WATER QUALITY TRADING PLAN

May 8, 2023
Revised: December 1, 2023



Village of Blue River
Wastewater Treatment Facility

WPDES Permit No. WI-0023418
607 West Street
Blue River, Wisconsin 53518

Prepared by:

Delta 3 Engineering, Inc.

875 S Chestnut St. | Platteville, WI 53818
Phone: (608) 348-5355
mail@delta3eng.biz

www.delta3eng.biz

DELTA 3
EVERY ANGLE COVERED

Project Number: D21-071

TABLE OF CONTENTS

I. Executive Summary 1

II. Background 3

III. Location and Description of Credit Generation Sites 7

IV. Methods for Nonpoint Source Load Reductions 8

V. Trade Timeline 12

VI. Inspection and Reporting 13

VII. Certification 15

Attachments

1) Notice of Intent to Conduct Water Quality Trading
2) Water Quality Trading Checklist
3) Location Map
4) Sanitary Sewer Map
5) Wastewater Treatment Facility Flow Schematic
6) HUC-12 Watershed Map
7) Soils Map and Testing Data
8) Current State of Eroding Streambanks Documentation
9) NRCS Streambank Erosion Estimator Report
10) Operation and Maintenance (O&M) Plan
11) WQT Plans and Specifications

I. Executive Summary -

This Water Quality Trading Plan summarizes the Village of Blue River's (Village) plan to utilize Water Quality Trading (WQT) for compliance with the final total phosphorus limit as provided in the Wisconsin Pollutant Discharge Elimination System (WPDES) Permit #WI 0023418-09-0. The WQT Credit generation will include nonpoint source reduction of Total Phosphorus (TP) as modeled by the NRCS Streambank Erosion Estimator. Credits are then applied to the daily monitoring reports to demonstrate compliance. The WWTF plans to utilize biological phosphorus removal (BPR) and offset TP with WQT Credits in order to meet the final seasonal average limit of 0.075 mg/L is required to offset, which will become effective June 30, 2023.

NRCS Streambank Erosion modeling methods were used to calculate the total phosphorus credits that would be generated based on the installation of best management practices (BMPs). These credits will be used to demonstrate compliance with the final total phosphorus limit as proposed in the WPDES Permit.

As demonstrated in modeling results from Table 1.1, the WWTF has the ability to register approximately 50.5 credits. The implementation of this WQT Plan will result in compliance with the final TP limits. The WWTF intends to monitor TP credit usage and intends to perform construction of additional BMPs as needed for future effluent TP to comply with WPDES Permits Limits. A new Water Quality Trading Plan will be submitted at that time for new BMP practices and credit production.

Table 1.1 – Modeling Results

Property Owner	Site	Current Phosphorus Loading (lbs/yr)	Proposed Phosphorus Loading (lbs/yr)	Proposed Phosphorus Reductions (lbs/yr)	Trade Ratio[1]	Proposed Phosphorus Credits
East Ridge Farm, LLC	Chute 1 Right	4.8	0	4.8	2:1	2.4
	Chute 1 Left	4.8	0	4.8	2:1	2.4
	Chute 2 Right	7.5	0	7.5	2:1	3.7
	Chute 2 Left	7.5	0	7.5	2:1	3.7
	Chute 3 Right	9.6	0	9.6	2:1	4.8
	Chute 3 Left	9.6	0	9.6	2:1	4.8
	Chute 4 Right	15.2	0	15.2	2:1	7.6
	Chute 4 Left	15.2	0	15.2	2:1	7.6
	Chute 5 Right	2.9	0	2.9	2:1	1.4
	Chute 5 Left	2.9	0	2.9	2:1	1.4
	Chute 6 Right	5.4	0	5.4	2:1	2.7
	Chute 6 Left	5.4	0	5.4	2:1	2.7
	Chute 7 Right	1.3	0	1.3	2:1	0.6
	Chute 7 Left	1.3	0	1.3	2:1	0.6
	Chute 8 Right	3.9	0	3.9	2:1	2.0
	Chute 8 Left	3.9	0	3.9	2:1	2.0
					Total	**50.5**

NOTE:

Trade Ratio = (Delivery + Downstream + Equivalency + Uncertainty + Habitat Adjustment):1

Delivery = 0 (Trading within same HUC-12 Watershed)

Downstream = 0 (For trades upstream of Outfall 001)

Equivalency = 0 (Not necessary of Total Phosphorus)

Uncertainty: = *Streambank Stabilization with Habitat Restoration* = 2

II. Background -

The purpose of this Water Quality Trading Plan (Plan) is to describe the Village's use of Water Quality Trading to comply with the total phosphorus limits as provided in the Village's WPDES Permit #WI-0023418-09-0. The Plan was developed following the Notice of Intent to Conduct Water Quality Trading, provided in Attachment #1, dated November 8, 2022. The Water Quality Trading Checklist Form 3400-208 is provided in Attachment #2.

The Village of Blue River is located in the northern portion of Grant County on State Trunk Highway "133" in southwest Wisconsin. The Village owns, operates, and maintains a Wastewater Treatment Facility (WWTF) which serves a population of approximately 434 residents.

The Village is comprised mostly of residential development and is positioned along the Wisconsin River. The Village has gentle slopes with grades ranging from 1% to 3% throughout the area. Elevations in the area range from approximately 671'± at the Wastewater Treatment Facility (WWTF) to 680'± at the Fire Station, which is located on the southern edge of the Village. The 100-year regional flood elevation for the Village of Blue River's WWTF site is at USGS Elevation = 668.00'. The location of the WWTF is provided in Attachment #3.

The existing sanitary sewer collection consists of approximately 73 sanitary manholes and 17,540 feet of eight-inch (8") sanitary sewer. One (1) lift station is utilized throughout the system along with approximately 110 feet of four-inch (4") sanitary force main to assist with the delivery of wastewater sewer collection system components. The gravity sanitary sewer main is typically composed of PVC. The manholes are primarily precast structures. Please refer to Attachment #4 – Sanitary Sewer Map for location of sanitary sewer collection system components.

The Village of Blue River owns and operates a WWTF that utilizes an extended-aeration, activated sludge treatment process. The facility currently discharges approximately 16,000 gallons per day (GPD) and has a design flow of 31,000 GPD (0.031 MGD). Primary treatment of the wastewater at the headworks of the facility consists of a mechanical screen. Wastewater then proceeds to the fermentation tank and anaerobic tank for selection of biological phosphorus removal. Following the anaerobic tank, wastewater enters the aeration tank for processing the influent flow and discharges into a rectangular final clarifier. The facility effluent passes through an ultraviolet (UV) system for disinfection prior to effluent discharge to the Blue River. The return activated sludge (RAS) from the clarifier is returned to the anaerobic tank for continued treatment, and the waste activated sludge (WAS) is pumped via air lift from the final clarifier into an aerobic digester for further sludge stabilization. Sludge is then transferred to an anaerobic sludge storage tank for on-site storage prior to landspreading on DNR approved sites. No chemicals are used at the WWTF for the removal of Phosphorus. Please see Attachment #5 for the WWTF flow schematic. The Village of Blue River's WWTF has one (1) receiving water and effluent discharge location, Outfall 001: Blue River (Blue River Watershed, LW09 – Lower Wisconsin River Basin).

The monthly average influent and effluent flows and loadings at the WWTF for 2020, 2021, and 2022 are provided in Table 2.1, Table 2.2, Table 2.3 respectively.

Table 2.1 – 2020 Monthly Averages

Month	Flow	BOD_5		Suspended Solids		Total Phosphorus		Total Phosphorus
	(MGD)	(mg/L)		(mg/L)		(mg/L)		(lbs./day)
	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Effluent
Jan. (’20)	0.017	291	2	191	3	-	5.20	0.74
Feb. (’20)	0.017	256	2	173	3	-	5.30	0.75
Mar. (’20)	0.020	213	2	125	3	-	4.67	0.78
Apr. (’20)	0.021	264	3	139	3	-	4.65	0.81
May (’20)	0.020	240	3	112	3	-	6.10	1.02
June (’20)	0.014	224	2	142	3	-	6.29	0.73
July (’20)	0.013	221	3	143	3	-	6.69	0.73
Aug. (’20)	0.014	188	4	137	4	-	7.73	0.90
Sept. (’20)	0.013	194	3	128	3	-	6.37	0.69
Oct. (’20)	0.015	175	2	140	2	-	5.89	0.74
Nov. (’20)	0.016	191	5	119	6	-	6.61	0.88
Dec. (’20)	0.017	241	5	142	3	-	5.18	0.73
Annual Average =	**0.016**	**225**	**3**	**141**	**3**	**-**	**5.89**	**0.79**

Table 2.2 – 2021 Monthly Averages

	Flow	BOD_5		Suspended Solids		Total Phosphorus		Total Phosphorus
	(MGD)	(mg/L)		(mg/L)		(mg/L)		(lbs./day)
	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Effluent
Jan. (’21)	0.017	312	3	169	3	-	4.88	0.69
Feb. (’21)	0.019	322	6	151	4	-	4.49	0.71
Mar. (’21)	0.015	278	3	119	3	-	5.17	0.65
Apr. (’21)	0.014	325	2	130	2	-	6.65	0.78
May (’21)	0.014	281	2	133	2	-	5.83	0.68
June (’21)	0.013	287	4	162	2	-	6.43	0.70
July (’21)	0.013	265	2	124	3	-	6.82	0.74
Aug. (’21)	0.014	221	2	128	3	-	9.28	1.08
Sept. (’21)	0.013	243	3	180	5	-	7.73	0.84
Oct. (’21)	0.014	176	3	117	3	-	6.64	0.78
Nov. (’21)	0.010	201	3	109	5	-	4.83	0.40
Dec. (’21)	0.009	286	5	132	8	-	4.94	0.37
Annual Average =	**0.014**	**266**	**3**	**137**	**4**	**-**	**6.14**	**0.72**

Table 2.3 – 2022 Monthly Averages

	Flow	BOD_5		Suspended Solids		Total Phosphorus		Total Phosphorus
	(MGD)	(mg/L)		(mg/L)		(mg/L)		(lbs./day)
	Effluent	Influent	Effluent	Influent	Effluent	Influent	Effluent	Effluent
Jan. ('22)	0.012	287	7	135	9	-	4.84	0.48
Feb. ('22)	0.020	281	11	115	7	-	4.94	0.82
Mar. ('22)	0.019	327	17	142	15	-	5.49	0.87
Apr. ('22)	0.020	305	17	130	15	-	5.67	0.95
May ('22)	0.017	324	9	130	7	-	7.54	1.07
June ('22)	0.014	303	13	132	5	-	6.43	0.75
July ('22)	0.018	332	16	155	4	-	**0.63**	**0.09**
Aug. ('22)	0.015	295	11	147	4	-	6.27	0.78
Sept. ('22)	0.014	269	10	121	3	-	3.51	0.41
Oct. ('22)	0.016	282	5	143	3	-	**0.74**	**0.10**
Nov. ('22)	0.017	263	11	139	5	-	3.00	0.42
Dec. ('22)	0.020	256	12	146	7	-	1.01	0.17
Annual Average =	**0.016**	**294**	**12**	**136**	**7**	-	**4.17**	**0.57**

Possible sources of TP within the Municipality were evaluated to determine if Phosphorus was being significantly contributed and will continue its investigation of Phosphorus contributors:

1. New Design Salon
2. New Horizon Supply Coop

During the initial evaluation of sanitary dischargers, it was determined that the businesses were not major contributors of Phosphorus. Currently, the Village has been able to maintain an average Total Phosphorus effluent of 6.14 mg/L which is well within the WPDES interim limit of 9.0 mg/L. The Village will continue to investigate options for TP removal at the WWTF. Results following the BPR startup in July, 2022 have demonstrated that TP concentrations less than 1.0 mg/L are readily achievable.

The Village has investigated watershed compliance alternatives such as Water Quality Trading (WQT) and Adaptive Management (AM). Utilizing the results from PRESTO, the watershed of the WWTF has a nonpoint source ratio of 9:91 and is considered to be nonpoint-source dominated. No potential stream monitoring projects are planned for this watershed. As calculated in the Water Quality Based Effluent Limit (WQBEL) on November 5, 2015, the rolling median TP concentration was 0.145 mg/L. The median average was almost double the applicable Water Quality Standard (WQS) of 0.075 mg/L. The Blue River is listed as an impaired river for Total Phosphorus on the DNR 2022 Impaired Waters List. The Village intends to perform WQT projects within the Village's Hydrological Unit Code – 12 (HUC-12) watershed #070700051407 as provided in Attachment #6.

Water Quality Trading may be used by municipal WPDES permit holders to demonstrate compliance with water quality-based effluent limitations (WQBELs). Generally, trading would involve the Village compensating another party to implement best management practices (BMPs) that would reduce Phosphorus runoff within the Blue River watershed. The Phosphorus runoff is modeled to demonstrate Phosphorus Credits generated by the BMPs. Through an agreement between the Village and other party, Phosphorus Credits generated by the other party are used by the Village to offset Phosphorus discharged at the WWTF.

Required TP Credits can be calculated by subtracting the average pounds discharged by the average pounds allowed by the seasonal limit. Based on results from 2022, the BPR process is capable to reducing TP to less than 1.0 mg/L. Flow and loading data from 2022 were utilized to determine credits needed. Calculations for required WQT reductions are provided below.

1) The current annual Phosphorus loading discharged at the WWTF is calculated as follows:

Seasonal Average Daily Flow (Q) = 0.016 MGD
Average Phosphorus concentration = 1.00 mg/L

1.00 mg/L x 0.016 MGD x 8.34 x 365 days/yr. = **49 lbs./yr.**

2) The proposed allowable annual Phosphorus mass limit at the WWTF is calculated as follows:

Seasonal Average Daily Flow (Q) = 0.016 MGD
Proposed Seasonal Phosphorus Concentration Limit = 0.075 mg/L

0.075 mg/L x 0.016 MGD x 8.34 x 365 days/yr. = **4 lbs./yr.**

3) Reduction of Total Phosphorus required at WWTF -
49 lbs./yr. – 4 lbs./yr. = **45 lbs./yr.**

In 2022, the Village of Blue River would have been required to generate over 45 TP Credits. The guidelines for WQT require that a trade result in water quality improvement at a Non-Point Source (NPS) providing credits to the WWTF (Point Source (PS)). Methods, formulas, and trade ratios are dependent on type of land and improvements being completed for the NPS reduction. For estimation purposes, a 2:1 final trade ratio was used. (Example: 2 pounds of load reduction generated for each long-term credit available.) Utilizing 2:1 trade ratio listed above, the required NPS Phosphorus reduction would be 90 lbs./year.

To demonstrate compliance through WQT, the Village intends to perform stabilization of oxbow chutes. The Village intends to generate additional credits as a factor of safety and for future growth.

III. Location and Description of Credit Generation Sites –

The Village discharges to the Blue River (Blue River Watershed, LW09 – Lower Wisconsin River Basin) at Outfall 001. As mentioned previously, the Village intends to perform WQT projects within the Village's HUC-12 #070700051407. The Village plans to perform stabilization of oxbow chutes which will utilize grading and/or riprap to prevent erosion of sediment from the oxbow chutes. Projects will occur on privately owned property. Stabilization of oxbow chutes will not only prevent sediment from entering the steam, but will also prevent phosphorus, nitrogen, and other pollutants from discharging to the Blue River. Reducing pollutant discharge will restore stream habitat and generate water quality trading credits. See Figure 3.1 for additional project location information.



Figure 3.1 – Project location in relation to Outfall 001.

IV. Methods for Nonpoint Source Load Reduction –

The Plan identifies stabilization of oxbow chutes practices that will reduce TP runoff from nonpoint sources.

