yd.	\$ 40.00	\$ 8,400.00	2026
NRCS 580	Geotextile Fabric	315	sq. yd.	\$ 4.00	\$ 1,260.00	2026
NRCS 580	Liming, fertilizing, seeding and mulching	1	acre	\$ 5,000.00	\$ 5,000.00	2026
					\$ -	
					\$ -	
	<b>Sub-Total</b>				<b>\$ 30,660.00</b>	
	Contingencies (10%)				\$ 3,070.00	
Note: These are estimates based on preliminary review of the site with no design nor specific numbers calculated. The exact values in the field may differ from above.				<b>TOTALS</b>	<b>\$ 33,730.00</b>	
Typed Name of Landowner / Operator						
Arthur Lutttig Trust						

Water Quality Trading Agreement:  
Village of Boaz and Timothy &  
Sara Eness

Document Number

Document Title

**340830**  
**DEBORAH J. MCCOY**  
**REGISTER OF DEEDS**  
**RICHLAND COUNTY, WI**  
**02/13/2025 03:46 PM**  
**REC FEE: 30.00 PAGES: 7**

Recording Area

Name and Return Address

Village of Boaz  
17010 State Highway 171  
Richland Center, WI 53581

Parcel Identification Number (PIN)

008-1944-1000

**THIS PAGE IS PART OF THIS LEGAL DOCUMENT – DO NOT REMOVE.**

This information must be completed by submitter: document title, name & return address, and PIN (if required). Other information such as the granting clause, legal description, etc., may be placed on this first page of the document or may be placed on additional pages of the document.

WRDA Rev. 12/22/2010

# Water Quality Trading Agreement: Village of Boaz and Timothy & Sara Eness

## Permittee Information

Credit User Name (Permittee) Village of Boaz	Permit Number WI-0036749-06-0
---	----------------------------------

Credit User Address 26404 Jackson Drive, Muscoda, WI 53573
---

Broker Name Richland County Land Conservation Division	Trade Agreement Number
---	------------------------

Broker Address			
Street Address 181 W Seminary Street	City Richland Center	State WI	ZIP Code 53581

Project Name Eness Bank Stabilization
--

Name of Credit Generator (Landowner/Operator) (Last, First, M.I.) Eness, Timothy & Sara
--

Street Address 25891 County Hwy E	City Muscoda	State WI	ZIP Code 53573
--------------------------------------	-----------------	-------------	-------------------

## Property Information

Name of Landowner(s) (if not Operator) (Last, First, M.I.) Eness, Timothy & Sara
---

Street Address 25891 County Hwy E	City Muscoda	State WI	ZIP Code 53573
--------------------------------------	-----------------	-------------	-------------------

Legal Description of Property - Contiguous sites under the same ownership: (add additional sheets if necessary)

Parcel Identification Numbers (PIN): 00819441000 beginning 350 feet south of NE property corner and terminating 850 feet south of NE property corner along west bank of Mill Creek.

Parcel ID(s): 00819441000
------------------------------

## Site Locator for Construction Projects

County	Township	Range	E/ W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Richland	10N	01W		19	SE ¼ of the SE ¼ W OF MILL CREEK EX N 20 RD
	N				
	N				
	N				

## Agreement

The property described above is enrolled in a Water Quality Trading Agreement. Funding is provided by the credit user to pay for the installation of best management practices (BMPs) on the described property which are designed to reduce phosphorous, a nonpoint source of pollution. This agreement commits the landowner/operator, their heirs or successors and assigns to maintain the BMPs and fulfill the trade agreement in perpetuity or release is filed by the credit user, whichever occurs first.

Plans which describe the BMPs, costs, installation schedule, and conditions are hereby incorporated into this agreement, are on file with the credit user and may be given to Wisconsin Department of Natural Resources (DNR) upon request by the DNR.

Landowner/Operator

Signed this 10 day of January, 20~~24~~<sup>25</sup>

Timothy & Sara Eness  
Signature of Operator

Sara Eness  
Signature of Landowner/Operator

Typed Name of Operator

Timothy & Sara Eness, Landowner  
Typed Name of Landowner/Operator

STATE OF WISCONSIN

Personally came before me this 10 day of January, 20~~24~~<sup>25</sup>

Richland County

ss. The above named Timothy & Sara Eness to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.



Taryne Ramsden  
Signature of Notary Public  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires 01-08-2028).

Landowners (if not operator)

If the landowner section is not completed, check (X) one or both of the following that apply

Landowner is also operator

Trade agreement contains only high residue management, nutrient management, pesticide management, cropland protection cover (green manure)

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20<sup>24</sup>

Signature of Landowner (if not operator)

Signature of Landowner (if not operator)

Typed Name of Landowner (if not operator)

Typed Name of Landowner (if not operator)

STATE OF WISCONSIN

Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20<sup>24</sup>

\_\_\_\_\_ County

ss. The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Credit User

Signed this 13<sup>th</sup> day of Feb, 20~~24~~<sup>25</sup>

Jean S. Nicks  
Signature of credit user

Village of Boaz  
Typed Name of credit user/broker/exchange

STATE OF WISCONSIN

Personally came before me this 13<sup>th</sup> day of Feb, 20~~24~~<sup>25</sup>

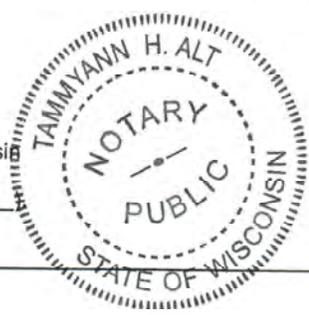
Richland County

ss. The above named Jean S. Nicks to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Tammynn H. Alt  
Signature of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires 10/26/2026)



Other Signer- Specify title or relationship: Richland County - Broker

Signed this 28<sup>th</sup> day of January, 2024.

Cathy Cooper  
Signature

Signature

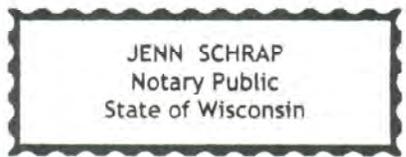
Cathy Cooper, Richland County  
Typed Name

Typed Name

STATE OF WISCONSIN  
Richland County

Personally came before me this 28<sup>th</sup> day of January, 2024.

ss. The above named Cathy Cooper to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.



Jenn Schrap  
Signature of Notary Public

Jenn Schrap  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires April 24, 2028).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

ss. The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

ss. The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Check this box if this page is purposely left blank.

## Section A – General Requirements

1. The following relationship has been established for this Water Quality Trading Agreement:
  - Village of Boaz will hereby be known as the Credit User.
  - The Richland County Land Conservation Division will be known as the Broker.
  - Tim & Sara Eness will be known as the Landowner/Operator & Credit Generator.
2. If any land covered by this agreement is transferred or otherwise changes ownership, this agreement will be held in obligation with the land for the full 20 years and the new owners will be obliged to comply with this agreement. Landowners are obliged to notify any prospective buyers of this agreement and their responsibilities under this agreement and applicable law.
3. This contract may be amended, by written mutual agreement of the parties, during the installation or maintenance period, if the proposed changes will provide equal or greater control of water pollution. For any changes in practice components or costs, the broker will determine eligibility and whether to approve such changes. Any increases to the project cost shall be approved in advance in writing by the Credit User.
4. Village of Boaz reserves the right to terminate this agreement if the Wisconsin Department of Natural Resources (DNR) does NOT approve the Water Quality Trading Plan (WQT). The WQT identifies this project for phosphorus credits to help the Village of Boaz wastewater treatment plant (WWTP). These credits are established in the WQT and has been analyzed as a cost-effective project. Should the DNR either deny or reduce the project credits which results in a higher cost per pound of phosphorus credit, then the Village of Boaz may terminate the agreement.
5. Village of Boaz reserves the right to terminate this agreement if the Village is unable to procure funding to cover the cost of the project, which would provide reasonable terms to the Village and its users.
6. The Broker reserves the right to enter the property to verify the information on the inspection report is accurate.
7. Any duly authorized officer, employee or representative of WDNR shall have the right to access and inspect the practices pursuant to Wis. Stat. 283.55(2) so long as this Agreement remains in effect.
8. **Hold Harmless.** The Credit User shall defend, indemnify and hold the Broker, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the negligence of the Broker.

## Section B – Credit User

1. The Credit User is responsible for all monetary costs incurred with the BMP practice installation, which includes but is not limited to site preparation, clearing, ensuring planned grades; stream shaping; rock riprap and installation; liming, fertilizing, seeding and mulching.
2. The Credit User shall have the right to access the property for inspection or maintenance. If a natural disaster impacts the BMPs and causes damage that reduces phosphorus credits, the credit user has the option of paying the cost of repairs or releasing this agreement.
3. The Credit User shall discuss with the Credit Generator options for access so as to not negatively impact the property as a whole and to avoid disturbing Credit Users farming operation.

## Section C – Landowner/Operator Shall:

1. Compliance with this agreement shall be for a period of **20 years** from the completion of construction. During this period, BMPs must be maintained or replaced with a practice that ensures continued compliance with the applicable performance standard. If the practice is damaged by a catastrophic event, the Landowner is not obligated to make repairs.
2. If any land covered by this agreement is transferred or otherwise changes ownership, this agreement will be held in obligation with the land and the new owners will be obligated to comply with this agreement for the 20 year period following completion of construction. Landowners are obligated to notify any prospective buyers of this agreement and their responsibilities under this agreement and applicable law.
3. The Landowners agree to repay all project costs to the credit user, upon demand by the Broker, if the Landowner fails to comply with the terms of this agreement. Repayment shall not be required if a practice(s) is rendered ineffective due to circumstances which are beyond the control of the Landowner.
4. The Landowner/Operator shall inspect riprap and streambank at least annually and after heavy storms. Broker should be contacted immediately and directly if any damage has occurred. The Broker will determine the cause, extent, and projected costs of the repair. If the damage occurred due to no fault of the Landowner, the 100% cost of repairs will be covered by the Credit User. The Broker will determine the cause of the damage.
5. The Landowner/Operator shall develop and implement a Rotational Grazing Plan to control and limit livestock access to the restored streambanks. Ensure that debris is removed from the channel and that vegetation is controlled around the channel only when the vegetation or obstructions are threatening stream function. Invasive vegetation should be controlled, and channel obstructions deemed harmful may be removed. Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall

only be performed when they are causing or could cause unacceptable bank erosion, flow restriction, or damage to structures. Habitat forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to the extent possible.

6. Check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and replanted by Landowner as soon as possible with a seed mix pre-approved by the Broker.
7. Periodically mow the vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 20-foot buffer from the top of the bank.
8. Eliminate all burrowing rodents and repair damage caused by them.
9. Maintain the project consistent with NRCS technical standard 580.
10. Installation of these practices brings the Landowner into compliance with the applicable state and local performance standards listed below. Compliance with these performance standards shall be in perpetuity. These practices must be maintained or replaced with a practice which ensures continued compliance with the following N.R. 151 performance standards:
  - N.R. 151.03 Tillage Setback
  - N.R. 151.06 Clean Water Diversion
  - N.R. 151.08 Manure Management Prohibitions

#### Section D. Broker

1. The Broker will be responsible for the oversight of BMP practice design, project bidding, contractor construction agreements, inspection of site preparation, project design, BMP installation oversight, regulation of applicable performance standards, annual inspections and monitoring of landowners' obligations in the form of performing on-site checks as needed. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.

TA Number	Typed Name of Landowner/Operator	Initials of Landowner/Operator	Date
	Timothy & Sara Eness	TE SE	1-16-25

2. The Broker will ensure the contract is recorded in the Richland County Register of Deeds office.
3. The Broker agrees to complete annual inspections.

Drafted by: Carson Hackett  
Davy Engineering Co.

# Water Quality Trading Agreement: Village of Boaz and John Halink

## Permittee Information

Credit User Name (Permittee) Village of Boaz	Permit Number WI-0036749-06-0
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Credit User Address  
26404 Jackson Drive, Muscodia, WI 53573

Broker Name Richland County Land Conservation Division	Trade Agreement Number
---	------------------------

Broker Address

Street Address 181 W Seminary Street	City Richland Center	State WI	ZIP Code 53581
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Project Name  
John Halink Bank Stabilization

Name of Credit Generator (Landowner/Operator) (Last, First, M.I.)  
Halink, John / Halink, Dale

Street Address 24298 County Hwy Z	City Richland Center	State WI	ZIP Code 53581
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## Property Information

Name of Landowner(s) (if not Operator) (Last, First, M.I.)  
Halink, John

Street Address 24298 County Hwy Z	City Richland Center	State WI	ZIP Code 53581
--------------------------------------	-------------------------	-------------	-------------------

Legal Description of Property - Contiguous sites under the same ownership: (add additional sheets if necessary)

Parcel Identification Numbers (PIN): 00817131000, 00817335000, 10620226000

Parcel ID(s):  
00817131000, 00817335000, 10620226000

## Site Locator for Construction Projects

County	Township	Range	E/ W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Richland	10N	01W		17	SW ¼ of the NE ¼
Richland	10N	01W		17	W ½ of the SW ¼
Richland	10N	01W		20	NW ¼ of the NW ¼
	N				

## Agreement

The property described above is enrolled in a Water Quality Trading Agreement. Funding is provided by the credit user to pay for the installation of best management practices (BMPs) on the described property which are designed to reduce phosphorous, a nonpoint source of pollution. This agreement commits the landowner/operator, their heirs or successors and assigns to maintain the BMPs and fulfill the trade agreement in perpetuity or release is filed by the credit user, whichever occurs first.

