WATER QUALITY TRADING PLAN
ARCADIA WWTP

ARCADIA, WI

JANUARY 2018
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ARCADIA, WI

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1 EXECUTIVE SUMMARY

The WPDES Permit for the Arcadia wastewater treatment facility (WWTP) proposes a future effluent limit of 0.10 mg/L phosphorus. The existing limit is 1.0 mg/L. The Facility Plan proposes to comply with the permit by adding Clarifiers to reduce phosphorus to 0.6-0.8 mg/L combined with a Water Quality Trade (WQT) to offset the phosphorus mass to the 0.10 mg/L limit.

In 2018, the total discharge from the Arcadia lagoon averaged 1.56 MGD. The design effluent phosphorus concentration is 1.0 mg/L. The effluent phosphorus mass loading at 1.0 mg/L is 4,870 lbs./year. At the same flow, the future 0.1 mg/L limit will reduce the phosphorus mass loading to 490 lbs./year, a reduction of 4,380 lbs./year, the base trade amount. With the addition of the Clarifiers to reduce the effluent phosphorus concentration to 0.6 – 0.8 mg/L that would change the base trade to 2,440 to 3,410 lbs./year. WQT will require at least a 2:1 Trade Ratio, which means Arcadia would need to secure an equivalent to 4,880 – 6,820 lbs./year of credit to meet the limit via Water Quality Trade (WQT). This is for current conditions, not the higher flows that are estimated in the future.

The WWTP is located on a hill above Myers Valley Creek but the discharge is piped to the Trempealeau River.

2 PURPOSE OF WATER QUALITY TRADING PLAN

The purpose of this Water Quality Trading Plan is to describe how the Arcadia WWTF will utilize water quality trading (WQT) to comply with the phosphorus limits of WPDES permit WI-0023230-09-0, which expired on March 31, 2019. This Water Quality Trading Plan will require a Water Quality Trade Agreement with WDNR. The agreement will be developed pursuant to a Notice of Intent (form 3400-206) to conduct a WQT. The Notice of Intent (NOI) was filed and is included in **Appendix 2-1** of this plan.

3 DESCRIPTION OF EXISTING LAND USES IN VICINITY OF WQT PROJECTS

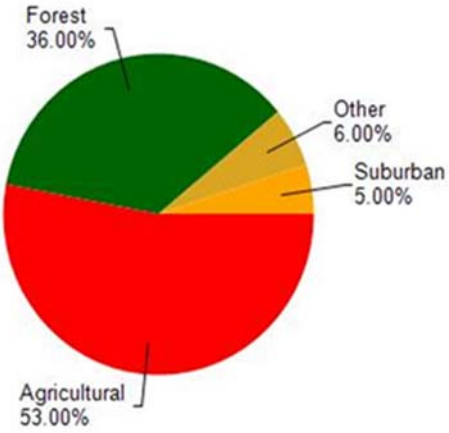
3.1 Myers Valley Creek

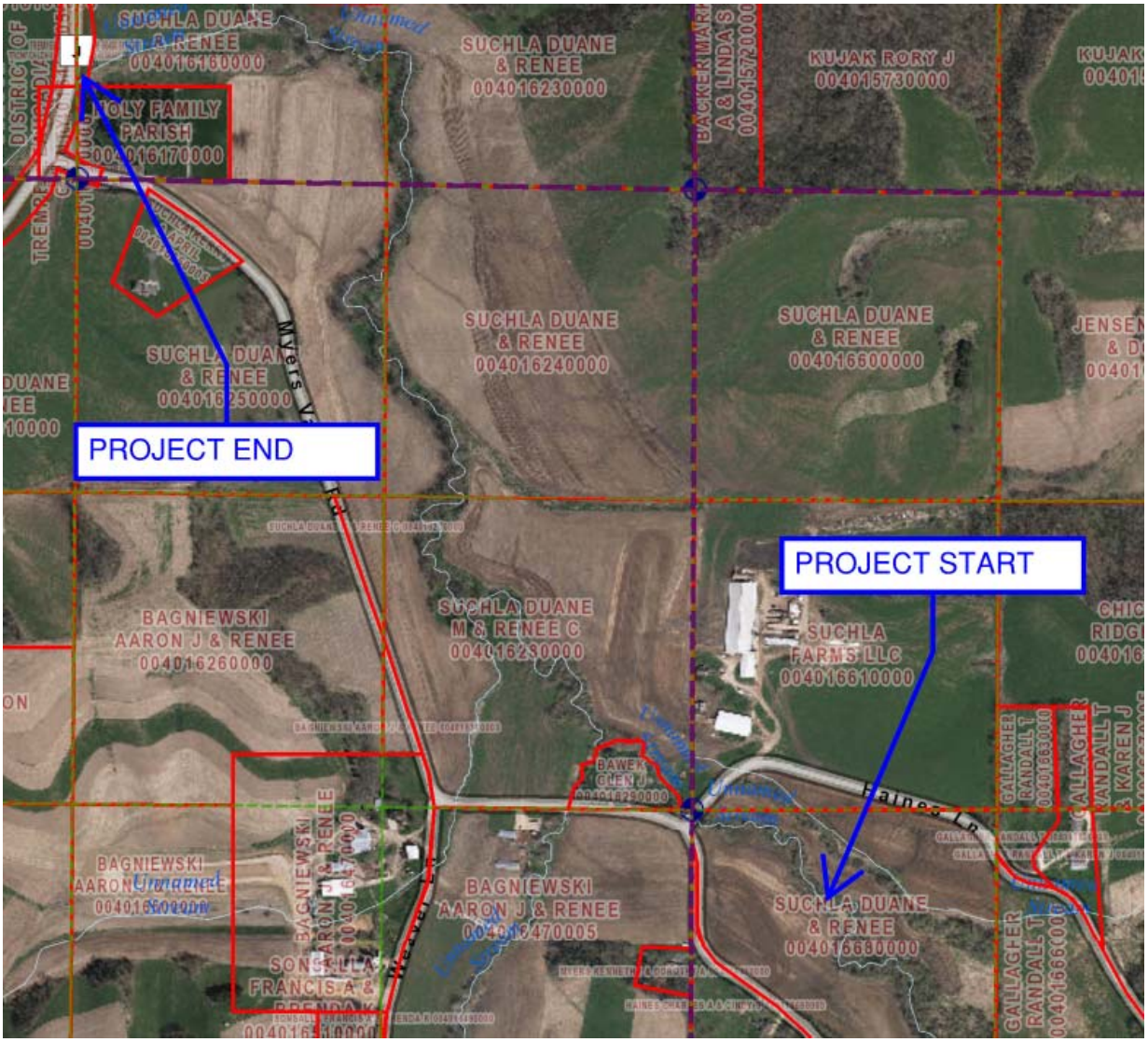
Myers Valley Creek is a 3.74-mile long, Class III trout stream largely within the Town of Arcadia in west central Trempealeau County, Wisconsin. Nonpoint source pollution has been identified along the entire stream. Per the WI DNR website, “Animal wastes from barnyard runoff, intensive livestock pasturing, flooding and channelization have severely degraded stream habitat. This stream has moderate potential to improve its trout fishery if point and nonpoint sources of pollution are controlled.” Myers Valley Creek is considered a “Coldwater, Cool-Cold Headwater, Macroinvertebrate” stream under the state's Natural Community Determinations.

Myers Valley Creek is located in the Middle Trempealeau River watershed which is 205.47 mi². Land use in the watershed is primarily agricultural (53%), forest (36%) and a mix of suburban (5%) and other uses (6%). This watershed has 489.89 stream miles, 396.56 lake acres and 5,115.26 wetland acres.

The land surrounding Myers Valley Creek is heavily dominated by agricultural practices on steep slopes and heavy grazing of cattle. There are many areas of channelized flow leaving the fields and depositing high phosphorus loads into the creek due to the topography and erosion of streambanks. The proposed 6,250-foot bank stabilization project begins approximately 2,000 feet southeast of the intersection of Haines Lane and Myers Valley Road and ends behind Holy Family Parish cemetery, where County Road J meets Myers Valley Road.

See **Appendix 3-1** for the Soils Map.



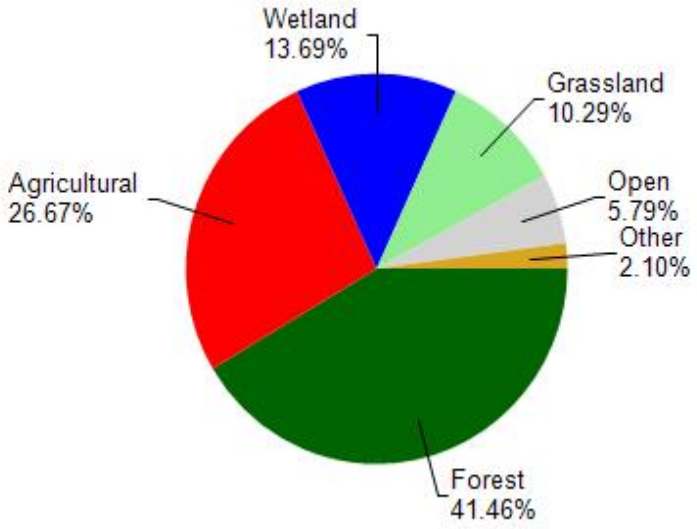


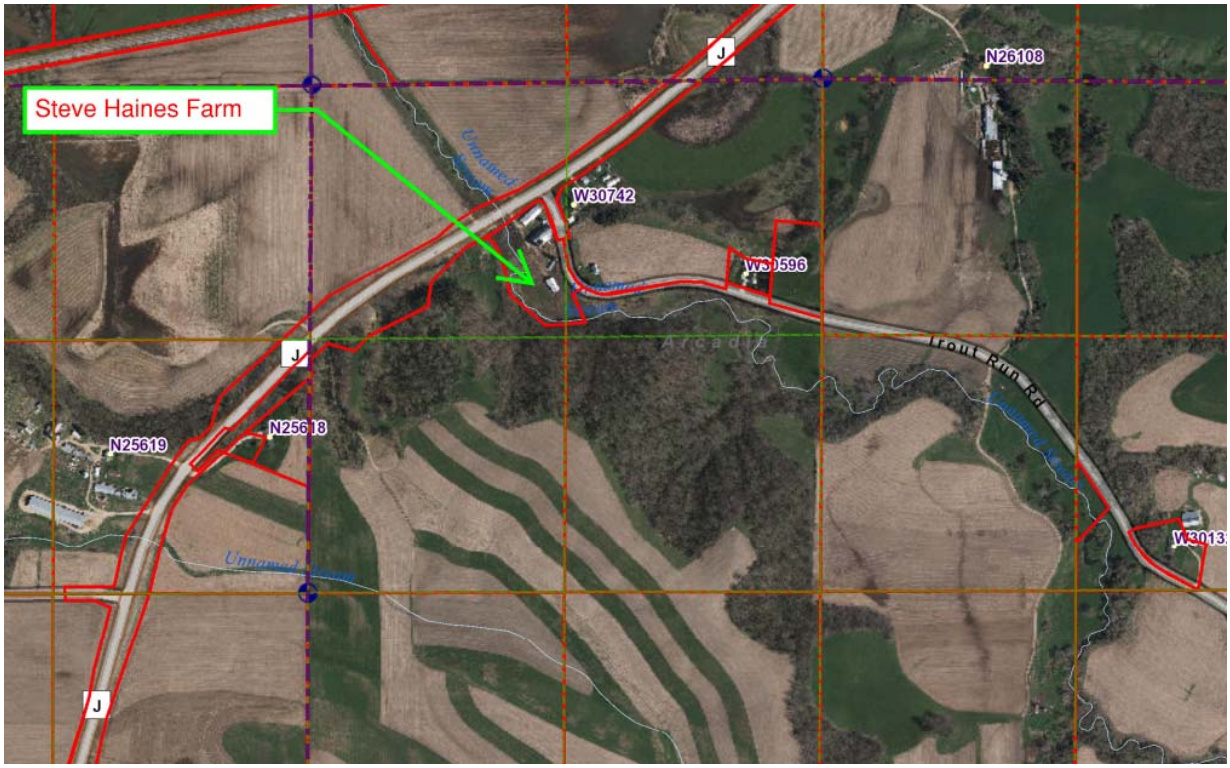
3.2 Upper Trout Run Creek

Upper Trout Run Creek is a 3.80-mile long, Class II trout stream largely within the Town of Arcadia in west central Trempealeau County, Wisconsin. Nonpoint source pollution has been identified along the entire stream. Trout Run Creek is considered a “Coldwater” stream under the state's Natural Community Determinations.

Trout Run Creek is located in the Lower Trempealeau River watershed which is 177.10 mi². Land use in the watershed is primarily forest (41%), agricultural (27%), and a mix of wetland (14%) and other uses (18%). This watershed has 332.55 stream miles, 4,667.44 lake acres and 13,986.78 wetland acres.

The land surrounding Trout Run Creek is heavily dominated by forests and agricultural practices on steep slopes and heavy grazing of cattle. There are many areas of channelized flow leaving the fields and depositing high phosphorus loads into the creek due to the topography and erosion of streambanks. The proposed 4,500-foot bank stabilization project begins at the railroad track northwest of the intersection of County Road J and Trout Run Road and ends along adjacent to the dairy farm just southeast of the intersection.





4 MANAGEMENT PRACTICES USED TO GENERATE CREDITS

Streambank Stabilization. The 6,250-foot streambank stabilization site for the Myers Valley Creek project was chosen as a good site to generate WQT credits through a riprap project, as this section of streambank is where very high-velocity waters rapidly erode the banks during flood events. A very conservative annual recession rate of one (1) foot per year was determined, but over the last few years this site has lost many feet of streambank during flood events. This site also has high levels of nonpoint source pollutants entering from farm practices. Working with the farmer on this project to install conservation practices would greatly reduce those pollutants. It was determined that riprapping the creek banks to permanently armor the banks was the best solution to the problem, along with removing cattle from the banks and installing vegetative buffers.

Farm Use Limitation. The farm at the intersection of County Highway J and Trout Run Road was chosen as a good site to generate WQT credits because of the farm's proximity to the adjacent creek. The site generates large amount of runoff to the trout stream from farming activity. The farm operation is generating approximately 539 lbs. of P per year discharge to the stream. The management practice is to create a farm use limitation at the property. No dairy use would be allowed, and the barnyard and streambanks graded / seeded to control erosion. Parts of the farm would still be available for crops or pasture, but no milking or feedlots would be allowed. The phosphorus is being discharge is largely related to the proximity to the stream and intensity of use.

4.1 Duration of Management Practice

The duration of the streambank restoration management practice can be essentially 100+ years if it is maintained properly. The construction will require shaping of the streambank and placement of properly sized rip rap. The MVC landowner has entered into a contract with the County and City, which requires the landowner to maintain the streambank protection for a minimum of 20 years. The operation and maintenance are discussed in more detail in Section 13 of this plan.

The proposed duration of the Upper Trout Run Creek farm use limitation management practice is 20 years. The limitation will stay with the parcel and prevent farm animals from accessing the streambanks. The construction would require some reshaping and seeding of the barnyard and stream banks. The farm use limitation will be secured with an agreement between the Owner and County. That agreement will be recorded and apply to subsequent purchasers for the 20-year period.

5 AMOUNT OF CREDIT BEING GENERATED

Calculations show that an estimated 6,081 pounds of phosphorus per year would be prevented from entering Myers Valley and Trout Run Creek. See **Appendix 5-1** for the Phosphorus Loss Calculation.

Additional credit can be generated 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

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:

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

6.1 Delivery Factor

The delivery factor is determined by the following equation:

Delivery Factor = (1 / SPARROW delivery fraction) – 1

The SPARROW delivery fraction is determined by a model found on the USGS website. The website location is http://water.usgs.gov/nawqa/sparrow. Upon visiting the website, it was discovered as of July 31, 2017 the SPARROW model has been inactivated and cannot be used to determine the delivery factor. Since that time, 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 shown to be a 1:1 ratio (a zero in the trade ratio equation).

Myers Valley Creek. The credit user and credit generator are in the same HUC 12 basin, and, the credit generator is upstream of the credit user. The distance between the two on Myers Valley Creek (MVC) is approximately 2.25 miles apart or 3.53 miles if the meandering path of the creek from the credit generator project site to the credit user discharge point at the Trempealeau River is measured. Per the *Guidance for Implementing Water Quality Trading in WPDES Permits*, the Delivery Factor in section 2.11.1 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. 14). 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 Myers Valley Creek project is within the same HUC 12 and the discharge point of the user is downstream of the credit generator as well as the DNR website showing a 1:1 ratio, therefore the delivery factor will be zero and for the purposes of this narrative will be quantified as such.

Part of the Myers Valley Creek flow is seasonally diverted to a wetland mitigation project before the confluence with the Trempealeau River. There is an in-stream sediment trap associated with this diversion structure. This wetland area only takes approximately 5% of the stream flow, the rest of the flow is diverted around the wetland area. The sediment trap will be discussed in further detail in Section 6.2.

Upper Trout Run Creek. The credit user and credit generator are in the same HUC 12 basin, but the credit generator is downstream of the credit user. The distance between the generator and user site is approximately 3.0 miles apart or 5.47 miles if the meandering path of the creek and river are used. Similar to Myers Valley Creek delivery factor, the factor was shown to be a 1:1 per the Sparrow model on DNR website, therefore the delivery factor for the Upper Trout Run Creek is equal to zero (0).

6.2 Downstream Factor

The Wisconsin Department of Natural Resources (2013) 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. 16). 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.

Myers Valley Creek. The credit generator is upstream of the credit user (WWTF); therefore, the downstream factor is dropped from the trade equation. Furthermore, the credit generator and credit user are in the same HUC 12 watershed. However, downstream on MVC, before the confluence with the Trempealeau River, there is a "sedimentation basin". This was constructed during the 1990 relocation of the stream and was intended to capture some sediment from the stream as it was diverted to the wetland mitigation project in the old lagoons. Samples were collected before and after this basin during 2018. Before the sedimentation basin, TP averaged 0.615 mg/L and ranged from 0.153 to 1.550 mg/L. TSS averaged 199 mg/L and ranged from 27 to 637 mg/L. After the sedimentation basin, TP averaged 0.325 mg/L and ranged from 0.066 to 0.881 mg/L. TSS averaged 47 mg/L and ranged from 5 to 169 mg/L. The basin appears to be more effective in capturing TP and TSS than expected but the sample results may not show the "washout" that occurs during high stream flows. Studies of storm water sedimentation basins show that those facilities are likely to lose much of the captured solids when stream flows are high. We have not been able to locate a good means of quantifying the net, annual phosphorus removal from this type of facility. In the absence of a better value, the 13% reduction using P8 will continue to be used. The email correspondence can be seen in **Appendix 6-1A**.