A. Methods Used to Generate Load Reductions

For stabilization of oxbow chutes, the Village has the ability to generate TP load reductions through grading and/or riprapping of eight (8) chutes for a total of approximately 800 lineal feet.

Stabilization will be performed as per NR 328 *Shore Erosion Control Structures in Navigable Waterways and* NRCS 580 *Streambank and Shoreline Protection*. Shaping and riprapping will eliminate the discharge of sediment to the stream. The project will occur within HUC-12 #070700051407 in order to generate TP credits. Standard Plans and Specifications for the Project Site will be provided by Mike Engel, United States Fish & Wildlife Service (USFWS). The Property Owner will also acquire all required permits and authorizations for the Projects.

To register credits, the Village has entered into trade agreements with Property Owners pursuant to *s. 283.84(1)(b), Wis. Stats*.

B. History of Project Site

Proposed stream improvements were developed based on the information provided in the Wisconsin DNR *Blue River Watershed (LW09)*. This report stated the following:

"A cursory habitat evaluation was done on a tributary to the Blue River in the summer of 2001. This survey found fair habitat and overall problems resulted from erosion and nonpoint source pollution from the watershed. The intensive agriculture in the watershed is a limiting factor. Barnyards and grazing may be causing in-stream habitat and water quality problems in the reach above the state fishery area. Eroding streambanks are also a problem in spots, and silt deposits in some pools and riffles are causing in-stream habitat problems."

Blue River Watershed has experienced agricultural development within the watershed and has issues caused by sedimentation. The watershed has also experienced reduction of large woody debris along the streambanks due to agricultural development which reduces available habitat and bank roughness. Watershed improvements will reduce sediment which was identified as a primary reason for habitat degradation in the Blue River Watershed.

The Project Sites are planned within the Blue River Watershed. The project location is on private property along the Blue River.

The Partners for Fish and Wildlife Program in partnership with Ducks Unlimited and the private landowner through a signed agreement (WIPLO-19-005) is designing, permitting, and implementing this restoration with cost share. The Project consists of enhancing and restoring degraded wetlands in the Blue River watershed. The privately owned land is used for recreation and agriculture. The 107 acre restoration/enhancement site current land use is grazing, hay, and crops when not too wet. Vegetation is dominated by invasive Reed canary grass. The goal is to increase habitat for migratory and resident wetland bird species. The restoration will filter and slowly release cleaner and cooler water through infiltration to the Blue River. A greater diversity of plant species will lead to richer amphibian and insect diversity.

This restoration will restore hydrology by disabling a drainage ditch. Water control devices will be installed to maximize wildlife habitat including moist soil management. Several berms across waterways (dams) will be created to increase surface water. The site will be seeded to a quick growing annual grass such as winter wheat, oats, or annual rye to stabilize soil. These areas will be followed with permanent vegetation cover to include enhanced pasture, prairie, and/or annual crops in the moist soil management unit.

The WQT project is to include Chutes / Graded Control Structures to reduce sedimentation and restore wetland function as part of the larger site plan. In consensus with USFWS and DNR, the erosion indicators demonstrate the lateral recession rate ranges from Moderate to Severe as per the NRCS Recession Rate Table. Therefore, the recession rate varied from 0.2 feet/year to 0.4 feet/year were determined on a case-by-case basis for modeling purposes.

Natural Heritage Inventory Data has no elemental occurrences for this site. There are four records (see attachment) that will not be impacted. Wisconsin Historic Preservation Database has no records for this site.

C. Trade Ratio

The Plan identifies trading practices that will reduce TP runoff. However, the DNR requires a trade ratio to provide a safety factor for meeting water quality standards. Trade ratios consider pollutant reductions of varying certainty, location, and type. For the given WQT practice, a trade ratio of 2:1 was calculated. The trade ratio is derived as follows:

Trade Ratio = (Delivery + Downstream + Equivalency + Uncertainty – Habitat Adjustment):1
Delivery = 0 (Trading within same HUC-12 Watershed)
Downstream = 0 (For trades upstream of Outfall 001)
Equivalency = 0 (Not necessary of Total Phosphorus)
Uncertainty: *Streambank Stabilization with Habitat Restoration* = 2

Uncertainty factor was determined from Appendix H – Management Practices and Associated Information of the Wisconsin Department of Natural Resources *Guidance for*

implementing Water Quality Trading in WPDES Permits (Edition 2).

D. Model Used to Derive Load Reductions

NRCS Streambank Erosion modeling methods were used to calculate the total phosphorus credits that would be generated based on the installation of BMPs. These credits will be used to demonstrate compliance with the final total phosphorus limit as proposed in the WPDES Permit. Modeling results are provided in Table 4.1. If the Plan or model inputs change during construction, the Village will submit to the DNR the revised models and calculations to more accurately reflect and number of credits generated.

Table 4.1 – Modeling Results

Property Owner	Site	Current Phosphorus Loading (lbs/yr)	Proposed Phosphorus Loading (lbs/yr)	Proposed Phosphorus Reductions (lbs/yr)	Trade Ratio[1]	Proposed Phosphorus Credits
East Ridge Farm, LLC	Chute 1 Right	4.8	0	4.8	2:1	2.4
	Chute 1 Left	4.8	0	4.8	2:1	2.4
	Chute 2 Right	7.5	0	7.5	2:1	3.7
	Chute 2 Left	7.5	0	7.5	2:1	3.7
	Chute 3 Right	9.6	0	9.6	2:1	4.8
	Chute 3 Left	9.6	0	9.6	2:1	4.8
	Chute 4 Right	15.2	0	15.2	2:1	7.6
	Chute 4 Left	15.2	0	15.2	2:1	7.6
	Chute 5 Right	2.9	0	2.9	2:1	1.4
	Chute 5 Left	2.9	0	2.9	2:1	1.4
	Chute 6 Right	5.4	0	5.4	2:1	2.7
	Chute 6 Left	5.4	0	5.4	2:1	2.7
	Chute 7 Right	1.3	0	1.3	2:1	0.6
	Chute 7 Left	1.3	0	1.3	2:1	0.6
	Chute 8 Right	3.9	0	3.9	2:1	2.0
	Chute 8 Left	3.9	0	3.9	2:1	2.0
					Total	**50.5**

NOTE:

Trade Ratio = (Delivery + Downstream + Equivalency + Uncertainty – Habitat Adjustment):1

Delivery = 0 (Trading within same HUC-12 Watershed)
Downstream = 0 (For trades upstream of Outfall 001)
Equivalency = 0 (Not necessary of Total Phosphorus)
Uncertainty: *Streambank Stabilization with Habitat Restoration* = 2

Soil testing has been completed to determine TP concentrations within the soil. Soil sampling was performed at each Chute location. Soil sampling included the use of a soil sampler which pulled ¾" cores at 8" depth. Approximately six (6) cores were taken at each sampling location to provide a representative sample. Soils maps and soil testing data is provided in Attachment #7.

Chute cross sections were surveyed with global position system (GPS) equipment by USFWS. Chute heights were calculated as per guidance for the NRCS Streambank Erosion Estimator. An average height was determined for each Chute for input to the NRCS Streambank Erosion Estimator.

An onsite evaluation has been conducted to estimate bank recession rate. The bank has was also evaluated in the field by Mike Engel (USFWS). The data, narrative, and photos documenting the current state of eroding stream banks are provided in Attachment #8.

With the collected data, the NRCS Streambank Erosion Estimator was used to calculate TP loss from each reach of the eroding oxbow chute. The modeling data for the NRCS Streambank Erosion Estimator is available in Attachment #9. The grading and riprap design will eliminate bank recession thus eliminating TP inputs due to bank recession in riprap areas.

Additionally, in-stream habitat structures were designed by USFWS to incorporate habitat improvements with the Project Plans. These structures are intended to increase available cover for juvenile and adult fish. These structures will also influence stream hydrology by creating pools and riffles which are stream formations essential to macroinvertebrates, fish, and other aquatic life. The quantity and location of habitat structures is provided in Table 4.2 below.

Table 4.2 – Habitat Structures

Location	Root Wad
Chute 1	1
Chute 2	1
Chute 3	1
Chute 4	1
Chute 5	1
Chute 6	1
Chute 7	1
Chute 8	1
Total	**8**

E. Operation and Maintenance

An Operation and Maintenance (O&M) Plan is provided in Attachment #10. The O&M plan describes how the Stream Stabilization Practices will be operated and maintained. The O&M Plan also addresses response procedures for Practice Registration, Noncompliance Notification, and Notification of Trade Agreement Termination.

As previously mentioned, Village is planning to perform stabilization of oxbow chutes by implementing BMPs. The stabilization practices will be installed and maintained per the United States Fish & Wildlife Service Plans and Specifications as provided in Attachment #11. BMPs are to follow NR 328 Shore Erosion Control Structures in

Navigable Waterways, NRCS 580 Streambank and Shoreline Protection, and NRCS 395 Stream Habitat Improvement and Management.

Restoration landscaping and seeding will be installed following construction and will be closely monitored for a minimum of two (2) growing seasons to ensure the new seeding grows and erosion is not prevalent. Weeds and invasive vegetation growth will be addressed if present. The BMPs will be inspected following heavy rain events at a minimum. Inspection will be used to determine appropriate actions in order to maintain the BMPs for continuous and ongoing bank stabilization and TP credit generation.

The BMPs will be inspected annually by a licensed Professional Engineer to ensure that the BMPs are functioning as intended in order to meet the requirements of this WQT Plan.

V. Trade Timeline –

Schedule for Installation of the above-mentioned trading practices for Total Phosphorus Credit Generation for TP compliance is provided in Table 5.1 below.

Table 5.1 – Trade Timeline

Item	Completion Timeline
Site Investigation	Fall 2021 – Fall 2022
Construction of BMPs	April 1 - May 31, 2023
Phosphorus Credit Registration	June 30, 2023
Use of Phosphorus Credits by Village of Blue River (Ongoing for Permit Compliance)	June 30, 2023

Credits will be used by the Village beginning June 30, 2023. Credits will continue as long as the trading practices are maintained as outlined in this WQT Plan.

VI. Inspection Reporting –

A. Tracking Procedures

The Village will track credits used monthly. The Village will report credit usage to the DNR on a monthly basis in the Discharge Monitoring Reports (DMRs). The annual report will summarize the 12 months of credit usage and credit generation. The Village will report to DNR any concern that they have that may result in a need to modify the trade agreement and/or this trade plan. For example, a need to generate additional credits based on discharge.

B. Inspection

Inspection of the BMPs shall occur during construction phase to ensure they are installed per the design and meet all applicable codes and permits. Once completed, inspections of the established BMPs shall occur each month at a minimum or following heavy rain events. A licensed professional engineer will perform an annual certification to ensure the practice is performing as designed and the Village remains in compliance.

The inspection reports will include:

i. Name and contact information of the inspector
ii. Inspection Date
iii. Relevant standards set forth in the Design Plan or Operation and Maintenance Plan
iv. Issues identified
v. When and how any issues identified were addressed
vi. When and how any issues identified will be addressed in the future

Inspection reports generated during each routine or after rain event inspection will be included with the Annual Water Quality Trading Report submitted by the Village to DNR. Annual inspections by a professional engineer will typically occur in April or May. This time of year is ideal for evaluating the condition of BMPs as it follows the freeze/thaw which poses the greatest potential for changes to the BMPs. Minimal vegetation cover will allow for adequate visual inspection.

C. Management Practice Registration Form

The Village will file a completed registration form 3400-207 for Water Quality Trading Management Practice Registration separately from this Plan.

D. Annual Water Quality Trading Report Submittal

The following shall be submitted to the DNR by January 31 of each year:

i. The number of pollutant reduction credits (lbs/month) used each month of the previous year to demonstrate compliance;
ii. A summary of the annual inspection of the practice that generated any of the pollutant reduction credits used during the previous year, this inspection shall be completed by a licensed Professional Engineer;
iii. All monthly inspection reports;

iv. Identification of noncompliance or failure to implement any terms or conditions of this permit with respect to water quality trading that have not been reported in discharge monitoring reports;
v. A list of all noncompliance and the correction measures and timing to address the issues throughout the year; and
vi. An updated WQT plan if management practices have or will change.

E. Monthly Certification of Management Practices

Each month, the Village will certify that the BMPs are maintained and operating in a manner consistent with this Water Quality Trading Plan or provide a statement noting noncompliance with this Plan. The monthly Discharge Monitoring Report (DMR) will include the following statement as a certification of compliance when the Credit Generating Practice is operating in a manner consistent with the Plan:

> "I certify that to the best of my knowledge that the management practices identified in the approved water quality trading plan as the source of phosphorus credits is installed, established and properly maintained."

F. Notification of Failure to Generate Credits

The Village will notify DNR by telephone call to DNR's regional wastewater compliance engineer within 24 hours or next business day of becoming aware that phosphorus credits used or intended for use by Village are not being generated as outlined in this Water Quality Trading Plan.

The Village will submit a written notification within five days after the Village recognizes that the phosphorus credits are not being generated as outlined in the Trading Plan. DNR may waive the requirement for submittal for a written notice within five days and instruct the Village to submit the written notice with the next regularly scheduled monitoring report required by Village's WPDES Permit.

The written notice will contain a description of how and why the TP credits are not being generated as outlined in the Water Quality Trading Plan, the steps taken or planned to prevent reoccurrence of the identified problems and the length of time anticipated it will take to address the issue.

The Village will work to rectify the problem as laid out in the Operation and Maintenance Plans.

G. Conditions under which Management Practices May Be Inspected

Any DNR authorized officer, employee, or representative has the right to access and inspect the credit generating practice so long as the Village's trade agreement with the property owner(s) and this Water Quality Trading Plan remain in effect.

VII. Certification –

The undersigned hereby certifies that this Water Quality Trading Plan is accurate and correct to the best of his knowledge.

Village of Blue River Wastewater Treatment Facility

By: _____

Chad Williamson
Director of Public Works
Village of Blue River
607 West Street
Blue River, WI 53518
Telephone: (608) 485-0903
Email: brsp@mwt.net

Attachment #1

State of WisconsinDepartment of Natural Resources101 South Webster Street
Madison WI 53707-7921dnr.wi.gov

Notice of Intent to Conduct Water Quality Trading

Form 3400-206 (1/14)

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

Applicant Information

Permittee Name	Permit Number	Facility Site Number
Village of Blue River	WI- 0023418-09-0	

Facility Address	City	State	ZIP Code
607 West Street	Blue River	WI	53518

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Jordan Fure (Delta 3 Eng.)	875 South Chestnut Street	Platteville	WI	53818

Project Name: Blue River WWTF Upgrade

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
Blue River	Total Phosphorus	070700051407

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

Credit Generator Information

Credit generator type (select all that apply):
- ☐ Permitted Discharge (non-MS4/CAFO)
- ☐ Permitted MS4
- ☐ Permitted CAFO
- ☑ Urban nonpoint source discharge
- ☑ Agricultural nonpoint source discharge
- ☐ Other - Specify: _____

Are any of the credit generators in a different HUC 12 than the applicant?
- ○ Yes; HUC 12: _____
- ◉ No
- ○ Unsure

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

Will a broker/exchange be used to facilitate trade?
- ○ Yes; Name: _____
- ◉ No
- ○ Unsure

Point to Point Trades (Traditional Municipal [illegible])

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

Notice of Intent to Conduct Water Quality Trading

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

List the practices that will be used to generate credits:

The Village intends to perform streambank stabilization. The construction will occur upstream of Outfall 001.