**Plans which describe the BMPs, costs, installation schedule, and conditions are hereby incorporated into this agreement, are on file with the credit user and may be given to Wisconsin Department of Natural Resources (DNR) upon request by the DNR.**

Landowner/Operator

Signed this 12 day of December, 2023.

Signature of Operator

x Dale Halink  
Signature of Landowner/Operator

Typed Name of Operator

Dale Halink, Operator  
Typed Name of Landowner/Operator

STATE OF WISCONSIN

) Personally came before me this 12 day of December, 2023.

\_\_\_\_\_ County

) ss. The above named Dale Halink to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.

Cheryl Dull  
Signature of Notary Public

Cheryl E. Dull  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires 5-17-2027).

Landowners (if not operator)

If the landowner section is not completed, check (X) one or both of the following that apply

Landowner is also operator

Trade agreement contains only high residue management, nutrient management, pesticide management, cropland protection cover (green manure)

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

Signature of Landowner (if not operator)

Signature of Landowner (if not operator)

Typed Name of Landowner (if not operator)

Typed Name of Landowner (if not operator)

STATE OF WISCONSIN

) Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

\_\_\_\_\_ County

) ss. The above named \_\_\_\_\_ to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Credit User

Signed this 18th day of Dec, 2023.

Signature of credit user

Village of Boaz  
Typed Name of credit user/broker/exchange

STATE OF WISCONSIN

) Personally came before me this 18th day of Dec, 2023.

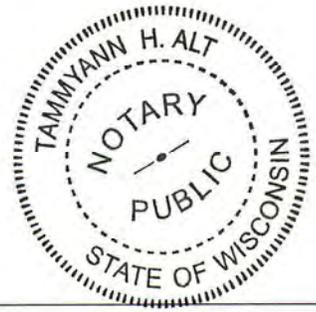
Richland County

) ss. The above named Jean Nicks to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.

Tammyann H. Alt  
Signature of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires 10/26/2026).



Other Signer- Specify title or relationship: Richland County - Broker

Signed this 12 day of December, 2023.

Cathy Cooper  
Signature

Signature

Cathy Cooper, Richland County  
Typed Name

Typed Name

STATE OF WISCONSIN  
Richland County

} Personally came before me this 12 day of December, 2023.

} ss. The above named Cathy Cooper to me known to be  
the person(s) who executed the foregoing instrument and acknowledge the same.

Cheryl S. Dull  
Signature of Notary Public

Cheryl E. Dull  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires 5-17-2027).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

} Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

} ss. The above named \_\_\_\_\_ to me known to be  
the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

} Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

} ss. The above named \_\_\_\_\_ to me known to be  
the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Check this box if this page is purposely left blank.

## Section A – General Requirements

1. The following relationship has been established for this Water Quality Trading Agreement:
  - Village of Boaz will hereby be known as the Credit User.
  - The Richland County Land Conservation Division will be known as the Broker.
  - John or Dale Halink will be known as the Landowner/Operator.
2. This contract may be amended, by written mutual agreement of the parties, during the installation or maintenance period, if the proposed changes will provide equal or greater control of water pollution. For any changes in practice components or costs, the broker will determine eligibility and whether to approve such changes. Any increases to the project cost shall be approved in advance in writing by the Credit User.
3. Village of Boaz reserves the right to terminate this agreement if the Wisconsin Department of Natural Resources (DNR) does NOT approve the Water Quality Trading Plan (WQT). The WQT identifies this project for phosphorus credits to help the Village of Boaz wastewater treatment plant (WWTP). These credits are established in the WQT and has been analyzed as a cost-effective project. Should the DNR either deny or reduce the project credits which results in a higher cost per pound of phosphorus credit, then the Village of Boaz may terminate the agreement.
4. Village of Boaz reserves the right to terminate this agreement if the Village is unable to procure funding to cover the cost of the project, which would provide reasonable terms to the Village and its users.
5. The Broker reserves the right to enter the property to verify the information on the inspection report is accurate.
6. Any duly authorized officer, employee or representative of WDNR shall have the right to access and inspect the practices pursuant to Wis. Stat. 283.55(2) so long as this Agreement remains in effect.
7. **Hold Harmless.** The Credit User shall defend, indemnify and hold the Broker, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the negligence of the Broker.

## Section B – Credit User

1. The Credit User is responsible for all monetary costs incurred with the BMP practice installation, which includes but is not limited to site preparation, clearing, ensuring planned grades; stream shaping; rock riprap and installation; liming, fertilizing, seeding and mulching.
2. The Credit User shall have the right to access the property for inspection or maintenance. If a natural disaster impacts the BMPs and causes damage that reduces phosphorus credits, the credit user has the option of paying the cost of repairs or releasing this agreement.

## Section C – Landowner/Operator Shall:

1. If any land covered by this agreement is transferred or otherwise changes ownership, this agreement will be held in obligation with the land in perpetuity and the new owners will be obligated to comply with this agreement. Landowners are obligated to notify any prospective buyers of this agreement and their responsibilities under this agreement and applicable law.
2. The Landowners agree to repay all project costs to the credit user, upon demand by the Broker, if the Landowner fails to comply with the terms of this agreement. Repayment shall not be required if a practice(s) is rendered ineffective due to circumstances which are beyond the control of the Landowner.
3. The Landowner/Operator shall inspect riprap and streambank at least annually and after heavy storms. Broker should be contacted immediately and directly if any damage has occurred. The Broker will determine the cause, extent, and projected costs of the repair. If the damage occurred due to no fault of the Landowner, the cost of repairs will be shared between Landowner and Credit User. If the costs are under \$1000, costs will be split 50% between Landowner and Credit User. If over \$1,000, costs will be split 80% Credit User, 20% Landowner. If damage was due to Landowner negligence, Landowner will be responsible for 100% of the Costs. The Broker will determine the cause of the damage.
4. The Landowner/Operator shall develop and implement a Rotational Grazing Plan to control and limit livestock access to the restored streambanks. Ensure that debris is removed from the channel and that vegetation is controlled around the channel only when the vegetation or obstructions are threatening stream function. Invasive vegetation should be controlled, and channel obstructions deemed harmful may be removed. Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall only be performed when they are causing or could cause unacceptable bank erosion, flow restriction, or damage to structures. Habitat forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to the extent possible.
5. Check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and replanted by Landowner as soon as possible with a seed mix pre-approved by the Broker.
6. Periodically mow the vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 20-foot buffer from the top of the bank.

7. Eliminate all burrowing rodents and repair damage caused by them.
8. Maintain the project consistent with NRCS technical standard 580.
9. Installation of these practices brings the Landowner into compliance with the applicable state and local performance standards listed below. Compliance with these performance standards shall be in perpetuity. These practices must be maintained or replaced with a practice which ensures continued compliance with the following N.R. 151 performance standards:
  - N.R. 151.03 Tillage Setback
  - N.R. 151.06 Clean Water Diversion
  - N.R. 151.08 Manure Management Prohibitions

**Section D. Broker**

1. The Broker will be responsible for the oversight of BMP practice design, project bidding, contractor construction agreements, inspection of site preparation, project design, BMP installation oversight, regulation of applicable performance standards, annual inspections and monitoring of landowners' obligations in the form of performing on-site checks as needed. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.
2. The Broker will ensure the contract is recorded in the Richland County Register of Deeds office.
3. The Broker agrees to complete annual inspections.

TA Number	Typed Name of Landowner/Operator Dale Halink	Initials of Landowner/Operator D.H.	Date 12-12-23
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# Water Quality Trading Agreement: Village of Boaz and Michael & Jane Killoy (Village View Dairy Inc.)

**Permittee Information**

Credit User Name (Permittee) Village of Boaz	Permit Number WI-0036749-06-0
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Credit User Address  
26404 Jackson Drive, Muscoda, WI 53573

Broker Name Richland County Land Conservation Division	Trade Agreement Number
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Broker Address

Street Address 181 W Seminary Street	City Richland Center	State WI	ZIP Code 53581
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Project Name  
Village View Dairy Bank Stabilization

Name of Credit Generator (Landowner/Operator) (Last, First, M.I.)  
Village View Dairy / Killoy, Michael & Jane

Street Address 25611 Jackson St.	City Muscoda	State WI	ZIP Code 53573
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**Property Information**

Name of Landowner(s) (if not Operator) (Last, First, M.I.)  
Village View Dairy / Killoy, Michael & Jane

Street Address 25611 Jackson St.	City Muscoda	State WI	ZIP Code 53573
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Legal Description of Property - Contiguous sites under the same ownership: (add additional sheets if necessary)

Parcel Identification Numbers (PIN): 10619412000, 00819411000

Parcel ID(s):  
10619412000, 00819411000

**Site Locator for Construction Projects**

County	Township	Range	E/ W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Richland	10N	01W		19	NE ¼ of the SE ¼
Richland	10N	01W		19	S ½ NE ¼ of the SE ¼
	N				
	N				

**Agreement**

The property described above is enrolled in a Water Quality Trading Agreement. Funding is provided by the credit user to pay for the installation of best management practices (BMPs) on the described property which are designed to reduce phosphorous, a nonpoint source of pollution. This agreement commits the landowner/operator, their heirs or successors and assigns to maintain the BMPs and fulfill the trade agreement in perpetuity or release is filed by the credit user, whichever occurs first.

**Plans which describe the BMPs, costs, installation schedule, and conditions are hereby incorporated into this agreement, are on file with the credit user and may be given to Wisconsin Department of Natural Resources (DNR) upon request by the DNR.**

Landowner/Operator

Signed this 18<sup>th</sup> day of December, 2023

Signature of Operator

Michael & Jane Killoy  
Signature of Landowner/Operator

Typed Name of Operator

Michael & Jane Killoy, Landowner  
Typed Name of Landowner/Operator

STATE OF WISCONSIN



Personally came before me this 18<sup>th</sup> day of December, 2023

ss. The above named Michael Killoy + Jane Killoy to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Jackie E Nix  
Signature of Notary Public

Jackie E Nix  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires December 31, 2025)

Landowners (if not operator)

If the landowner section is not completed, check (X) one or both of the following that apply

Landowner is also operator

Trade agreement contains only high residue management, nutrient management, pesticide management, cropland protection cover (green manure)

Signed this 16<sup>th</sup> day of January, 2023 24

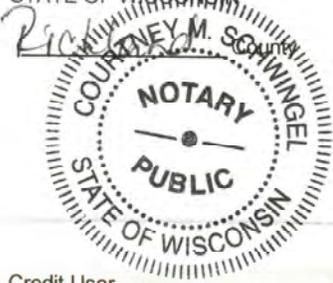
Signature of Landowner (if not operator)

Signature of Landowner (if not operator)

Typed Name of Landowner (if not operator)

Typed Name of Landowner (if not operator)

STATE OF WISCONSIN



Personally came before me this 16<sup>th</sup> day of January, 2023 24

ss. The above named Jean Nicks to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Courtney M. Schwengel  
Signature of Notary Public

Courtney M. Schwengel  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires 11-13-26)

Credit User

Signed this 16<sup>th</sup> day of Jan, 2023 24

Signature of credit user

Village of Boaz  
Typed Name of credit user/broker/exchange

STATE OF WISCONSIN

Richland County

Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

ss. The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public  
Notary Public Richland County, Wisconsin  
My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: Richland County – Broker

Signed this 3rd day of January, 20~~23~~<sup>24</sup>.

Signature Cathy Cooper

Signature \_\_\_\_\_

Cathy Cooper, Richland County  
Typed Name

Typed Name \_\_\_\_\_



} Personally came before me this 3rd day of January, 20~~23~~<sup>24</sup>.

} ss. The above named Cathy Cooper to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public [Signature]

Typed Name of Notary Public Jackie E Nix

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Signature \_\_\_\_\_

Signature \_\_\_\_\_

Typed Name \_\_\_\_\_

Typed Name \_\_\_\_\_

STATE OF WISCONSIN  
\_\_\_\_\_ County

} Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

} ss. The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public \_\_\_\_\_

Typed Name of Notary Public \_\_\_\_\_

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Signature \_\_\_\_\_

Signature \_\_\_\_\_

Typed Name \_\_\_\_\_

Typed Name \_\_\_\_\_

STATE OF WISCONSIN  
\_\_\_\_\_ County

} Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

} ss. The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public \_\_\_\_\_

Typed Name of Notary Public \_\_\_\_\_

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Check this box if this page is purposely left blank.