Upper Trout Run Creek. The Upper Trout Run Creek is downstream of the Arcadia WWTF discharge and within the same HUC 12; therefore, a downstream factor must be applied. The downstream factor is based upon Table 2 Downstream Trading Factor (pg. 17) of the *Guidance for Implementing Water Quality Trading in WPDES Permits.* The table is based on the percent of the average phosphorus discharge from the user to the receiving stream compared to the total phosphorus in the receiving stream. These figures can be found in the Nonpoint Source Dominated Facility Lookup spreadsheet, found at the following DNR website: https://dnr.wi.gov/topic/SurfaceWater/documents/PRESTO/PRESTOv1.1NPSdominatedFacilityLookup.pdf. The spreadsheet listed the Arcadia WWTF with an average phosphorus load of 4,935 lbs and the receiving river, the Trempealeau River, with a total of 539,465. The percent contribution from the Arcadia discharge is 0.91%, which yields a downstream factor of 0.1 from Table 2 in the *Guidance for Implementing Water Quality Trading in WPDES Permits.*

Summary

Myers Valley Creek downstream factor = 0
Upper Trout Run Creek downstream factor = 0.1

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* from the Wisconsin Department of Natural Resources (2013), 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. 17). 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 can be seen on pages 20-23 in the *Guidance for Implementing Water Quality Trading in WPDES Permits* (Wisconsin Department of Natural Resources, 2013).

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) because the habitat adjustment will be implemented.

In addition to the bank stabilization, the project will involve constructing a 30-foot wide vegetative buffer along the top of the bank. Based upon the above-mentioned table, an assigned uncertainty factor of three (3) would be required for the buffers. There would be no habitat adjustment available for the buffers.

6.4.2 Farm Use Limitation

DNR has agreed that the uncertainty factor for removal of the cattle from the farm and the cover restoration would be the minimum factor of 1.2. For cattle removal, there is no habitat adjustment factor, therefore, the uncertainty factor for the cattle removal and revegetation BMP is a 1.2.

6.5 Habitat Adjustment

The habitat adjustment factor is the same as 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 website, http://dnr.wi.gov/water/impairedDetail.aspx?key=14353, the waterbody for Myers Valley Creek and for Trout Run Creek, https://dnr.wi.gov/water/impairedDetail.aspx?key=14344, are considered an impaired system (Degraded Biological Community) due to both unknown pollutant as well as total phosphorus and would qualify for Aquatic Habitat Adjustment.

In order to obtain the habitat adjustment, best management practices must be implemented and established as part of the project. Per Table 4, pg. 21 of the *Guidance for Implementing Water Quality Trading in WPDES Permits*, the uncertainty factor for both Myers Valley Creek and Trout Run can be reduced from a three (3) to a two (2) with aquatic habitat restoration. Helping to restore aquatic restoration can come in many forms.

Myers Valley Creek. Per email correspondence with the DNR, because Myers Valley Creek is not 303(d) listed for phosphorus it cannot be used in habitat adjustment. DNR advised that if the creek is monitored and tested for phosphorus it could establish that the phosphorus is a pollutant contributing to the biological impairment and thus could apply for the habitat adjustment. The

City of Arcadia set up three locations for monitoring the creek. One location was slightly downstream of the bank stabilization project site, one was upstream of the sediment basin, and the last point was slightly downstream of the sediment basin. The monitoring procedure followed the outlined procedure from *Wisconsin 2018 Consolidated Assessment and Listing Methodology (WisCALM) – Clean Water Act Section 303(d) and 305(b) Integrated Reporting*. The creek was monitored and tested for both total phosphorus and total suspended solids (TSS). The testing sampled the creek on a monthly basis over a 6-month period from May through October. Based upon the WisCALM guidelines, the lower 90% confidence interval needs to be greater than 0.075 mg/L to qualify for a phosphorus impaired stream. The data collected and analyzed showed the lower 90% confidence interval to be 0.3404 mg/L; therefore, this stream qualifies for impaired waters and habitat adjustment factor. See **Appendix 6-1B** for the Water Quality Data and Analysis.

On April 26, 2018 discussions were held between Davy Engineering, Trempealeau County Land Conservation and DNR Fishery Biologist. The discussion was to determine the acceptable forms of fish habitat and the amount required. The proposed idea is to install several Trout Lunker structures. In general, this was determined to be an acceptable method but prior to the County completing plans, a site visit by DNR may be warranted.

For streambank restoration a Stream Habitat Suitability Index (HSI) must be prepared (NRCS Standard 395). On September 18, 2018, the Trempealeau County Land Conservation staff visited the project site on Myers Valley Creek to perform the HSI observations and calculations. The evaluation was broken up into six (6) sections, which correspond with the same six (6) sections separated for the phosphorus loss calculations. See **Appendix 6-2a** for the HSI worksheets.

The HSI worksheets assesses the eligibility for the conservation practices to obtain the habitat adjustment. A score is given to the streambank based on observed physical surroundings for both the existing and proposed conditions. The scores showed that each site visited on Myers Valley Creek was eligible for the Habitat Adjustment parameter.

The following habitat structure alternatives are from the *NRCS Companion Document 580-15, EFH Notice 210-WI-122* (August 2011). This document can be seen in **Appendix 6-2**.

- **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. It 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 both snakes and turtles as well. This practice is best situated downstream of a riffle area and are best fit for slow moving areas within the stream. One of the cons of these practices is the cost to install. 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.** This is a built habitat, which is unique to trout. It is essentially a shelter on the side of the stream bank. These structures are best suited for corners 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.

6.6 Summary

In summary, there are several different projects with numerous different factors. Table 6.1 below summarizes the list of projects.

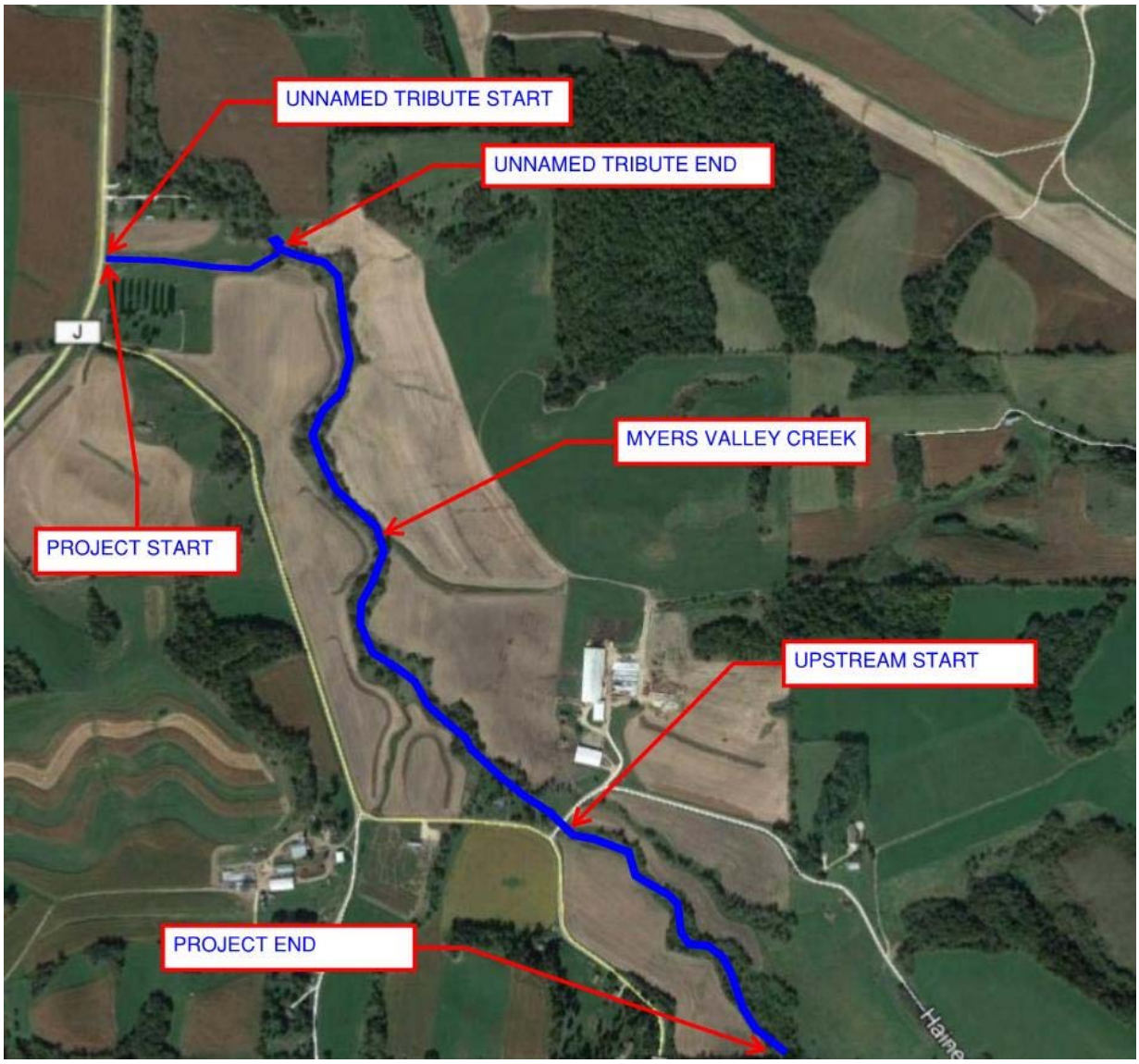
TABLE 6.1: WATER QUALITY TRADING FACTORS

	Project	Delivery Factor	Downstream Factor	Equivalency Factor	Uncertainty Factor	Habitat Adjustment	Trade Ratio
1	Suchla Section 1	0	0	0	3	1	**2**
2	Suchla Section 2	0	0	0	3	1	**2**
3	Suchla Section 3	0	0	0	3	1	**2**
4	Suchla Section 4	0	0	0	3	1	**2**
5	Suchla Section 5	0	0	0	3	1	**2**
6	Suchla Section 6	0	0	0	3	1	**2**
7	Suchla Buffer 1-6	0	0	0	3	1	**2**
8	Suchla Upstream	0	0	0	3	1	**2**
9	Suchla Upstream Buffer	0	0	0	3	1	**2**
10	Steve Haines Cattle Removal & Cover Restoration	0	0.1	0	1.2	0	**1.3**
11	Steve Haines Milkhouse	0	0.1	0	2	0	**2.1**

7 LOCATION WHERE CREDITS WILL BE GENERATED

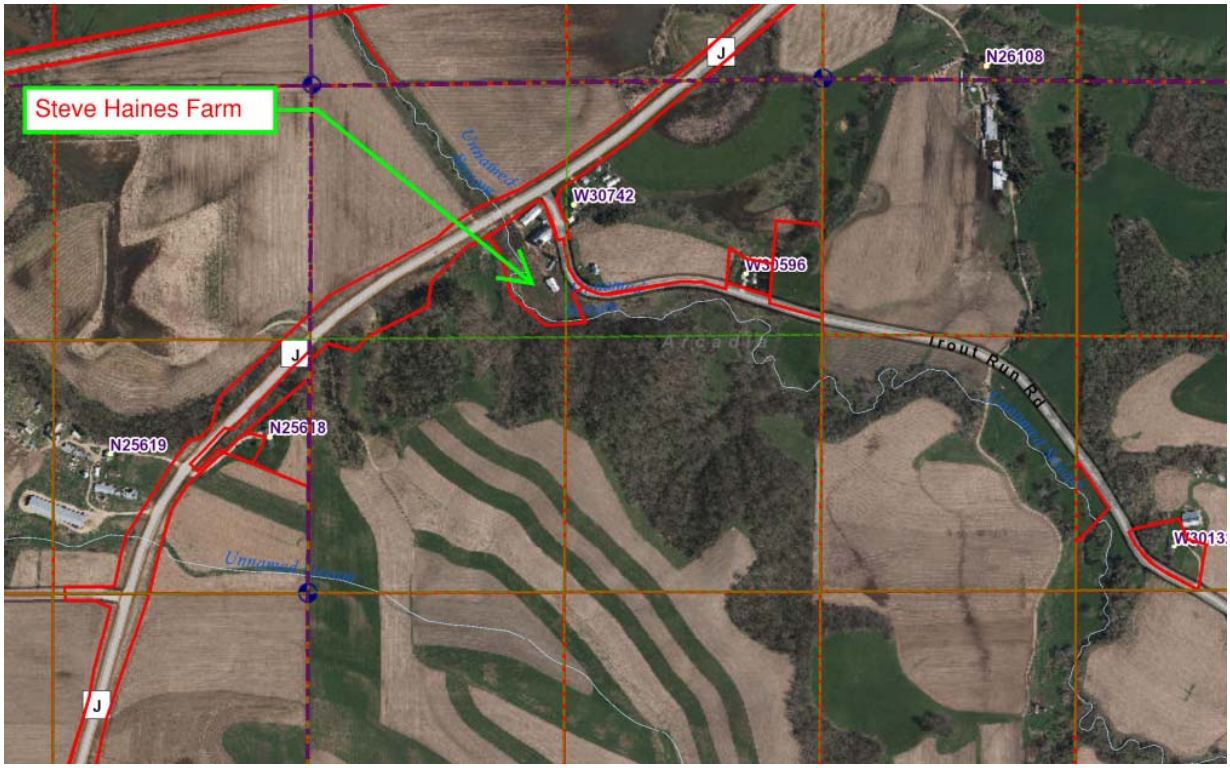
Credits will be generated in two different areas within the Arcadia WWTF HUC 12. The two creeks used to generate credits in this plan are Myers Valley Creek and Upper Trout Run Creek.

Myers Valley Creek. The Suchla project site is best described as both banks of the stream along Myers Valley Creek, beginning at the intersection of Haines Lane and Myers Valley Road and would end behind Holy Family Parish cemetery, where County Road J meets Myers Valley Road. Additional areas on the stream will also be restored, labeled as “Upstream Myers Valley Creek”. While adding the Suchla upstream MVC segment of stream bank stabilization is not nearly as cost-effective as the original downstream segment, it is administratively simple to add. The property owner and County are both prepared to do the work right away and it can be added to the 3-party agreement quickly. Doing the upstream work should also help protect the downstream project, making that more stable and easier to maintain. This section of stream will include the north side of the stream with patches on the south side and begins at Haines Lane and Myers Valley Road and extends to approximately 2,000 feet southeast of the intersection. See the blue lines along the map below.



Source: "Arcadia, Wisconsin." 44°13'38.91" N and 91°29'45.27" W. **GOOGLE EARTH.** September 28, 2015. January 19, 2018.

Upper Trout Run Creek. The Trout Run project site is best described as the farm on the southwest corner of the intersection of County Road J and Trout Run Road. See the map below.



8 TIMELINE FOR CREDITS AND AGREEMENTS

The credit generation must occur before the credit user can claim the credit, per the *Water Quality Trading How To Manual* (pg. 15). The permit expiration date is March 31, 2019. The Work is planned for 2019 to 2020; therefore, the available date for the credits will be available is in 2021. The deadline for completing construction of all the work necessary for phosphorus compliance, the Clarifiers Addition and WQT projects is May 1, 2021 (Existing permit is dated May 1, 2014).

Streambank Stabilization. Since this site will be armored and performing as designed, it will continue to generate credit on an annual basis as long as the riprap is maintained.

The Agreement with Arcadia, the County and Suchla's is included in **Appendix 8-1**.

Farm Use Limitation. As long as the restriction in land use, no dairy operations, is continued, the BMP will continue to generate credit on an annual basis.

The agreement with Steve Haines is in the process of negotiation.

9 METHOD FOR QUANTIFYING CREDITS

Streambank Stabilization. Existing phosphorus loss for the streambank projects were produced using the NRCS Soil Loss Spreadsheet recommended by the DNR, which can be seen in **Appendix 5-1**. The County produced data for the streambank in linear feet, the average stream bank height in feet, and the total soil phosphorus concentration in units of % P (see **Appendix 9-1** soil test data from the University of Wisconsin Soil Science Laboratory) to determine the phosphorus loss in pounds per year. Soil samples were taken by Trempealeau County Department of Land Management staff on August 18, 2017 for the Suchla project. Soil samples were gathered for the Trout Run and Suchla upstream projects in early 2019. Soil samples were gathered by taking a number of individual

grab samples and combining them into one large composite soil sample for every 1,000 feet. The grab locations were documented with a GPS unit. The locations of the sample collections can be seen in **Appendix 9-2**. The average % P over the six samples gathered was 0.075% for MVC. Thus, it was deemed that this project would withhold 5,220 pounds of phosphorus from entering Myers Valley Creek (and thus, the Trempealeau River) each year that the riprap would be retained (this number is including the 13% reduction discussed in section 6). The 8 sections of the creek were calculated separately and added together to determine the total pounds of phosphorus reduction.

Farm Use Limitations. The Trout Run Creek project was determined to withhold 861 pounds of phosphorus per year from entering Trout Run Creek, which also discharges to the Trempealeau River. The farm use limitation includes removing milk cattle from the property. This BMP has two parts, which include the cattle and the milkhouse operations. The removal of the cattle from the land involves the phosphorus content from the manure runoff and the erosion from the cattle presence. This portion of the phosphorus credits was quantified by using the DNR program BARNY. The results can be seen in **Appendix 9-3**.

The second part of the farm use limitation is the elimination of the milkhouse operation. The phosphorus content eliminated from the milking operation is based upon the number of cattle and an average phosphorus concentration in Milk Center Wastewater. The value used was obtained from NCRS 629. See **Appendix 9-4** for the Milkhouse Volume and Phosphorus Calculations.

10 TRACKING PROCEDURES

This project will be tracked with photography before, during, and after riprap installation and farm use limitation. The projects will also be monitored with inspections and documented in a log book, to ensure the preservation of the project site and BMP installations. The landowners will inspect the bank stabilization site after flood events. The Trempealeau County Department of Land Management will annually inspect the site as well, 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. Any debris observed will be documented and noted as to whether it should remain or be removed.

11 CONDITIONS UNDER WHICH THE MANAGEMENT PRACTICES MAY BE INSPECTED

The riprap should be inspected at least once per year and immediately after flood events. The velocity of both Myers Valley Creek increases greatly during flood events, and these portions of the streambank have been eroding at alarming rates during heavy rains. The landowners should work with the Trempealeau County Department of Land Management to ensure that these sites are properly maintained and should approach them for technical assistance if there are any concerns regarding the projects.

12 REPORTING REQUIREMENTS SHOULD THE MANAGEMENT PRACTICE FAIL

If the riprap were to fail at these sites, the landowners should immediately report the situation to the Trempealeau County Department of Land Management to develop a remediation action plan. If a dairy operation is resumed at the Haines farm, the County is to be notified.

13 OPERATION AND MAINTENANCE PLAN FOR EACH MANAGEMENT PRACTICE

Maintenance of the riprap will be the responsibility of the landowner with technical assistance from the Trempealeau County Department of Land Management. The maintenance will consist of the following:

Inspect riprap annually and after heavy storms for any erosion or displacement of rocks. Repairs should be done immediately.

1. 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.
2. Check for sloughing, erosion, or damage to vegetative cover. Damaged areas shall be graded, shaped, and re-vegetated as soon as possible.
3. Periodically cut grass to control weeds and invading brush.
4. Eliminate burrowing animals and repair damage.

There is no maintenance associated with the farm use limitation.

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

Myers Valley Creek. The projects are located over two miles southeast from the City of Arcadia Wastewater Treatment Facility Discharge, within the same HUC-12 (HUC 070400050501), the Lower Trempealeau River watershed. See **Appendix 14-1** for a Location Map.