Method for quantifying credits generated:
- ☐ Monitoring
- ☑ Modeling, Names: NRCS Streambank Erosion Estimator
- ☐ Other: _____

Projected date credits will be available:

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
Jordan Fr...	10/1/2022

Authorized Representative Signature

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

Signature of Authorized Representative	Date Signed
Chad Mullins	11/8/22

Attachment #2

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

Water Quality Trading Checklist

Form 3400-208 (1/14)

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

Applicant Information

Permittee Name	Permit Number	Facility Site Number
Village of Blue River	WI- 0023418	

Facility Address	City	State	ZIP Code
607 West Street	Blue River	WI	53518

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Jordan Fure (Delta 3 Eng.)	875 South Chestnut Street	Platteville	WI	53818

Project Name
Proposed Stream Improvements

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
Blue River	Total Phosphorus	070700051407

Credit Generator Information

Credit generator type (select all that apply):

- ☐ Permitted Discharge (non-MS4CAFO)
- ☐ Permitted MS4
- ☐ Permitted CAFO
- ☐ Urban nonpoint source discharge
- ☒ Agricultural nonpoint source discharge
- ☐ Other - Specify: _____

Are any of the credit generators in a different HUC 12 than the applicant?
- ○ Yes; HUC 12: _____
- ◉ No

Are any of the credit generators downstream of the applicant?
- ○ Yes
- ◉ No

Will a broker/exchange be used to facilitate trade?
- ○ Yes *(include description and contact information in WQT plan)*
- ◉ No

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

Are each of the point source credit generators identified in this section in compliance with their WDPES permit requirements?
- ○ Yes
- ○ No

Discharge Type	Permit Number	Name	Contact Information	Trade Agreement Number
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				
○ Traditional ○ MS4 ○ CAFO				

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

Does plan have a narrative that describes:			Plan Section
a. Summary of discharge and existing treatment including optimization	◯ Yes	◯ No	
b. Amount of credit being generated	◯ Yes	◯ No	
c. Timeline for credits and agreements	◯ Yes	◯ No	
d. Method for quantifying credits	◯ Yes	◯ No	
e. Tracking and verification procedures	◯ Yes	◯ No	
f. Location of credit generator in proximity to receiving water and credit user	◯ Yes	◯ No	
g. Other: _____	◯ Yes	◯ No	

Point to Nonpoint Trades (Non-Permitted Urban, Agricultural, Other)

Discharge Type	Practices Used to Generate Credits	Method of Quantification	Trade Agreement Number	Have the practice(s) been formally registered?
◯ Urban NPS ◯ Agricultural NPS ◯ Other	Streambank Stabilization	NRCS Streambank Erosion Estimator		◯ Yes ◉ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part
◯ Urban NPS ◯ Agricultural NPS ◯ Other				◯ Yes ◯ No ◯ Only in part

Does plan have a narrative that describes:			Plan Section
a. Description of existing land uses	◉ Yes	◯ No	Section IV
b. Management practices used to generate credits	◉ Yes	◯ No	Section IV
c. Amount of credit being generated	◉ Yes	◯ No	Section IV
d. Description of applicable trade ratio per agreement/management practice	◉ Yes	◯ No	Section IV
e. Location where credits will be generated	◉ Yes	◯ No	Section III
f. Timeline for credits and agreements	◉ Yes	◯ No	Section V
g. Method for quantifying credits	◉ Yes	◯ No	Section IV

Does plan have a narrative that describes:			Plan Section
h. Tracking procedures	◉ Yes	○ No	Section IV
i. Conditions under which the management practices may be inspected	◉ Yes	○ No	Section VI
j. Reporting requirements should the management practice fail	◉ Yes	○ No	Section VI
k. Operation and maintenance plan for each management practice	◉ Yes	○ No	Section IV
l. Location of credit generator in proximity to receiving water and credit user	◉ Yes	○ No	Section III
m. Practice registration documents, if available	○ Yes	◉ No	
n. History of project site(s)	◉ Yes	○ No	Section IV
o. Other: _____	○ Yes	○ No	

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.
- I certify that the information in this document is true to the best of my knowledge.

Signature of Preparer	Date Signed
[signature]	5-8-2023

Authorized Representative Signature

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

Signature of Authorized Representative	Date Signed
[signature]	5/8/2023

Attachment #3

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
- Index to EN_Image_Basemap_Leaf_Off

Notes

0.5 0 0.25 0.5 Miles

NAD_1983_HARN_Wisconsin_TM

1: 15,840

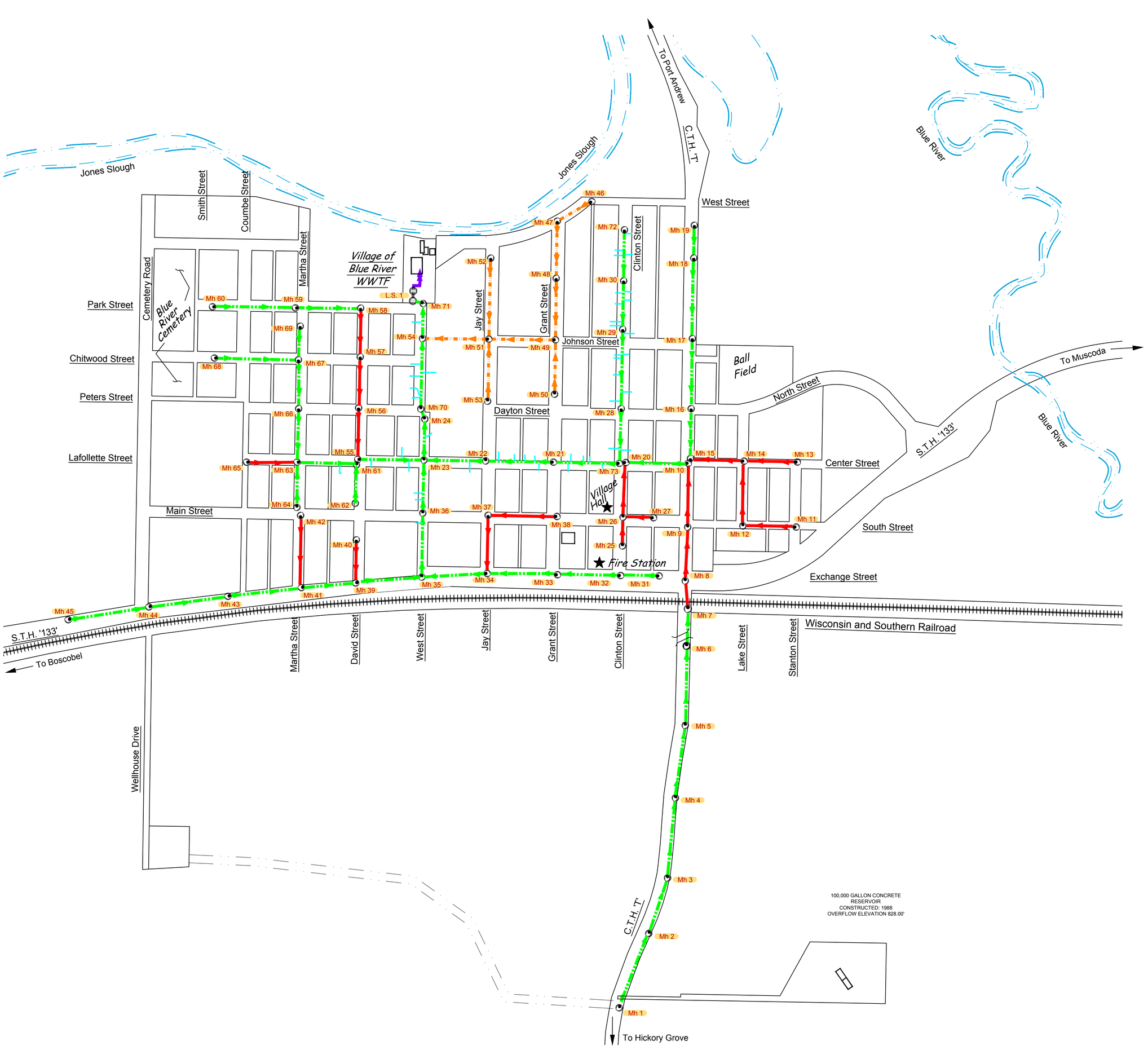
DISCLAIMER: The information shown on these maps has been obtained from various sources, and are of varying age, reliability and resolution. These maps are not intended to be used for navigation, nor are these maps an authoritative source of information about legal land ownership or public access. No 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/

Attachment #4

SANITARY SEWER SYSTEM MAP

VILLAGE OF BLUE RIVER

GRANT COUNTY, WI



Legend

Known Lateral Location

Existing 8" Sanitary Sewer - PVC

Existing 8" Sanitary Sewer - Truss Pipe

Existing 8" Sanitary Sewer - Clay

Existing 4"/6" Sanitary Force Main

Existing Flow Direction

Existing Sanitary Manhole

Lift Station

River/Stream

FIGURE 2-2

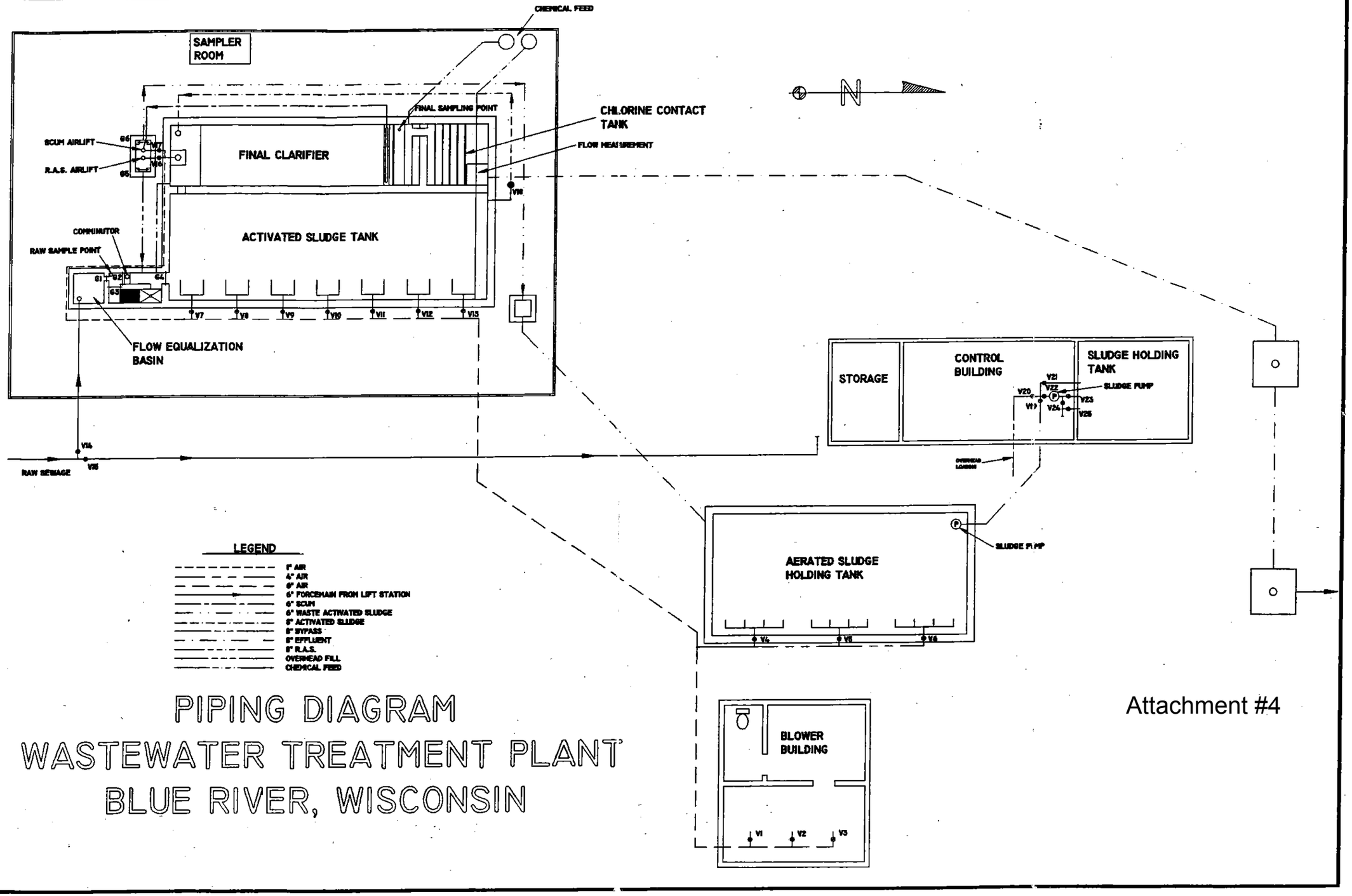
Drawn by: C.Coyier
Date: Jan 21, 2010

Revised by: C.Coyier
Date:Oct 21, 2015

DELTA 3 ENGINEERING INC
PROFESSIONAL CIVIL-MUNICIPAL & STRUCTURAL ENGINEERING • ARCHITECTURE
GRANT WRITING • LAND DEVELOPMENT • PLANNING & CADD SERVICES
875 SOUTH CHESTNUT STREET
PLATTEVILLE, WISCONSIN 53818
PHONE: (608) 348-5355
FAX: (608) 348-5455

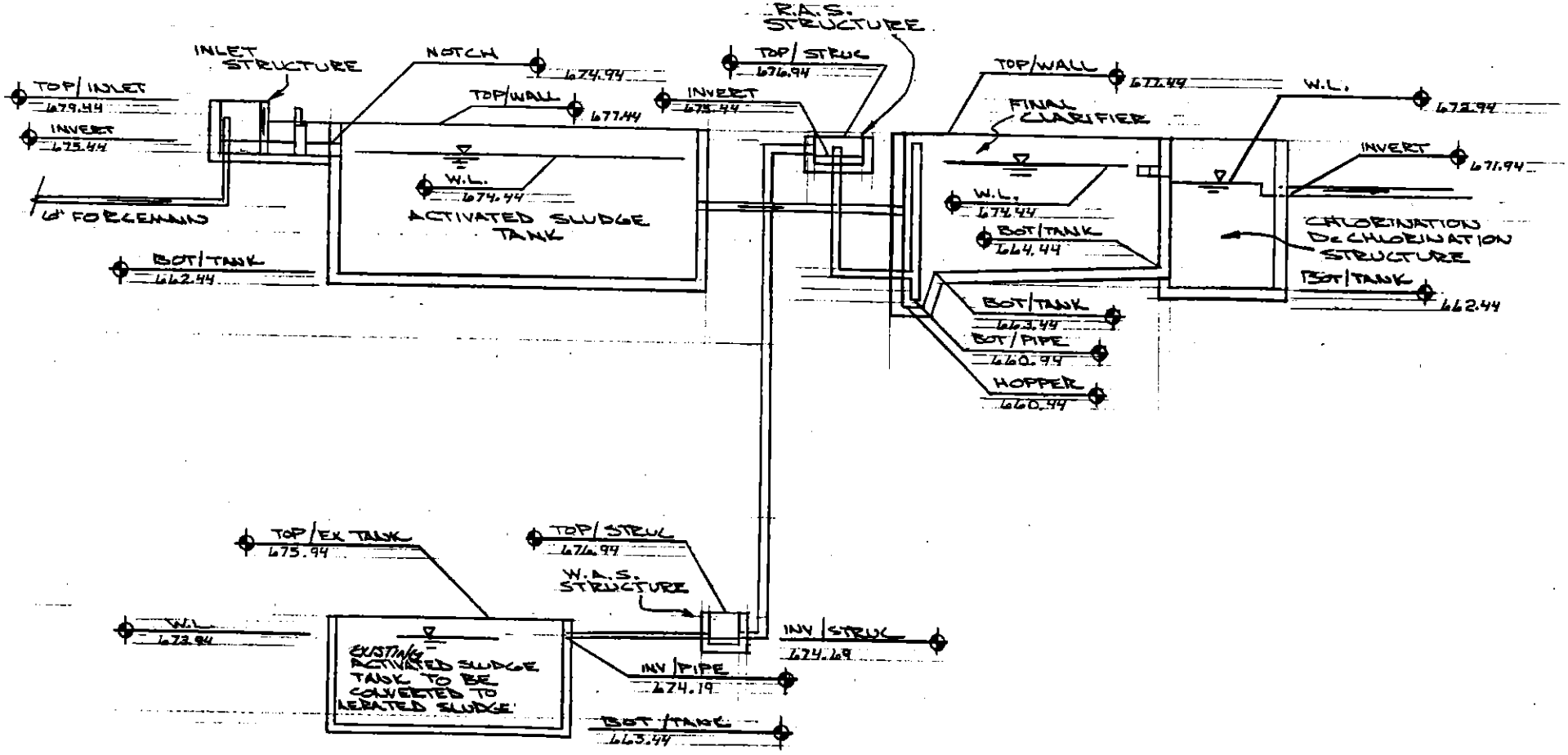
File: G:\Projects\Blue River\Maps\Utilities_Sanitary.dwg