## Section A – General Requirements

1. The following relationship has been established for this Water Quality Trading Agreement:
  - Village of Boaz will hereby be known as the Credit User.
  - The Richland County Land Conservation Division will be known as the Broker.
  - Michael & Jane Killoy will be known as the Landowner/Operator.
2. This contract may be amended, by written mutual agreement of the parties, during the installation or maintenance period, if the proposed changes will provide equal or greater control of water pollution. For any changes in practice components or costs, the broker will determine eligibility and whether to approve such changes. Any increases to the project cost shall be approved in advance in writing by the Credit User.
3. Village of Boaz reserves the right to terminate this agreement if the Wisconsin Department of Natural Resources (DNR) does NOT approve the Water Quality Trading Plan (WQT). The WQT identifies this project for phosphorus credits to help the Village of Boaz wastewater treatment plant (WWTP). These credits are established in the WQT and has been analyzed as a cost-effective project. Should the DNR either deny or reduce the project credits which results in a higher cost per pound of phosphorus credit, then the Village of Boaz may terminate the agreement.
4. Village of Boaz reserves the right to terminate this agreement if the Village is unable to procure funding to cover the cost of the project, which would provide reasonable terms to the Village and its users.
5. The Broker reserves the right to enter the property to verify the information on the inspection report is accurate.
6. Any duly authorized officer, employee or representative of WDNR shall have the right to access and inspect the practices pursuant to Wis. Stat. 283.55(2) so long as this Agreement remains in effect.
7. **Hold Harmless.** The Credit User shall defend, indemnify and hold the Broker, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the negligence of the Broker.

## Section B – Credit User

1. The Credit User is responsible for all monetary costs incurred with the BMP practice installation, which includes but is not limited to site preparation, clearing, ensuring planned grades; stream shaping; rock riprap and installation; liming, fertilizing, seeding and mulching.
2. The Credit User shall have the right to access the property for inspection or maintenance. If a natural disaster impacts the BMPs and causes damage that reduces phosphorus credits, the credit user has the option of paying the cost of repairs or releasing this agreement.

## Section C – Landowner/Operator Shall:

1. If any land covered by this agreement is transferred or otherwise changes ownership, this agreement will be held in obligation with the land in perpetuity and the new owners will be obligated to comply with this agreement. Landowners are obligated to notify any prospective buyers of this agreement and their responsibilities under this agreement and applicable law.
2. The Landowners agree to repay all project costs to the credit user, upon demand by the Broker, if the Landowner fails to comply with the terms of this agreement. Repayment shall not be required if a practice(s) is rendered ineffective due to circumstances which are beyond the control of the Landowner.
3. The Landowner/Operator shall inspect riprap and streambank at least annually and after heavy storms. Broker should be contacted immediately and directly if any damage has occurred. The Broker will determine the cause, extent, and projected costs of the repair. If the damage occurred due to no fault of the Landowner, the cost of repairs will be shared between Landowner and Credit User. If the costs are under \$1000, costs will be split 50% between Landowner and Credit User. If over \$1,000, costs will be split 80% Credit User, 20% Landowner. If damage was due to Landowner negligence, Landowner will be responsible for 100% of the Costs. The Broker will determine the cause of the damage.
4. The Landowner/Operator shall develop and implement a Rotational Grazing Plan, if necessary, to control and limit livestock access to the restored streambanks. Other methods of cattle rotation that will protect the streambanks may be acceptable. Ensure that debris is removed from the channel and that vegetation is controlled around the channel only when the vegetation or obstructions are threatening stream function. Invasive vegetation should be controlled, and channel obstructions deemed harmful may be removed. Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall only be performed when they are causing or could cause unacceptable bank erosion, flow restriction, or damage to structures. Habitat forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to the extent possible.
5. Check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and replanted by Landowner as soon as possible with a seed mix pre-approved by the Broker.
6. Periodically mow the vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 20-foot buffer from the top of the bank.

7. Eliminate all burrowing rodents and repair damage caused by them.
8. Maintain the project consistent with NRCS technical standard 580.
9. Installation of these practices brings the Landowner into compliance with the applicable state and local performance standards listed below. Compliance with these performance standards shall be in perpetuity. These practices must be maintained or replaced with a practice which ensures continued compliance with the following N.R. 151 performance standards:
  - N.R. 151.03 Tillage Setback
  - N.R. 151.06 Clean Water Diversion
  - N.R. 151.08 Manure Management Prohibitions

**Section D. Broker**

1. The Broker will be responsible for the oversight of BMP practice design, project bidding, contractor construction agreements, inspection of site preparation, project design, BMP installation oversight, regulation of applicable performance standards, annual inspections and monitoring of landowners' obligations in the form of performing on-site checks as needed. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.
2. The Broker will ensure the contract is recorded in the Richland County Register of Deeds office.
3. The Broker agrees to complete annual inspections.

TA Number	Typed Name of Landowner/Operator	Initials of Landowner/Operator	Date
	Michael & Jane Killoy	MK JK	12-18-23



# Water Quality Trading Agreement: Village of Boaz and Everett & Lori Newberry Irrevocable Trust

## Permittee Information

Credit User Name (Permittee) Village of Boaz	Permit Number WI-0036749-06-0
---	----------------------------------

Credit User Address  
26404 Jackson Drive, Muscoda, WI 53573

Broker Name Richland County Land Conservation Division	Trade Agreement Number
---	------------------------

Broker Address

Street Address 181 W Seminary Street	City Richland Center	State WI	ZIP Code 53581
---	-------------------------	-------------	-------------------

Project Name  
Everett Newberry Bank Stabilization

Name of Credit Generator (Landowner/Operator) (Last, First, M.I.)  
Newberry, Everett & Lori

Street Address 21941 County Hwy Z	City Richland Center	State WI	ZIP Code 53581
--------------------------------------	-------------------------	-------------	-------------------

Property Information

Name of Landowner(s) (if not Operator) (Last, First, M.I.)  
Newberry, Everett & Lori (Irrevocable Trust) named grantees Jeremy Newberry, Jenna Morales, and Tammy Wheelock

Street Address 21941 County Hwy Z	City Richland Center	State WI	ZIP Code 53581
--------------------------------------	-------------------------	-------------	-------------------

Legal Description of Property - Contiguous sites under the same ownership: (add additional sheets if necessary)

Parcel Identification Numbers (PIN): 00804221000, 0183334000

Parcel ID(s):  
00804221000, 01833340000

## Site Locator for Construction Projects

County	Township	Range	E/ W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Richland	10N	01W		04	Part of NW ¼ of the NW ¼
Richland	11N	01W		33	SE ¼ of the SW ¼
	N				
	N				

**Agreement**

The property described above is enrolled in a Water Quality Trading Agreement. Funding is provided by the credit user to pay for the installation of best management practices (BMPs) on the described property which are designed to reduce phosphorous, a nonpoint source of pollution. This agreement commits the landowner/operator, their heirs or successors and assigns to maintain the BMPs and fulfill the trade agreement in perpetuity or release is filed by the credit user, whichever occurs first.

**Plans which describe the BMPs, costs, installation schedule, and conditions are hereby incorporated into this agreement, are on file with the credit user and may be given to Wisconsin Department of Natural Resources (DNR) upon request by the DNR.**

Landowner/Operator

Signed this 5 day of December, 2023.

Signature of Operator

Everett & Lori Newberry  
Signature of Landowner/Operator

Typed Name of Operator

Everett & Lori Newberry Irrevocable Trust, Landowner  
Typed Name of Landowner/Operator

STATE OF WISCONSIN ) Personally came before me this 5 day of December, 2023.

Richland County

) ss. The above named Everett + Lori Newberry to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Cheryl E. Dull  
Signature of Notary Public

Cheryl E. Dull  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires 5-17-2027).

Landowners (if not operator)

If the landowner section is not completed, check (X) one or both of the following that apply

- Landowner is also operator
- Trade agreement contains only high residue management, nutrient management, pesticide management, cropland protection cover (green manure)

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

Signature of Landowner (if not operator)

Signature of Landowner (if not operator)

Typed Name of Landowner (if not operator)

Typed Name of Landowner (if not operator)

STATE OF WISCONSIN ) Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

\_\_\_\_\_ County

) ss. The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Credit User

Signed this 18th day of Dec, 2023.

Signature of credit user

Village of Boaz  
Typed Name of credit user/broker/exchange

STATE OF WISCONSIN ) Personally came before me this 18th day of Dec, 2023.

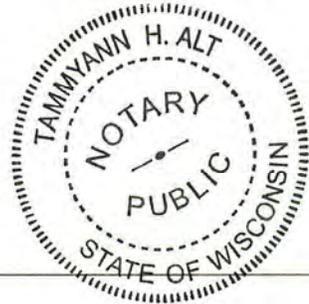
Richland County

) ss. The above named Jean Nicks to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Tammynn H. Alt  
Signature of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires 10/24/2026).



Other Signer- Specify title or relationship: Richland County – Broker

Signed this 5 day of December, 2023.

Cathy Cooper  
Signature

Signature

Cathy Cooper, Richland County  
Typed Name

Typed Name

STATE OF WISCONSIN  
Richland County

} Personally came before me this 5 day of December, 2023.

} ss. The above named Cathy Cooper to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Cheryl S. Dull  
Signature of Notary Public

Cheryl E. Dull  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires 5-17-2027).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

} Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

} ss. The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

} Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_.

} ss. The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Check this box if this page is purposely left blank.

## Section A – General Requirements

1. The following relationship has been established for this Water Quality Trading Agreement:
  - Village of Boaz will hereby be known as the Credit User.
  - The Richland County Land Conservation Division will be known as the Broker.
  - Everett & Lori Newberry Irrevocable Trust will be known as the Landowner/Operator.
2. This contract may be amended, by written mutual agreement of the parties, during the installation or maintenance period, if the proposed changes will provide equal or greater control of water pollution. For any changes in practice components or costs, the broker will determine eligibility and whether to approve such changes. Any increases to the project cost shall be approved in advance in writing by the Credit User.
3. Village of Boaz reserves the right to terminate this agreement if the Wisconsin Department of Natural Resources (DNR) does NOT approve the Water Quality Trading Plan (WQT). The WQT identifies this project for phosphorus credits to help the Village of Boaz wastewater treatment plant (WWTP). These credits are established in the WQT and has been analyzed as a cost-effective project. Should the DNR either deny or reduce the project credits which results in a higher cost per pound of phosphorus credit, then the Village of Boaz may terminate the agreement.
4. Village of Boaz reserves the right to terminate this agreement if the Village is unable to procure funding to cover the cost of the project, which would provide reasonable terms to the Village and its users.
5. The Broker reserves the right to enter the property to verify the information on the inspection report is accurate.
6. Any duly authorized officer, employee or representative of WDNR shall have the right to access and inspect the practices pursuant to Wis. Stat. 283.55(2) so long as this Agreement remains in effect.
7. **Hold Harmless.** The Credit User shall defend, indemnify and hold the Broker, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the negligence of the Broker.

## Section B – Credit User

1. The Credit User is responsible for all monetary costs incurred with the BMP practice installation, which includes but is not limited to site preparation, clearing, ensuring planned grades; stream shaping; rock riprap and installation; liming, fertilizing, seeding and mulching.
2. The Credit User shall have the right to access the property for inspection or maintenance. If a natural disaster impacts the BMPs and causes damage that reduces phosphorus credits, the credit user has the option of paying the cost of repairs or releasing this agreement.

## Section C – Landowner/Operator Shall:

1. If any land covered by this agreement is transferred or otherwise changes ownership, this agreement will be held in obligation with the land in perpetuity and the new owners will be obligated to comply with this agreement. Landowners are obligated to notify any prospective buyers of this agreement and their responsibilities under this agreement and applicable law.
2. The Landowners agree to repay all project costs to the credit user, upon demand by the Broker, if the Landowner fails to comply with the terms of this agreement. Repayment shall not be required if a practice(s) is rendered ineffective due to circumstances which are beyond the control of the Landowner.
3. The Landowner/Operator shall inspect riprap and streambank at least annually and after heavy storms. Broker should be contacted immediately and directly if any damage has occurred. The Broker will determine the cause, extent, and projected costs of the repair. If the damage occurred due to no fault of the Landowner, the cost of repairs will be shared between Landowner and Credit User. If the costs are under \$1000, costs will be split 50% between Landowner and Credit User. If over \$1,000, costs will be split 80% Credit User, 20% Landowner. If damage was due to Landowner negligence, Landowner will be responsible for 100% of the Costs. The Broker will determine the cause of the damage.
4. The Landowner/Operator shall develop and implement a Rotational Grazing Plan to control and limit livestock access to the restored streambanks. Ensure that debris is removed from the channel and that vegetation is controlled around the channel only when the vegetation or obstructions are threatening stream function. Invasive vegetation should be controlled, and channel obstructions deemed harmful may be removed. Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall only be performed when they are causing or could cause unacceptable bank erosion, flow restriction, or damage to structures. Habitat forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to the extent possible.
5. Check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and replanted by Landowner as soon as possible with a seed mix pre-approved by the Broker.
6. Periodically mow the vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 20-foot buffer from the top of the bank.

7. Eliminate all burrowing rodents and repair damage caused by them.
8. Maintain the project consistent with NRCS technical standard 580.
9. Installation of these practices brings the Landowner into compliance with the applicable state and local performance standards listed below. Compliance with these performance standards shall be in perpetuity. These practices must be maintained or replaced with a practice which ensures continued compliance with the following N.R. 151 performance standards:
  - N.R. 151.03 Tillage Setback
  - N.R. 151.06 Clean Water Diversion
  - N.R. 151.08 Manure Management Prohibitions

**Section D. Broker**

1. The Broker will be responsible for the oversight of BMP practice design, project bidding, contractor construction agreements, inspection of site preparation, project design, BMP installation oversight, regulation of applicable performance standards, annual inspections and monitoring of landowners' obligations in the form of performing on-site checks as needed. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.
2. The Broker will ensure the contract is recorded in the Richland County Register of Deeds office.
3. The Broker agrees to complete annual inspections.