Upper Trout Run Creek. The farm is located approximately three miles southwest from the City of Arcadia Wastewater Treatment Facility Discharge, within the same HUC-12 (HUC 070400050501), the Lower Trempealeau River watershed. See **Appendix 14-1** for a Location Map.

15 PRACTICE REGISTRATION DOCUMENTS, IF AVAILABLE

The project has not yet begun. Registration documents will be completed by the County and submitted to the DNR prior to the start of construction.

16 HISTORY OF PROJECT SITE(S)

Myers Valley Creek. This project site has been privately owned by the Suchla family for decades. Throughout the early to mid-1990s, the Trempealeau County Department of Land Management was instrumental in installing several conservation practices on the Suchla Farms site, such as a manure pit, riprap along a small portion of the steam, and fish habitat. Time, severe flood events, heavy grazing, and corn/bean cropping rotations have degraded the entire portion of Myers Valley Creek referenced in this narrative. The streambanks of Myers Valley Creek have also seen an exponential increase of erosion problems due to an increasing number of flood events and heavy rainfalls.

Upper Trout Run Creek. Based upon aerial photography, which only went as far back as 1992, it appears the farm has been in existence since that time. Discussions with the County dates the farm to have been in existence since before 1970.

17 REQUIRED PHOSPHORUS CREDITS

At the Average Flow of 1.56 MGD, the phosphorus mass loadings and the required WQT are summarized in the following tables on the next page:

TABLE 17.1: REQUIRED PHOSPHORUS MASS OFFSET

Description	Units	Amount
Annual Average Daily Existing Flow	MGD	1.56
Effluent Phosphorus Concentration	mg/L	0.70
Target P Concentration	mg/L	0.10
Annual Mass of Phosphorus	lbs/year	3,324
WQT Target Mass of Phosphorus	lbs/year	475
Baseline Mass (Existing - Target)	**lbs/year**	**2,849**

The Flow has been revised to 1.56 MGD, the actual 2018 annual average. Note that the to-date 2019 average is 1.7 MGD. When the limit comes into play after May 1, 2021, DNR will use a rolling 6-month average to do a mass calculation to determine compliance. This reinforces the importance of making progress on correcting I/I sources to reduce the Flow. The estimated effluent phosphorus concentration following treatment has been reduced from 0.80 to 0.70 mg/L. That increases the risk as there will be no opportunity to verify performance of the Clarifier Addition before permit issuance.

TABLE 17.2: WATER QUALITY TRADING PROJECT PHOSPHORUS MASS CREDITS

	Project	BMP Type	TR	P lbs/year	TRxP lbs/year
1	Suchla Section 1	Streambank Stabilization	2	647	324
2	Suchla Section 2	Streambank Stabilization	2	647	324
3	Suchla Section 3	Streambank Stabilization	2	755	378
4	Suchla Section 4	Streambank Stabilization	2	755	378
5	Suchla Section 5	Streambank Stabilization	2	755	378
6	Suchla Section 6	Streambank Stabilization	2	1,294	647
7	Suchla Buffer 1-6	Buffer	3	159	53
	Subtotal			**5,012**	**2,480**
8	Suchla Upstream	Streambank Stabilization	2	193	96
9	Suchla Upstream Buffer	Buffer	3	15	5
	Subtotal			**208**	**101**
10	Steve Haines Cattle Removal & Cover Restoration	Farm Use Limitation	1.3	217	167
11	Steve Haines Milkhouse	Farm Use Limitation	2.1	322	153
	Subtotal			**539**	**320**
	Total			**5,759**	**2,901**

17.1 Summary

The County estimates that the Suchla bank stabilization and buffer project will cost approximately $445,000 for the total project, but this total is not the complete project cost. The negotiations are currently in process to take the cattle farm out of production, which will require a payment to the landowner. The County cost estimate is included in **Appendix 17-1**.

17.1.1 Compare Target Mass to Available Credits at Existing 1.0 mg/L Effluent

The target phosphorus mass is based upon the effluent concentration and flow of the WWTF. Without any additional treatment, the Arcadia WWTF effluent concentration is 1.0 mg/L, which yields a mass of 4,749 lbs. per year at 1.56 MGD annual average. The new standard to meet is concentration of 0.10 mg/L, which yields a mass of 475 lbs. per year at the same volume. To determine the target of phosphorus credit, the new standard mass should be subtracted from the existing mass, which yields a baseline or target mass of 4,274 lbs. per year. This is our target mass for no improvements to the WWTF.

The next step is determining the amount of credits generated by the WQT management practice. In this case the calculated amount is 6,081 lbs. per year for the WQT projects. A trade ratio is discussed in Section 6. With the habitat adjustment, the estimated trade ratio determined in this report is 2:1, but the buffer projects will need to be a 3:1. To implement this ratio, the phosphorus credits generated by the management practice must be adjusted by the appropriate trade ratio as shown in Table 17.2, which results in 2,901 lbs per year of available phosphorus credit.

The final step is to compare the target mass to the available credit. As determined in the first step, the target mass is 4,274 lbs. per year. The available credit with the trade ratio applied is 2,901 lbs. per year as determined in the second step. The difference between the two values is a negative 1,283 lbs. per year, which includes the incorporation of habitat features. The 1,373 lbs. difference represents the amount of phosphorus reduction which still need to be obtained.

17.1.2 Compare Target Mass to Available Credits at Improved 0.75 mg/L Effluent with Clarifier Addition

Section 17.1.1 discussed the scenario which the WWTF does not provide any additional treatment. This discussion follows the criteria shown in Table 17.1. With the construction of the Clarifier Addition, the anticipated reduction of phosphorus will bring the concentration levels to a range of 0.6 mg/L to 0.8 mg/L. For this evaluation, a value of 0.70 mg/L is used.

The baseline or target mass value will differ from the discussion in Section 17.1.1. The baseline value is dependent upon the effluent concentration of phosphorus. In this example the target baseline value is 2,849 lbs. per year. The second step is identical to section 17.1.1, since it is based upon the WQT project scope, which yields an available phosphorus credit of 2,901 lbs. per year with the incorporated trade ratios seen in Table 17.2.

The final step is to compare the target mass to the available credit. With the current projects, the required credits are met. The City still has until May 1, 2021 to implement the projects to account for the required credits.

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 8 (2013, p. 37). Table 8 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 City of Arcadia will be installing rip rap bank stabilization at several locations and implementing a farm use limitation project to generate credits for the WWTP.

Below is a list of the requirements to be included in a WQT plan per column (e) of Table 8. This list includes a brief statement of where to find the information in this plan.

- Permittee's / credit user's WPDES Permit number. The City of Arcadia WWTP WPDES permit number is WI-0023230-09-0 and is referenced in Section 2.
- Permittee's / credit user's contact information. The contact information is included in Section 19.
- Pollutants for which credits will be generated. Credits will be generated for total phosphorus, which is discussed in Section 5.
- Amounts of credits available from each location / management practice / local governmental unit when acting as a broker. The amount of credit 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 14-1.
- Identification of method(s) including management practice(s) that will be used to generate credits at each location. Identifications of methods are discussed in Section 9.
- Duration of agreement (i.e. the design life of the management practice) with each credit generator. The duration of the agreement is discussed in Section 4.1.
- Schedule for installation / construction of each management practice. The schedule is discussed in Section 8.
- Operation and maintenance plan for each management practice used to generate credits. The operation and maintenance plan 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 April 1, 2019 when the permit is modified, and this date is referenced in Section 8.
- Models used to derive the amount of credits. The model used to derive the amount of credits is a scientific equation for phosphorus loss. This is discussed in Section 9.
- The applicable trade ratio for each management practice including supporting technical basis (see Table 4 on p. 20 of the WQT Guidance). The applicable trade ration is 3:1 and the technical basis and calculation of the trade ratio is discussed in Section 6.

19 DISCUSSION OF AMENDMENT #1

This plan had been approved, but after approval one of the landowners and the City of Arcadia could not agree on terms. This resulted in the City not meeting the required phosphorus reduction to meet the WPDES compliance. Another project was identified, which is why Amendment #1 was prepared for this WQT Plan. Amendment #1 is part of this report and can be seen in **Appendix 19-1**.

20 CERTIFICATION OF WATER QUALITY TRADING PLAN

This plan was prepared by Davy Engineering Co. with assistance from the Trempealeau County Department of Land Management. This Water Quality Trading Plan is complete, accurate and correct, to the best of our knowledge and belief.

Prepared By: Davy Engineering Co., Inc.

By: _____

Brice A. Nelson, P.E.
Project Engineer
Davy Engineering Co.
115 6th Street South
La Crosse, WI 54601
Telephone: 608.782.3130

Owner: City of Arcadia

By: _____

Chadwick Hawkins
City Administrator
City of Arcadia
203 West Main Street
Arcadia, WI 54612
Telephone: 608.323.3359

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

PHOTOGRAPHS

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2017. 8. 18 10:20


2017 8 18 10 23


2017. 8.18 10:33


2017. 8.18 11:00


2017. 8.18 11:09


2017. 8.18 11:17


2017. 8.18 11:19


2017. 8.18 12:25

CHANNELIZED FLOW PATHS LEAVING CORN FIELDS ALONG STREAMBANKS


2017. 8. 18 12:54

CATTLE CROSSING SITE – HEAVY DEGRADATION AND LEVELS OF NUTRIENTS ENTERING THE STREAM:


2017. 8.18 13:22


2017. 8.18 13:22


2017. 8. 18 13:22

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APPENDICES

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APPENDIX 2-1

NOTICE OF INTENT

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

Notice of Intent to Conduct Water Quality Trading

Form 3400-206 (1/14)

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

Applicant Information

Permittee Name	Permit Number	Facility Site Number
City of Arcadia	WI- 0023230-09-0	

Facility Address	City	State	ZIP Code
1070 Middle Road	Arcadia	WI	54612

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Bill Chang	203 W Main St.	Arcadia	WI	54612

Project Name: Suchla WQT - MVC Bank Stabilization

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
Trempealeau River	Phosphorus	0740400050405, 070400050404

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

Credit Generator Information

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

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

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

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

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

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

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

List the practices that will be used to generate credits:

Stream bank stabilization with habitat features

Method for quantifying credits generated:
- ☐ Monitoring
- ☒ Modeling, Names: Trempealeau County
- ☐ 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
Michael Davy	1/23/2018

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]	1/25/18

APPENDIX 3-1

SOILS MAP

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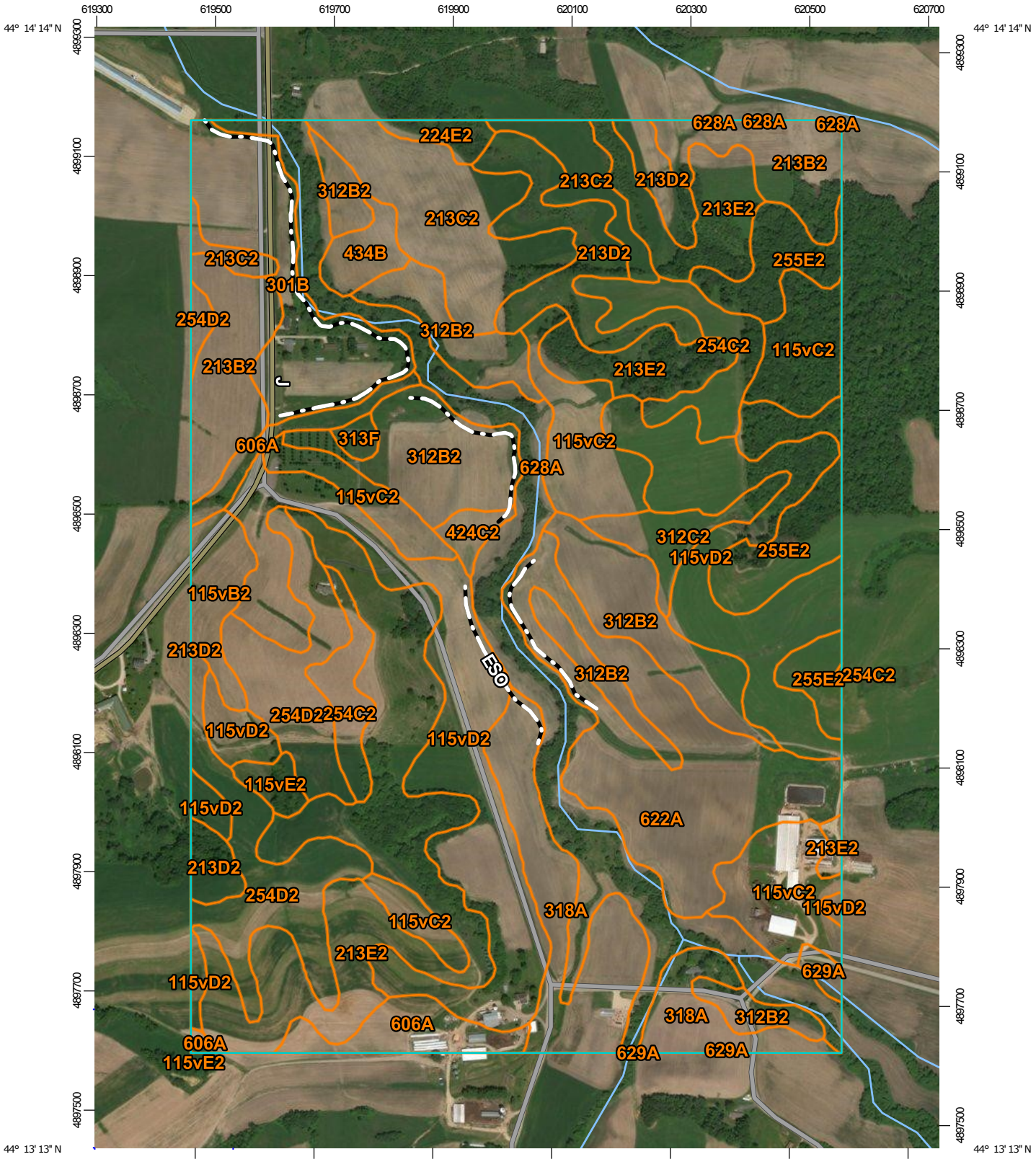
Soil Map—Trempealeau County, Wisconsin
(MVC WQT Project)



Map Scale: 1:9,160 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 100 200 400 600

Feet: 0 400 800 1600 2400

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 1:15,800.

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

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

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

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

Soil Survey Area: Trempealeau County, Wisconsin
Survey Area Data: Version 10, Oct 7, 2017

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

Date(s) aerial images were photographed: Jun 7, 2014—Mar 7, 2017

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
115vB2	Seaton silt loam, driftless valley, 2 to 6 percent slopes	5.5	1.3%
115vC2	Seaton silt loam, driftless valley, 6 to 12 percent slopes, moderately eroded	31.1	7.3%
115vD2	Seaton silt loam, driftless valley, 12 to 20 percent slopes, moderately eroded	60.0	14.1%
115vE2	Seaton silt loam, driftless valley, 20 to 30 percent slopes, moderately eroded	1.9	0.4%
213B2	Hixton silt loam, 2 to 6 percent slopes, moderately eroded	18.1	4.3%
213C2	Hixton silt loam, 6 to 12 percent slopes, moderately eroded	22.8	5.4%
213D2	Hixton silt loam, 12 to 20 percent slopes, moderately eroded	16.3	3.8%
213E2	Hixton silt loam, 20 to 30 percent slopes, moderately eroded	52.0	12.2%
224E2	Elevasil sandy loam, 20 to 30 percent slopes, moderately eroded	2.0	0.5%
254C2	Norden silt loam, 6 to 12 percent slopes, moderately eroded	12.2	2.9%
254D2	Norden silt loam, 12 to 20 percent slopes, moderately eroded	25.3	5.9%
255E2	Urne fine sandy loam, 20 to 30 percent slopes, moderately eroded	18.3	4.3%
301B	Pillot silt loam, 2 to 6 percent slopes	17.9	4.2%
312B2	Festina silt loam, 2 to 6 percent slopes, moderately eroded	36.0	8.5%
312C2	Festina silt loam, 6 to 12 percent slopes, moderately eroded	4.9	1.1%
313F	Plumcreek silt loam, 20 to 45 percent slopes	1.0	0.2%
318A	Bearpen silt loam, 0 to 3 percent slopes, rarely flooded	21.8	5.1%

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
424C2	Merit silt loam, 6 to 12 percent slopes, moderately eroded	1.7	0.4%
434B	Bilson sandy loam, 1 to 6 percent slopes	3.3	0.8%
606A	Huntsville silt loam, 0 to 3 percent slopes, occasionally flooded	9.3	2.2%
622A	Worthen silt loam, 0 to 2 percent slopes, occasionally flooded	29.2	6.9%
628A	Orion silt loam, 0 to 3 percent slopes, occasionally flooded	33.6	7.9%
629A	Ettrick silt loam, 0 to 2 percent slopes, frequently flooded	1.0	0.2%
Totals for Area of Interest		**425.2**	**100.0%**

APPENDIX 5-1

PHOSPHORUS LOSS CALCULATION

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

Farmer / Cooperator Name: Suchla
Tract Number: Sections 1 - 6
Evaluated By:
Evaluation Date:

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)
	1	2,083.0	7.0	14,581	1.00	14,581.0	Silt Loam	85	619.7
	2	2,083.0	7.0	14,581	1.00	14,581.0	Silt Loam	85	619.7
			Total Estimated Annual Streambank or Ditch Erosion Soil Loss (Tons):						1239.4
			Percent Leachable Phosphorus in the Soil (nitric/peroxide):						0.06%
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons):						0.744
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):						**1487**

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)
	3	2,083.0	7.0	14,581	1.00	14,581.0	Silt Loam	85	619.7
	4	2,083.0	7.0	14,581	1.00	14,581.0	Silt Loam	85	619.7
	5	2,083.0	7.0	14,581	1.00	14,581.0	Silt Loam	85	619.7
			Total Estimated Annual Streambank or Ditch Erosion Soil Loss (Tons):						1859.1
			Percent Leachable Phosphorus in the Soil (nitric/peroxide):						0.07%
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons):						1.301
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):						**2603**

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)
	6	2,083.0	7.0	14,581	1.00	14,581.0	Silt Loam	85	619.7

Total Estimated Annual Streambank or Ditch Erosion Soil Loss (Tons):	619.7
Percent Leachable Phosphorus in the Soil (nitric/peroxide):	0.12%
Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons):	0.744
Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):	**1487**

Total Phosphorus Loss for sum of reaches (lbs/yr):	**5577**
Reduction from sediment pond per DNR	**13%**
Total Phosphorus Loss after sediment pond reductions (lbs/yr):	**4852**
Total Phosphorus Loss with 2:1 Trade Ratio (lbs/yr):	**2426**

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

Streambank or Ditch Erosion Calculation Formula:

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

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

Farmer / Cooperator Name: Suchla
Tract Number: Upstream from Haines Ln
Evaluated By:
Evaluation Date:

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)
	1	1,300.0	3.5	4,550	0.20	910.0	Silt Loam	85	38.7
	2	700.0	6.0	4,200	0.30	1,260.0	Silt Loam	85	53.6
	3	500.0	4.0	2,000	0.30	600.0	Silt Loam	85	25.5
			Total Estimated Annual Streambank or Ditch Erosion Soil Loss (Tons):						117.7
			Percent Leachable Phosphorus in the Soil (nitric/peroxide):						0.10%
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons):						0.118
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):						**235**

Total Phosphorus Loss for sum of reaches (lbs/yr):	**235**

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

Streambank or Ditch Erosion Calculation Formula:

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

CALCULATION SHEET
CREP ENVIRONMENTAL BENEFIT REPORT

This form is used to calculate the average annual pollution reduction by waterbody and by practice. Use the attached summary sheet when submitting this information to DATCP. You may need to fill out this form for each CREP area. Summarize the results on the *CREP Environmental Benefit Report Summary Form* .