Attachment #5



PIPING DIAGRAM
WASTEWATER TREATMENT PLANT
BLUE RIVER, WISCONSIN

Attachment #4



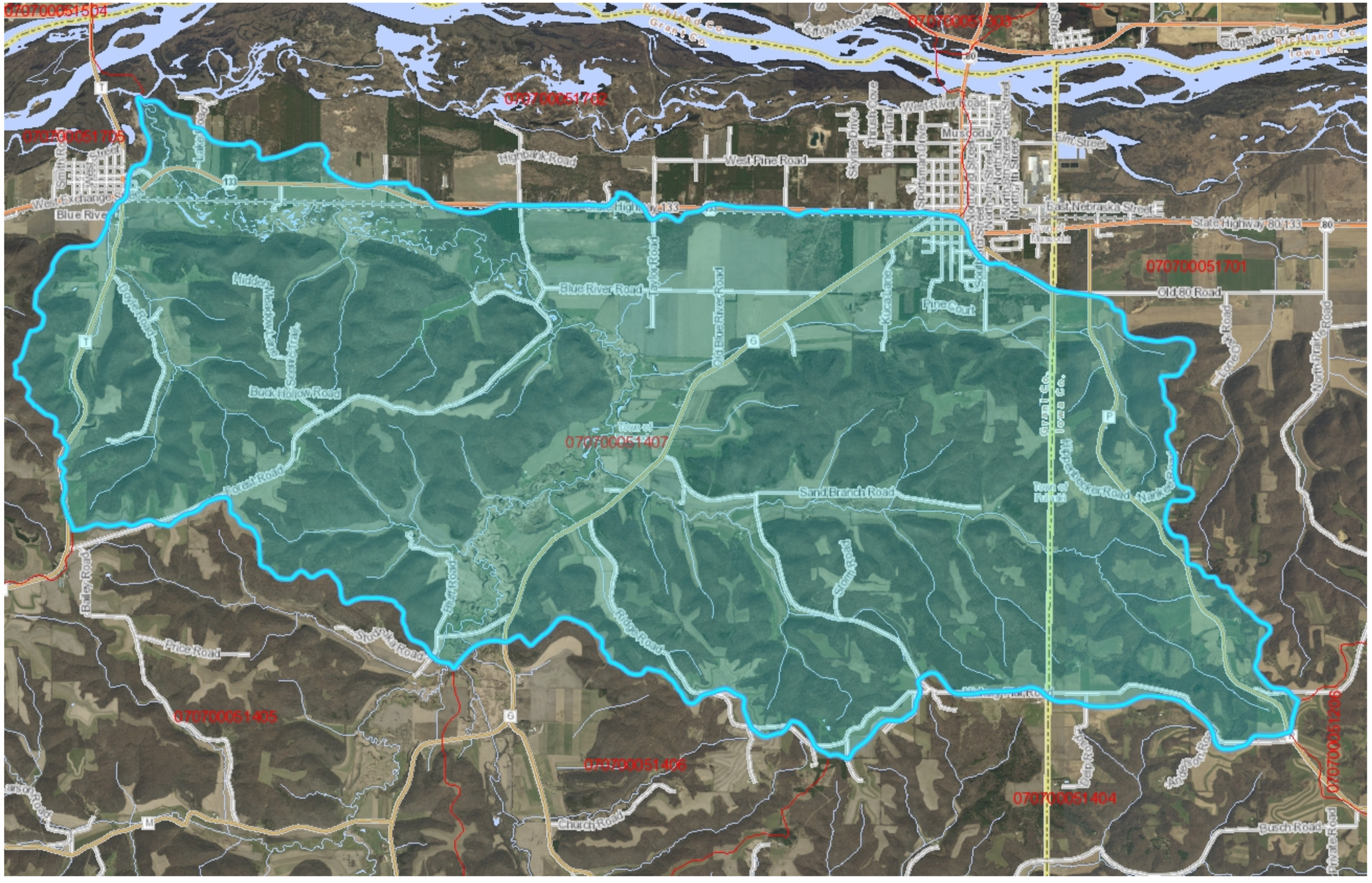
FLOW SCHEMATIC

N.T.S.

Attachment #4

Attachment #6

HUC-12 Watershed Map





Legend

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

1.5 0 0.75 1.5 Miles

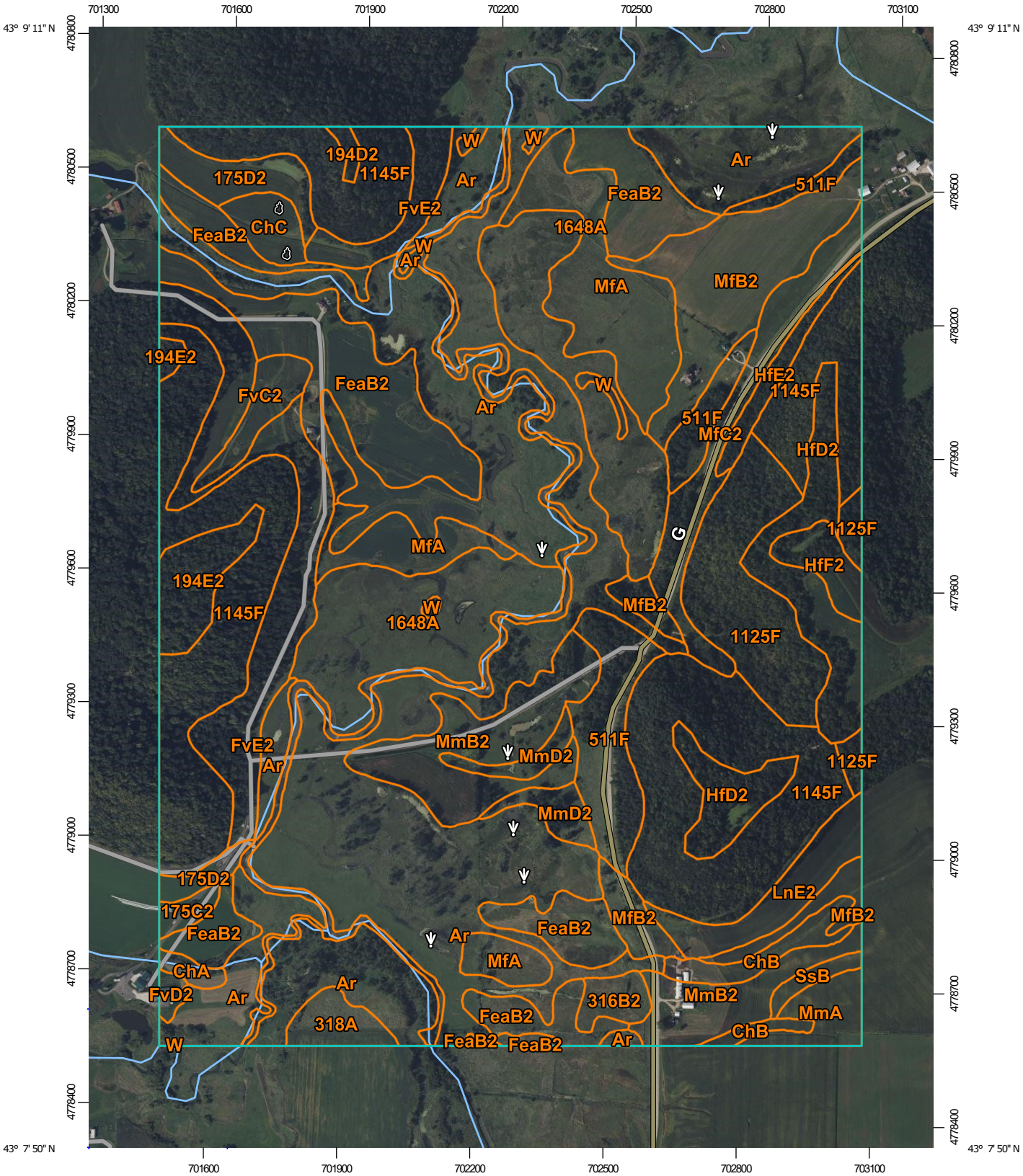
1:47,520

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

Attachment #7



Map Scale: 1:12,300 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 150 300 600 900

Feet: 0 500 1000 2000 3000

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

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

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

Special Point Features

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

Water Features

- Streams and Canals

Transportation

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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

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: Grant County, Wisconsin
Survey Area Data: Version 17, Sep 6, 2022

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

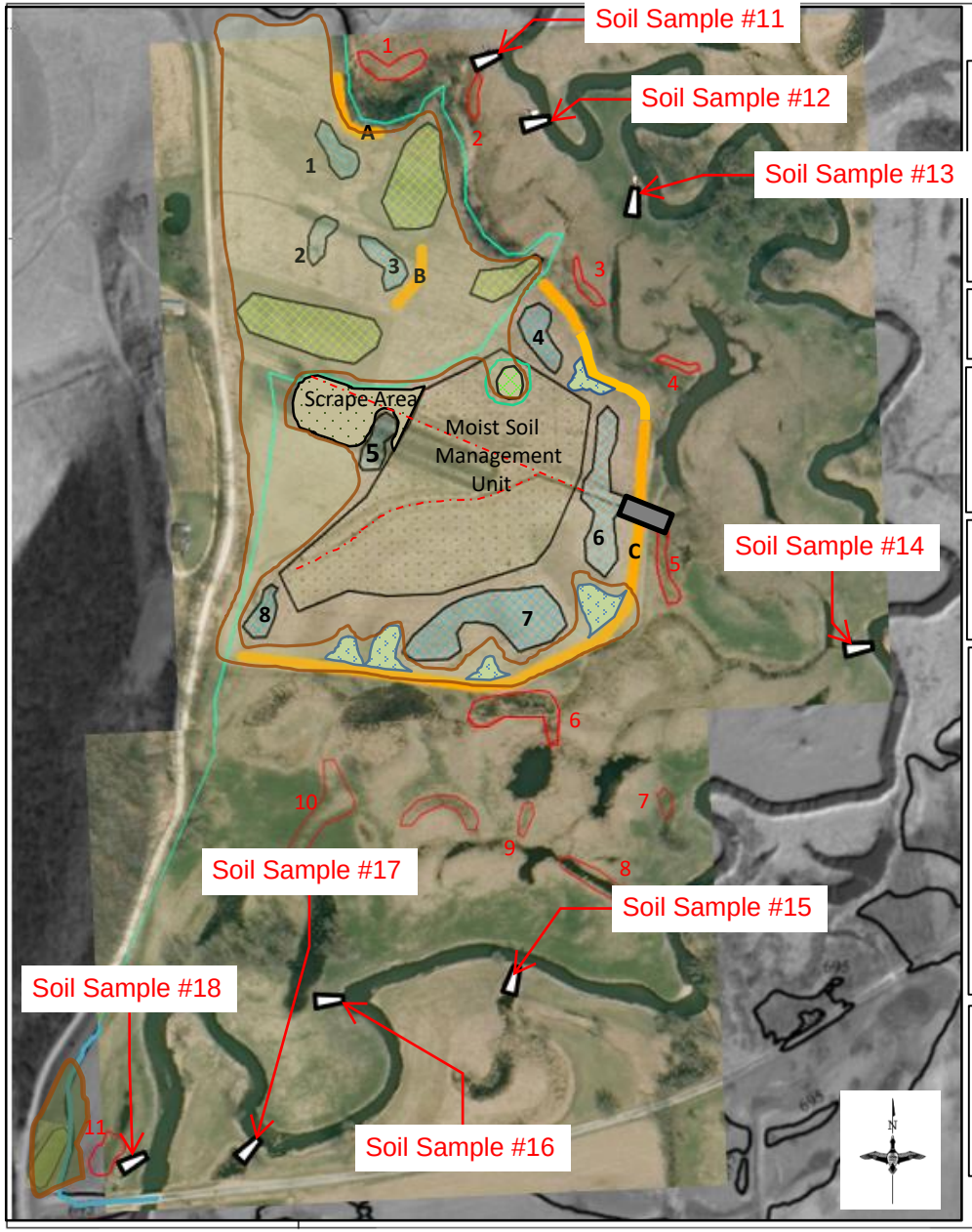
Date(s) aerial images were photographed: Aug 2, 2022—Sep 28, 2022

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
175C2	Palsgrove silt loam, 6 to 12 percent slopes, moderately eroded	2.2	0.3%
175D2	Palsgrove silt loam, 12 to 20 percent slopes, moderately eroded	10.9	1.3%
194D2	Newglarus silt loam, moderately deep, 12 to 20 percent slopes, moderately eroded	1.1	0.1%
194E2	Newglarus silt loam, moderately deep, 20 to 30 percent slopes, moderately eroded	10.6	1.3%
316B2	Ella silt loam, 1 to 6 percent slopes, moderately eroded	4.0	0.5%
318A	Bearpen silt loam, 0 to 3 percent slopes, rarely flooded	5.4	0.7%
511F	Plainfield sand, river valley, 15 to 60 percent slopes	24.7	3.1%
1125F	Dorerton, very stony-Elbaville complex, 30 to 60 percent slopes	29.3	3.6%
1145F	Gaphill-Rockbluff complex, 30 to 60 percent slopes	119.1	14.7%
1648A	Northbend-Ettrick silt loams, 0 to 3 percent slopes, frequently flooded	60.5	7.5%
Ar	Arenzville silt loam, 0 to 3 percent slopes, occasionally flooded	197.5	24.4%
ChA	Chaseburg silt loam, moderately well drained, 0 to 2 percent slopes	1.8	0.2%
ChB	Chaseburg silt loam, moderately well drained, 2 to 6 percent slopes	7.2	0.9%
ChC	Chaseburg silt loam, 6 to 15 percent slopes	5.2	0.6%
FeaB2	Festina silt loam, 1 to 6 percent slopes, moderately eroded	68.6	8.5%
FvC2	Fayette silt loam, valleys, 6 to 12 percent slopes, moderately eroded	6.0	0.7%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
FvD2	Fayette silt loam, valleys, 12 to 20 percent slopes, moderately eroded	1.3	0.2%
FvE2	Fayette silt loam, valleys, 20 to 30 percent slopes, moderately eroded	41.1	5.1%
HfD2	Hixton fine sandy loam, 10 to 15 percent slopes, moderately eroded	26.6	3.3%
HfE2	Hixton fine sandy loam, 15 to 20 percent slopes, moderately eroded	4.6	0.6%
HfF2	Hixton fine sandy loam, 20 to 30 percent slopes, moderately eroded	5.5	0.7%
LnE2	Lindstrom silt loam, 15 to 30 percent slopes, moderately eroded	11.2	1.4%
MfA	Meridian fine sandy loam, 0 to 2 percent slopes	38.7	4.8%
MfB2	Meridian fine sandy loam, 2 to 6 percent slopes, moderately eroded	38.9	4.8%
MfC2	Meridian fine sandy loam, 6 to 10 percent slopes, moderately eroded	17.4	2.2%
MmA	Meridian loam, 0 to 2 percent slopes	6.6	0.8%
MmB2	Meridian loam, 2 to 6 percent slopes, moderately eroded	35.5	4.4%
MmD2	Meridian loam, 10 to 15 percent slopes, moderately eroded	6.9	0.9%
SsB	Sparta loamy fine sand, 2 to 6 percent slopes	2.2	0.3%
W	Water	19.4	2.4%
Totals for Area of Interest		**809.9**	**100.0%**



Notes:

Material placed in the flood plain associated with berm C is less than material removed from the food plain associated with oxbow restoration 1,2,3,7,8,9,10, 11 and scrape 5 along with borrow from 4,6,7,8 above ground water level used in building berms and will result in increased flood storage (see page 3)

Oxbow scrapes will be located in areas dominated by reed canary grass

Micotopography work will accentuate existing topographic features by moving 4 inches or less in targeted areas. These areas will receive custom seed mixes to establish wet prairie.