TA Number	Typed Name of Landowner/Operator	Initials of Landowner/Operator	Date
	Everett & Lori Newberry Irrevocable Trust	EN	12-26-2023

# Water Quality Trading Agreement: Village of Boaz and Gary & Karen Olson

## Permittee Information

Credit User Name (Permittee) Village of Boaz	Permit Number WI-0036749-06-0
---	----------------------------------

Credit User Address  
26404 Jackson Drive, Muscoda, WI 53573

Broker Name Richland County Land Conservation Division	Trade Agreement Number
---	------------------------

## Broker Address

Street Address 181 W Seminary Street	City Richland Center	State WI	ZIP Code 53581
---	-------------------------	-------------	-------------------

Project Name  
Olson Bank Stabilization

Name of Credit Generator (Landowner/Operator) (Last, First, M.I.)  
Olson, Gary & Karen

Street Address 12075 Cook Road	City Richland Center	State WI	ZIP Code 53581
-----------------------------------	-------------------------	-------------	-------------------

## Property Information

Name of Landowner(s) (if not Operator) (Last, First, M.I.)  
Olson, Gary & Karen

Street Address State Hwy 171 & Oscar Ln.	City Muscoda	State WI	ZIP Code 53573
---	-----------------	-------------	-------------------

Legal Description of Property - Contiguous sites under the same ownership: (add additional sheets if necessary)

Parcel Identification Numbers (PIN): 00819210000, 00819120000

Parcel ID(s):  
00819210000, 00819120000

## Site Locator for Construction Projects

County	Township	Range	E/ W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Richland	10N	01W		19	NE ¼ of the NW ¼
Richland	11N	01W		19	NW ¼ of the NE ¼
	N				
	N				

## Agreement

The property described above is enrolled in a Water Quality Trading Agreement. Funding is provided by the credit user to pay for the installation of best management practices (BMPs) on the described property which are designed to reduce phosphorous, a nonpoint source of pollution. This agreement commits the landowner/operator, their heirs or successors and assigns to maintain the BMPs and fulfill the trade agreement in perpetuity or release is filed by the credit user, whichever occurs first.

Plans which describe the BMPs, costs, installation schedule, and conditions are hereby incorporated into this agreement, are on file with the credit user and may be given to Wisconsin Department of Natural Resources (DNR) upon request by the DNR.

Landowner/Operator

Signed this 9 day of February, 20<sup>24</sup>

Signature of Operator

*\* Gary & Karen Olson*  
Signature of Landowner/Operator

Typed Name of Operator

Gary & Karen Olson, Landowner  
Typed Name of Landowner/Operator

STATE OF WISCONSIN

Personally came before me this 9 day of February, 20<sup>24</sup>

Richland County

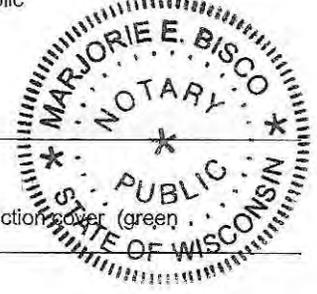
) ss. The above named Gary Lee Olson to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.

*Marjorie E. Bisco*  
Signature of Notary Public

Marjorie E. Bisco  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires 10-13-2024).



Landowners (if not operator)

If the landowner section is not completed, check (X) one or both of the following that apply

Landowner is also operator

Trade agreement contains only high residue management, nutrient management, pesticide management, cropland protection cover (green manure)

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20<sup>23</sup>

Signature of Landowner (if not operator)

Signature of Landowner (if not operator)

Typed Name of Landowner (if not operator)

Typed Name of Landowner (if not operator)

STATE OF WISCONSIN

Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20<sup>23</sup>

\_\_\_\_\_ County

) ss. The above named \_\_\_\_\_ to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Credit User

Signed this 23<sup>rd</sup> day of February, 20<sup>24</sup>

*Jean S. Nicks*  
Signature of credit user

Village of Boaz  
Typed Name of credit user/broker/exchange

STATE OF WISCONSIN

Personally came before me this 23<sup>rd</sup> day of February, 20<sup>24</sup>

Richland County

) ss. The above named Jean S Nicks to me known to be  
) the person(s) who executed the foregoing instrument and acknowledge the same.



Miranda A Welig  
Signature of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires 10-15-2007).

Other Signer- Specify title or relationship: Richland County – Broker

Signed this 12th day of February, 2023-24.

Cathy Cooper  
Signature

Signature

Cathy Cooper, Richland County  
Typed Name

Typed Name



Personally came before me this 12th day of February, 2023-24

ss. The above named Cathy Cooper to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Jackie E Nix  
Signature of Notary Public

Jackie E Nix  
Typed Name of Notary Public

Notary Public Richland County, Wisconsin

My commission (is permanent) (expires December 26, 2025).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

ss. The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Other Signer- Specify title or relationship: \_\_\_\_\_

Signed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN  
\_\_\_\_\_ County

Personally came before me this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_\_.

ss. The above named \_\_\_\_\_ to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Signature of Notary Public

Typed Name of Notary Public

Notary Public \_\_\_\_\_ County, Wisconsin

My commission (is permanent) (expires \_\_\_\_\_).

Check this box if this page is purposely left blank.

## Section A – General Requirements

1. The following relationship has been established for this Water Quality Trading Agreement:
  - Village of Boaz will hereby be known as the Credit User.
  - The Richland County Land Conservation Division will be known as the Broker.
  - Gary & Karen Olson will be known as the Landowner/Operator.
2. This contract may be amended, by written mutual agreement of the parties, during the installation or maintenance period, if the proposed changes will provide equal or greater control of water pollution. For any changes in practice components or costs, the broker will determine eligibility and whether to approve such changes. Any increases to the project cost shall be approved in advance in writing by the Credit User.
3. Village of Boaz reserves the right to terminate this agreement if the Wisconsin Department of Natural Resources (DNR) does NOT approve the Water Quality Trading Plan (WQT). The WQT identifies this project for phosphorus credits to help the Village of Boaz wastewater treatment plant (WWTP). These credits are established in the WQT and has been analyzed as a cost-effective project. Should the DNR either deny or reduce the project credits which results in a higher cost per pound of phosphorus credit, then the Village of Boaz may terminate the agreement.
4. Village of Boaz reserves the right to terminate this agreement if the Village is unable to procure funding to cover the cost of the project, which would provide reasonable terms to the Village and its users.
5. The Broker reserves the right to enter the property to verify the information on the inspection report is accurate.
6. Any duly authorized officer, employee or representative of WDNR shall have the right to access and inspect the practices pursuant to Wis. Stat. 283.55(2) so long as this Agreement remains in effect.
7. **Hold Harmless.** The Credit User shall defend, indemnify and hold the Broker, its officers, officials, employees and volunteers harmless from any and all claims, injuries, damages, losses or suits including attorney fees, arising out of or in connection with the performance of this Agreement, except for injuries and damages caused by the negligence of the Broker.

## Section B – Credit User

1. The Credit User is responsible for all monetary costs incurred with the BMP practice installation, which includes but is not limited to site preparation, clearing, ensuring planned grades; stream shaping; rock riprap and installation; liming, fertilizing, seeding and mulching.
2. The Credit User shall have the right to access the property for inspection or maintenance. If a natural disaster impacts the BMPs and causes damage that reduces phosphorus credits, the credit user has the option of paying the cost of repairs or releasing this agreement.

## Section C – Landowner/Operator Shall:

1. If any land covered by this agreement is transferred or otherwise changes ownership, this agreement will be held in obligation with the land in perpetuity and the new owners will be obligated to comply with this agreement. Landowners are obligated to notify any prospective buyers of this agreement and their responsibilities under this agreement and applicable law.
2. The Landowners agree to repay all project costs to the credit user, upon demand by the Broker, if the Landowner fails to comply with the terms of this agreement. Repayment shall not be required if a practice(s) is rendered ineffective due to circumstances which are beyond the control of the Landowner.
3. The Landowner/Operator shall inspect riprap and streambank at least annually and after heavy storms. Broker should be contacted immediately and directly if any damage has occurred. The Broker will determine the cause, extent, and projected costs of the repair. If the damage occurred due to no fault of the Landowner, the cost of repairs will be shared between Landowner and Credit User. If the costs are under \$1000, costs will be split 50% between Landowner and Credit User. If over \$1,000, costs will be split 80% Credit User, 20% Landowner. If damage was due to Landowner negligence, Landowner will be responsible for 100% of the Costs. The Broker will determine the cause of the damage.
4. The Landowner/Operator shall develop and implement a Rotational Grazing Plan, if necessary, to control and limit livestock access to the restored streambanks. Other methods of cattle rotation that will protect the streambanks may be acceptable. Ensure that debris is removed from the channel and that vegetation is controlled around the channel only when the vegetation or obstructions are threatening stream function. Invasive vegetation should be controlled, and channel obstructions deemed harmful may be removed. Channel clearing to remove stumps, fallen trees, debris, and sediment bars shall only be performed when they are causing or could cause unacceptable bank erosion, flow restriction, or damage to structures. Habitat forming elements that provide cover, food, pools, and water turbulence shall be retained or replaced to the extent possible.
5. Check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and replanted by Landowner as soon as possible with a seed mix pre-approved by the Broker.
6. Periodically mow the vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 20-foot buffer from the top of the bank.

7. Eliminate all burrowing rodents and repair damage caused by them.
8. Maintain the project consistent with NRCS technical standard 580.
9. Installation of these practices brings the Landowner into compliance with the applicable state and local performance standards listed below. Compliance with these performance standards shall be in perpetuity. These practices must be maintained or replaced with a practice which ensures continued compliance with the following N.R. 151 performance standards:
  - N.R. 151.03 Tillage Setback
  - N.R. 151.06 Clean Water Diversion
  - N.R. 151.08 Manure Management Prohibitions

**Section D. Broker**

1. The Broker will be responsible for the oversight of BMP practice design, project bidding, contractor construction agreements, inspection of site preparation, project design, BMP installation oversight, regulation of applicable performance standards, annual inspections and monitoring of landowners' obligations in the form of performing on-site checks as needed. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.
2. The Broker will ensure the contract is recorded in the Richland County Register of Deeds office.
3. The Broker agrees to complete annual inspections.

TA Number	Typed Name of Landowner/Operator Gary & Karen Olson	Initials of Landowner/Operator 	Date 2-9-24

# **APPENDIX 9-1**

**THIS PAGE HAS BEEN INTENTIONALLY LEFT BLANK**



Derrick Warner  
181 W Seminary St  
Richland Center, WI 53581

**Date** 12/11/2025  
**Acct #** 555053  
**Lab #** 3390

*Comments*

## Soil Analysis

<i>Sample ID</i>	<i>Total Leachable P</i> %	
L1	0.0389	Luttig
L2	0.0338	
L3	0.0348	
L4	0.026	
L5	0.0323	
B1	0.0256	Barelli
B2	0.0418	
B3	0.0261	



**Soil and Forage Analysis Lab**  
WISCONSIN STATE LABORATORY OF HYGIENE  
UNIVERSITY OF WISCONSIN-MADISON

4702 University Avenue  
Madison, WI 53705  
608-262-4364

[soil-lab@mailplus.wisc.edu](mailto:soil-lab@mailplus.wisc.edu)  
<https://uwlab.soils.wisc.edu>

Derrick Warner / Richland County LCD  
181 W Seminary St  
Richland Center, WI 53581

**Date** 8/18/2023  
**Account #** 555053  
**Lab #** 3047

**COMMENTS:**

***Soil Total Leachable P***

Sample #	Sample ID	Total Leachable P %
1	Eness 1	0.04
2	Eness 2	0.04



**Soil and Forage Analysis Lab**  
WISCONSIN STATE LABORATORY OF HYGIENE  
UNIVERSITY OF WISCONSIN-MADISON

4702 University Avenue  
Madison, WI 53705  
608-262-4364

[soil-lab@mailplus.wisc.edu](mailto:soil-lab@mailplus.wisc.edu)  
<https://uwlab.soils.wisc.edu>

Derrick Warner / Richland County LCD  
181 W Seminary St  
Richland Center, WI 53581

**Date** 8/18/2023  
**Account #** 555053  
**Lab #** 3046

**COMMENTS:**

***Soil Total Leachable P***

Sample #	Sample ID	Total Leachable P %
1	Halink 1	0.03
2	Halink 2	0.03



Derrick Warner / Richland County LCD  
181 W Seminary St  
Richland Center, WI 53581

**Date** 6/9/2023  
**Account #** 555053  
**Lab #** 2273

**COMMENTS:**

***Soil Total Leachable P***

Sample #	Sample ID	Total Leachable P ppm
1	Halink 3	0.03
2	Halink 4	0.02



**Soil and Forage Analysis Lab**  
WISCONSIN STATE LABORATORY OF HYGIENE  
UNIVERSITY OF WISCONSIN-MADISON

4702 University Avenue  
Madison, WI 53705  
608-262-4364

[soil-lab@mailplus.wisc.edu](mailto:soil-lab@mailplus.wisc.edu)  
<https://uwlab.soils.wisc.edu>