Project Name: **Suchla Water Quality Trade Project**
Section: **1**

Calculated by: Brice A. Nelson, PE
Company: Davy Engineering Company, Inc.
Project County: Trempealeau County
Side 1: South/West Side
Side 2: North/East Side
Buffer Width: 30 feet

Pollution Reduction for Filter Strips, Riparioan Buffers, and Grassland Practices

Calculation of Areas

1. Acres of Permanent Vegetation: This will generally correspond to the acres covered under the CRP contract. Calculate the acres or fill in the appropriate acres under the CRP contract under total permanent vegetation.

30	x	2,083	=	62,490	sq. ft
Average Width		Total Length		sq. ft of vegetation	

62,490	/ 43,560	=	1.435	acres
sq. ft of vegetation			total permanent vegetation	

2. Acres Contributiong Area: (per side)

Side 1:

Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 1	

Side 2:

Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 2	

3. Total Area: (Acres permanent + contributing areas)

Side 1:	1.435	+	21.519	=	22.953
	Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland 30% *Value is based off of aerial view of Google Maps*

% Pastureland 70% *Value is the difference between 100% and Cropland*

6.886		16.067
acres cropland		acres pasture

Side 2:

1.435	+	21.519	=	22.953
Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland 50% *Value is based off of aerial view of Google Maps*
% Pastureland 50% *Value is the difference between 100% and Cropland*

11.477		11.477
acres cropland		acres pasture

Phosphorus Delivery Reduction Calculation

1. Phosphorus Delivery

Side 1	6.886	x	1.1	=	7.575
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery
	16.067	x	0.5	=	8.034
	Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery
Side 2	11.477	x	1.1	=	12.624
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery
	11.477	x	0.5	=	5.738
	Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Total P Delivery for both sides 33.971 Pounds of P

2. Phosphorus Reduction

33.971	x	70%	=	**23.779**
Pounds of Total P		% Reduction *		**Pounds of P Reduced**

** Based on Average Width of Vegetation, One or both sides, as applicable. (See Table B)*

** Inputted value is interpolated from Table B*

CALCULATION SHEET
CREP ENVIRONMENTAL BENEFIT REPORT

This form is used to calculate the average annual pollution reduction by waterbody and by practice. Use the attached summary sheet when submitting this information to DATCP. You may need to fill out this form for each CREP area. Summarize the results on the CREP Environmental Benefit Report Summary Form.

Project Name: **Suchla Water Quality Trade Project**
Section: **2**

Calculated by: Brice A. Nelson, PE
Company: Davy Engineering Company, Inc.
Project County: Trempealeau County
Side 1: South/West Side
Side 2: North/East Side
Buffer Width: 30 feet

Pollution Reduction for Filter Strips, Riparioan Buffers, and Grassland Practices

Calculation of Areas

1. Acres of Permanent Vegetation: This will generally correspond to the acres covered under the CRP contract. Calculate the acres or fill in the appropriate acres under the CRP contract under total permanent vegetation.

30	x	2,083	=	62,490	sq. ft
Average Width		Total Length		sq. ft of vegetation	

62,490	/ 43,560	=	1.435	acres
sq. ft of vegetation			total permanent vegetation	

2. Acres Contributiong Area: (per side)

Side 1:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 1	

Side 2:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 2	

3. Total Area: (Acres permanent + contributing areas)

Side 1:	1.435	+	21.519	=	22.953
	Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland	90%	*Value is based off of aerial view of Google Maps*
% Pastureland	10%	*Value is the difference between 100% and Cropland*

20.658	2.295
acres cropland	acres pasture

Side 2:	1.435	+	21.519	=	22.953
	Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland	97%	*Value is based off of aerial view of Google Maps*
% Pastureland	3%	*Value is the difference between 100% and Cropland*

22.265	0.689
acres cropland	acres pasture

Phosphorus Delivery Reduction Calculation

1. Phosphorus Delivery

Side 1	20.658	x	1.1	=	22.724
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

2.295	x	0.5	=	1.148
Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Side 2	22.265	x	1.1	=	24.491
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

0.689	x	0.5	=	0.344
Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Total P Delivery for both sides	48.707	Pounds of P

2. Phosphorus Reduction

48.707	x	70%	=	**34.095**
Pounds of Total P		% Reduction *		**Pounds of P Reduced**

** Based on Average Width of Vegetation, One or both sides, as applicable. (See Table B)*

** Inputted value is interpolated from Table B*

CALCULATION SHEET

CREP ENVIRONMENTAL BENEFIT REPORT

This form is used to calculate the average annual pollution reduction by waterbody and by practice. Use the attached summary sheet when submitting this information to DATCP. You may need to fill out this form for each CREP area. Summarize the results on the CREP Environmental Benefit Report Summary Form.

Project Name: **Suchla Water Quality Trade Project**
Section: **3**

Calculated by: Brice A. Nelson, PE
Company: Davy Engineering Company, Inc.
Project County: Trempealeau County
Side 1: South/West Side
Side 2: North/East Side
Buffer Width: 30 feet

Pollution Reduction for Filter Strips, Riparioan Buffers, and Grassland Practices

Calculation of Areas

1. Acres of Permanent Vegetation: This will generally correspond to the acres covered under the CRP contract. Calculate the acres or fill in the appropriate acres under the CRP contract under total permanent vegetation.

30	x	2,083	=	62,490	sq. ft
Average Width		Total Length		sq. ft of vegetation	

62,490	/ 43,560	=	1.435	acres
sq. ft of vegetation			total permanent vegetation	

2. Acres Contributiong Area: (per side)

Side 1:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 1	

Side 2:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 2	

3. Total Area: (Acres permanent + contributing areas)

Side 1:

1.435	+	21.519	=	22.953
Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland 90% *Value is based off of aerial view of Google Maps*
% Pastureland 10% *Value is the difference between 100% and Cropland*

20.658	2.295
acres cropland	acres pasture

Side 2:

1.435	+	21.519	=	22.953
Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland 95% *Value is based off of aerial view of Google Maps*
% Pastureland 5% *Value is the difference between 100% and Cropland*

21.806	1.148
acres cropland	acres pasture

Phosphorus Delivery Reduction Calculation

1. Phosphorus Delivery

Side 1

20.658	x	1.1	=	22.724
Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

2.295	x	0.5	=	1.148
Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Side 2

21.806	x	1.1	=	23.986
Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

1.148	x	0.5	=	0.574
Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Total P Delivery for both sides	48.431	Pounds of P

2. Phosphorus Reduction

48.431	x	70%	=	**33.902**
Pounds of Total P		% Reduction *		**Pounds of P Reduced**

** Based on Average Width of Vegetation, One or both sides, as applicable. (See Table B)*

** Inputted value is interpolated from Table B*

CALCULATION SHEET

CREP ENVIRONMENTAL BENEFIT REPORT

This form is used to calculate the average annual pollution reduction by waterbody and by practice. Use the attached summary sheet when submitting this information to DATCP. You may need to fill out this form for each CREP area. Summarize the results on the CREP Environmental Benefit Report Summary Form.

Project Name: **Suchla Water Quality Trade Project**
Section: **4**

Calculated by: Brice A. Nelson, PE
Company: Davy Engineering Company, Inc.
Project County: Trempealeau County
Side 1: South/West Side
Side 2: North/East Side
Buffer Width: 30 feet

Pollution Reduction for Filter Strips, Riparioan Buffers, and Grassland Practices

Calculation of Areas

1. Acres of Permanent Vegetation: This will generally correspond to the acres covered under the CRP contract. Calculate the acres or fill in the appropriate acres under the CRP contract under total permanent vegetation.

30	x	2,083	=	62,490	sq. ft
Average Width		Total Length		sq. ft of vegetation	

62,490	/ 43,560	=	1.435	acres
sq. ft of vegetation			total permanent vegetation	

2. Acres Contributiong Area: (per side)

Side 1:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 1	

Side 2:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 2	

3. Total Area: (Acres permanent + contributing areas)

Side 1:	1.435	+	21.519	=	22.953
	Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland	85%	*Value is based off of aerial view of Google Maps*
% Pastureland	15%	*Value is the difference between 100% and Cropland*

19.510	3.443
acres cropland	acres pasture

Side 2:	1.435	+	21.519	=	22.953
	Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland	95%	*Value is based off of aerial view of Google Maps*
% Pastureland	5%	*Value is the difference between 100% and Cropland*

21.806	1.148
acres cropland	acres pasture

Phosphorus Delivery Reduction Calculation

1. Phosphorus Delivery

Side 1	19.510	x	1.1	=	21.461
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

3.443	x	0.5	=	1.721
Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Side 2	21.806	x	1.1	=	23.986
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

1.148	x	0.5	=	0.574
Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Total P Delivery for both sides	47.743	Pounds of P

2. Phosphorus Reduction

47.743	x	70%	=	**33.420**
Pounds of Total P		% Reduction *		**Pounds of P Reduced**

** Based on Average Width of Vegetation, One or both sides, as applicable. (See Table B)*

** Inputted value is interpolated from Table B*

CALCULATION SHEET

CREP ENVIRONMENTAL BENEFIT REPORT

This form is used to calculate the average annual pollution reduction by waterbody and by practice. Use the attached summary sheet when submitting this information to DATCP. You may need to fill out this form for each CREP area. Summarize the results on the CREP Environmental Benefit Report Summary Form.

Project Name: **Suchla Water Quality Trade Project**
Section: **5**

Calculated by: Brice A. Nelson, PE
Company: Davy Engineering Company, Inc.
Project County: Trempealeau County
Side 1: South/West Side
Side 2: North/East Side
Buffer Width: 30 feet

Pollution Reduction for Filter Strips, Riparioan Buffers, and Grassland Practices

Calculation of Areas

1. Acres of Permanent Vegetation: This will generally correspond to the acres covered under the CRP contract. Calculate the acres or fill in the appropriate acres under the CRP contract under total permanent vegetation.

30	x	2,083	=	62,490	sq. ft
Average Width		Total Length		sq. ft of vegetation	

62,490	/ 43,560	=	1.435	acres
sq. ft of vegetation			total permanent vegetation	

2. Acres Contributiong Area: (per side)

Side 1:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 1	

Side 2:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 2	

3. Total Area: (Acres permanent + contributing areas)

Side 1:	1.435	+	21.519	=	22.953
	Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland	85%	*Value is based off of aerial view of Google Maps*
% Pastureland	15%	*Value is the difference between 100% and Cropland*

19.510	3.443
acres cropland	acres pasture

Side 2:	1.435	+	21.519	=	22.953
	Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland	98%	*Value is based off of aerial view of Google Maps*
% Pastureland	2%	*Value is the difference between 100% and Cropland*

22.494	0.459
acres cropland	acres pasture

Phosphorus Delivery Reduction Calculation

1. Phosphorus Delivery

Side 1	19.510	x	1.1	=	21.461
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

	3.443	x	0.5	=	1.721
	Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Side 2	22.494	x	1.1	=	24.744
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

	0.459	x	0.5	=	0.230
	Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Total P Delivery for both sides	48.156	Pounds of P

2. Phosphorus Reduction

48.156	x	70%	=	**33.709**
Pounds of Total P		% Reduction *		**Pounds of P Reduced**

** Based on Average Width of Vegetation, One or both sides, as applicable. (See Table B)*

** Inputted value is interpolated from Table B*

CALCULATION SHEET
CREP ENVIRONMENTAL BENEFIT REPORT

This form is used to calculate the average annual pollution reduction by waterbody and by practice. Use the attached summary sheet when submitting this information to DATCP. You may need to fill out this form for each CREP area. Summarize the results on the CREP Environmental Benefit Report Summary Form.

Project Name: **Suchla Water Quality Trade Project**
Section: **6**

Calculated by: Brice A. Nelson, PE
Company: Davy Engineering Company, Inc.
Project County: Trempealeau County
Side 1: South/West Side
Side 2: North/East Side
Buffer Width: 30 feet

Pollution Reduction for Filter Strips, Riparioan Buffers, and Grassland Practices

Calculation of Areas

1. Acres of Permanent Vegetation: This will generally correspond to the acres covered under the CRP contract. Calculate the acres or fill in the appropriate acres under the CRP contract under total permanent vegetation.

30	x	2,083	=	62,490	sq. ft
Average Width		Total Length		sq. ft of vegetation	

62,490	/ 43,560	=	1.435	acres
sq. ft of vegetation			total permanent vegetation	

2. Acres Contributiong Area: (per side)

Side 1:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 1	

Side 2:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,083	=	937,350
Contributing Area Width		average (stream) length		sq. ft

937,350	/ 43,560	=	21.519	acres
Contributing area side 1 (sq. ft.)			contributing area side 2	

3. Total Area: (Acres permanent + contributing areas)

Side 1:	1.435	+	21.519	=	22.953
	Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland	3%	*Value is based off of aerial view of Google Maps*
% Pastureland	97%	*Value is the difference between 100% and Cropland*

0.689	22.265
acres cropland	acres pasture

Side 2:	1.435	+	21.519	=	22.953
	Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland	80%	*Value is based off of aerial view of Google Maps*
% Pastureland	20%	*Value is the difference between 100% and Cropland*

18.363	4.591
acres cropland	acres pasture

Phosphorus Delivery Reduction Calculation

1. Phosphorus Delivery

Side 1	0.689	x	1.1	=	0.757
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

	22.265	x	0.5	=	11.132
	Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Side 2	18.363	x	1.1	=	20.199
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

	4.591	x	0.5	=	2.295
	Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Total P Delivery for both sides	34.384	Pounds of P

2. Phosphorus Reduction

34.384	x	70%	=	**24.069**
Pounds of Total P		% Reduction *		**Pounds of P Reduced**

** Based on Average Width of Vegetation, One or both sides, as applicable. (See Table B)*

** Inputted value is interpolated from Table B*

CALCULATION SHEET

CREP ENVIRONMENTAL BENEFIT REPORT

This form is used to calculate the average annual pollution reduction by waterbody and by practice. Use the attached summary sheet when submitting this information to DATCP. You may need to fill out this form for each CREP area. Summarize the results on the CREP Environmental Benefit Report Summary Form.

Project Name: **Suchla Water Quality Trade Project**
Section: **Upstream**

Calculated by: Brice A. Nelson, PE
Company: Davy Engineering Company, Inc.
Project County: Trempealeau County
Side 1: South/West Side
Side 2: North/East Side
Buffer Width: 30 feet

Pollution Reduction for Filter Strips, Riparioan Buffers, and Grassland Practices

Calculation of Areas

1. Acres of Permanent Vegetation: This will generally correspond to the acres covered under the CRP contract. Calculate the acres or fill in the appropriate acres under the CRP contract under total permanent vegetation.

30	x	2,500	=	75,000	sq. ft
Average Width		Total Length		sq. ft of vegetation	

75,000	/ 43,560	=	1.722	acres
sq. ft of vegetation			total permanent vegetation	

2. Acres Contributiong Area: (per side)

Side 1:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	2,000	=	900,000
Contributing Area Width		average (stream) length		sq. ft

900,000	/ 43,560	=	20.661	acres
Contributing area side 1 (sq. ft.)			contributing area side 1	

Side 2:
Average slope % 3 Determine contributing area from Table D on other sheet

450	x	500	=	225,000
Contributing Area Width		average (stream) length		sq. ft

225,000	/ 43,560	=	5.165	acres
Contributing area side 1 (sq. ft.)			contributing area side 2	

3. Total Area: (Acres permanent + contributing areas)

Side 1:	1.722	+	20.661	=	22.383
	Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland	70%	*Value is based off of aerial view of Google Maps*
% Pastureland	30%	*Value is the difference between 100% and Cropland*

15.668	6.715
acres cropland	acres pasture

Side 2:	1.722	+	5.165	=	6.887
	Acres of Permanent Vegetation		Acres of Contributing		Total Acres

% Cropland	30%	*Value is based off of aerial view of Google Maps*
% Pastureland	70%	*Value is the difference between 100% and Cropland*

2.066	4.821
acres cropland	acres pasture

Phosphorus Delivery Reduction Calculation

1. Phosphorus Delivery

Side 1	15.668	x	1.1	=	17.235
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

	6.715	x	0.5	=	3.357
	Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Side 2	2.066	x	1.1	=	2.273
	Acres Cropland		Pounds of P per acre		Total Pounds of P Delivery

	4.821	x	0.5	=	2.410
	Acres Pasture		Pounds of P per acre		Total Pounds of P Delivery

Total P Delivery for both sides	25.275	Pounds of P

2. Phosphorus Reduction

25.275	x	70%	=	**17.693**
Pounds of Total P		% Reduction *		**Pounds of P Reduced**

** Based on Average Width of Vegetation, One or both sides, as applicable. (See Table B)*

** Inputted value is interpolated from Table B*

SUCHLA STREAM BUFFER PHOSPHORUS REMOVAL SUMMARY

Section of Stream	Width of Buffer (feet)	Length of Stream (feet)	Total Phosphorus Reduction (lbs P / year)
1	30	2,083	23.779
2	30	2,083	34.095
3	30	2,083	33.902
4	30	2,083	33.420
5	30	2,083	33.709
6	30	2,083	24.069
Upstream	30	2,500	17.693
Total Phosphorus Reduction from Buffer Strips			**201**
Trade Ratio for Filter Strip / Buffer is 3:1			
Reduction from sediment pond per DNR			**13%**
Total Phosphorus Reduction after Trade Ratio and pond reduction			**58**

Table A: Reduction of Sediment Based on Width of Filter Strip or Riparian Buffer or Grassland Practice

Width of Vegetation (feet)	% Reduction
20	70
35	80
70	85
100	90
>150	95
>500	98

Table B: Reduction of Phosphorus and Nitrates Based on Width of Filter Strip or Riparian Buffer or Grassland Practice

Width of Vegetation (feet)	% Reduction
20	60
35	75
70	80
100	85
>150	90
>500	95

Table C: Predicted Volume of Pollutants Generated Per Acre Based on the Land Use of the Tributary Area and Acres of Riparian Buffer or Filter Strip

Land Use	# of P	# of N	Tons of Sediment
Cropland	1.1	0.6	0.5
Pastureland	0.5	0.2	0.1

Table D: Predicted Tributary Width/Lineal Foot (each side) of Riparian Buffer/Filter Strip Based on Slope, Land Use

Land Use	Slope*(%)	Tributary Width** (ft)
Cropland	0-2	600
	2-6	450
	6-12	250
	>12	150
Pastureland	0-2	800
	2-6	500
	6-12	300
	>12	200

* Slope is measured as average slope within 150 to 200 feet of the water resource or buffer area

** Tributary width plus the width of the filter strip or riparian buffer is multiplied by the lineal feet of buffer or filter strip, divided by 43,560 sq. ft./acre, to determine the acres of contributing area