Moist soil management unit will involve scraping (spoils moved out of flood plain), leveling, and tile installation for waterfowl and shorebird management.

Erosion Control Plan

Immediately after earth moving is complete the site will be seeded and planted where appropriate . Erosion control matting will be placed on areas where slopes are greater than 5:1. Mulch may be used in areas less than 5:1. Culverts leading to river will be monitored and straw bales placed if needed. All erosion control will be installed and maintained according to NRCS technical standards (see attached NRCS Standard 484).

Planting/Seeding Plan

Planting and seeding will be established in accordance to NRCS Wisconsin Agronomy Technical Note 5 (see attached). All disturbed areas will be seeded down to a native prairie mix (see Table 17, Tech Note 5). Seed mix may be altered due to seed availability but diversity should remain the same.

Legend

- Water Control Structure
- Borrow/Scrape
- Berm
- Approximate Flood Plain
- Spoil Placed outside FP
- Rock-lined Chute w/lunker
- Oxbow Scrape
- Micro-topography
- Moist Soil Unit
- Tile Installation
- Prairie Planting

Thomas Restoration

Plan View

REVISIONS:

CAD FILE:

DESIGNED BY:

DRAWN BY:

SURVEYED BY:

BOOK NO.

DATE 1/23/13

PROJECT NO.:

ROCK RIVER LABORATORY, INC.
AGRICULTURAL ANALYSIS

710 Commerce Drive
PO Box 169
Watertown, WI 53094

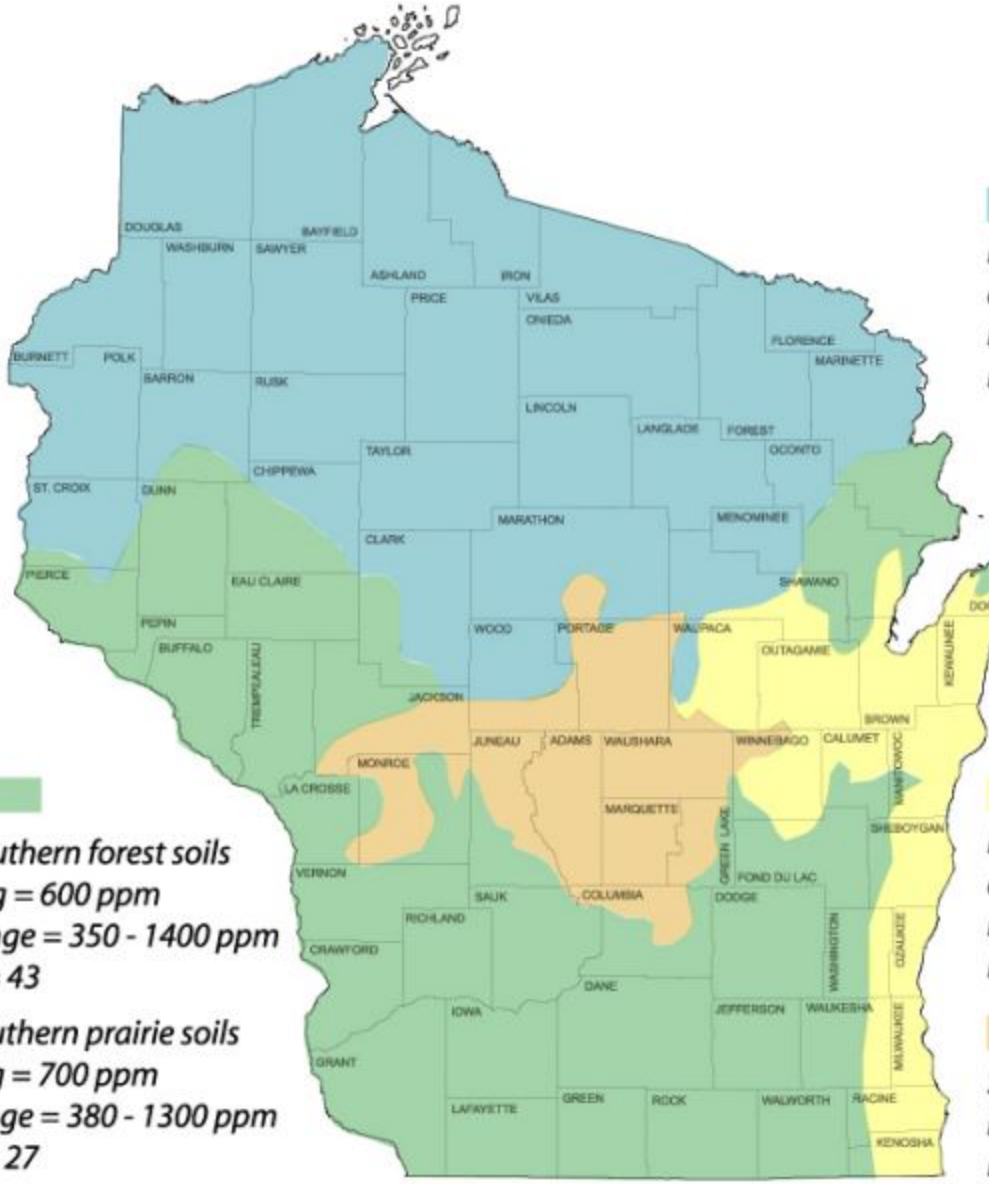
920-261-0446 phone
920-261-1365 fax
www.rockriverlab.com

Insight FS Darlington, WI - Total Phosphorus Analysis 03/03/2023

Field ID	Sample ID	Total P (ppm)
Blue River	8	624.1
Blue River	6	730.9
Blue River	4	666.9
Blue River	17	578.7
Blue River	11	710.7
Blue River	13	829.7
Blue River	14	792.1
Blue River	15	603
Blue River	12	827.5
Blue River	1	1067
Blue River	18	406.3
Blue River	5	708.7
Blue River	9	700.4
Blue River	2	160.2
Blue River	7	538
Blue River	3	523.6
Blue River	16	745
Blue River	10	584.9

Field ID	Sample ID	Total P (ppm)
Avoca	15	429.4
Avoca	17	464.3
Avoca	19	638.8
Avoca	21	286.5
Avoca	23	485.8
Avoca	25	252
Avoca	27	494.9
Avoca	1	423.3
Avoca	3	504.5
Avoca	5	444.6
Avoca	9	565.8
Avoca	7	496.9
Avoca	11	469.9
Avoca	13	532.9
Avoca	29	737.6
Avoca	31	317.6

Soil Total P



Northern loamy soils
avg = 540 ppm
range = 480-580 ppm
n = 4

Southern forest soils
avg = 600 ppm
range = 350 - 1400 ppm
n = 43

Southern prairie soils
avg = 700 ppm
range = 380 - 1300 ppm
n = 27

Eastern red soils
avg = 950 ppm
range = 430 - 2820 ppm
n = 12

Sandy soils
range = 250 - 400 ppm
n = 2

Organic soils: range = 1330 - 1350 ppm, n = 2

Attachment #8

ATTACHEMENT #8
TABLE OF CONTENTS

I. Introduction 1

Chute 1 Documentation 1

Chute 2 Documentation 2

Chute 3 Documentation 3

Chute 4 Documentation 3

Chute 5 Documentation 4

Chute 6 Documentation 5

Chute 7 Documentation 5

Chute 8 Documentation 6

I. Introduction

The lateral recession rate of the eroding bank is a critical component for the NRCS Streambank Erosion Estimator. The following documentation provides the justification for the lateral recession rates used in the NRCS Streambank Erosin Estimator. Lateral recession rate was estimated based on the photos provided, description, and on site evaluation. The following includes representative photos of Project Sites to be stabilized through installation of Best Management Practices (BMPs).

II. Blue River Erosion Documentation



Image 1.0 – Chute 1: Severe undercut with bare banks and vegetative overhang



Image 2.0 – Chute 2: Moderate undercut with vegetative overhang



Image 3.0 – Chute 3: Moderate undercut with vegetative overhang



Image 4.0 – Severe vegetative overhang and bare banks



Image 4.1 – Severe vegetative overhang and bare banks



Image 5.0 – Chute 5: Moderate undercut and vegetative overhang



Image 6 – Chute 6: Moderate undercut and vegetative overhang



Image 7.0 – Chute 7: Moderate undercut with slump and vegetative overhang



Image 7.1 – Chute 7: Moderate undercut with slump and vegetative overhang



Image 8.0 – Chute 8: Severe undercut with slump and vegetative overhang



Image 8.1 – Chute 8: Severe undercut with slump and vegetative overhang



Image 8.2 – Chute 8: Severe undercut with slump and vegetative overhang

Attachment #9

NRCS Excel Workbook Estimating 'Other' Erosion Types June 2006

Annual soil loss predictions for conservation planning purposes are made with current soil loss prediction technology (RUSLE2). RUSLE2 estimates sheet, rill and interrill erosion. Erosion that is seasonal in nature and caused by concentrated flow, however, is not predicted by RUSLE2.

This workbook provides conservation planners with simple tools and processes to help estimate the amount of erosion occurring in ephemeral gullies, classic gullies and on streambank erosion sites.

Definitions:

Rill Erosion: consists of the removal of soil by concentrated water running through little streamlets, or headcuts. Detachment in a rill occurs if the sediment in the flow is below the amount the load can transport and if the flow exceeds the soil's resistance to detachment. As detachment continues or flow increases, rills will become wider and deeper. Rills may be of any size but are usually less than four inches deep. Rills are:

<> generally parallel on the slope, but may converge,
<> generally of uniform spacing and dimension,
<> generally appear at different locations on the landscape from year to year,
<> generally shorter than ephemeral cropland gullies,
<> usually end at a concentrated flow channel, or an area where the slope flattens and deposition occurs,
<> are on the same portion of the slope that is used to determine the length of slope (L) for RUSLE2,
<> many small, but conspicuous channels running in the direction of slope gradient

Rill erosion is considered in the RUSLE2 calculations.

Ephemeral Gully Erosion: Small erosion channels formed on crop fields as a result of concentrated flow of runoff water. These channels are routinely eliminated by tillage of the field but return following subsequent runoff events. Ephemeral Gullies are small enough to be eliminated (temporarily) with the use of typical farm tillage equipment and they:

<> recur in the same area of concentrated flow each time they form,
<> frequently form in well-defined depressions in natural drainage ways,
<> are generally wider, deeper, and longer than the rills in the field,

Ephemeral Gullies are **not** calculated by the RUSLE2 program.

Gully Erosion: Permanent gullies are formed when channel development has progressed to the point where the gully is too wide and too deep to be tilled across. These channels carry large amounts of water after rains and deposit eroded material at the foot of the gully. They disfigure landscape and make the land unfit for growing crops. Gullies:

<> may grow or enlarge from year to year by head cutting and lateral enlarging,
<> often occur in depressions or natural drainage ways,
<> may begin as ephemeral gullies that were left in the field untreated,
<> may, over time, become partially stabilized by grass, weeds or woody vegetation,

Gully erosion is not calculated by the RUSLE2 program.

Streambank Erosion: The wearing away of streambanks by flowing water. The removal of soil from streambanks is typically caused by the direct action of stream flow and/or wind/wave action, typically occurring during periods of high flow. Streambank erosion:

<> is a natural process that generally increases when unprotected streambanks (e.g. no woody vegetation) are subject to the actions of flowing water and ice damage.

<> is a common occurrence on many Vermont river channels that are experiencing geomorphic adjustments

---

The soil loss from ephemeral gullies, gullies and streambank erosion areas can be estimated by calculating the volume of soil removed by erosion processes. The volume of soil loss can be multiplied by the typical unit weight of the soil (based on soil texture) which is eroded. Approximate soil unit weights are expressed below[1]:

Soil Texture	Estimated Dry Density lb/ft^3
Gravel	110
Sand	105
Loamy Sand	100
Sandy Loam	100
Fine Sandy Loam	100
Sandy Clay Loam	90
Silt Loam	85
Silty Clay Loam	85
Silty Clay	85
Clay Loam	85
Organic	22

Procedure for estimating Ephemeral Soil Erosion:

The following formula will be used to calculate annual estimated ephemeral gully erosion:

$$\frac{\text{Ephemeral Gully } \mathbf{Length} \times \text{Gully Average } \mathbf{Width} \times \text{Gully Average } \mathbf{Depth}}{2000} \times \text{Soil Weight (lbs/ft}^3\text{)} \times \text{Occurrences per Year} = \mathbf{Estimated} \text{ Soil Loss (Tons per Year)}$$

***** Ephemeral gully erosion may reform multiple times per year, and under certain conditions it may not form in a given year. The voided volume which would be calculated after a runoff event is not necessarily representative of an annual rate, but is representative of only the specific event. This erosion can be calculated for individual storms and can be summed for a yearly estimate.

1 Data from published soil surveys, laboratory data, and soil interpretation record are to be used where available. Parent materials, soil consistency, soil structure, pore space, soil texture, and coarse fragments all influence unit weight.

Procedure for estimating Gully Soil Erosion:

The following formula will be used to calculate annual estimated classic gully erosion:

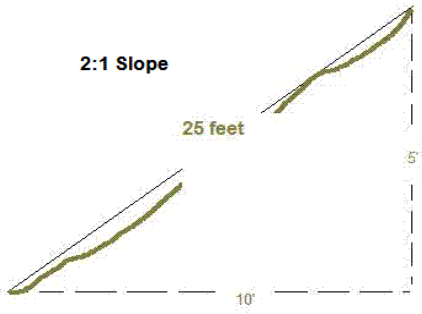
$$\frac{\text{Gully } \textbf{Length} \text{ X (Average } \textbf{Width} \text{ X Average } \textbf{Depth} \text{ X 0.5) X } \textbf{Soil Weight} \text{ (lbs/ft3)}}{2000} \; / \; \text{Formation Years} = \textbf{Estimated} \text{ Soil Loss Per Year (Tons)}$$

Procedure for estimating Streambank Soil Erosion (Direct Volume Method):

The following formula will be used to calculate annual estimated streambank erosion unless a field measurement procedure[2] is used:

$$\frac{\text{ing Bank } \textbf{Length} \text{ X Eroding Bank Height X Lateral Recession Rate (FT/YR) X Soil Weight (lb}}{2000} = \textbf{Estimated} \text{ Soil Loss Per Year (Tons)}$$

** Eroding bank height is measured along the bank, not the vertical height of bank. Example: if vertical height of an eroding streambank is 5 feet, and the bank is on a 2:1 slope, the total eroding bank distance is 25 feet -- 1/2 (Base X Height).