Derrick Warner / Richland County LCD  
181 W Seminary St  
Richland Center, WI 53581

**Date** 6/9/2023  
**Account #** 555053  
**Lab #** 2272

**COMMENTS:**

***Soil Total Leachable P***

Sample #	Sample ID	Total Leachable P ppm
1	Killoy Site 1	0.03
2	Killoy Site 2	0.03



**Derrick Warner**  
**LCD**  
**181 W Seminary St**  
**Richland Center, WI 53581**

**Date** 7/9/2025  
**Account #** 565035  
**Report #** 1827

## **Soil Total Mineral Analysis**

Newberry New Sites

<b>Sample ID</b>	<b>TP %</b>
1	0.0375
2	0.0260
3	0.0250
4	0.0243
5	0.0249
6	0.0257
7	0.0315
8	0.0351



**Soil and Forage Analysis Lab**  
WISCONSIN STATE LABORATORY OF HYGIENE  
UNIVERSITY OF WISCONSIN-MADISON

4702 University Avenue  
Madison, WI 53705  
608-262-4364

[soil-lab@mailplus.wisc.edu](mailto:soil-lab@mailplus.wisc.edu)  
<https://uwlab.soils.wisc.edu>

Derrick Warner / Richland County LCD  
181 W Seminary St  
Richland Center, WI 53581

**Date** 12/19/2023  
**Account #** 555053  
**Lab #** 4095

**COMMENTS:**

Olson

***Soil Total Leachable P***

Sample #	Sample ID	Total Leachable P %
1	1	0.05
2	2	0.03
3	3	0.03

# **APPENDIX 13-1**



**Natural Resources Conservation Service**  
**CONSERVATION PRACTICE STANDARD**  
**STREAMBANK AND SHORELINE PROTECTION**

**CODE 580**

**(ft)**

**DEFINITION**

Treatment(s) used to stabilize and protect banks of streams or constructed channels and shorelines of lakes, reservoirs, or estuaries.

**PURPOSE**

This practice is used to accomplish one or more of the following purposes:

- Prevent the loss of land or damage to land uses or facilities adjacent to the banks of streams or constructed channels and shorelines of lakes, reservoirs, or estuaries. This includes the protection of known historical, archaeological, and traditional cultural properties.
- Maintain the flow capacity of streams or channels.
- Reduce the offsite or downstream effects of sediment resulting from bank erosion.
- Improve or enhance the stream corridor or shoreline for fish and wildlife habitat, aesthetics, or recreation.

**CONDITIONS WHERE PRACTICE APPLIES**

This practice applies to streambanks of natural or constructed channels and shorelines of lakes, reservoirs, or estuaries susceptible to erosion. It does not apply to erosion problems on main ocean fronts, beaches, or similar areas of complexity.

*This standard does not apply to protection along open and unprotected shorelines of the Great Lakes.*

*If a single site exceeds 500 feet, or the combination of existing and planned protection exceeds 1,000 feet in a ¼ mile reach (include both sides of the stream), complete the additional site assessment found under Open Channel (Code 582), Additional Criteria for Stream Restoration. Apply this practice as a component of stream restoration and address all identified channel impairments to the extent practicable.*

**CRITERIA**

**General Criteria Applicable to All Purposes**

Plan, design, and construct this practice to comply with all Federal, State, and local laws, rules, and regulations. The landowner must obtain all necessary permissions from regulatory agencies, or document that no permits are required. The landowner and/or contractor is responsible for locating all buried utilities in the project area, including drainage tile and other structural measures.

*The landowner is responsible for removing hazardous materials or point source pollution (e.g. septic discharge) within the work limits and attaining regulatory compliance prior to the construction of stream and shoreline protection.*

*Do not use construction demolition for streambank and shoreline protection, e.g. concrete, asphalt, blocks, bricks, etc..*

Assess unstable streambank or shoreline sites in enough detail to identify the causes contributing to the instability. The assessment should provide details necessary for design of the treatments and convey reasonable confidence that the treatments will perform adequately for the design life of the measure. If the failure mechanism for a streambank is a result of the degradation or removal of riparian vegetation, if possible, implement stream corridor restoration, along with bank treatment.

Causes of instability include—

- Livestock access;
- Watershed alterations resulting in significant modifications of discharge or sediment production;
- In-channel modifications such as gravel mining;
- Head cutting;
- Water level fluctuations; and
- Boat-generated waves.

Design streambank and shoreline treatments that are compatible with—

- Existing bank or shoreline materials;
- Planned improvements or improvements installed by others;
- Water chemistry;
- Channel or lake hydraulics; and
- Slope characteristics above and below the water line.

Avoid adverse effects on—

- Endangered, threatened, and candidate species and their habitats;
- Archaeological, historical, structural, and traditional cultural properties; and
- Existing wetland functions and values.

Design treatments that result in stable slopes based on the bank or shoreline materials and the type of measure proposed. Account for anticipated ice action, wave action, and fluctuating water levels. Ensure that installations are protected from overbank flows from upslope runoff and flooding. Include internal drainage where bank seepage is a problem. Use geotextiles, designed filters, or bedding to prevent piping or erosion of material from behind the treatment. Anchor end sections into existing treatments or existing stable areas. *Refer to NRCS NEH, Part 633, Chapter 26 for design of granular filters.*

*Geotextile, granular filters, or bedding is not required to prevent piping or erosion of material from behind rock riprap protection if all of the following conditions are met:*

- *Minimum thickness of the rock riprap layer is three times the  $D_{50}$  stone size*
- *Seepage is not evident during the soils investigation*
- *Soil base is cohesive i.e. no substantial layers of fine sand or non-plastic silt*
- *Soil base is free of organics and very soft clays*

Revegetate all areas disturbed during construction in accordance with NRCS Conservation Practice Standard (CPS) Critical Area Planting (Code 342). If climatic conditions preclude the use of vegetation, use NRCS CPS Mulching (Code 484) to install inorganic cover materials such as gravel. Protect the area from livestock and human traffic until the site is fully stabilized.

### **Additional Criteria for Streambanks**

*In addition to the assessment requirements under General Criteria, include the following information in the design report. Refer to WI NRCS Supplements to NEH, Part 650, Chapter 16 for assessment tools.*

- *List the landowner's objectives for protection, available materials for bank treatments, existing and desired riparian land use, willingness to carry out maintenance activities, and special conditions.*
- *Determine the elevation of the bankfull flow (i.e. channel-forming discharge or ordinary high water mark). Bankfull flow fills a channel to an elevation where flow begins to spill onto the active floodplain. Bankfull flow can be identified by field indicators in alluvial channels that have adjusted to hydrologic conditions and sediment delivery. Over the long term, bankfull flow typically completes the most work in transporting sediment relative to the magnitude and frequency of other flows. Bankfull flow has a typical recurrence interval range of 1 to 3 years on an annualized frequency curve, with a predominance of values in the 1.2 to 1.8-year range, although exceptions may include urban areas, wetland streams, or settings influenced by colluvium or glacial features.*
- *Determine the elevation of the highest active floodplain bench.*
- *Describe the bank erosion severity using both methods below. Refer to the WI Field Office Technical Guide, Section III >Erosion Prediction for erosion estimates.*
  - *Average annual rate of lateral migration (feet/year) measured at the apex of the channel bend using historic aerial imagery over a period of 20 years. This method may be excluded, or the evaluation period abbreviated, if imagery is unavailable or obscured by canopy. In this case, use the estimated age of trees bordering each side of the channel.*
  - *Bank Erosion Potential Index (BEPI) at the apex of the channel bend*
- *Describe the channel evolutionary stage (i.e. down-cutting, widening, aggrading, or stable) and indications of future direction. Refer to NRCS NEH Part 654.0305(c).*
- *Describe the type and cause of streambank instability. Determine the type of bank failure such as a shallow slip failure, cantilever failure, or rotational shear failure. Describe the cause of erosion such as concentrated flow around debris or sediment bars, seepage and soil piping, or high flow velocities along weak soil stratigraphy. Refer to NEH Part 653, Fig. 7-29.*

*Perform a soils investigation along the planned improvement. Log the soil profile from the top of high bank to a depth of stable substratum using the Unified Soil Classification System. Identify the location and elevation of soil layers with seepage. Classify the bedload material.*

*Design streambank protection to be stable for all discharges from bankfull flow up to the 100-year flood or highest active floodplain bench. Estimate stream flows using the USGS Flood Frequency Characteristics of Wisconsin Streams or hydrologic models such as NRCS WinTR-20, WinTR-55, or USACE HEC-HMS.*

*Use the shear stress method to design rock riprap, soil bioengineering, or other protection components. Use a minimum safety factor of 1.2 for stability design. Refer to WI NRCS Website >Engineering > Spreadsheets >Streambank Protection, or NEH, Part 654, TS-14C for stone sizing criteria.*

*Extend inert bank protection to the elevation of bankfull flow or above. Limit structural treatment above the bankfull flow where vegetation establishment is adequate to stabilize the bank. Use a minimum slope of 1.5 horizontal to 1 vertical for rock riprap; 2:1 or flatter is recommended.*

*Do not install bank protection treatment in channel systems undergoing rapid and extensive changes in bottom grade and/or alignment unless designing the treatments to control or accommodate the changes. Refer to Channel Bed Stabilization (Code 584). Construct bank treatment to a depth at or below the anticipated lowest depth of streambed scour.*

*Refer to NRCS NEH, Part 654, TS-14B, or USACE EM 1110-2-1601, Chapter 3, Section IV for scour calculations. At minimum, key the treatment at least two feet below the streambed or into stable substratum. Investigate the thalweg for at least 150 feet downstream to anticipate advancing headcuts or knickpoints.*

*Start and end the treatment at a stable anchorage point, such as a crossover or well-vegetated bank. Key the upstream and downstream end of a revetment into the bank to prevent flanking by erosion. Consider the potential for lateral channel migration in determining the appropriate keyway depth. Key the ends of articulated concrete mats or gabion-type revetment at least 4 feet into the bank. Key the ends of a rock riprap revetment at least 2 times the blanket thickness into the bank— a minimum length of 4 feet on each end.*

Stabilize toe erosion by treatments that redirect the stream flow away from the toe or by structural treatments that armor the toe. Where toe protection alone is inadequate to stabilize the bank, shape the upper bank to a stable slope and establish vegetation, or stabilize with structural or soil bioengineering treatments.

*Shape the vegetated portion of banks to a minimum slope of 3 horizontal to 1 vertical. A minimum 2:1 slope is acceptable for short reaches where physical structures, roadways, utilities, or property lines restrict space.*

To the extent possible, retain or replace habitat-forming elements that provide cover, food, pools, and water turbulence. This includes stumps, fallen trees, debris, and sediment bars. Only remove these stream habitat elements when they cause unacceptable bank erosion, flow restriction, or damage to structures.

Design treatments to remain functional and stable for the design flow and sustainable for higher flow conditions. Evaluate the effects of changes to flow levels compared with the preinstallation flow levels, for low and high flow conditions. Ensure treatments do not limit stream flow access to the floodplain. Do not design treatments that result in negative offsite impacts such as increased channel or bank erosion downstream.

*Evaluate the impact of flow-changing techniques (e.g. stream barbs) on the opposite bank. If the opposite bank is under different ownership, consult with that landowner about potential impacts. Refer to NRCS NEH, Part 650, TS-14H for flow-changing techniques.*

**Critical Sites.** *The following sites present a high risk of failure and require further analysis of the potential failure modes to ensure a stable design.*

- *Water surface slope > 0.8 percent*
- *Sites < 200 feet downstream from a bridge or culvert crossing*
- *Entrenched channels (floodprone width to bankfull width ratio <1.4) and headwater channels with colluvium cobbles and boulders. These conditions are indicative of Rosgen stream types (A, F, G, and D) at crossover sections immediately upstream and downstream of the channel bend.*

*Flow at these sites is often classified as nonuniform, rapid, or supercritical. Flow is associated with high shear stress or heavy bedload. Consider a water surface profile model to evaluate a full range of flows to determine location and magnitude of sudden changes in water surface elevation (i.e. hydraulic jumps). Use the model to determine accurate flow parameters (e.g. energy slopes and depths) for rock size and scour depth calculations. This detailed hydraulic analysis may result in heavier revetment components, uniform rock gradations, flatter side slopes, or deeper keyways. Refer to USACE HEC-RAS software to develop a water surface profile model. Refer to rock sizing methods for hydraulically steep slopes, USACE EM 1110-2-1601, 3.7(e); bridge scour, FHWA HEC-23; and culvert discharge, FHWA HEC-14, Chapter 10. Refer to Open Channel (Code 582) when bank instability is caused by bedload transport issues; and Channel Bed Stabilization (Code 584) when the bank instability is caused by channel bed aggradation or degradation.*

- *Home or building located near the top of bank.*

*Conduct a geotechnical investigation and develop a slope stability model to determine the factor of safety when a home or building is located near the streambank. The distance of concern will vary depending on type of structure, bank slope, soil type, and presence of seepage, but will generally be horizontally within two to three times the height of the bank from the toe of the slope. Refer to NRCS NEH Part 631, Chapters 2 and 5 for Group B structures for geologic investigation guidance. Investigations typically include logging and sampling from top of bank to a depth below the thalweg. Soil tests typically include mechanical analysis and Atterberg Limits for Unified Soil Classification; in-place density, moisture content, and shear strength.*

### **Additional Criteria for Shorelines**

For the design of structural treatments, evaluate the site characteristics below the waterline for a minimum of 50 feet horizontally from the shoreline measured at the design water surface. Base the height of the protection on the design water surface plus the computed wave height and freeboard. Use mean high tide as the design water surface in tidal areas. Limit revetments, bulkheads, or groins to no higher than 3 feet above mean high tide, or mean high water in nontidal areas. Key-in structural shoreline protective treatments to a depth that prevents scour during low water.