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APPENDIX 6-1

HUC 12 WATERSHED BASIN

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Arcadia HUC 12 - 070400050501

Legend

- Intermittent Streams
- 24K Hydrography Streams and Rivers
- 24K Hydrography Lakes and Open Water
- 12-digit HUCs (Subwatersheds)
- Municipality
- State Boundaries
- County Boundaries
- Major Roads
  - Interstate Highway
  - State Highway
  - US Highway
- County and Local Roads
  - County HWY
  - Local Road
- Railroads
- Tribal Lands
- Rivers and Streams
- Intermittent Streams
- Lakes and Open water

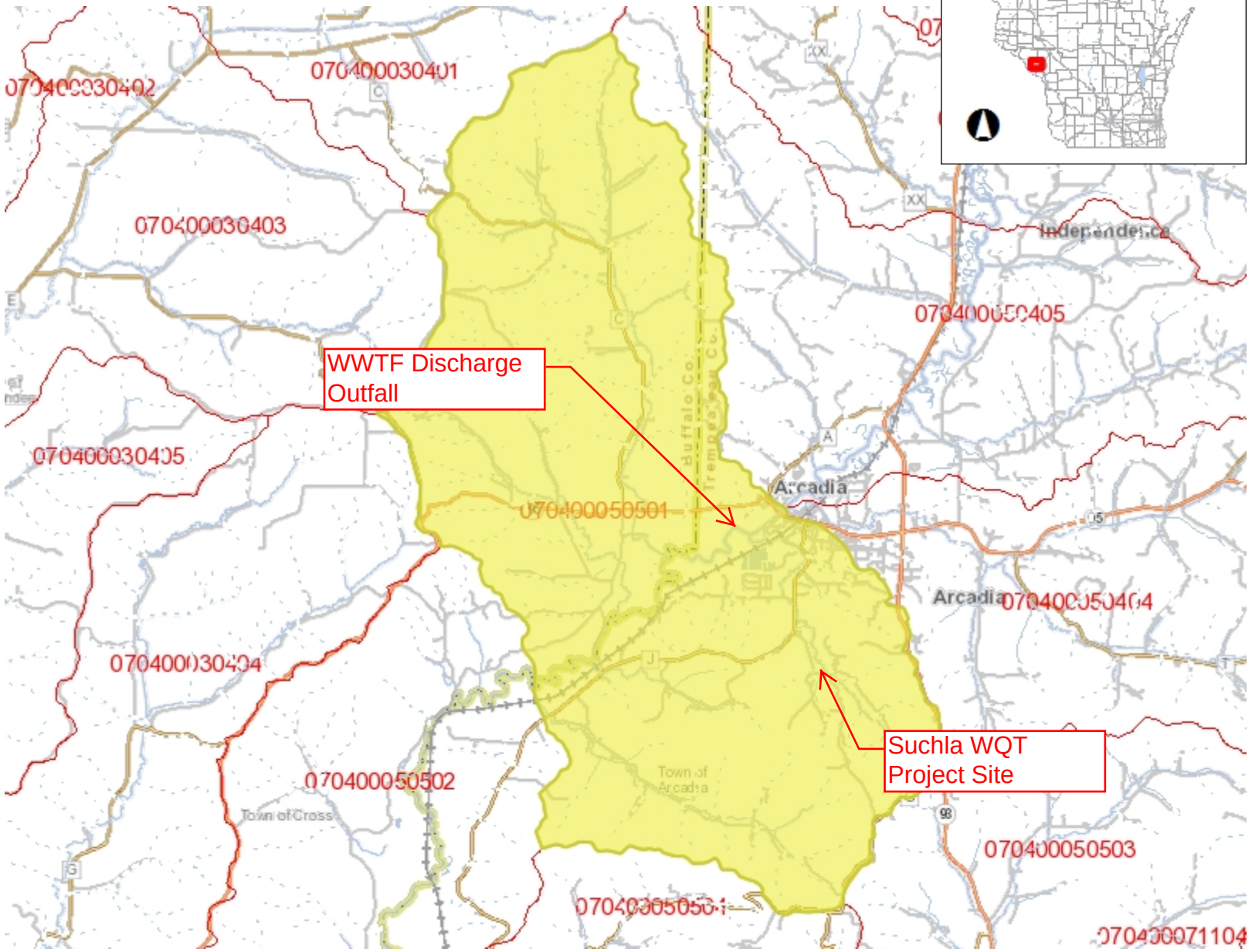
Notes

4.0 0 2.00 4.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 126,720

Arcadia HUC 12 - 070400050501



Legend

- Intermittent Streams
- 24K Hydrography Streams and Rivers
- 24K Hydrography Lakes and Open Water
- 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

4.0 0 2.00 4.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 126,720

Notes

APPENDIX 6-1

APPENDIX 6-1A

DNR CORRESPONDENCE

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Nelson, Brice

From: Hartenbower, Benjamin P - DNR <Benjamin.Hartenbower@wisconsin.gov>
Sent: Wednesday, June 6, 2018 11:12 AM
To: Davy, Michael; Garbe, Amy M - DNR; Claucherty, Matthew L - DNR
Cc: Fassbender, Lori - DNR; Nelson, Brice; Bill Chang (cityadmin@cityofarcadiawi.com); Heidenreich Kirstie
Subject: RE: WQT Plan for Arcadia-Estimating Suchla Credits
Attachments: HSI-Stream_Habitat-(2017-04).docx

1. Yes, we can agree that it will be not greater than 13%.

5. Qualifying for the aquatic habitat adjustment will bring the trade ratio to 2:1 for Meyers Valley Creek. This stream sampling is helping to provide evidence of phosphorus impairment to satisfy part of the qualification. The fulfillment of aquatic habitat standards can be verified by an approved stream habitat GP. I have attached a Stream Habitat Suitability Index worksheet for NRCS 395. It will provide an idea of how the habitat projects are assessed.

8. The fundamental difference between the use of the NRCS spreadsheet and the originally submitted calculation method is the assumption of 100 lbs/ft^3 vs approximation based on the soil texture dropdown menu. If reasonable justification of the 100 lbs/ft^3 can be made, the original calculation method should be acceptable. The main reason we request that the project calculation be broken into sections is to separately factor in different soil sampling, average bank height, and annual recession rates. The sampling composites are separated and your follow-up response regarding the County's conclusion and documentation for recession rate seems reasonable, but the we need more detail on the bank height averages.

We are committed to service excellence.
Visit our survey at http://dnr.wi.gov/customersurvey to evaluate how I did.

Benjamin Hartenbower, P.E.
Phone: 715-839-3712
Benjamin.Hartenbower@wisconsin.gov

From: Davy, Michael [mailto:mfdavy@davyinc.com]
Sent: Monday, June 04, 2018 2:54 PM
To: Hartenbower, Benjamin P - DNR <Benjamin.Hartenbower@wisconsin.gov>; Garbe, Amy M - DNR <Amy.Garbe@wisconsin.gov>; Claucherty, Matthew L - DNR <Matthew.Claucherty@wisconsin.gov>
Cc: Fassbender, Lori - DNR <Lori.Fassbender@wisconsin.gov>; Nelson, Brice <bnelson@davyinc.com>; Bill Chang (cityadmin@cityofarcadiawi.com) <cityadmin@cityofarcadiawi.com>; Heidenreich Kirstie <kirstieh@tremplocounty.com>
Subject: [WARNING: ATTACHMENT(S) MAY CONTAIN MALWARE]RE: WQT Plan for Arcadia-Estimating Suchla Credits

The property owner (Suchla) and Trempealeau County, acting as broker, have approved the agreement (attached) for the bank stabilization project on the Suchla farm along Myers Valley Creek. Arcadia, the credit user, is prepared to proceed with this project but needs a reasonable degree od assurance that the project will generate sufficient Phosphorus credits to meet the current objective. Following are some updates and additional comments on the thread below:

1. We are investigating alternative means of estimating the phosphorus that may be trapped in the MVC "sedimentation basin". Can we agree that the offset in credit will be NO MORE than the 13% you estimated via P8?
5. The project is being designed by the Trempealeau County Department of Land Management. The County has been in contact with DNR related to incorporating habitat features and intends to add those to their design. In order to show that MVC is "impaired" for phosphorus, Arcadia is proceeding with the monthly stream sampling as suggested. Early results (1.3 mg/L, 0.51 mg/L) show that the MVC phosphorus concentrations are well above the 0.10 mg/L applicable to the Trempealeau River. With the habitat features and continued evidence of phosphorus impairment, the expectation is that a 2:1 Trade Ratio will apply.
8. Based on recent DNR comments on the Galesville Watershed Plan, it appears that DNR may prefer the NRCS spreadsheet for estimating soil/phosphorus loss on bank stabilization projects rather that the method originally submitted by the County. Attached is a spreadsheet with those calculations along with a copy of the map showing the location of the 6 reaches. This method results in 5,577 #P/year, lower than 6,563 #P/year originally estimated. Will the NRCS method be applicable for Arcadia? With approval of a 2:1 Trade Ratio, the new credit is 2,789 #P/year compared to the 2,983 #P/year target value for current conditions. With the potential 13% offset, the new credit is 2,426 #P/year compared to the 2,983 #P/year target value. That leaves us 194 to 557 #P/year short.

Recognizing the unanswered questions and the obligation to actually complete construction as planned, the City is requesting that DNR provide guidance on the credits likely to be available. Does it appear reasonable to plan a minimum of 2,426 #P/year credits for the Suchla bank stabilization project?
Mike

From: Davy, Michael
Sent: Thursday, April 26, 2018 3:04 PM
To: Hartenbower, Benjamin P - DNR <Benjamin.Hartenbower@wisconsin.gov>
Cc: Fassbender, Lori - DNR <Lori.Fassbender@wisconsin.gov>; Garbe, Amy M - DNR <Amy.Garbe@wisconsin.gov>; Nelson, Brice <bnelson@davyinc.com>; Bill Chang (cityadmin@cityofarcadiawi.com) <cityadmin@cityofarcadiawi.com>; Claucherty, Matthew L - DNR <Matthew.Claucherty@wisconsin.gov>; Heidenreich Kirstie <kirstieh@tremplocounty.com>
Subject: RE: WQT Plan for Arcadia to DNR-Questions-Responses

This is very helpful. A few follow ups:

1. Arcadia plans to do some P/TSS sampling above and below the MVC "sedimentation basin" at the old lagoon in an attempt to estimate trapped phosphorus.
5. We need some idea of the acceptable scope of habitat features in order to do any design. Perhaps a discussion with the DNR Fishery Biologist will provide some guidance.
5. Arcadia plans to do some P/TSS sampling on MVC at the CTH J crossing during 2018.
7. Cindy Koperski provided sampling guidance for the County. Each of the 6 samples were representative of the area and were collected from various heights and depths along the bank. Each set of samples was composited in a bucket before analysis.
8. The recession rate was determined by the County and they have photographic documentation available. The County feels that the 1 ft. per year is conservatively low.
11. Section B of the 3 party agreement will be modified to add, "*Maintain the project consistent with NRCS technical standard 580"* and edit B3 to state, *"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"*

Mike

From: Hartenbower, Benjamin P - DNR <Benjamin.Hartenbower@wisconsin.gov>
Sent: Wednesday, April 18, 2018 11:21 AM
To: Davy, Michael <mfdavy@davyinc.com>
Cc: Fassbender, Lori - DNR <Lori.Fassbender@wisconsin.gov>; Garbe, Amy M - DNR <Amy.Garbe@wisconsin.gov>; Nelson, Brice <bnelson@davyinc.com>; Bill Chang (cityadmin@cityofarcadiawi.com) <cityadmin@cityofarcadiawi.com>; Claucherty, Matthew L - DNR <Matthew.Claucherty@wisconsin.gov>
Subject: RE: WQT Plan for Arcadia to DNR-Questions

Mike,
Please see the responses to your questions.
Call me if you have any questions.
-Ben

We are committed to service excellence.
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Benjamin Hartenbower, P.E.
Phone: 715-839-3712
Benjamin.Hartenbower@wisconsin.gov

From: Davy, Michael [mailto:mfdavy@davyinc.com]
Sent: Tuesday, April 03, 2018 3:00 PM
To: Hartenbower, Benjamin P - DNR <Benjamin.Hartenbower@wisconsin.gov>
Cc: Fassbender, Lori - DNR <Lori.Fassbender@wisconsin.gov>; Garbe, Amy M - DNR <Amy.Garbe@wisconsin.gov>; Smith, Stephen J - DNR <Stephen.Smith@wisconsin.gov>; Nelson, Brice <bnelson@davyinc.com>; Bill Chang (cityadmin@cityofarcadiawi.com) <cityadmin@cityofarcadiawi.com>
Subject: FW: WQT Plan for Arcadia to DNR-Questions

Ben, as discussed, we need some feedback from DNR on this proposal so that Arcadia can be assured that we are on the right track toward achieving phosphorus compliance. We view this WQT Plan similar to a Preliminary Report or Facility Plan. For those reports, DNR does a formal review, asks questions and issues an approval letter. That process allows us to proceed with the preparation of plans and obtaining permits knowing that the concept is acceptable. On other types of wastewater improvement projects there is also a plan approval step before starting construction. That provides another, more detailed, approval of the proposal. While the project has to perform as planned and designed, we know before construction starts that ultimately the "final product" will be acceptable and approved.

For Arcadia, we would like your overall comments and specifically on the following:

1. Delivery Factor = 0. Downstream from the project, before the confluence with the Trempealeau River, the MVC stream flow is manipulated in several ways. Near the former wastewater lagoons, a weir was constructed across the creek to raise the water level to allow a portion of the flow to be diverted through an 18" CMP into the former primary lagoon to create wetlands. There is a control structure but it is usually kept in a fixed position allowing about 5% of the streamflow to be diverted into the wetlands. That infiltrates, transpires and evaporates. The weir also creates a small impoundment that acts as a sediment trap under some flow conditions. This area has been cleaned out 1 or 2x times in the past 20+ years. That may trap some particulate phosphorus but this has not been quantified. The delivery factor for the trade ratio would be =0, but our calculations using P8 modeling indicate a 13% reduction in offset credit. You may provide an alternative calculation method to quantify the trapped phosphorus if you feel it would be more accurate.
2. Downstream Factor = 0 Correct.
3. Equivalency Factor = 0 Correct.
4. Uncertainty Factor = 2 or 3 The uncertainty factor is 3 and may be adjusted to 2 if qualifying for the habitat adjustment factor.

5. Habitat Adjustment = change Uncertainty Factor to 2 by including 2 or 3 habitat structures (Random Boulder, Cross-Channel Logs, Trout Lunker) under the guidance of DNR'S fishery biologist. Is this type and number generally satisfactory? To qualify for habitat adjustment, the surface water must be 303(d) listed for the TRADED pollutant and the habitat project is an approved management practice. The simplest way to document that the structure meets specs is have it designed through the County LCD and submit the GP (https://dnr.wi.gov/topic/waterways/documents/permitDocs/GPs/GP15.pdf)

   Meyers Valley Creek is not 303(d) listed for PHOSPHORUS, however it is listed as biologically impaired for an "unknown pollutant."
   If you can submit some additional monitoring using our WisCALM guidelines (http://dnr.wi.gov/water/wsSWIMSDocument.ashx?documentSeqNo=144407523), we might be able to justify qualification of Meyers Valley Creek for the habitat adjustment if there is a phosphorus impairment. Waters should be sampled monthly over a 6-month period from May through October, ideally within the same year. Each sample should be collected approximately 30 days apart, with no samples collected within 15 days of one another. If the lower confidence limit (LCL) of the phosphorus dataset from a particular stream site exceeds the applicable criterion, and those data were representative of normal weather and hydrology, then the corresponding stream segment is considered to be exceeding the TP criteria.
   The small unnamed tributary portion of the project (~800 ft) is not on the 303(d) list and will not be eligible for the habitat adjustment.
6. Trade Ratio = 2:1 (3:1) until we get evidence of phosphorus impairment and qualifying habitat projects.
7. Soil Analysis. Six samples were collected and analyzed for Total Leachable P. Is this a sufficient quantity and the proper analysis? The samples need to be representative. If the soil profile varies along the stream bank, soil samples will need to be collected at different depths and tested for Total P to obtain an accurate phosphorus profile.
8. Method for Quantifying Credits. The average bank height was used and an annual recession rate of 1 ft per year assumed. The formula in Appendix 5.1 shows a calculated 6,563 #P/tear. The reach is being divided into 6 segments and the calculations will be revised. Is the formula and this general method acceptable? We do not expect that the segmented calculations will result in a significantly different total mass. Please provide more detail as to how the (1 ft/yr) recession rate was determined. A map that displays the segment locations and documentation (site photos, county LCD communications, etc) supporting the assumptions will help. Each of the segments should have separate measurements on bank length and height and field notes should be included.
9. Agreement. A 3-party agreement is planned with the County being the broker, the landowners (Suchla's) the credit generator and the Arcadia Sewer Utility the credit user. The County will design and construct the project with Arcadia paying the costs. The County will earn the credits and transfer those to Arcadia. Is that the proper agreement? That should be acceptable.
10. Tracking. The landowners are responsible for regular inspections and the County will provide annual inspections. Failed sections will be repaired by the landowner. Is that acceptable? More detail will be needed, but that should be acceptable.

11. O&M. The O&M for the bank stabilization is described in section 13. Is this adequate? O&M needs to be consistent with NRCS technical standard 580. The points are adequate, however, #2 and #4 need to be more specific to accommodate 580. #2 and #4 indicate O&M activities will include debris removal from the channel, and that vegetation will be controlled around the cannel. There are situations when this can occur, but only when the vegetation or obstructions are threatening stream function. Invasive vegetation should be controlled, and channel obstructions deemed harmful may be removed. Here are excerpts from 580:

> "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"

12. Compare Target Mass to Available Credits. With the clarifier addition supporting a 0.8 mg/L effluent limit, the target mass is 2,983 #P/year at current flow. Is it acceptable to match this initial WQT to current flow and add WQT projects as future wastewater flow increases? Yes. Does DNR agree with this calculation? At a 2:1 Trade Ratio, this project will generate 3,282 #P/year Credits, 298 #P/year more than the Target Mass. The credit will need to be recalculated to account for the trapped phosphorus under "current conditions." Additional evidence of phosphorus impairment needs to be provided before a 2:1 Trade Ratio can be approved.
13. Timing. Arcadia's WPDES Permit expires on March 31, 2019, and the renewal application is due October 3, 2018. The goal is to have the project designed and permitted this summer with the work started in 2018 and completed in 2019. The plans and permits will be in place when the WPDES renewal is filed this fall but the construction will not be done. Is this OK? Construction is not required to be finished prior to approval. The practice needs to be in place by May 1, 2021. If these comments are addressed and a designed and permitted project for the WQT plan is approved, the new permit would have a 2 year compliance schedule to install the practice and generate credits.