***The average annual recession rate is the thickness of soil eroded from a bank surface (perpendicular to the face) in an average year.

Stream bank erosion sometimes presents itself as a major occurance in a given year, whereas the same bank may not erode significantly for a period of years if no major runoff events occur. Recession rates need to be calculated as an average of years when erosion does and does not occur. Recession rate is not calculated as the erosion occurring after a single event.

Use available resources to assist in the estimation of recession rate: use past and present aerial photography, old survey records, and any other information that helps to determine the bank condition at known times in the past. When such information is lacking or insufficient, field observations and professional judgement are needed to estimate recession rates.
It is often not possible to directly measure recession rates in the field. Therefore, the following table has been included which relates recession rates to narrative descriptions of banks eroding at different rates (Table from NRCS Wisconsin guidance).

Lateral Recession Rate (ft/yr)	Category	Description
0.01-0.05	Slight	Some bare bank but active erosion not readily apparent. Some rills but no vegetative overhang. No exposed tree roots.
0.06-0.2	Moderate	Bank is predominantly bare with some rills and vegetative overhang. Some exposed tree roots but no slumps or slips.
0.3-0.5	Severe	Bank is bare with rills and severe vegetative overhang. Many exposed tree roots and some fallen trees and slumps or slips. Some changes in cultural features such as fence corners missing and realignment of roads or trails. Channel cross section becomes U-shaped as opposed to V-shaped.
0.5+	Very Severe	Bank is bare with gullies and severe vegetative overhang. Many fallen trees, drains and culverts eroding out and changes in cultural features as above. Massive slips or washouts common. Channel cross section is U-shaped and stream course may be meandering.

2 The best way to quantify streambank erosion is to measure it directly in the field. The basic procedure in measuring streambank erosion is to survey, flag, or in some way fix a “before" image of the channel you are evaluating in order to establish the baseline condition. Changes due to erosion can then be monitored over time by going back to the study area and re-measuring from the fixed reference points.
Channel cross-sections can be surveyed and plotted on a periodic basis to monitor change. Stakes or pins can be driven into channel banks flush with the surface. The amount of stake or pin exposed due to erosion is the amount of change at the streambank erosion site between your times of observation.
The time required to monitor a site often precludes this method of data collection. The Direct Volume Method can be used to estimate streambank erosion at your site.

Acknowledgements: This Excel workbook was created as a planning tool for use by conservation planners. The basic format and content of the tool is a compilation of various similar tools, processes and procedures employed by NRCS in several states including: Indiana, Iowa, Kansas, Maryland, Michigan, Missouri, Nebraska, Oklahoma, South Dakota and Wisconsin. Some of the terminology in the 'Definitions' section of this Readme document closely mirrors these sources.

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

Farmer / Cooperator Name: East Ridge Farm, LLC
Tract Number: Varies
Evaluated By: J. Fure
Evaluation Date: May 8, 2023

Field Number	Eroding Strmbnk Reach #; or Ditch Side/Bottom	Eroding Bank or Ditch Length (Feet)	Eroding Bank Height; or Ditch Bottom Width* (Feet)	Area of Eroding Strmbank or Ditch (FT^2)	Lateral or Ditch Bottom Recession Rate (Estimated) (FT / Year)	Estimated Volume (FT^3) Eroded Annually	Soil Texture	Approximate Pounds of Soil per FT^3	Estimated Soil Loss (Tons/Year)	Soil Total Phosphorus (ppm)	Estimated Phosphorus Loss (Pounds/Year)
East Ridge Farm, LLC	Chute 1 Right	70	2.8	198	0.40	79.2	Silt Loam	85	3.4	710.7	4.8
	Chute 1 Left	70	2.8	198	0.40	79.2	Silt Loam	85	3.4	710.7	4.8
	Chute 2 Right	125	4.2	530	0.20	106.1	Silt Loam	85	4.5	827.5	7.5
	Chute 2 Left	125	4.2	530	0.20	106.1	Silt Loam	85	4.5	827.5	7.5
	Chute 3 Right	160	4.2	679	0.20	135.8	Silt Loam	85	5.8	829.7	9.6
	Chute 3 Left	160	4.2	679	0.20	135.8	Silt Loam	85	5.8	829.7	9.6
	Chute 4 Right	100	5.7	566	0.40	226.3	Silt Loam	85	9.6	792.1	15.2
	Chute 4 Left	100	5.7	566	0.40	226.3	Silt Loam	85	9.6	792.1	15.2
	Chute 5 Right	100	2.8	283	0.20	56.6	Silt Loam	85	2.4	603.0	2.9
	Chute 5 Left	100	2.8	283	0.20	56.6	Silt Loam	85	2.4	603.0	2.9
	Chute 6 Right	100	4.2	424	0.20	84.9	Silt Loam	85	3.6	745.0	5.4
	Chute 6 Left	100	4.2	424	0.20	84.9	Silt Loam	85	3.6	745.0	5.4
	Chute 7 Right	45	2.8	127	0.20	25.5	Silt Loam	85	1.1	578.7	1.3
	Chute 7 Left	45	2.8	127	0.20	25.5	Silt Loam	85	1.1	578.7	1.3
	Chute 8 Right	100	2.8	283	0.40	113.1	Silt Loam	85	4.8	406.3	3.9
	Chute 8 Left	100	2.8	283	0.40	113.1	Silt Loam	85	4.8	406.3	3.9
				TOTAL		1654.6			70.3		**101.0**

Attachment #10

Water Quality Trading
Operation and Maintenance Plan

Introduction:
The Water Quality Trading (WQT) Operation and Maintenance (O&M) Plan is meant to be a working document and should be updated as new trading practices are implemented. Currently, the Operation and Maintenance Plan revolves around the Best Management Practice (BMP) construction along the Blue River. The attached *BMP Inspection Form* should be completed during annual inspections of BMPs and following major storm events. Inspection forms shall be retained for at least five (5) years to ensure compliance with the WQT Plan.

Publicly Owned BMP:
District representative to complete inspection form annually and following major storm events. The form will then be provided to the Director of Public Works following inspection. The District will address maintenance issues identified during inspection within 30 days. Substantial maintenance issues may require an extended timeframe for generation of plans, specifications, and a public bid process to perform the work. Inspections and O&M activities shall be reported in the annual WQT Report sent to the DNR. **Currently, no BMP projects are planned to occur on Publicly owned property.**

Privately Owned BMP:
District representative to complete inspection form annually and following major storm events. The form will then be provided to the Director of Public Works following inspection. The District will address maintenance issues identified during inspection within 30 days. Substantial maintenance issues may require an extended timeframe for generation of plans, specifications, and a public bid process to perform the work. Maintenance expenses will be incurred by either by the District or Private Property Owner depending on agreement with the District. The Private Property Owner will be allowed to perform maintenance activities at the expense of the Private Property Owner. Inspections and O&M activities shall be reported in the annual WQT Report sent to the DNR.

Quality Assurance:
Riprap gradation and composition shall be provided for each source of material. Streambank shaping and riprap shall be installed per the Green County Land Conservation Department and NRCS Standards. Contractors to supply rock that is approved by the NRCS and meets criteria in Wisconsin Construction Spec.9.

Installation:
- Do not place riprap over frozen or spongy subgrade surfaces.
- Place riprap as indicated on Construction Plans. Do not dump rip-rap over the bank.
- Blend riprap with existing bank.
- Spread spoil out in a layer of less than 6” and seed down. Do not spread soil in wetlands.
- All disturbed areas and spoil must be seeded and mulched.
- Install Root Wad Installation per Project Plans.

Practice Registration:
The purpose of the “Water Quality Trading Management Practice Registration” form is to report to WDNR that a management practice identified in the trading plan has been properly installed and is

established and effective. This information will be used to track implementation progress, verify compliance and perform audits, as necessary. A registration form should be submitted for every management practice that has been identified in the trading plan. If practices are established prior to trading plan submittal, registration forms may be submitted with the trading plan. Otherwise, registration forms should be submitted during the permit term as practices become effective or with the annual report. A blank *Water Quality Trading Management Practice Registration Form 3400-207* is attached and should be submitted following implementation of the trading practice.

Tracking Procedures:
The District will track credits used monthly. The District will report credit usage to the DNR on a monthly basis in the Discharge Monitoring Reports (DMRs). The annual report will summarize the 12 months of credit usage and credit generation. The District will report to DNR any concern that they have that may result in a need to modify the trade agreement and/or this trade plan. For example, a need to generate additional credits based on discharge.

Inspections/Maintenance Considerations:

- A *BMP Inspection Form* is attached.
    - Site: As noted on Construction Plans
    - Condition of BMP: Excellent; Good; Fair; or Poor
    - Maintenance Estimate: Provide an estimate for how long the maintenance will take to complete or a dollar value for completion. This will help determine if the District will perform the work or if the District will hire another entity to perform the work.
    - Date Completed: Following completion of the required maintenance, input the date of completion.
    - Comments: Provide the required maintenance activity along with any other useful information. If the cell provided is not large enough for Comments, write "See Back of Sheet" and provide comments on the reverse side of the Form.
- Following installation, inspect the disturbed areas closely over the next few months to ensure that seeding grows.
- BMPs may settle or shift especially after flooding events or freeze/thaw.
- May need to control weed and brush growth.
- Inspect stabilized areas as needed.
- At a minimum, inspect after major storm events.
- If a BMP has been damaged, repair it promptly to prevent a progressive failure.
- If repairs are needed repeatedly at a location, evaluate the site to determine if the original design conditions have changed.

Routine Maintenance Items that can be performed by District:

- Evaluate BMP condition
    - Reconstruct/replace BMPs that have settled, shifted, or washed out.
- Manage Vegetation
    - Remove invasive/noxious plants.
- Manage Garbage
    - Remove garbage and other debris that could otherwise impair the streambank stability.

Monthly Certification:
Each month, the District will certify that the BMPs are maintained and operating in a manner consistent with this Water Quality Trading Plan or provide a statement noting noncompliance with this Plan. The monthly Discharge Monitoring Report (DMR) will include the following statement as a certification of compliance when the Credit Generating Practice is operating in a manner consistent with the Plan:

> "I certify that to the best of my knowledge that the management practices identified in the approved water quality trading plan as the source of phosphorus credits is installed, established and properly maintained."

Annual Inspection:
An annual inspection of the BMPs will be performed by a licensed Professional Engineer to ensure that the BMPs are functioning as intended in order to meet the requirements of the WQT Plan.

Noncompliance:
The District will notify DNR by telephone call to DNR's regional wastewater compliance engineer within 24 hours or next business day of becoming aware that phosphorus credits used or intended for use by District are not being generated as outlined in this Water Quality Trading Plan.

The District will submit a written notification within five days after the District recognizes that the phosphorus credits are not being generated as outlined in the Trading Plan. DNR may waive the requirement for submittal for a written notice within five days and instruct the District to submit the written notice with the next regularly scheduled monitoring report required by District's WPDES Permit.

The written notification should include:

- Description of noncompliance and cause.
- Period of noncompliance including dates and times.
- Schedule for attaining compliance including time and steps toward compliance.
- Plan to prevent reoccurrence of the noncompliance.

Notification of Trade Agreement Termination:
If a trade agreement or the trading plan needs to be terminated during the permit term, the permittee should submit a Notice of Termination to the wastewater engineer/specialist to inform WDNR of the termination. WDNR staff should use this information to determine if a permit modification is required due to the termination, the termination will result in non-compliance, or other permit actions are required due to the termination. When credits are reduced or eliminated for any reason, the permittee is still required to meet their WQBELs without any grace period. To prevent noncompliance with WQBELs, changes to trading plans must be addressed before credits are lost. Modifying the permit/trading plan will require at least 180 days. A blank *Notification of Water Trade Agreement Termination Form 3400-209* is attached and should be submitted to WDNR prior to practice termination, no later than the submittal date of the annual report.

BMP Inspection Form

Date_____

Inspector_____

Reason for Inspection _____

Property Owner	Site	Condition BMP	Required Maintenance	Maintenance Estimate (Time or Cost)	Date Completed	Comments

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

Water Quality Trading Management Practice Registration

Form 3400-207 (R 1/14)

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

Applicant Information

Permittee Name	Permit Number WI-	Facility Site Number

Facility Address	City	State	ZIP Code

Project Contact Name (if applicable)	Address	City	State	ZIP Code

Project Name

Broker/Exchange Information (if applicable)

Was a broker/exchange be used to facilitate trade? ◯ Yes ◯ No

Broker/Exchange Organization Name	Contact Name

Address	Phone Number	Email

Trade Registration Information (Use a separate form for each trade agreement)

Type	Trade Agreement Number	Practices Used to Generate Credits	Anticipated Load Reduction	Trade Ratio	Method of Quantification
◯ Urban NPS ◯ Agricultural NPS ◯ Other					

County	Closest Receiving Water Name	Land Parcel ID(s)	Parameter(s) being traded

The preparer certifies all of the following:

- I have completed this document to the best of my knowledge and have not excluded pertinent information.
- I certify that the information in this document is true to the best of my knowledge.

Signature of Preparer	Date Signed

Authorized Representative Signature

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

Signature of Authorized Representative	Date Signed

Leave Blank – For Department Use Only

Date Received		Trade Docket Number
Entered in Tracking System ☐ Yes	Date Entered	Name of Department Reviewer

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

Notification of Water Trade Agreement Termination

Form 3400-209 (1/14)

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

Applicant Information

Permittee Name	Permit Number WI-	Facility Site Number

Facility Address	City	State	ZIP Code

Project Contact Name (if applicable)	Address	City	State	ZIP Code

Project Name

Credit Generator Information

Credit generator type (select all that apply):

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

Trade Agreement number(s) to be terminated including affected land parcel ID(s):

Amount of trading credit being terminated	Effective date of termination

Reason for termination

Is this agreement being updated or replaced?

- ◯ Yes
- ◯ No
- ◯ Unsure

Will this termination result in non-compliance with the effective limit or other permit requirements?