When using vegetation as the protective treatment, include a temporary breakwater during establishment when wave run-up could damage the vegetation.

*In addition to the assessment requirements under General Criteria, include the following information in the design report.*

- *Landowner's objectives for protection, available materials for shoreline treatments, existing and desired riparian land uses, willingness to carry out maintenance activities, and special conditions.*
- *Elevation of the ordinary high water mark (OHWM) and range of lake level fluctuations.*
- *Height of watercraft waves and frequency of watercraft activity.*
- *Severity of shoreline erosion using average annual rate (feet per year) of shoreline recession with measurements from historic aerial imagery over a period of 20 years. This method may be excluded, or the evaluation period abbreviated, if imagery is unavailable or obscured by canopy. Refer to NRCS Field Office Technical Guide, Section III >Erosion Prediction for erosion estimates.*
- *Location, type, and quantity of existing shoreline protection adjacent to the site. Describe the effectiveness or success of those treatments.*
- *History of ice action or evidence of ice sheet thickness and push up elevations. This information may be determined from interviews.*
- *Type and density of riparian vegetation and invasive species.*
- *Lake designations: Areas of Special Natural Resource Interest (ASNRI), Outstanding Resource Waters (ORW), Exceptional Resource Waters (ERW), size and type of water body.*

*Perform a soils investigation along the planned reach of protection. Log the soil profile from the top of bank to a depth of stable substratum. Use the Unified Soil Classification System. Identify the location, elevation, and soil layer(s) of observed seepage. Classify the littoral material.*

*Conduct a geotechnical investigation and develop a slope stability model to determine the factor of safety when a home or building is located near the shoreline escarpment. The distance of concern will vary depending on type of structure, bank slope, soil type, and presence of seepage, but will generally be horizontally within two to three times the height of the bank from the toe of the slope. Refer to NRCS NEH Part 631, Chapters 2 and 5 for Group B structures for geologic investigation guidance. Investigations typically include logging and sampling from top of bank to a depth below the lake bottom. Soil tests typically include mechanical analysis and Atterberg Limits for Unified Soil Classification; in-place density, moisture content, and shear strength.*

*Provide lakeshore protection to the highest elevation of the following:*

- *OHWM plus the storm-wave height as specified in Wisconsin NR 328*
- *Height of watercraft generated waves*
- *Height of seep lines in the bank if not controlled by some other fashion*

*Use a minimum slope of 1.5 horizontal to 1 vertical for rock riprap; 2:1 or flatter is recommended.*

#### **Additional Criteria for Stream Corridor Improvement**

Establish stream corridor vegetative components as necessary for ecosystem function and stability. The appropriate composition of vegetative components is a key element in preventing excess long-term channel migration in reestablished stream corridors. Establish vegetation on channel banks and associated areas according to NRCS CPS Critical Area Planting (Code 342).

Design treatments to achieve habitat and population objectives for fish and wildlife species or communities of concern as determined by a site-specific assessment or management plan. Establish objectives on the survival and reproductive needs of populations and communities, including habitat diversity, habitat linkages, daily and seasonal habitat ranges, limiting factors, and native plant communities. Develop the requirements for the type, amount, and distribution of vegetation using the requirements of the fish and wildlife species or communities of concern.

Design treatments to meet aesthetic objectives as determined by a site-specific assessment or management plan. Establish aesthetic objectives based on human needs, including visual quality, noise control, and microclimate control. Use construction materials, grading practices, and other site development elements compatible with adjacent land uses.

#### **CONSIDERATIONS**

When designing protective treatments, consider changes that may occur in the watershed hydrology and sedimentation over the design life of the treatments.

*Consider changes that may occur in the watershed hydrology, land use, and sedimentation due to climate change. The magnitude and duration of rainfall and streamflow events may have increased from historical averages. Use local forecasts of climate change in the design if available.*

Incorporate debris removed from the channel or streambank into the treatment design when it is compatible with the intended purpose to improve benefits for fish, wildlife, and aquatic systems.

Use construction materials, grading practices, vegetation, and other site development elements that minimize visual impacts and maintain or complement existing landscape uses such as pedestrian paths, climate controls, buffers, etc. Avoid excessive disturbance and compaction of the site during installation.

Use vegetative species that are native and/or compatible with local ecosystems. Avoid introduced species that could become nuisances. Consider species that have multiple values such as those suited for biomass, nuts, fruit, browse, nesting, aesthetics, and tolerance to locally used herbicides. Avoid species that may be alternate hosts to disease or undesirable pests. Consider species diversity to avoid loss of function due to species-specific pests.

Select plant materials that provide habitat requirements for desirable wildlife and pollinators. The addition of native forbs and legumes to grass mixes will increase the value of plantings for both wildlife and pollinators. Consider and refer to NRCS CPS Wetland Wildlife Habitat Management (Code 644).

Use treatments that promote beneficial sediment deposition and the filtering of sediment and sediment-attached and dissolved substances.

Maintain or improve fish and wildlife habitat by including treatments that provide aquatic habitat in the treatment design and that may lower or moderate water temperature and improve water quality.

Stabilize side channel inlets and outlets, and outlets of tributary streams from erosion.

Maximize adjacent wetland functions and values with the project design to the extent practicable.

To maintain plant community integrity, exclude livestock during establishment of vegetative treatments and apply appropriate grazing practices after establishment.

Control wildlife during establishment of vegetative treatments. Use temporary and local population control methods with caution and within applicable regulations.

When appropriate, consider establishing a buffer strip and/or diversion at the top of the bank or shoreline protection zone to help maintain and protect installed treatments, improve their function, filter out sediments, nutrients, and pollutants from runoff, and provide additional wildlife habitat.

*Consider the perennial vegetation requirement (35' min.) under Wisconsin NR 115.05(1)(c)2 "Minimum zoning standards for shorelands," in the operation & maintenance plan.*

*To the extent possible, excavate a floodplain bench to reduce the entrenchment ratio and stress on streambank protection measures.*

Consider safety hazards to boaters, swimmers, or people using the shoreline or streambank when designing treatments. Place warning signs as necessary.

Consider installing self-sustaining or minimal maintenance treatments.

## **PLANS AND SPECIFICATIONS**

Prepare plans and specifications that describe the requirements for applying the practice according to this standard. Include provisions to minimize erosion and sediment production during construction and provisions necessary to comply with conditions of any environmental agreements, biological opinions, or other terms of applicable permits. At a minimum, include—

- A plan view of the layout of the streambank and shoreline protection.
- Typical profiles and cross sections of the streambank and shoreline protection.
- *If the planned treatment exceeds 300 feet, show a profile view along the channel improvement reach. Include the thalweg, top of high bank, bankfull elevation, vertical extent (top and bottom) of treatment and other planned structures. Include seepage locations and soil investigation logs.*
- Structural drawings adequate to describe the construction requirements.
- Requirements for vegetative establishment and mulching, as needed.
- Safety features.
- Site-specific construction and material requirements, e.g. *rock and bedding/filter gradations.*
- *Work limits — extent of protection, ingress and egress locations for construction equipment, parking areas, borrow and spoil locations, areas of habitat requiring protection or avoidance (e.g. wetlands, regulated floodplains, riparian and upland areas, instream habitat), property lines, and buried/overhead utilities.*
- *Pollution control, e.g. staged construction, floating silt curtains, silt fences, erosion control wattles and logs.*

## **OPERATION AND MAINTENANCE**

Prepare an operation and maintenance plan for the operator.

At a minimum, include—

- Instructions for operating and maintaining the system to ensure it functions properly.
- Periodic inspections and prompt repair or replacement of damaged components.
- Periodic inspections and prompt repair of erosion.
- Instructions for maintaining healthy vegetation, when required.
- Instructions for controlling undesirable vegetation.

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# **APPENDIX 13-2**



## Natural Resources Conservation Service

### CONSERVATION PRACTICE STANDARD

## PRESCRIBED GRAZING

### CODE 528

#### (ac)

#### DEFINITION

Managing the harvest of vegetation with grazing and/or browsing animals with the intent to achieve specific ecological, economic, and management objectives.

#### PURPOSE

Apply this practice as a part of a conservation management system to achieve one or more of the following:

- Improve or maintain desired species composition, structure and/or vigor of plant communities
- Improve or maintain quantity and/or quality of forage for grazing and browsing animals' health and productivity
- Improve or maintain surface and/or subsurface water quality and/or quantity
- Improve or maintain riparian and/or watershed function
- Reduce soil erosion, and maintain or improve soil health
- Improve or maintain the quantity, quality, or connectivity of food and/or cover available for wildlife
- Manage fine fuel loads to achieve desired conditions

#### CONDITIONS WHERE PRACTICE APPLIES

practice applies to all lands where grazing and/or browsing animals are managed.

#### CRITERIA

##### General Criteria Applicable to All Purposes

Manage stocking rates and grazing periods to adjust the intensity, frequency, timing, duration, and distribution of grazing and/or browsing to meet the planned objectives for the plant communities, and the associated resources, including the grazing and/or browsing animals.

Remove forage in accordance with site production limitations, rate of plant growth, the physiological needs of forage plants, and the nutritional needs of the animals.

Provide desired grazed/browsed plants sufficient recovery time from grazing/browsing to meet planned objectives. The recovery period can be provided for part or all of the growing season of key plants. Deferral and/or rest will be planned for critical periods of plant or animal needs.

Manage livestock movements based on rate of plant growth, available forage, and identified objectives such as utilization, plant height or standing biomass, residual dry matter, and/or animal performance.

Manage grazing and/or browsing animals to maintain adequate vegetative cover on sensitive areas (i.e., riparian, wetland, habitats of concern, and karst areas).

NRCS reviews and periodically updates conservation practice standards. To obtain the current version of this standard, contact your Natural Resources Conservation Service State office or visit the Field Office Technical Guide online by going to the NRCS website at <https://www.nrcs.usda.gov/> and type FOTG in the search field.

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NRCS, WI  
April 2017

Provide adequate quantity and quality of drinking water during period of occupancy.

Develop contingency plans to deal with expected episodic disturbance events (e.g., drought, wildfire, insect infestation, etc.).

Develop monitoring plans that directly support adaptive management decisions based upon identified ecologic triggers and thresholds to optimize the conservation outcome for the selected purposes.

Conform to all applicable Federal, State, Tribal and local laws. Seek measures to avoid adverse effects to endangered, threatened, and candidate species and their habitats.

**Additional Criteria to Improve or Maintain the Health and Vigor of Desired Plant Communities.**

Base the intensity, frequency, timing, and duration of grazing and/or browsing on desired plant health, expected productivity, and composition of key species to meet management objectives.

Plan periodic deferment from grazing and/or browsing to maintain or restore the desired plant community following grazing/browsing and episodic events, such as wildfire or severe drought.

Where appropriate, test soil periodically for nutrient status and soil reaction, and apply fertilizer and/or soil amendments according to soil test results to improve or maintain plant vigor.

Average stocking rates (animal units/acre) over the growing season shall not exceed those calculated in an animal forage balance unless seasonal forage production is higher than the estimated amount and minimum forage heights are maintained. The animal forage balance must also take supplemental feed into account.

The plan shall identify the primary pasture forage species and minimum stubble height using Table 1. Grazing shall be initiated when the designated species reaches a minimum height and ceased when a minimum stubble height is reached. Minimum heights may be exceeded for specific management objectives as outlined in the plan.

**Table 1. Minimum Heights of Pasture Species for Initiating and Terminating Grazing**

Species	Begin Grazing	End Grazing
	Minimum to Optimum Height of Vegetative Growth	Minimum
Alfalfa	8-12	4
Red Clover	8-12	4
Alsike Clover	8-12	4
Ladino Clover	8-12	4
Kura Clover	8-12	4
Festololium	6-8	3
Kentucky Bluegrass	4-6	2
Meadow Fescue	8-12	4
Orchardgrass	8-12	4
Perennial Ryegrass	6-8	3
Reed Canarygrass	8-12	4
Smooth Brome	8-12	4
Tall Fescue	8-12	4
Timothy	8-12	4
Big Bluestem	12-14	6
Indiangrass	12-14	6

Species	Begin Grazing	End Grazing
	Minimum to Optimum Height of Vegetative Growth	Minimum
Little Bluestem	4-6	2
Sideoats Grama	4-6	2
Switchgrass	12-14	6
*Minimum stubble height is critical if stand is to be maintained. This applies to that part of the grazing season after the initial rapid growth period in early May, as well as at the end of the grazing season.		