Thanks for your help and guidance.
Mike

From: Davy, Michael
Sent: Monday, January 29, 2018 3:00 PM
To: Fassbender, Lori - DNR <Lori.Fassbender@wisconsin.gov>; 'Smith, Stephen J - DNR' <Stephen.Smith@wisconsin.gov>; 'Knutson, Jason R - DNR' <Jason.Knutson@wisconsin.gov>
Cc: Garbe, Amy M - DNR <Amy.Garbe@wisconsin.gov>; Nelson, Brice <bnelson@davyinc.com>; Bill Chang (cityadmin@cityofarcadiawi.com) <cityadmin@cityofarcadiawi.com>
Subject: RE: WQT Narrative for Arcadia to DNR

The attached report is intended to be the "Trading Plan" for Arcadia. The checklist and NOI are included. This will be used as the basis for developing the Trade Agreement between the City and Suchla's. The County may be a party as well; the goal is to have that ready by March
The intent is to comply with the 0.10 mg/L Phosphorus limit with the following steps:

1. Clarifier Addition to improve P removal to <0.80 mg/L (now at 1.0 mg/L).
2. Suchla Bank Stabilization to meet mass for current flow volumes (approval of 2:1 Trade Ratio necessary).
3. Future WQT project for the additional mass for future flow volumes.

We are looking forward to your comments. It's important to know that this approach is acceptable.
Mike

From: Smith, Stephen J - DNR [mailto:Stephen.Smith@wisconsin.gov]
Sent: Monday, January 29, 2018 9:47 AM
To: Davy, Michael <mfdavy@davyinc.com>
Cc: Fassbender, Lori - DNR <Lori.Fassbender@wisconsin.gov>; Garbe, Amy M - DNR <Amy.Garbe@wisconsin.gov>
Subject: FW: WQT Narrative for Arcadia to DNR

Mike; I am forwarding your message and attached water quality phosphorus trading report / proposal to Lori Fassbender (715-284-1458) in the DNR Eau Claire office.

At this time, the DNR field wastewater engineers in conjunction with Amy Garbe (262-574-2135, DNR Fitchburg office) are generally handling the initial reviews of the water quality P trading reports / proposals.

If any questions, feel free to contact me.

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Stephen J. Smith
Wastewater Section, Bureau of Water Quality – WQ/3
Wisconsin Department of Natural Resources
P.O. Box 7921
Madison, WI 53707-7921
Phone: (608) 266-7580
Fax: (608) 267-2800
stephen.smith@wisconsin.gov

dnr.wi.gov

From: Davy, Michael [mailto:mfdavy@davyinc.com]
Sent: Monday, January 29, 2018 1:15 PM
To: Smith, Stephen J - DNR
Subject: WQT Narrative for Arcadia to DNR

Who does the review of the Water Quality Trading Narrative Plans?
Mike

Sincerely,
Michael F. Davy, P.E.
Davy Engineering Co., Inc.
115 6th St S
La Crosse WI 54601
(608)782-3130
www.davyinc.com

APPENDIX 6-1B

STREAM WATER QUALITY DATA & ANALYSIS

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2018 MVC STREAM MONITORING
PHOSPHORUS AND SUSPENDED SOLIDS
ARCADIA, WI

Site 1 CTH J TP = Total Phosphorus as P
Site 2 Upstream Weir at "Sediment Basin"
Site 3 Downstream Weir City rain gauge at WWTP

Date	TP, mg/L			TSS, mg/L			Stream Depth, inches			Precipitation
Site	1	2	3	1	2	3	1	2	3	previous day (in)
May 2, 2018	1.360	1.120	0.066	448	530	104	27	27	15	1.1
May 30, 2018	0.516	0.472	0.157				31	26	18	-
June 5, 2018	0.264	0.303	0.114	70	97	6	27	21	16	-
June 18, 2018	1.590	1.550	0.881	680	637	169	31	26	30	0.5
July 5, 2018	0.548	0.641	0.625	171	186	71	39	19	19	1.8
July 13, 2018	0.660	0.587	0.285	104	105	21	39	20	18	1.0
August 28, 2018	0.850	0.950	0.680	112	149	39	38	31.5	28.5	1.8
September 12, 2018	0.182	0.186	0.142	33	33	6	38	28	19	-
September 27, 2018	0.156	0.153	0.130	18	27	5	30.5	25.5	19	-
October 12, 2018	0.192	0.188	0.172	23	31	6	35	27	21	-
Average	*0.632*	*0.615*	*0.325*	*184*	*199*	*47*				

Descriptive Statistics Summary (Site 1)

Mean	0.6318
Standard Error	0.159
Median	0.532
Mode	1.59
Standard Deviation	0.5027
Sample Variance	0.2527
Kurtosis	0.0156
Skewness	1.0282
Range	1.434
Minimum	0.156
Maximum	1.59
Sum	6.318
Count	10
Confidence Level(90%)	0.2914
Upper Confidence Limit	0.9232
Lower Confidence Limit	0.3404

This stream is an impaired stream. The lower 90% confidence level is greater than the threshold of 0.075 mg/L as specified in Table 14 of the Wisconsin 2018 Consolidated Assessment and Listing Methodology (WisCALM), pg. 48

APPENDIX 6-2

NRCS COMPANION DOCUMENT 580-15, EFH NOTICE 210-WI-122

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Stream Habitat Development

Introduction

One of the purposes of streambank protection is to improve and protect wildlife habitat and biodiversity. Although adding stream and stream corridor habitat is not a required component of a protection project, these practices come with multiple benefits to a number of species.

This guide will explore some of the common habitat development practices that have been successfully implemented by the NRCS in Wisconsin. It includes recommendations on where each particular practice should be installed to maximize utility, and also a discussion of the pros and cons of each technique. All corresponding WI Standard Drawings are also included.

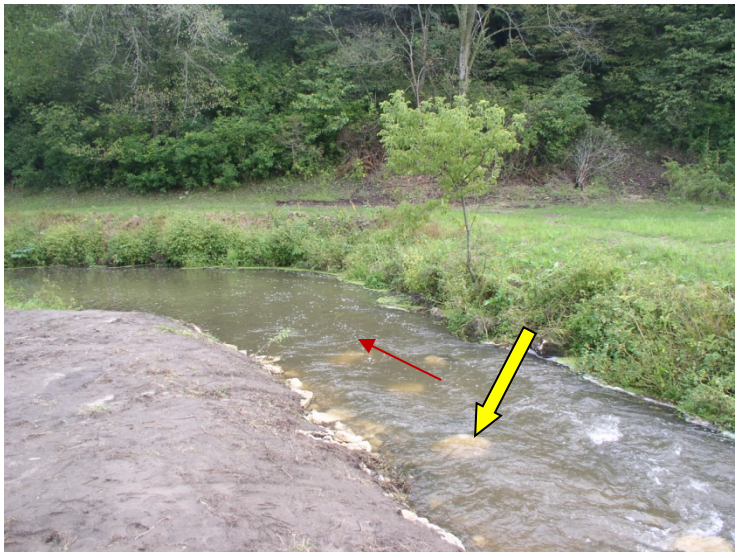
Knowledge of the fishery and fishery potential for a stream is essential when selecting the type of habitat development to install. The Field Office Technical Guide, Practice Standard 395 *Stream Habitat Improvement and Management* outlines criteria for installing habitat in streams. These plans require approval of the DNR fish manager. Be sure to review these criteria and coordinate with the DNR fish manager before beginning to plan habitat development.

There are many additional resources available on habitat development. The last page of this guide lists some them.

Table of Contents

Habitat Development Practices

Random Boulder Placement



Purpose:
Encourages additional scouring and provides micro habitat for several species.

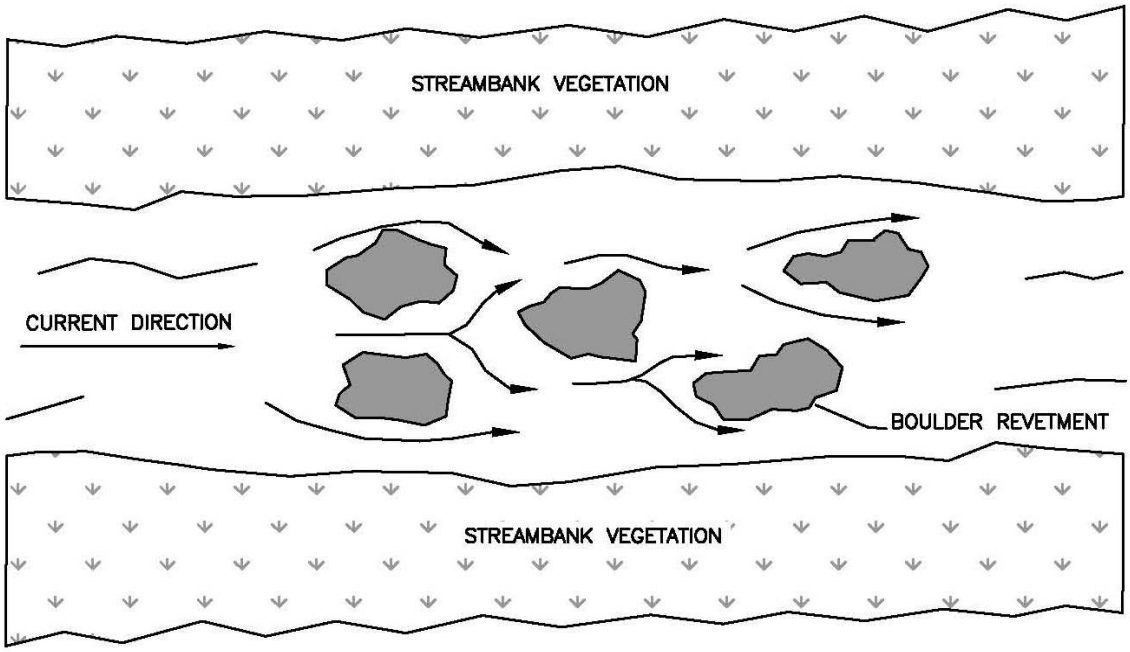
Location:
In runs and/or in existing scour holes.

Species:
The scouring and small overhangs primarily benefit trout but have the potential to benefit all fish species. If scouring down to native gravel beds is accomplished it can benefit all macro-invertebrates. If a shadow in the current creates deposition of fine sediments, it could be over-wintering habitat for turtles such as the Wood, Map and Blanding's. Also if placed so some boulders protrude from water during normal flows can be loafing and perching areas for birds.

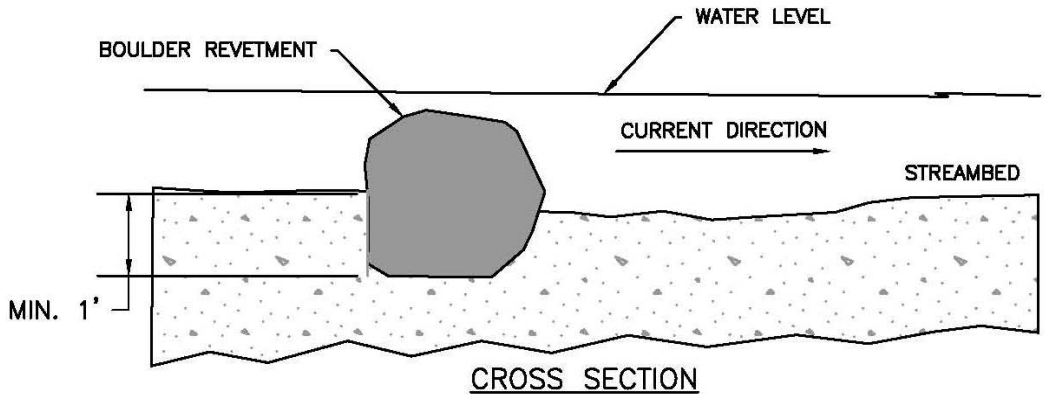
Caution:
Care needs to be taken in placement to ensure that currents are not deflected into stream banks, and also that the boulders will not catch flood debris which could cause stream bank erosion.

Pros	Cons
• Easy and inexpensive to install • Very versatile-can be installed in almost any setting • Potential to benefit many different species	• Only creates small amounts of habitat

See next page for Standard Drawing WI-937.



PLAN VIEW



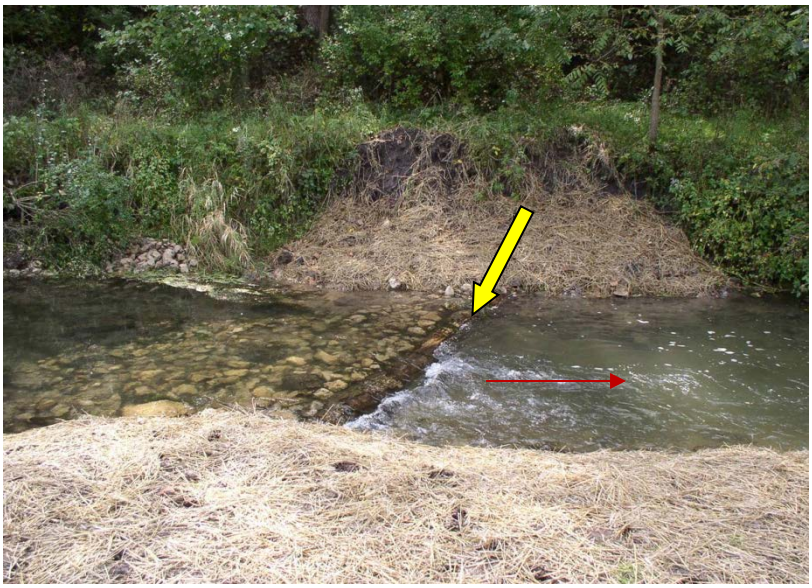
CROSS SECTION

- AVERAGE ROCK SIZE– 1.5'–3.5' DIA.–ROCK, SIZE IS SITE DEPENDENT.
- A MINIMUM OF ONE BOULDER PER SET OF BOULDER REVETMENTS SHOULD PROTRUDE FROM WATER SURFACE DURING TIMES OF ORDINARY FLOW TO ACT AS MID–STREAM PERCHING/LOAFING SITES.
- USE BOULDERS WITH IRREGULARITIES OR MULITPLE BOULDERS TOGETHER TO PROVIDE SLIGHT OVERHANGING COVER.
- PLACE BOULDER REVETMENT SO CURRENT WILL NOT BE DEFLECTED INTO UNPROTECTED STREAM BANKS.

NRCS Natural Resources Conservation Service United States Department of Agriculture	RANDOM BOULDER PLACEMENT CLIENT: _____ COUNTY: _____	Date Designed _____ Drawn _____ Checked _____ Approved _____	Drawing Name WI–937 Date 12/2010 Sheet of

Cross-Channel Logs

Purpose:
Creates and maintains pools (scour holes) to re-connect a stream's natural riffle pool sequence while providing habitat for several species. They can also be used to deflect water away from eroding banks or towards other stabilization structures.

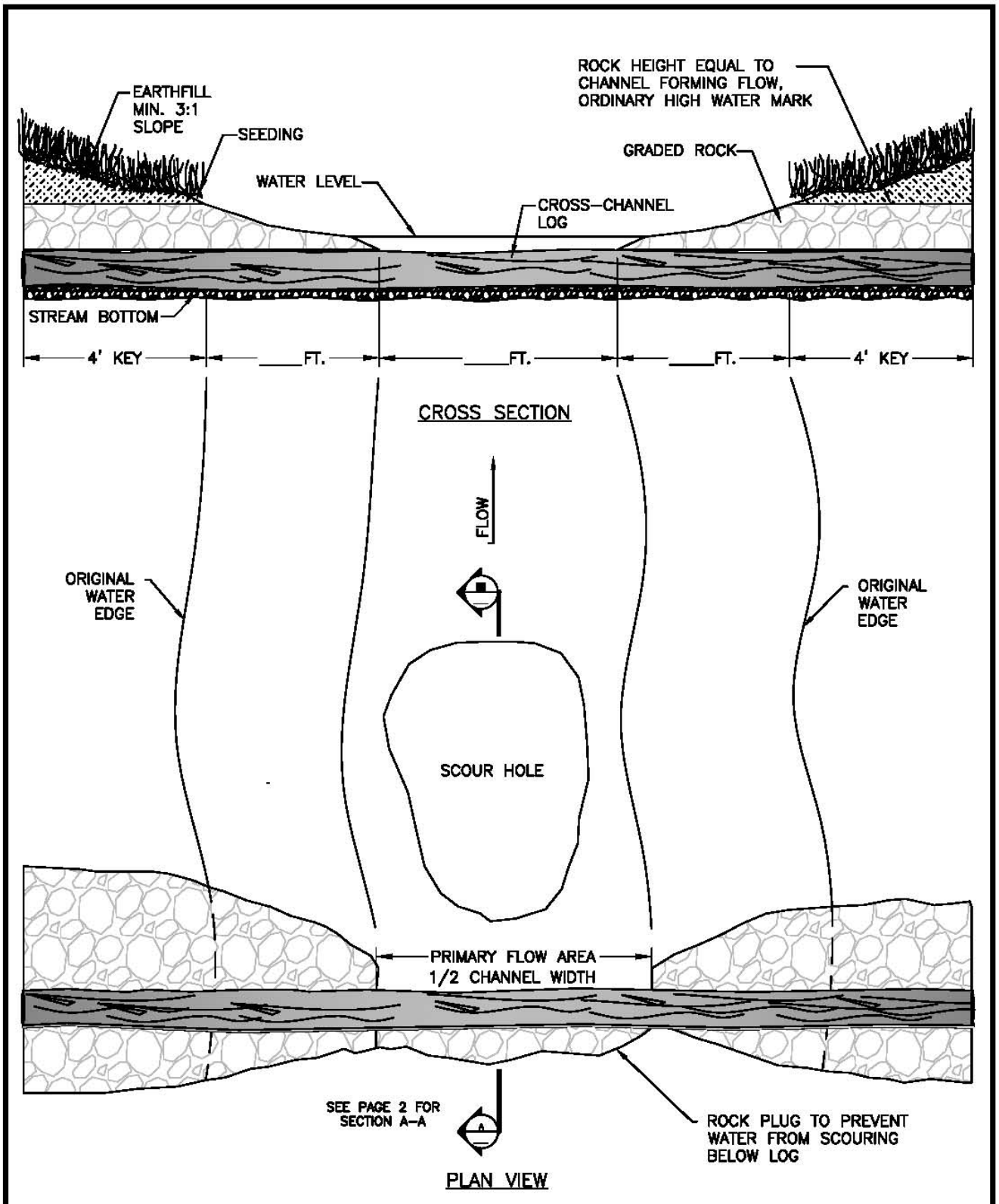


Location:
Primarily installed immediately downstream of riffle areas. They are occasionally used in slow runs to add variances in habitat.

Species:
The scour holes created benefit all fish species. When used in conjunction with other habitat structures, this practice can also benefit turtle and snake species.

Pros	Cons
• Multi-purpose • Can easily be used with other structures like escape logs and boulder retards • Potential to benefit many different species • Can use on site woody material – reduces cost	• Hauled in rock needed for proper installation – higher project costs • Exact placement of rock needs to be precise and can require additional labor and expertise • Does not maintain as large of a scour hold as a vortex weir

See next page for Standard Drawing WI-935.