- ◯ Yes; Name: _____
- ◯ No
- ◯ Unsure

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

Authorized Representative Signature

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

Signature of Authorized Representative	Date Signed

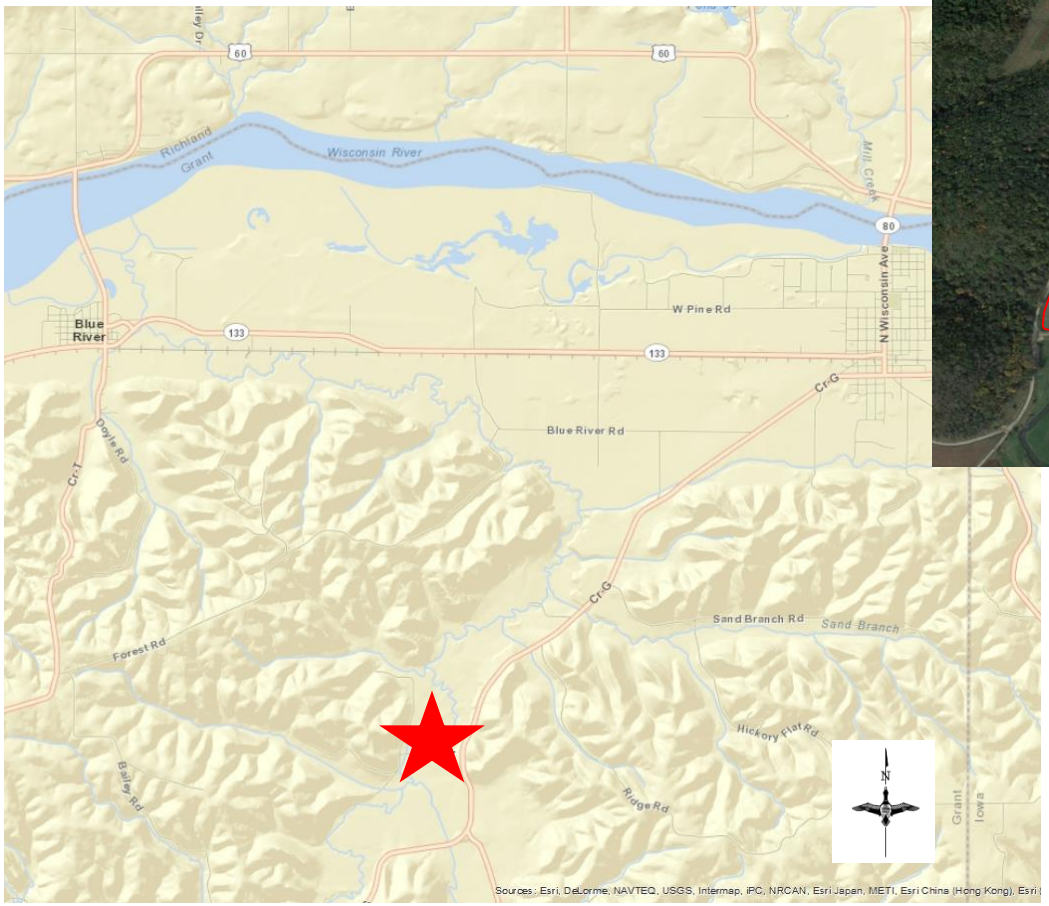
Attachment #11

Thomas Restoration

2295 Studnika Rd
Muscoda, WI

Muscoda Township
Grant Co, WI

T8N R1W
Section 29



Location: 5 mile South of Muscoda off County Rd G



Site Location

Contact Information

Project Lead:
Mike Engel
USFWS
(608)221-1206 X21
4511 Helgesen Dr.
Madison, WI 53718
mike_engel@fws.gov

Land Owner:
Joe Thomas
4904 Champions Run
Middleton, WI 53562
jhthomas22@gmail.com

DIGGERS HOTLINE
"Call 3 Work Days Before You Dig!"
TOLL FREE 1-800-242-8511
MILW. AREA (414) 259-1181
TDD 1-800-542-2289

Index

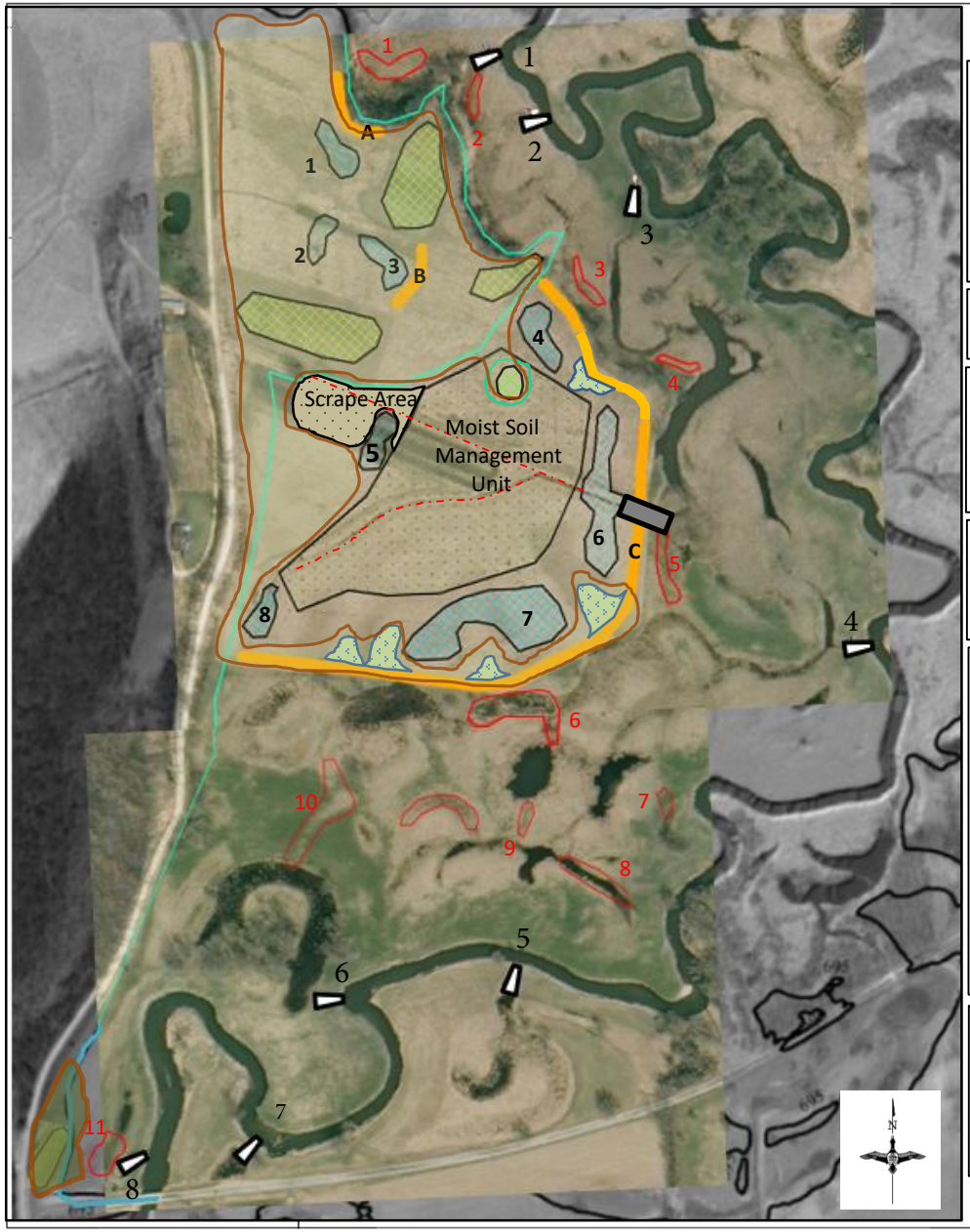
1. Cover Sheet
2. Plan View
2. Erosion/Seeding
3. Design/ Quantities
4. Water Control Structures

Thomas Restoration

Cover/ Location

REVISIONS:

CAD FILE:
DESIGNED BY:
DRAWN BY:
SURVEYED BY:
BOOK NO.:
DATE: 1/23/13
PROJECT NO.:



Notes:

Material placed in the flood plain associated with berm C is less than material removed from the food plain associated with oxbow restoration 1,2,3,7,8,9,10, 11 and scrape 5 along with borrow from 4,6,7,8 above ground water level used in building berms and will result in increased flood storage (see page 3)

Oxbow scrapes will be located in areas dominated by reed canary grass

Micotopography work will accentuate existing topographic features by moving 4 inches or less in targeted areas. These areas will receive custom seed mixes to establish wet prairie.

Moist soil management unit will involve scraping (spoils moved out of flood plain), leveling, and tile installation for waterfowl and shorebird management.

Erosion Control Plan

Immediately after earth moving is complete the site will be seeded and planted where appropriate . Erosion control matting will be placed on areas where slopes are greater than 5:1. Mulch may be used in areas less than 5:1. Culverts leading to river will be monitored and straw bales placed if needed. All erosion control will be installed and maintained according to NRCS technical standards (see attached NRCS Standard 484).

Planting/Seeding Plan

Planting and seeding will be established in accordance to NRCS Wisconsin Agronomy Technical Note 5 (see attached). All disturbed areas will be seeded down to a native prairie mix (see Table 17, Tech Note 5). Seed mix may be altered due to seed availability but diversity should remain the same.

Legend

- Water Control Structure
- Borrow/Scrape
- Berm
- Approximate Flood Plain
- Spoil Placed outside FP
- Rock-lined Chute w/~~lunker~~ root wad
- Oxbow Scrape
- Micro-topography
- Moist Soil Unit
- Tile Installation
- Prairie Planting

Thomas Restoration

Plan View

REVISIONS:

CAD FILE:

DESIGNED BY:

DRAWN BY:

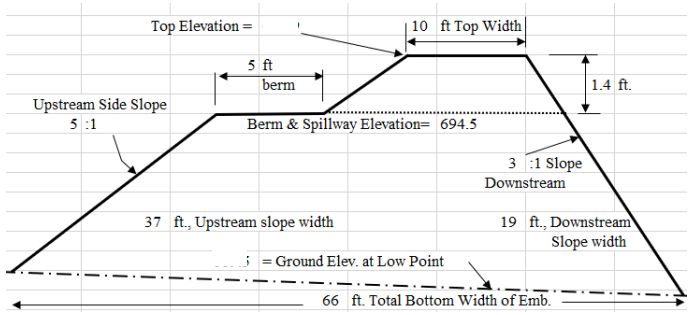
SURVEYED BY:

BOOK NO.

DATE 1/23/13

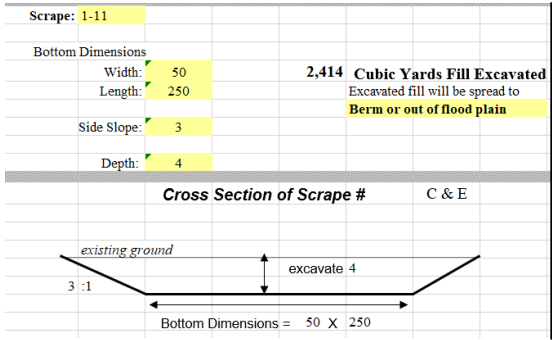
PROJECT NO.:

TYPICAL CROSS SECTION OF BERM

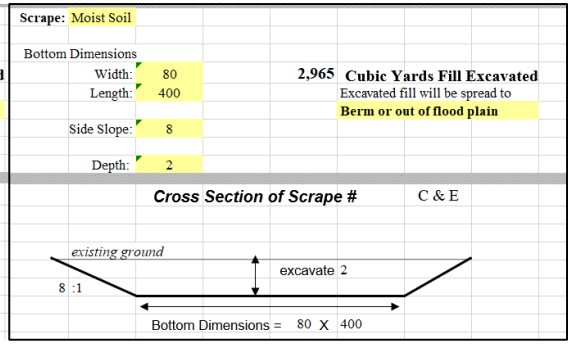


Note:
Remove all sod and muck from under embankment

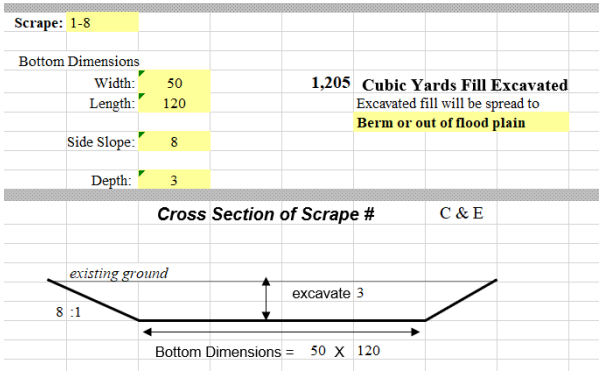
TYPICAL CROSS SECTION OF OXBOW SCRAPE



TYPICAL CROSS SECTION OF MOIST SOIL SCRAPE



TYPICAL CROSS SECTION OF BORROW/SCRAPE



Borrow areas to be located and shaped according to Plan View (Page 2)

Estimated Quantities

Feature	Linear Ft	Area (Ac.)	Volume (Yds³)
Berm A	100	0.1	300
Berm B	100	0.1	300
Berm C	2290	2.20	12,000
Moist Soil Scrape*	N/A	1.1	3,500
Oxbow 1*	N/A	0.5	2,400
Oxbow 2*	N/A	0.3	1,200
Oxbow 3*	N/A	0.3	1,200
Oxbow 4	N/A	0.3	1,200
Oxbow 5	N/A	0.3	1,200
Oxbow 6	N/A	0.5	2,400
Oxbow 7*	N/A	0.2	800
Oxbow 8*	N/A	0.3	1,200
Oxbow 9*	N/A	0.2	800
Oxbow 10*	N/A	0.3	1,200
Oxbow 11*	N/A	0.2	800
Borrow 1	N/A	0.3	300
Scrape 2*	N/A	0.3	1,200
Borrow 3	N/A	0.3	300
Borrow 4	N/A	0.3	1,200
Scrape 5*	N/A	0.3	1,200
Borrow 6	N/A	0.5	2,400
Borrow 7	N/A	0.3	1,200
Borrow 8	N/A	0.3	1,200
TOTAL	2490	9.3	28,100

* Indicates volume removed from floodplain (13,500Yds³) to offset Berm C. With additional storage from exchange of yardage in barrow areas the project results in an increased flood storage capacity of at least 300,000 gallons.

Berms are non-additive relative to volume as they are constructed using Barrow areas and Oxbow 4, 5, and 6 .

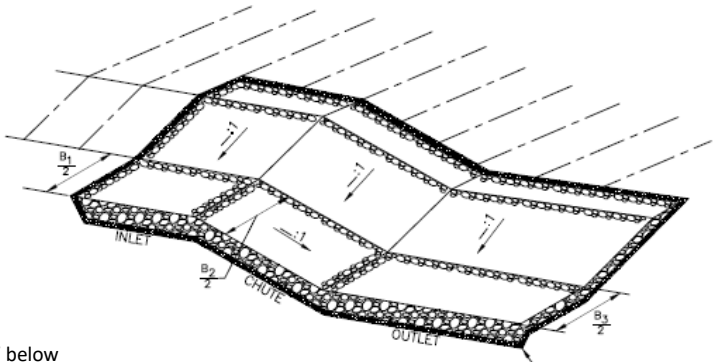
Thomas Restoration

Design & Quantities

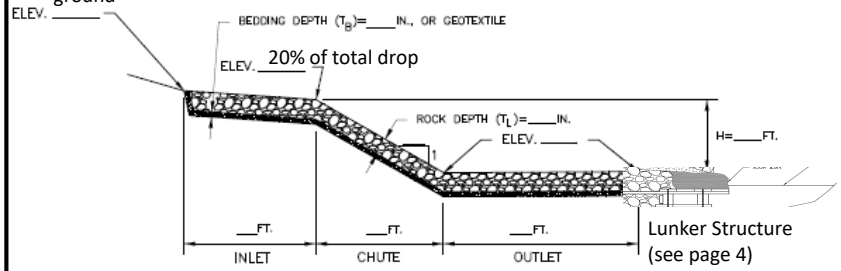
REVISIONS:

CAD FILE:
DESIGNED BY:
DRAWN BY:
SURVEYED BY:
BOOK NO.
DATE 1/23/13
PROJECT NO.:

Typical Rock Lined Chute



HALF SECTION OF ISOMETRIC VIEW



PROFILE ALONG CENTERLINE

QUANTITY ESTIMATE

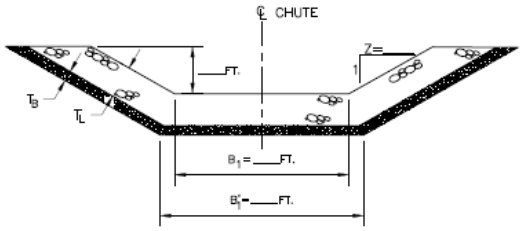
SITE PREPARATION _____ JOB

BEDDING MATERIAL (CONST. SPEC. 8) _____ _____ CU. YD.

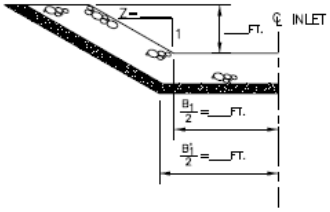
ROCK FOR RIPRAP (CONST. SPEC. 9) _____ _____ CU. YD.