Defer grazing in the spring on out-wintering or bale grazing area until forage plants have recovered to the minimum pre-grazing height.

#### **Additional Criteria to Improve or Maintain Quantity and Quality of Forage for Animal Health and/or Productivity**

Plan grazing and/or browsing to match forage quantity and/or quality goals of the producer within the capability of the resource to respond to management.

Enhance diversity of rangeland and pasture plants to optimize delivery of nutrients to the animals by planning intensity, frequency, timing, and duration of grazing and/or browsing.

Plan intensity, frequency, timing, and duration of grazing and/or browsing to reduce animal stress and mortality from toxic and/or poisonous plants.

Provide supplemental feed and/or minerals as needed to balance with forage consumption to meet the desired nutritional level for the kind and class of grazing and/or browsing livestock.

Base the dietary needs of livestock on the National Research Council's Nutrient Requirements of Domestic Animals or similar scientific sources with appropriate adjustments made for increased energy demand required by browsing or grazing animals foraging for food including travel to and from grazing/ browsing area.

Manage livestock to avoid the spread of disease, parasites, and contact with harmful insects and plants. An example is to avoid grazing young stock in paddocks following mature animals when Johne's disease is a concern or returning sheep to a paddock before the parasite cycle has completed.

#### **Additional Criteria to Improve or Maintain Surface and/or Subsurface Water Quality and/or Quantity**

Minimize concentrated livestock areas to enhance nutrient distribution and improve or maintain ground cover.

Manage intensity, frequency, timing, and duration of grazing, browsing and/or feeding to:

- Minimize deposition or flow of animal wastes into water bodies.
- Minimize animal impacts on stream bank or shoreline stability.
- Maintain or improve hydrologic function including infiltration and/or filtering capacity and soil surface stability to reduce runoff by providing adequate ground cover, plant spacing, and plant density.
- Ensure the location and management of supplemental feeding, out-wintering, and winter feeding areas are planned and implemented to address any identified water quality resource concerns.

#### **Additional Criteria to Improve or Maintain Riparian and/or Watershed Function**

Minimize concentrated livestock areas to improve or maintain riparian/floodplain plant community structure and functions.

Plan intensity, frequency, timing and duration of grazing and/or browsing to:

- Provide adequate ground cover and plant density to maintain or improve infiltration capacity and reduce runoff.
- Provide optimum ground cover, plant density, and/or plant structure to maintain or improve filtering capacity of the vegetation.
- Maintain adequate riparian community structure and function to sustain associated riparian, wetland, floodplain, and stream species.

#### **Additional Criteria to Reduce Soil Erosion and Maintain or Improve Soil Health**

Minimize concentrated livestock areas, trailing, and trampling to reduce soil compaction, excess runoff and erosion, and maintain soil organic matter.

Plan intensity, frequency, timing, and duration of grazing and/or browsing to provide adequate ground cover, litter, and canopy to maintain or improve infiltration.

#### **Additional Criteria to Improve or Maintain Food and/or Cover for Fish and/or Wildlife Species of Concern**

Identify species of concern in the objectives of the prescribed grazing plan.

Plan intensity, frequency, timing, and duration of grazing and/or browsing to provide for the development and maintenance of the plant structure, density, and diversity needed for the habitat requirements of the desired fish and wildlife species of concern.

#### **Additional Criteria for Management of Fine Fuel Load**

Plan intensity, frequency, timing, and duration of grazing and/or browsing to manage fuel continuity and loading to reduce wildfire hazard and/or facilitate desired conditions for prescribed burns.

### **CONSIDERATIONS**

Protect soil, water, air, plant, and animal resources when locating livestock feeding, supplementation, handling, and watering facilities.

Design and install livestock feeding, handling, and watering facilities in a manner to improve and/or maintain animal distribution and forage production. Design and install facilities to minimize stress, the spread of disease, parasites, contact with harmful organisms, and toxic plants.

Utilization, stubble height, and other target levels are tools that can be used in conjunction with monitoring to help ensure that resource conservation and producer objectives are met.

Where practical and beneficial, start the grazing sequence in a different management unit each growing season.

When weeds are a significant problem prescribed grazing and/or browsing should be implemented in conjunction with other pest management practices to promote plant community resistance to invasive species and protect desired plant communities.

Prescribed grazing should consider the needs of other enterprises utilizing the same land, such as wildlife and recreational uses.

Develop alternatives that minimize additional grazing management infrastructure while still achieving plan objectives for the desired fish and wildlife species of concern.

Provide deferment or rest from grazing or browsing as necessary to ensure the success of prescribed fire, brush management, seeding, or other conservation practices to prevent stress or damage to key plants

Improve carbon sequestration in biomass and soils through management of grazing and/or browsing to produce the desired results.

Plan biosecurity safeguards to prevent the spread of disease between on-farm or ranch classes of livestock and between livestock farm or ranch units.

Provide shelter in the form of windbreaks, sheds, shade structures, and other protective features where conditions warrant to protect livestock from severe weather, intense heat/humidity, and predators.

If nutrients are being applied, Wisconsin NRCS Conservation Practice Standard (WI NRCS CPS), Nutrient Management (Code 590) will be applied.

Maintain conservative stocking rates as a drought contingency strategy to minimize detrimental consequences during drought on economic and ecological sustainability.

Enhance pasture sustainability by including multiply functional groups (grasses, legumes, and forbs) of forages.

Use mechanical means, such as harvesting, clipping, and inter-seeding of pastures to manipulate the pasture sward.

Plan access roads or animal trail placement to minimize erosion and enhance livestock flow.

## **PLANS AND SPECIFICATIONS**

Prepare a prescribed grazing plan for all planned conservation management units where grazing and/or browsing will occur according to State standards and specifications.

Prescribed grazing plan will include:

- Goals and objectives clearly stated.
- Resource inventory that identifies:
  - Existing resource conditions and concerns.
  - Ecological site or forage suitability group.
  - Opportunities to enhance resource conditions.
- An overview plan map or maps with the following information:
  - Location of existing and proposed structural practices such as fences, water developments, animal trails, access roads, etc., including seasonal availability and quality of watering sites.
  - Location of critical and sensitive areas to grazing livestock such as shorelines, wetlands, forests, and natural areas.
  - Direction of livestock flow in a rotational stocking system.
  - Size and location of permanent paddocks (pasture divisions) and a typical temporary paddock.
- Forage inventory of the expected forage quality, quantity, and species in each management unit(s).
- Forage-animal balance developed for the grazing plan that ensures forage produced or available meets forage demand of livestock and/or wildlife.
- Grazing plan developed for livestock that identifies periods of grazing and/or browsing, deferment, rest, and/or other treatment activities for each management unit that accommodates the flexibility needed for adaptive management decisions as supported by the contingency plan and monitoring plan in order to meet goals and objectives.
- Contingency plan developed that details adaptive management decisions to avoid damaging the sward during severe drought and prolonged wetness, such as moving livestock to a feedlot or “sacrifice paddock” until the forage plants have recovered or the soils have become dry enough to avoid compaction. A sacrifice paddock should be big enough to feed the livestock and hold them. It should not be considered part of the acres certified as prescribed grazing.

- Monitoring plan developed with appropriate protocols and records that assess whether the grazing strategy is resulting in a movement toward meeting goals and objectives. Short-term monitoring includes grazing records in each pasture unit. Long-term monitoring determines whether the resource concerns have been solved. Identify the key areas, key plants, or other monitoring indicators that the manager should evaluate in making grazing management decisions.

## **OPERATION AND MAINTENANCE**

### **Operation**

Prescribed grazing will be applied on a continuing basis throughout the livestock occupation period of all planned grazing units.

Adaptive management decisions will be made as needed and documented within the plan to ensure that the goals and objectives of the prescribed grazing strategy are met.

### **Maintenance**

Monitoring data and grazing records will be used on a regular basis within the prescribed grazing plan to ensure that objectives are being met, or to make necessary changes in the prescribed grazing plan to meet objectives.

All facilitating and accelerating conservation practices (e.g., WI NRCS CPSs, Fence (Code 382), Pest Management (Code 595), Brush Management (Code 314), Forage and Biomass Planting (Code 512), etc.) that are needed to effect adequate grazing and/or browsing distribution as planned by this practice standard will be maintained in good working order and operated as intended.

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# **APPENDIX 13-3**

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## Natural Resources Conservation Service

### CONSERVATION PRACTICE STANDARD

## STREAM CROSSING

### CODE 578

(no)

#### DEFINITION

A stabilized area or structure constructed across a stream to provide controlled access for people, livestock, equipment, or vehicles.

#### PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Improve water quality by reducing sediment, nutrient, or organic loading to a stream
- Reduce streambank and streambed erosion

#### CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where—

- An intermittent or perennial watercourse (stream) exists.
- Controlled access from one side of the stream to the other side is necessary to reduce or eliminate environmental degradation.
- Soils, geology, fluvial geomorphology, and topography are suitable for construction of a stream crossing.

#### CRITERIA

##### General Criteria Applicable to All Purposes

The following requirements are applicable regardless of the purpose or type of crossing.

- Apply this standard in accordance with all Federal, State, Tribal, and local regulations, including floodplain regulations and flowage easements.
- The landowner/contractor is responsible for locating all aboveground and buried utilities, and buried structures in the project area, including drainage tile.
- Provide signage and guidance to caution against use *if dangerous flow levels might exist*. Place staff gage and warning sign in a location that is clearly visible to the user before traveling across structure.
- Do not create a passage barrier where aquatic species are present and using the stream. Where aquatic organism passage is an issue, use additional criteria in NRCS Conservation Practice Standard (CPS) Aquatic Organism Passage (Code 396).

#### Location

Locate the stream crossing in an area where the streambed is stable or where the streambed can be stabilized. See NRCS CPS Channel Bed Stabilization (Code 584) and NRCS National Engineering

Handbook (NEH Title 210), Part 654, Stream Restoration Handbook, Chapter 3, Site Investigation and Assessment. *Avoid wetland areas where possible.* Do not place a crossing where—

- The channel grade or alignment changes abruptly.
- Excessive seepage or instability is evident.
- Evidence of incision and bed instability exists.
- Large tributaries enter the stream.
- Water velocity and depth are excessive.

Meet guidelines identified by State or Federal agencies responsible for aquatic species resources spawning habitat. Where such guidelines do not exist, locate crossings at least 300 feet from listed species spawning areas.

To the extent possible, locate the crossing on straight and riffle sections. Avoid locating in bends. Install the stream crossing perpendicular to the direction of stream flow where possible. Account for potential future lateral migration of the stream in developing the design.

Minimize the number of stream crossings planned and installed through evaluation of alternative trail or travel-way locations and land user operations. Where feasible, use existing roads. Discourage livestock loafing in the stream by locating crossings, where possible, out of shady riparian areas or by including gates in the design. Where appropriate, use NRCS CPSs Fence (Code 382) and Access Control (Code 472) in conjunction with management strategies to restrict access to the stream crossing.

*Where a stream crossing is installed to remove an existing barrier to the passage of aquatic organisms, refer to Aquatic Organism Passage (Code 396).*

*If a stream crossing is installed higher than the channel bed, it can initiate sediment deposition in the upstream channel and bury habitat features such as deep pools, riffles, and overhead cover. Refer to the criteria and considerations in Channel Bed Stabilization (Code 584), if the stream crossing has the potential to affect the upstream channel gradient for a distance of more than 5 times the bankfull width.*

*Example: If the crossing is set 2 feet above the channel bed and the gradient is 0.004 ft/ft, sediment deposition can extend 500 feet upstream.  $2 \text{ ft} \div 0.004 \text{ ft/ft} = 500 \text{ ft}$ . If 500 ft is greater than 5 x bankfull width, refer to Channel Bed Stabilization (Code 584).*

### **Access road crossings**

Where the stream crossing is installed as part of an access road, design the crossing in accordance with the location, alignment, width, and surfacing criteria of NRCS CPS Access Road (Code 560).

### **Width**

Provide an adequate travel-way width for the intended use. Provide a travel-way no less than 10 feet wide for a multiuse stream crossing. Make a “livestock only” crossing no less than 6 feet wide and no more than 20 feet wide. Measure widths from the upstream end to the downstream end of the stream crossing, not including the side slopes.

### **Side slopes**

Make all side slope cuts and fills stable for the channel materials involved. Make the side slopes of cuts or fills in soil materials no steeper than 2 horizontal to 1 vertical (2:1). Make rock cuts or fills no steeper than 1.5 horizontal to 1 vertical (1.5:1).

### **Stream approaches**

Where possible, blend approaches to the stream crossing with existing site topography. Use streambank soil bioengineering practices and other streambank stabilization measures such as NRCS CPS Streambank and Shoreline Protection (Code 580) as appropriate and feasible. Design stable approaches with gradual ascent and descent grades that are no steeper than 5 horizontal to 1 vertical (5:1). Construct approaches with suitable material to withstand repeated and long-term use. Design the minimum width of

the approaches equal to the width of the crossing surface. Use NRCS CPSs Access Road (Code 560) or Trails and Walkways (Code 575) as needed.

Divert surface runoff around the approaches to prevent erosion. Use NRCS CPSs Diversion (Code 362), Structure for Water Control (Code 587), Lined Waterway or Outlet (Code 468), or Grade Stabilization Structure (Code 410) as needed.