NRCS
Natural Resources Conservation Service
United States Department of Agriculture

CROSS CHANNEL LOG

CLIENT: ----

COUNTY: ----

Designed ----- Date -----

Drawn

Checked

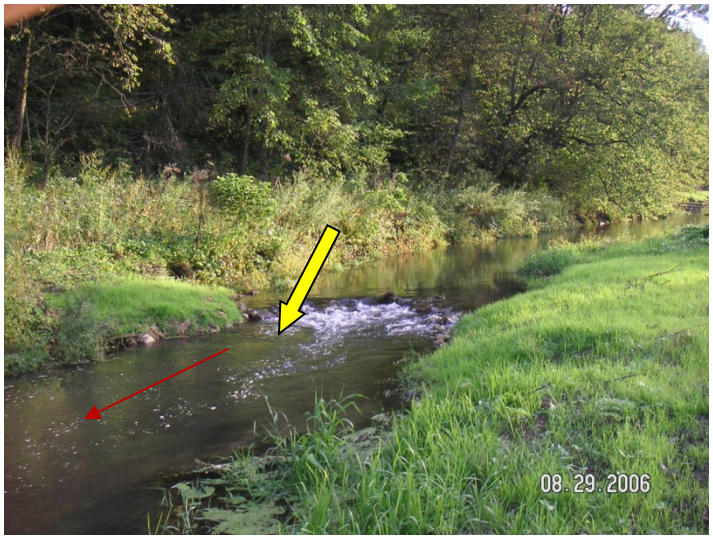
Approved

DWG Name/Date
WI-935/7-10

Page
1 of 2

Sheet XX of ----

Vortex Weir



Purpose:
Creates and maintains scour holes which serve as habitat for fish. They also re-connect a stream's natural riffle pool sequence.

Locations:
Primarily used immediately downstream of riffle areas. They can occasionally be used in slow runs to add variances in habitat.

Species:
All fish species are benefitted from the creation of the large scour hole. With the addition of other habitat development structures like escape logs or root wads, vortex weirs can also benefit turtle and amphibian species.

Pros

- Most effective practice for creating and maintaining scour holes
- Can easily be used with other structures like escape logs, root wads, or random boulder placements
- Potential to benefit many different species

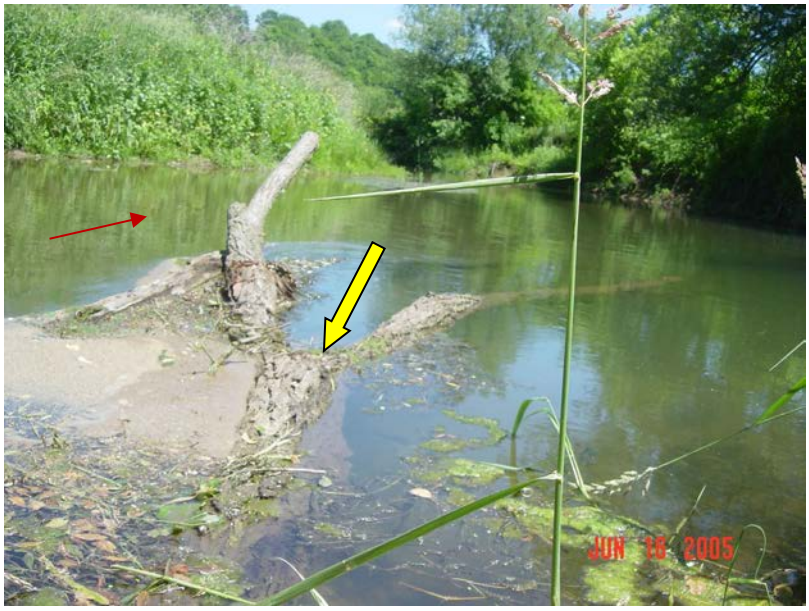
Cons

- Hauled in rock needed for proper installation – higher project costs
- Exact placement of rock needs to be precise and can require additional labor and expertise
- More difficult to install on narrow streams

See next page for Standard Drawing WI-932.

Escape Logs

Purpose:
Provide sunning areas for snakes, turtles and amphibians.



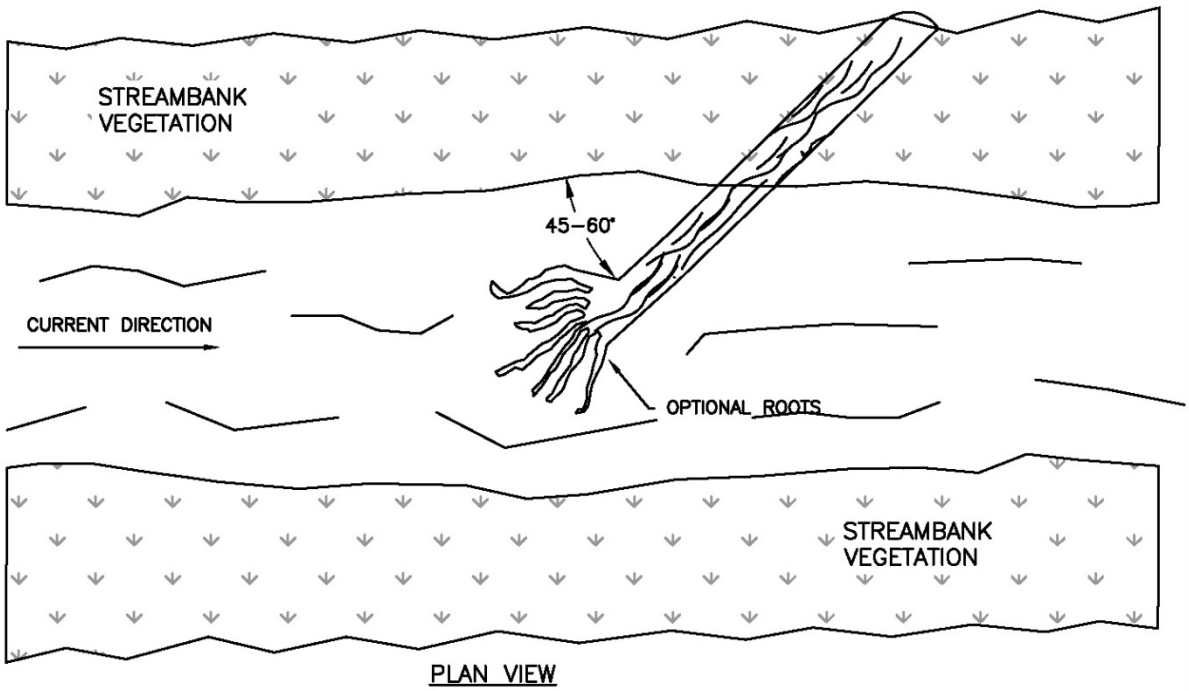
Location:
Installed in areas with deep, slow moving water.

Species:
All water dwelling snake, turtle and amphibian species benefitted. They can also serve as bird perches and provide minor overhead cover for fish.

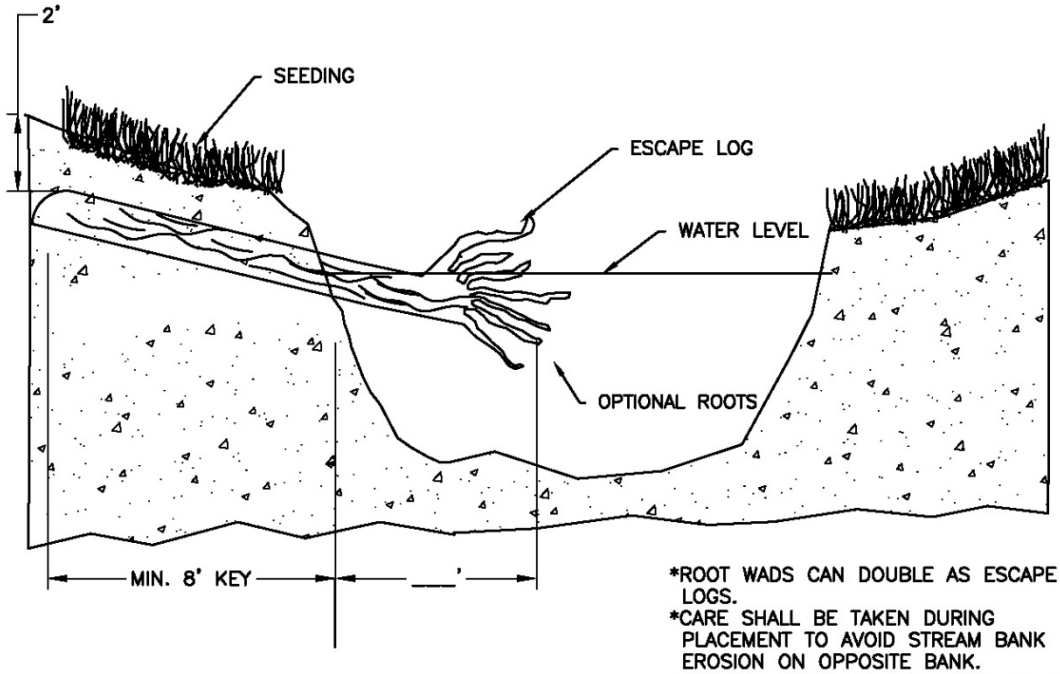
Caution:
Care needs to be taken in placement to ensure that currents are not deflected into stream banks.

Pros	Cons
• Potential to benefit many different species • Can use on site woody material – reduces cost	• Since logs are exposed to the atmosphere, they will not have as long of a lifetime as structures that are fully submerged

See next page for Standard Drawing WI-942.



PLAN VIEW



CROSS SECTION

*ROOT WADS CAN DOUBLE AS ESCAPE LOGS.
*CARE SHALL BE TAKEN DURING PLACEMENT TO AVOID STREAM BANK EROSION ON OPPOSITE BANK.
*THE LOG SHOULD EMERGE MIN. 3'–4' FROM EDGE OF STREAM BANK.
*ROOTS/LIMBS SHALL BE TRIMMED SO AS TO BE BELOW THE ORDINARY HIGH WATER MARK.

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

ESCAPE LOG

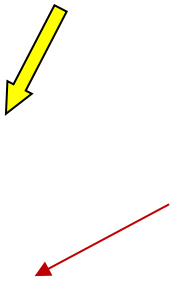
CLIENT: _____

COUNTY: _____

	Date	Drawing Name
Designed		WI–942
Drawn		Date 11/2013
Checked		
Approved		Sheet of

Log Deflectors

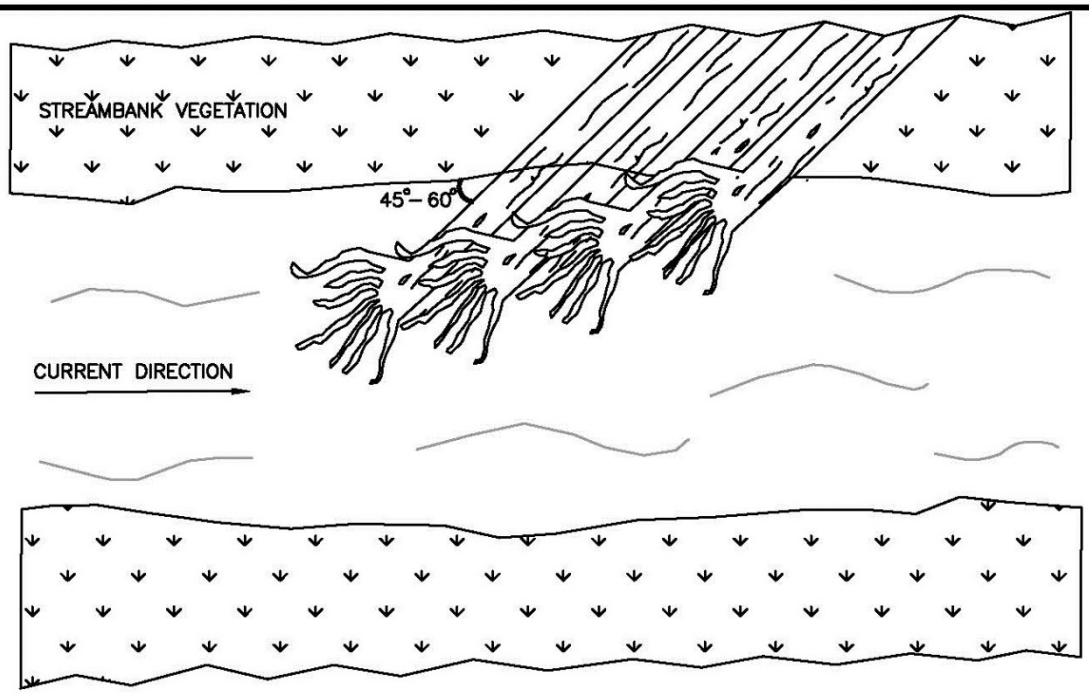
Purpose and Location:
Log deflectors have many functions depending on their location.
They are most commonly placed on eroding stream banks to guide the water away from the affected area. In long, wide stagnant runs they can narrow the stream and recreate some meander. In all settings given enough time, they encourage the development of a mudflat downstream of the structure.



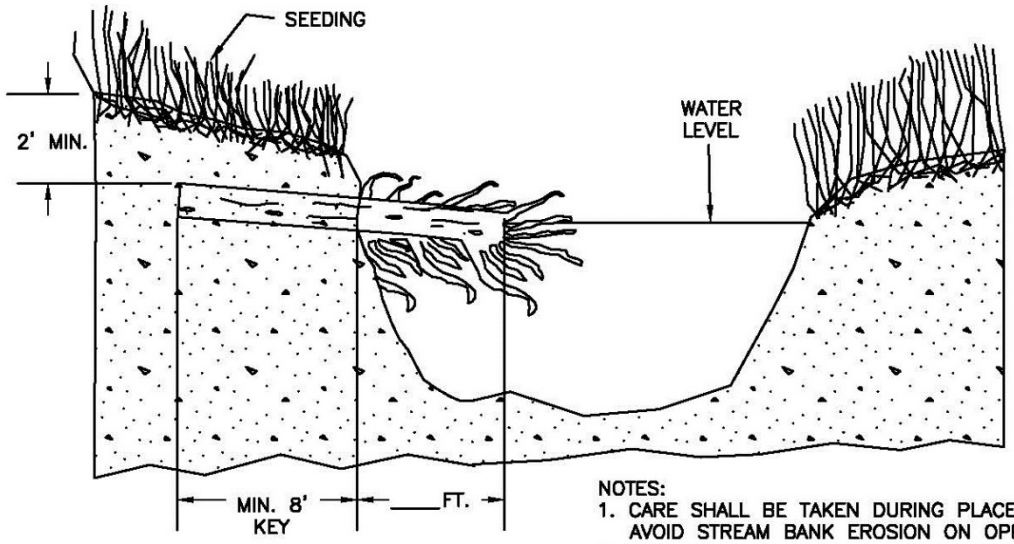
Species:
Root wads on the logs can serve as cover for reptile, amphibian, and fish species or as a perching area for birds. The mudflat that develops downstream can be utilized by amphibians and turtles as a basking area, as well as a feeding ground for shore birds.

Pros	Cons
• Multi-purpose • Can be used in many different areas • Potential to benefit many different species • Can use on site woody material – reduces cost	• More difficult to install – requires expertise from the equipment operator • Effectiveness of this technique could vary between streams and from flood event to flood event • Since portions of the logs are exposed to the atmosphere, they will not have as long of a lifetime as structures that are fully submerged

See next page for Standard Drawing WI-934.



PLAN



CROSS SECTION

NOTES:
1. CARE SHALL BE TAKEN DURING PLACEMENT TO AVOID STREAM BANK EROSION ON OPPOSITE BANK.
2. ROOT WADS MUST BE PRESENT ON EACH LOG.
3. THE LOG DEFLECTOR SHALL CONSIST OF THREE LOGS AT A MIN 24" DBH OR FIVE LOGS OF APPROX. 16" DBH.
4. THE MAJORITY OF THE LOG SHALL BE SUBMERGED WITH APPROX. 15% OF THE LOG EMERGED. CARE SHALL BE TAKEN TO KEEP THE LOG BELOW THE OHWM.

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

LOG DEFLECTOR

CLIENT: _____

COUNTY: _____

	Date	Drawing Name
Designed		WI-934
Drawn		Date
Checked		11/13
Approved		Sheet of

Rock Deflectors

Purpose and Location:
Rock deflectors have many functions depending on their location.
They are most commonly placed on eroding stream banks to guide the water away from the affected area. In long, wide stagnant runs they can narrow the stream and recreate some meander. In all settings with time, they encourage the development of a mudflat downstream of the structure. They are also used often to redirect current into another habitat structure, such as a set of lunker structures.

Species:
The mudflat that develops downstream can be utilized by amphibians and turtles as a basking area, as well as a feeding ground for shore birds.

Pros	Cons
• Multi-purpose • Immediate, permanent solution to erosion problems • Can be used in many different areas • Potential to benefit many different species • Natural in appearance after establishment of vegetation	• More difficult to install – requires expertise from the equipment operator • More expensive since they can require large quantities of rock • Improper placement can cause serious erosion to banks on opposite side of the stream

See next page for Standard Drawing WI-933.

Root Wads

Purpose:
Provide additional micro-habitat and cover for several species. They can also serve as escape logs and sunning areas.

Location:
Placed in deep scour holes, and often used in conjunction with other structures like vortex weirs or cross channel logs.

Species:
Provides overhead cover and micro-habitat for fish, amphibians, and reptiles.

Pros	Cons
• Can be used in along with other habitat structures • Potential to benefit many different species • Can use on site woody material – reduces cost	• If improving public recreation (fishing) is the purpose of the project, a root wad decreases the fishability of the scour hole

See next page for Standard Drawing WI-936.

Snake Hibernaculum

Purpose:
Provides a unique habitat for snake species that require a high humidity or saturated over-wintering area with temperatures above freezing.

Location:
Placed outside of the primary floodplain in an area that will provide 2'-3' of ordinary summer water table at the bottom of the trench with a minimum of 5' of soil cover from the top of the ordinary summer water table to the soil surface to provide necessary temperature buffering. The entrance should be placed with a southerly or westerly exposure. Also, if site conditions allow, a snake hibernaculum could be incorporated in the beginning or end section of Rip-Rap. Only one hibernaculum needed per roughly 1-2 mile segment of stream.

Species:
Snake species such as Milk, Garter and Western Fox snakes with the unique over-wintering needs mentioned above.

Caution:
Proper trench safety construction protocol should always be followed.

Pros	Cons
• Provides a unique habitat for snake species that would not normally be accommodated	• Requires a large amount of rock – increased project cost

See next page for Standard Drawing WI-941.

Turtle Hibernaculum

Purpose:
When stream bank stabilization practices occur such shaping and rip-rapping, turtle habitat is destroyed. Installing these lunkers provides an alternative habitat location for snapping turtles to over-winter.

Location:
These lunkers should be installed within a reasonable distance from bank stabilization projects and should be positioned in the shadow of the current. Best results are achieved if the lunker is installed adjacent to a structure that deflects flow (such as a rock deflector) and creates a back eddy to promote sedimentation.

Species:
The snapping turtle will be the primary species of benefit since they over-winter in tall eroding stream corners.

Special Notes:
- The hibernaculum should have no rock behind them
- A dredged hole should be dug in front of the lunker to serve as a sediment trap to catch fine sediments – this is where the turtles will burrow down to over-winter
- Care needs to be taken to ensure that no stream current will prevent sedimentation from occurring

Pros	Cons
• Provides a unique over-wintering habitat for snapping turtles • Contractors familiar with stream habitat restoration should be able to complete these project fairly easily	• This is a new practice, therefore there is no research to confirm the effectiveness of the technique

See next page for Standard Drawing WI-940.