GEOTEXTILE (CONST. SPEC. 13)
(WOVEN) (NONWOVEN) CLASS 2,500 SQ. YD.

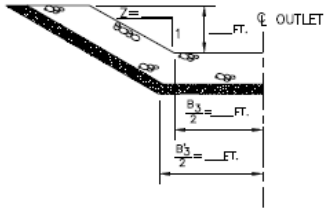
SEEDING _____ _____ ACRES



CROSS SECTION OF CHUTE
(AT CENTER)



HALF SECTION OF INLET
(AT UPSTREAM EDGE)



HALF SECTION OF OUTLET
(AT DOWNSTREAM EDGE)

Notes:

- Rock size shall be mixed with predominately 4-6 inch class.
- Rock shall be a minimum of 12 inches thick.
- Geotextile fabric edges shall be positioned as to not allow water underneath.

Feature	Linear Ft (Inlet+Chute+Outlet)	Depth "H"	Volume (Yds^3)
Chute 1	70	2	65
Chute 2	125	3	140
Chute 3	160	3	175
Chute 4	100	4	150
Chute 5	100	2	95
Chute 6	100	3	110
Chute 7	45	2	40
Chute 8	100	2	95
Total	800	na	870

Thomas Restoration

Chute Detail/ Quantities

REVISIONS:

CAD FILE:

DESIGNED BY:

DRAWN BY:

SURVEYED BY:

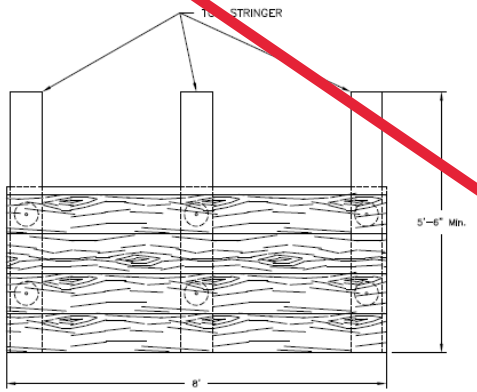
BOOK NO.

DATE 1/23/13

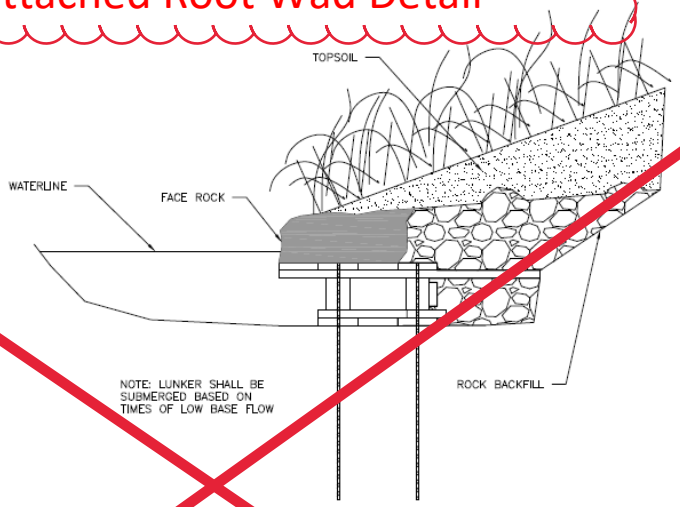
PROJECT NO.:

Lunker Structure

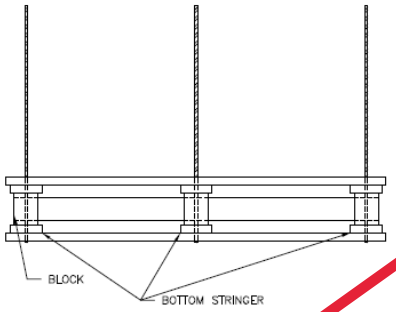
Replaced with Root Wad Structure
See attached Root Wad Detail



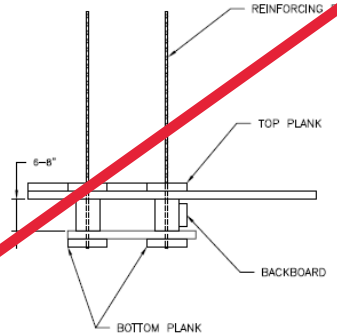
TOP VIEW



CONSTRUCTED SIDE VIEW



FRONT VIEW



SIDE VIEW

BILL OF MATERIALS
LUNKER STRUCTURE

ITEM	SIZE	QUANTITY
TOP PLANK	2" X 8" X 8' OAK BOARD	4
TOP STRINGER	2" X 8" X 5'–6" Min OAK BOARD	3
BLOCK	6" DIA. X 8" OAK BLOCK	6
BOTTOM STRINGER	2" X 8" X 30" BOARD	3
BOTTOM PLANK	2" X 8" X 8' OAK BOARD	2
BACKBOARD	2" X 8" X 8' OAK BOARD	1
#5 REINFORCING ROD	5/8" X 5' DEFORMED STEEL	6
RINGSHANK NAILS	20D GALVANIZED	60

10 Total Boards 2" X 8" X 8 Feet Long

Thomas Restoration

Lunker Structure Detail

REVISIONS:

CAD FILE:

DESIGNED BY:

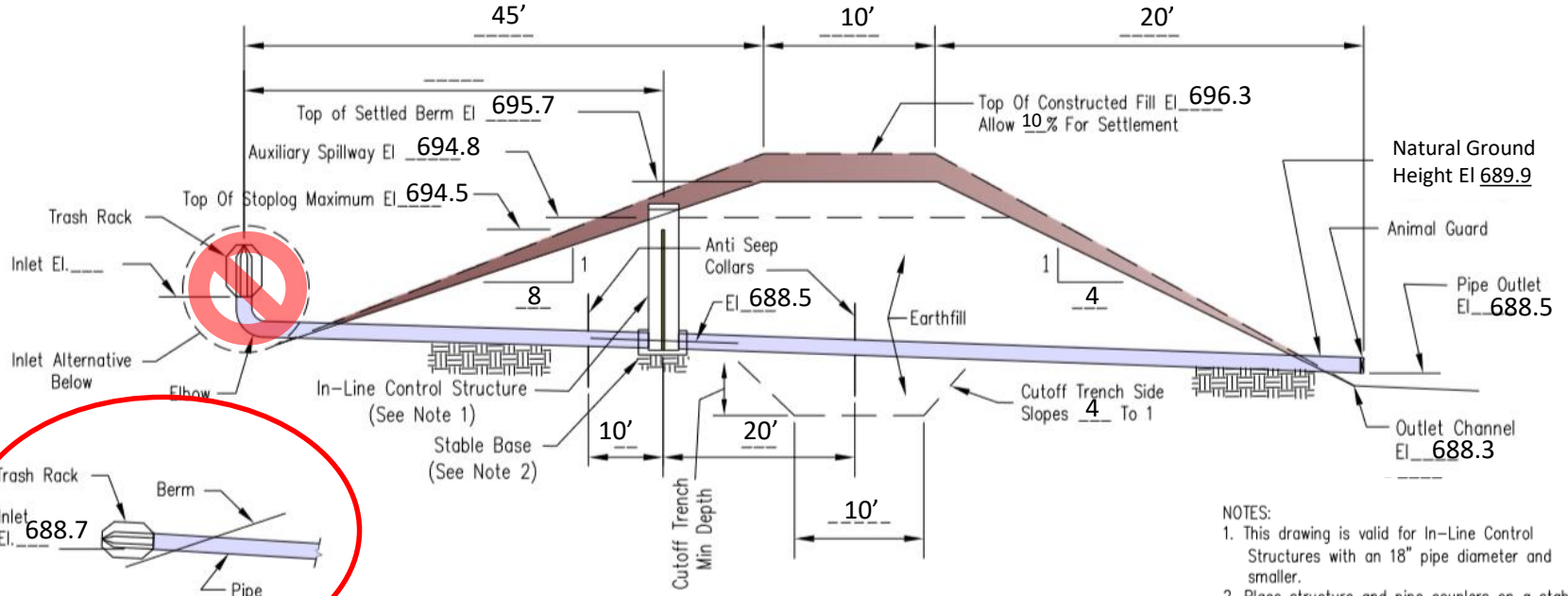
DRAWN BY:

SURVEYED BY:

BOOK NO.:

DATE: 1/23/13

PROJECT NO.:



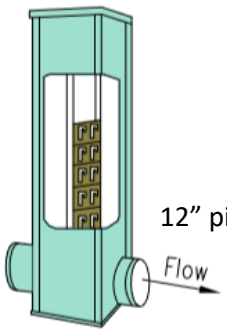
INLET ALTERNATIVE

Note: Use Inlet Alternate Design Option

STRUCTURE BERM CROSS SECTION

NOTES:
1. This drawing is valid for In-Line Control Structures with an 18" pipe diameter and smaller.
2. Place structure and pipe couplers on a stable base. A stable base may be compacted earth, compacted fill sand, or a concrete pad. Extend the stable base no less than 1 foot around structure.
3. PVC Pipe must conform to ASTM Standard D 2241 or D 1785. Pipe material must be PVC 1120 or PVC 1220.
4. Excavated material placed around structure, spillway pipe and anti-seep collar must be hand compacted in 4 inch lifts to same density requirements specified for the adjacent embankment.
5. Stuctural height = 5.8 feet.
   Natural Ground Low Point 689.9 to top of berm (design) 695.7

Item	Quantity
Water Control Structure (12" dia/ 5' tall)	1
Anti-seep collar	2
12" Diameter Pipe	75 Feet
Note: Include all necessary connections, trash rack and animal gard	



12" pipe 5' tall

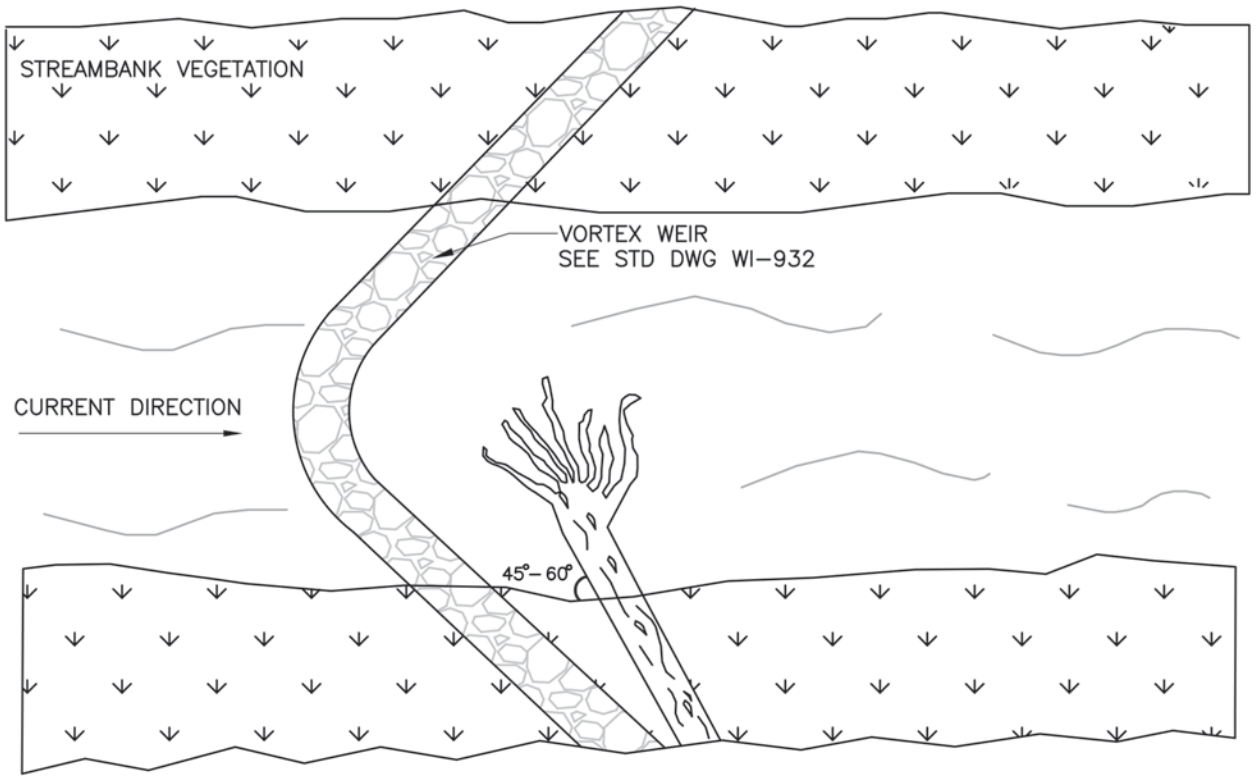
IN-LINE CONTROL STRUCTURE

Thomas Restoration

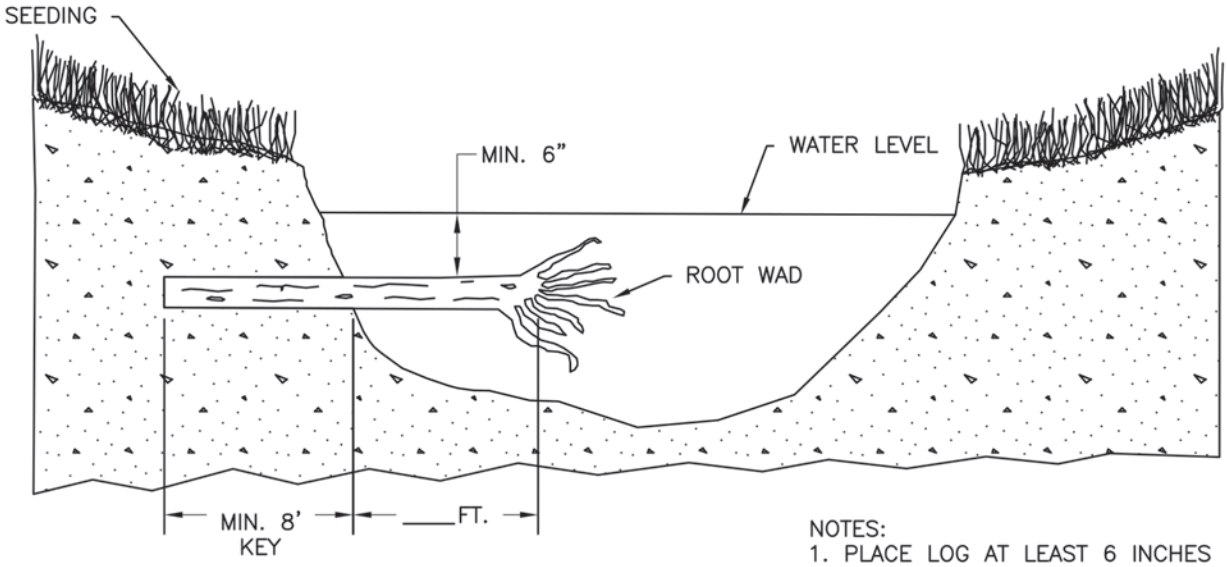
Design/Water Control Structures

REVISIONS:

CAD FILE:
DESIGNED BY:
DRAWN BY:
SURVEYED BY:
BOOK NO.
DATE:
PROJECT 1/23/13



PLAN



CROSS SECTION

NOTES:
1. PLACE LOG AT LEAST 6 INCHES BELOW THE WATERLINE.
2. PLACE LOG AT A 45–60 DEGREE ANGLE UPSTREAM FROM BANK.
3. REFERENCE WI STD DWG 932 FOR DETAILS ON VORTEX WEIR CONSTRUCTION.

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

ROOT WAD

CLIENT: _____

COUNTY: _____

	Date	Drawing Name
Designed		WI–936
Drawn		Date 7/10
Checked		
Approved		Sheet of