### **Rock**

Use only rock that is sound, durable, and able to withstand exposure to air, water, and freezing and thawing. Use rock of sufficient size and density to resist mobilization by design flood flows. Use appropriate rock sizes that will accommodate the intended traffic without causing injury to livestock or people, or damage to vehicles using the crossing. For a rock livestock crossing, use a hoof contact zone or alternative surfacing method over the rock.

*Use rock materials that meet Wisconsin Construction Specification 11, Small Rock Aggregate.*

### **Fencing**

Exclude livestock access to the crossing using fence and gates, as needed. Install cross-stream fencing at fords with breakaway wire, swinging floodgates, hanging electrified chain, or other devices to allow the passage of floodwater and large woody material during high flows. Design and construct all fencing in accordance with Fence (Code 382).

### **Vegetation**

As soon as practical after construction, vegetate highly disturbed areas in accordance with Critical Area Planting (Code 342), Riparian Herbaceous Cover (Code 390), and/or Riparian Forest Buffer (Code 391). In areas where the vegetation may not survive use Heavy Use Area Protection (Code 561).

### **Criteria Applicable to Bridge Crossings**

Design the bridge in a manner that is consistent with sound engineering principles and adequate for its intended use. Utilize appropriate bridge materials and necessary safety measures (including bridge rail and guardrail). Refer to NRCS 210-NEM-536 and the current edition of the American Association of State Highway and Transportation Officials (AASHTO) Load and Resistance Factor Design (LRFD) "Bridge Design Specifications."

Design the bridge to fully span the stream, passing at least the bankfull flow where the design flow is not dictated by regulations. At design flow capacity, the structure must convey stream flow, sediment, and other materials without appreciably altering stream flow characteristics and pass the design flow without causing erosion or overtopping of the structure. Adequately protect the bridge so that flows exceeding the bridge's flow capacity can safely bypass without damaging the bridge or eroding the streambanks.

For all bridge crossings, perform a geologic subsurface investigation that is in enough detail and analysis to support the design. Refer to NRCS 210-NEM, Part 531, "Geology."

*Bridges must meet the requirements for capacity as required by state statutes or local ordinances. Use Table 1 when no statutory or ordinance requirements apply.*

*On public roads, the minimum design storm runoff capacity shall be conveyed without causing erosion or road overtopping.*

*On non-public use roads, an erosion-resistant low point or overflow area may be constructed across the road to supplement the capacity. Flow depths and velocities must allow safe passage of private and emergency vehicles.*

*Evaluate the need for safety measures such as guardrails and reflectors at bridge crossings. Acceptable bridge materials include concrete, steel, and wood.*

**Table 1**

<b>Road Type</b>	<b>Storm Frequency (24-hour duration)</b>
<i>Forest, Farm Field</i>	<i>2-year*</i>
<i>Farm Driveways, Non-Public</i>	<i>10-year</i>
<i>Public</i>	<i>25-year</i>
<i>*Full bank flow may be used if the 2-year storm produces out-of- bank flow.</i>	

### **Criteria Applicable to Culvert Crossings**

Design the culvert in a manner that is consistent with sound engineering principles and adequate for its intended use. Evaluate the need for safety measures such as guardrails at the culvert crossing. Refer to NRCS 210-NEM-536 and the current edition of AASHTO LRFD “Bridge Design Specifications.”

*Design the culvert to have sufficient capacity to pass storm flow in Table 1. Adequately protect the culvert crossing so that flows in excess of culvert capacity can safely bypass the structure without damaging it or eroding the streambanks or crossing fill material. Do not use culverts in locations where large flows of sediment or large woody material are expected, or where the channel gradient exceeds 6 percent (100 horizontal to 6 vertical).*

*On non-public use roads, an erosion-resistant low point or overflow area may be constructed across the road to supplement the capacity. Ensure flow depths and velocities allow safe passage of private and emergency vehicles.*

If needed, use additional culverts at various elevations to maintain terrace or floodplain hydraulics and water surface elevations. The length of the culvert system must be adequate to extend the full width of the crossing, including side slopes and inlet or outlet extensions.

Acceptable culvert materials include concrete, corrugated metal, corrugated plastic, or steel. Select pipe material based on height of cover, soil type (corrosivity of the backfill material), and hydraulics.

For open bottom culverts or large culverts, perform a geologic investigation that is in enough detail and analysis to support the design. Refer to 210-NEM-531.

### **Criteria Applicable to Ford Crossings**

Ford crossings have the least detrimental impact on water quality when their use is infrequent. Ford crossings are adapted for crossing wide, shallow watercourses with firm streambeds. The following requirements are applicable to ford crossings regardless of the type of ford crossing:

- Do not place ford crossings immediately downstream from a pipe or culvert because of potential damage from localized high-velocity flows.
- Avoid placement of fords in areas where bank heights exceed 5 feet.
- Stream crossings used frequently or daily by livestock must use a culvert crossing or curbed bridge unless exclusion gates are included in the design to prevent livestock loafing on the crossing.
- To the extent possible, design the top surface of the ford crossing to follow contours of the streambed. Slope the crossing to match the existing thalweg (low-flow) channel.
- Provide cutoff walls at the upstream and downstream edges of the ford when needed to protect against undercutting.
- Evaluate the need for advance warning signage and water depth signage. Refer to Clarkin et al. (2006) for signage recommendations.

### Concrete fords

Use a concrete ford crossing only where the foundation of the stream crossing has enough detail and analysis to support the design. Refer to NRCS 210-NEM-531.

Recess the subgrade of the stream crossing so the upstream edge of the constructed (finished) surface of the crossing is at or below the original surface of the streambed. *Use Wisconsin Construction Specification 4 - Concrete for the design and installation of concrete fords.*

Dewatering of the site and toe walls is required during placement of concrete to lessen the potential for segregation and to maintain the proper water to cement ratio. Flowing water erodes concrete that is not sufficiently hardened. The stream must be diverted or prevented from flowing over the concrete until the concrete makes its final set, at a minimum of 12 hours after placement of the concrete.

Use a minimum thickness of 5 inches of placed concrete. Construct the concrete slab on a minimum 4-inch thick gravel base, unless the foundation is otherwise acceptable. Refer to NRCS 210-NEM-536 for design criteria.

Construct toe walls at the upstream and downstream ends of the crossing. Make the toe walls a minimum of 6 inches thick and 18 inches deep. Extend the toe walls in the stream approaches to the bankfull flow elevation.

Precast panels meeting the above criteria may be used in place of cast-in-place concrete slabs. *To the extent possible, the panels shall follow the contours of the stream bottom in order to avoid potential problems with sediment accumulation. Use concrete units that have adequate reinforcement for transportation and placement.* As with the cast-in-place concrete, install a gravel base and toe walls.

### Rock fords and the use of geosynthetic materials

When the site has a soft or unstable subgrade, use geotextiles to improve the foundation bearing capacity in the design of rock ford crossings. *Use geotextiles that meet the requirements of Table I or II, Class IV, in WI Construction Specification 13, Geotextiles.*

Recess the subgrade of the stream crossing so the upstream edge of the constructed (finished) surface of the crossing is at or below the original surface of the streambed.

Dewater and excavate the bed of the channel to the necessary depth and width and cover with geotextile material. Install the geotextile material to extend across the bottom of the stream and up the side slopes to at least the bankfull flow elevation.

Use durable geosynthetic materials and install them according to the manufacturer's recommendations, including the use of staples, clips, and anchor pins. Cover the geotextile material with at least 6 inches of crushed compacted rock. Use minimum 6-inch deep geocells if geocells are installed. *Cover the geotextile material or excavated bed with graded rock base as shown in Table 2.*

**Table 2**

<b>Foundation Consistency and Use</b>	<b>Minimum Base Course Thickness</b>
<i>Soft foundations for equipment crossing</i>	<i>18 inches or 8 inches underlain with geotextile</i>
<i>Firm foundations for equipment crossings and ALL cattle crossings</i>	<i>8 inches</i>

Design the rock ford stream crossing to remain stable for *the full bank design flow or 10-year, 24-hour duration storm flow, whichever is less.* Compute channel velocities and choose rock size using procedures and guidelines set forth in NRCS 210-NEH, Part 654, Technical Supplement (TS) 14N, "Fish Passage and Screening Design," and 210-NEH-650-16, Appendix 16A, "Size Determination for Rock Riprap," or other procedures approved by the State conservation engineer.

Crushed stone surfaces shall be stable for design velocities computed for the 10-year, 24-hour duration storm or full bank flow, whichever is less, unless provisions for replacement are included in the Operation and Maintenance Plan.

Allowable velocities for various sizes of rock material are shown in Table 3.

**Table 3**

<b>D50 (inches)</b>	<b>Allowable Velocity (fps)</b>
0.5	2.7
1	3.2
2	4.3
3	5
4	5.6
5	6
6	6.5
7	7.2
10	8

Base course options include quarry-run (angular) or field stone (rounded) graded rock (see Table 3). Surfacing treatment options include either:

1. 4 inches of crushed stone.
2. 4 inches of additional base course thickness.

If a 2-inch thick hoof contact zone is used, the thickness of the stone surface layer may be reduced by 2 inches. The material to be used for hoof contact will be decided upon by the landowner and could include sand, ground limestone, rock screenings, or similar materials.

Manufactured products such as articulated concrete blocks (ACBs) can be used to construct a low-flow ford. Properly designed ACB surfaces provide stable driving surfaces in a variety of conditions. Refer to 210-NEH-654, Technical Supplement (TS) 14L for guidance for planning, design, and uses of such materials.

### **Vented fords**

Use a vented ford where relatively frequent overtopping is expected during high flow events to have a driving surface above normal flows and remain functional and stable for the design flow and sustainable for high flow conditions. Unlike conventional bridges, the deck is depressed relative to the approach and generally has only a curb stop (no rails). The 'vent' can be a culvert or an arch culvert; align either to work with the stream planform (contour). Design the crossing—

- With one or more open structures (vents) that approximates or exceeds the size of the normal channel area, allowing low flows and average daily flows to pass beneath the roadbed.
- To remain functional and stable for the design flow and sustainable for high flow conditions.
- To protect the channel, the structure, and its foundation against scour and erosion and to mitigate downstream energy dissipation for high flow events.

### **CONSIDERATIONS**

For bridge, culvert, and vented ford crossings, consider incorporating natural streambed substrates through the impacted reach (including through the structure) for passage of aquatic organisms. See Bunte and Abt (2001) for sampling procedures. Natural streambeds provide passage and habitat benefits to many life stage requirements for aquatic organisms and may reduce maintenance costs. Consider all life

stages of aquatic organisms in the stream crossing design to accommodate their passage, in accordance with the species' requirements. Consider the habitat requirements of other aquatic or terrestrial species that may be affected by construction of a stream crossing. For example, a crossing may be designed with features that also promote safe crossing by terrestrial vertebrates.

Consider including a well-graded rock riprap apron on the downstream edge of concrete crossings to dissipate flow energy.

Locate stream crossings to avoid adverse environmental impacts and consider—

- When riffles are not present, consider using a stable straight reach.
- Effects on upstream and downstream flow conditions that could result in increases in erosion, deposition, or flooding. Consider habitat upstream and downstream of the crossing to avoid fragmentation of aquatic and riparian habitats.
- Short-term and construction-related effects on water quality.
- Timing of construction and other potential impacts in relation to passage of aquatic species.
- Overall effect on erosion and sedimentation that will be caused by the installation of the crossing and any necessary stream diversion.
- Effects of large woody material on the operation and overall design of the crossing.

## **PLANS AND SPECIFICATIONS**

Prepare plans and specifications for stream crossings in accordance with this standard. Clearly describe the requirements for applying the practice to achieve its intended purpose. As a minimum, include—

- Location of stream crossing
- Stream crossing width and length with profile and typical cross sections
- Details for permanent surface water diversion, as applicable
- Thickness, gradation, quantities, and type of rock or stone
- Type, dimensions, and anchoring requirements of geotextile
- Thickness, compressive strength, reinforcement, and other special requirements for concrete, if used
- Applicable structural details of all components, including reinforcing steel, type of materials, thickness, anchorage requirements, lift thickness, and covering
- Load limits for bridges and culverts
- Vegetative requirements that include seed and plant materials to be used, establishment rates, and season of planting
- Location, type, and extent of fencing required
- Location and types of gates required
- Method of surface water diversion and dewatering during construction or a statement making the contractor responsible for selecting such
- Location of all aboveground and buried utilities and notification requirements
- Location of all buried structures adjacent to the stream, including drainage tile
- Additional site-specific considerations
- Material and construction specifications

## **OPERATION AND MAINTENANCE**

Develop an operation and maintenance plan and implement it for the life of the practice.

As a minimum, include the following items in the operation and maintenance plan:

- State the appropriate conditions when the crossing can be safely used and when it should not be used by a predetermined depth. NOTE: If this restriction prevents the landowner from using a culvert or ford a significant amount of time, a bridge should be considered.
- Inspect the stream crossing, appurtenances, approaches, and associated fence and exclusion gates at least annually and after each major storm event. Make repairs, if needed.
- Remove accumulated organic material, woody material, or excess sediment.
- Replace surfacing stone for livestock crossing as needed.

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