Trout Lunker & Mini-Trout Lunker

Purpose:
To provide a unique habitat for trout.

Location:
Primarily placed on eroding stream corners while stream bank stabilization techniques such as shaping and rip-rap are being performed, but can be placed in any location where stream flow will pass through the lunker keeping them clean of sediment deposition.

Species:
Primarily Brown Trout, but will also be utilized by Brook Trout.

Pros	Cons
• Very effective habitat development technique – they have proven to increase the holding capacity for trout in a proper stream	• Favors Brown Trout over other fish species • Relatively expensive to install

See next pages for Standard Drawings WI-930 and WI-930A.

Brush Bundle

Purpose:
Induces sedimentation to allow the stream to constrict itself naturally. Adds woody material to the stream which serves as cover for many species.

Location:
In sections of stream in the shadow of the current, such as behind point bars or deflector structures.

Species:
Benefits reptile and amphibian species by adding cover.

Pros	Cons
• Can use on-site woody material – reduced cost • Relatively easy to install • Potential to benefit several species	• There have not been enough of these structures installed to determine the overall effectiveness – it is possible that there would be a minimal effect on sedimentation.

Other Resources

Glossary of Wisconsin Trout Habitat Development Techniques by Robert L. Hunt, illustrations by Ruth King, has been published by the Wisconsin Department of Natural Resources, 1987.

Unit Construction Of Trout Habitat Improvement Structures For Wisconsin Coulee Streams by David M. Vetrano, Administrative Report No. 27, 1988.

Driftless Riparian Habitat Guide prepared by Jeff Hastings with Trout Unlimited. Report No. 060109, 2009.

APPENDIX 6-2A

HIS WORKSHEETS

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Stream Habitat Suitability Index

Preface:

Use of the Stream Habitat Suitability Index (HSI) is required when contracting any Stream Restoration (NRCS Standard 395) activities. The Stream HSI is the approved State Office tool to determine whether a resource concern for "Inadequate Habitat for Fish and Wildlife" is present. The HSI has 4 elements each of which has a score from 0 to 1.0. A score will be tabulated for both the existing condition habitat condition and the planned condition. Calculating the planned condition will require the reviewer to have a working knowledge of stream restoration activities. The total score of each element is added together and divided by the number of elements to provide an HSI score. To verify a resource concern is present the existing score must be less than .5 and the planned score must be equal to or greater than .5 to document that installation of conservation practices will meet quality criteria.

Length of Stream to be assessed:

For the purposes of this HSI the minimum distance of stream to be assessed shall be twelve times the bank full width. The stream stretch to be assessed shall be representative of the entire length of the stream to be restored. If a representative area is difficult to decipher then multiple assessments may be performed and averaged as a final score.

Participant _Arcadia Utility Commission – Meyers Valley Creek Stream Restoration Project

Date _9/18/18___ Tract Section 1, Sample 1 91°29'36.456"W, 44°13'24.78"N Field No(s). _____

Bank Full Width __7 ft (average of multiple measurements)__

Stream Assessment Length __1,000 ft_____

STREAM HABITAT INDEX		EXISTING	PLANNED
1. Average % of rooted vegetation and rocky ground cover along the outside bends of the stream bank (water level to ordinary high water mark) during summer:			
<25	.25	_.25_	_____
25-50%	.5	_____	_____
51-75%	.75	_____	_____
>75%	1	_____	_.75__

2. Pool Assessment for low gradient streams (<2 %):

Pools absent, but some slow water habitat available, no cover discernible or reach is dominated by shallow continuous pools or slow water.	0.1	0.1	
Pools present but shallow (<2 x maximum depth of the upstream riffle. Only 10-30% of pool bottoms are obscured due to depth or wood cover.	0.4		0.4
1 or 2 deep pools separated by riffles, each with > than 30% of the pool bottom obscured. At least One shallow pool present.	0.7		
More than two deep pools separated by riffles, each with > 30% of the bottom obscured by depth, wood or other cover. Shallow pools present.	1.0		

3. Riffle to Riffle ratio (distance between riffles divided by the bankfull width):

*A complete riffle-pool-run segment constitutes the actual riffle to riffle distance measured

>25 times bankfull width	0		
20-25 times bankfull width	.25		
15-20 times bankfull width	.50	.50	
10-15 times bankfull width	.75		.75
<10 times bankfull width	1		

4. Habitat Features* within assessment reach (12 x bankful width)

Number of structures present (10 max)	EXISTING_4___ x 0.1	0.4	
	PLANNED_5___ x 0.1		.5

*habitat features include: Large logs, small wood accumulations, overhanging vegetation, large boulders, small boulder clusters, undercut banks, thick root mats, off-channel habitats, other non-game habitat.

See reference on page 4 or National Biology Handbook (SVAP) Subpart B, Part 614 element 12 for habitat feature definitions.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

TOTAL	EXISTING	PLANNED
(A) TOTAL HABITAT POINTS (MAX 4 points.)	_1.25_	_2.4__
(B) HABITAT INDEX/POTENTIAL (A/4)	_.3125_	_0.6__

Eligibility:

1) If (B) existing habitat is = or >.50 there is not an eligible resource concern

2) If (B) existing habitat is less than .5 then a resource concern exists and planned habitat must be .5 or > (compliance with national quality criteria)

NRCS, Wisconsin, June 2016

References

National Biology Handbook (SVAP) Subpart B, Part 614, Elements 10,12,13

http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

U.S. Fish and Wildlife Service Habitat Suitability Index Models: Brook and Brown Trout, September 1986

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Length of Stream to be assessed:

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Participant _Arcadia Utility Commission – Meyers Valley Creek Stream Restoration Project

Date _9/18/18___ Tract Section 2, Sample 2 91°29'42.828"W, 44°13'30.72"N Field No(s). _____

Bank Full Width __8 ft (average of multiple measurements)__

Stream Assessment Length __1,000 ft_____

STREAM HABITAT INDEX		EXISTING	PLANNED
1. Average % of rooted vegetation and rocky ground cover along the outside bends of the stream bank (water level to ordinary high water mark) during summer:			
<25	.25	_.25_	_____
25-50%	.5	_____	_____
51-75%	.75	_____	_____
>75%	1	_____	_.75__

2. Pool Assessment for low gradient streams (<2 %):

Pools absent, but some slow water habitat available, no cover discernible or reach is dominated by shallow continuous pools or slow water.	0.1	0.1	
Pools present but shallow (<2 x maximum depth of the upstream riffle. Only 10-30% of pool bottoms are obscured due to depth or wood cover.	0.4		
1 or 2 deep pools separated by riffles, each with > than 30% of the pool bottom obscured. At least One shallow pool present.	0.7		0.7
More than two deep pools separated by riffles, each with > 30% of the bottom obscured by depth, wood or other cover. Shallow pools present.	1.0		

3. Riffle to Riffle ratio (distance between riffles divided by the bankfull width):

*A complete riffle-pool-run segment constitutes the actual riffle to riffle distance measured

>25 times bankfull width	0		
20-25 times bankfull width	.25	.25	
15-20 times bankfull width	.50		.50
10-15 times bankfull width	.75		
<10 times bankfull width	1		

4. Habitat Features* within assessment reach (12 x bankful width)

Number of structures present (10 max)	EXISTING_2___ x 0.1	0.2	
	PLANNED_4___ x 0.1		0.4

*habitat features include: Large logs, small wood accumulations, overhanging vegetation, large boulders, small boulder clusters, undercut banks, thick root mats, off-channel habitats, other non-game habitat.

See reference on page 4 or National Biology Handbook (SVAP) Subpart B, Part 614 element 12 for habitat feature definitions.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

TOTAL	EXISTING	PLANNED
(A) TOTAL HABITAT POINTS (MAX 4 points.)	_0.8__	_2.35__
(B) HABITAT INDEX/POTENTIAL (A/4)	_0.2__	_.5875_

Eligibility:

1) If (B) existing habitat is = or >.50 there is not an eligible resource concern

2) If (B) existing habitat is less than .5 then a resource concern exists and planned habitat must be .5 or > (compliance with national quality criteria)

NRCS, Wisconsin, June 2016

References

National Biology Handbook (SVAP) Subpart B, Part 614, Elements 10,12,13

http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

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Length of Stream to be assessed:

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Participant _Arcadia Utility Commission – Meyers Valley Creek Stream Restoration Project

Date _9/18/18___ Tract Section 3, Sample 3 91°29'45.816"W, 44°13'36.732"N Field No(s). _____

Bank Full Width __12 ft (average of multiple measurements)__

Stream Assessment Length __1,000 ft_____

STREAM HABITAT INDEX		EXISTING	PLANNED
1. Average % of rooted vegetation and rocky ground cover along the outside bends of the stream bank (water level to ordinary high water mark) during summer:			
<25	.25	_.25_	_____
25-50%	.5	_____	_____
51-75%	.75	_____	_____
>75%	1	_____	_.75__

2. Pool Assessment for low gradient streams (<2 %):

Pools absent, but some slow water habitat available, no cover discernible or reach is dominated by shallow continuous pools or slow water.	0.1	0.1	
Pools present but shallow (<2 x maximum depth of the upstream riffle. Only 10-30% of pool bottoms are obscured due to depth or wood cover.	0.4		
1 or 2 deep pools separated by riffles, each with > than 30% of the pool bottom obscured. At least One shallow pool present.	0.7		0.7
More than two deep pools separated by riffles, each with > 30% of the bottom obscured by depth, wood or other cover. Shallow pools present.	1.0		

3. Riffle to Riffle ratio (distance between riffles divided by the bankfull width):

*A complete riffle-pool-run segment constitutes the actual riffle to riffle distance measured

>25 times bankfull width	0		
20-25 times bankfull width	.25		
15-20 times bankfull width	.50		
10-15 times bankfull width	.75	.75	.75
<10 times bankfull width	1		

4. Habitat Features* within assessment reach (12 x bankful width)

Number of structures present (10 max)	EXISTING 2 x 0.1	0.2	
	PLANNED 5 x 0.1		0.5

*habitat features include: Large logs, small wood accumulations, overhanging vegetation, large boulders, small boulder clusters, undercut banks, thick root mats, off-channel habitats, other non-game habitat.

See reference on page 4 or National Biology Handbook (SVAP) Subpart B, Part 614 element 12 for habitat feature definitions.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

TOTAL	EXISTING	PLANNED
(A) TOTAL HABITAT POINTS (MAX 4 points.)	_1.3__	_2.7_
(B) HABITAT INDEX/POTENTIAL (A/4)	_.325__	_.675__

Eligibility:

1) If (B) existing habitat is = or >.50 there is not an eligible resource concern

2) If (B) existing habitat is less than .5 then a resource concern exists and planned habitat must be .5 or > (compliance with national quality criteria)

NRCS, Wisconsin, June 2016

References

National Biology Handbook (SVAP) Subpart B, Part 614, Elements 10,12,13

http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

U.S. Fish and Wildlife Service Habitat Suitability Index Models: Brook and Brown Trout, September 1986

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Length of Stream to be assessed:

For the purposes of this HSI the minimum distance of stream to be assessed shall be twelve times the bank full width. The stream stretch to be assessed shall be representative of the entire length of the stream to be restored. If a representative area is difficult to decipher then multiple assessments may be performed and averaged as a final score.

Participant _Arcadia Utility Commission – Meyers Valley Creek Stream Restoration Project

Date _9/18/18___ Tract Section 4, Sample 4 91°29'51.684"W, 44°13'42.96"N Field No(s). _____

Bank Full Width __12 ft (average of multiple measurements)__

Stream Assessment Length __1,000 ft_____

STREAM HABITAT INDEX		EXISTING	PLANNED
1. Average % of rooted vegetation and rocky ground cover along the outside bends of the stream bank (water level to ordinary high water mark) during summer:			
<25	.25	_.25_	_____
25-50%	.5	_____	_____
51-75%	.75	_____	_____
>75%	1	_____	_.75__

2. Pool Assessment for low gradient streams (<2 %):

Pools absent, but some slow water habitat available, no cover discernible or reach is dominated by shallow continuous pools or slow water.	0.1	0.1	
Pools present but shallow (<2 x maximum depth of the upstream riffle. Only 10-30% of pool bottoms are obscured due to depth or wood cover.	0.4		
1 or 2 deep pools separated by riffles, each with > than 30% of the pool bottom obscured. At least One shallow pool present.	0.7		0.7
More than two deep pools separated by riffles, each with > 30% of the bottom obscured by depth, wood or other cover. Shallow pools present.	1.0		

3. Riffle to Riffle ratio (distance between riffles divided by the bankfull width):

*A complete riffle-pool-run segment constitutes the actual riffle to riffle distance measured

>25 times bankfull width	0		
20-25 times bankfull width	.25		
15-20 times bankfull width	.50	.50	
10-15 times bankfull width	.75		.75
<10 times bankfull width	1		

4. Habitat Features* within assessment reach (12 x bankful width)

Number of structures present (10 max)	EXISTING_3___ x 0.1	0.3	
	PLANNED_4___ x 0.1		0.4

*habitat features include: Large logs, small wood accumulations, overhanging vegetation, large boulders, small boulder clusters, undercut banks, thick root mats, off-channel habitats, other non-game habitat.

See reference on page 4 or National Biology Handbook (SVAP) Subpart B, Part 614 element 12 for habitat feature definitions.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

TOTAL	EXISTING	PLANNED
(A) TOTAL HABITAT POINTS (MAX 4 points.)	_1.15_	_2.6__
(B) HABITAT INDEX/POTENTIAL (A/4)	_.2875_	_.65__

Eligibility:

1) If (B) existing habitat is = or >.50 there is not an eligible resource concern

2) If (B) existing habitat is less than .5 then a resource concern exists and planned habitat must be .5 or > (compliance with national quality criteria)

NRCS, Wisconsin, June 2016

References

National Biology Handbook (SVAP) Subpart B, Part 614, Elements 10,12,13

http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

U.S. Fish and Wildlife Service Habitat Suitability Index Models: Brook and Brown Trout, September 1986

Stream Habitat Suitability Index

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Length of Stream to be assessed:

For the purposes of this HSI the minimum distance of stream to be assessed shall be twelve times the bank full width. The stream stretch to be assessed shall be representative of the entire length of the stream to be restored. If a representative area is difficult to decipher then multiple assessments may be performed and averaged as a final score.

Participant _Arcadia Utility Commission – Meyers Valley Creek Stream Restoration Project

Date _9/26/18___ Tract Section 5, Sample 5 91°29'48.84"W, 44°13'51.42"N Field No(s). _____

Bank Full Width __18 ft (average of multiple measurements)__

Stream Assessment Length __1,000 ft_____

STREAM HABITAT INDEX		EXISTING	PLANNED
1. Average % of rooted vegetation and rocky ground cover along the outside bends of the stream bank (water level to ordinary high water mark) during summer:			
<25	.25	____	_____
25-50%	.5	__.5__	_____
51-75%	.75	_____	_____
>75%	1	_____	_.75__

2. Pool Assessment for low gradient streams (<2 %):

Pools absent, but some slow water habitat available, no cover discernible or reach is dominated by shallow continuous pools or slow water.	0.1	____	_____
Pools present but shallow (<2 x maximum depth of the upstream riffle. Only 10-30% of pool bottoms are obscured due to depth or wood cover.	0.4	__.4__	_____
1 or 2 deep pools separated by riffles, each with > than 30% of the pool bottom obscured. At least One shallow pool present.	0.7	_____	_0.7
More than two deep pools separated by riffles, each with > 30% of the bottom obscured by depth, wood or other cover. Shallow pools present.	1.0	_____	_____

3. Riffle to Riffle ratio (distance between riffles divided by the bankfull width):

*A complete riffle-pool-run segment constitutes the actual riffle to riffle distance measured

>25 times bankfull width	0	_____	_____
20-25 times bankfull width	.25	_____	_____
15-20 times bankfull width	.50	_.5 _	_____
10-15 times bankfull width	.75	_____	__.75_
<10 times bankfull width	1	_____	_____

4. Habitat Features* within assessment reach (12 x bankful width)

Number of structures present (10 max)	EXISTING_4___ x 0.1	_0.4_	
	PLANNED_5___ x 0.1		_0.5__

*habitat features include: Large logs, small wood accumulations, overhanging vegetation, large boulders, small boulder clusters, undercut banks, thick root mats, off-channel habitats, other non-game habitat.

See reference on page 4 or National Biology Handbook (SVAP) Subpart B, Part 614 element 12 for habitat feature definitions.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

TOTAL	EXISTING	PLANNED
(A) TOTAL HABITAT POINTS (MAX 4 points.)	1.8	2.7
(B) HABITAT INDEX/POTENTIAL (A/4)	.45	.675

Eligibility:

1) If (B) existing habitat is = or >.50 there is not an eligible resource concern

2) If (B) existing habitat is less than .5 then a resource concern exists and planned habitat must be .5 or > (compliance with national quality criteria)

NRCS, Wisconsin, June 2016

References

National Biology Handbook (SVAP) Subpart B, Part 614, Elements 10,12,13

http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

U.S. Fish and Wildlife Service Habitat Suitability Index Models: Brook and Brown Trout, September 1986

Stream Habitat Suitability Index

Preface:

Use of the Stream Habitat Suitability Index (HSI) is required when contracting any Stream Restoration (NRCS Standard 395) activities. The Stream HSI is the approved State Office tool to determine whether a resource concern for "Inadequate Habitat for Fish and Wildlife" is present. The HSI has 4 elements each of which has a score from 0 to 1.0. A score will be tabulated for both the existing condition habitat condition and the planned condition. Calculating the planned condition will require the reviewer to have a working knowledge of stream restoration activities. The total score of each element is added together and divided by the number of elements to provide an HSI score. To verify a resource concern is present the existing score must be less than .5 and the planned score must be equal to or greater than .5 to document that installation of conservation practices will meet quality criteria.

Length of Stream to be assessed:

For the purposes of this HSI the minimum distance of stream to be assessed shall be twelve times the bank full width. The stream stretch to be assessed shall be representative of the entire length of the stream to be restored. If a representative area is difficult to decipher then multiple assessments may be performed and averaged as a final score.

Participant _Arcadia Utility Commission – Meyers Valley Creek Stream Restoration Project

Date _9/26/18___ Tract Section 6, Sample 6 91°30'1.044"W, 44°13'54.372"N Field No(s). _____

Bank Full Width 3 ft (average of multiple measurements)

Stream Assessment Length 1,000 ft

STREAM HABITAT INDEX		EXISTING	PLANNED
1. Average % of rooted vegetation and rocky ground cover along the outside bends of the stream bank (water level to ordinary high water mark) during summer:			
<25	.25	.25	_____
25-50%	.5	_____	_____
51-75%	.75	_____	_____
>75%	1	_____	.75

2. Pool Assessment for low gradient streams (<2 %):

Pools absent, but some slow water habitat available, no cover discernible or reach is dominated by shallow continuous pools or slow water.	0.1	0.1	0.1
Pools present but shallow (<2 x maximum depth of the upstream riffle. Only 10-30% of pool bottoms are obscured due to depth or wood cover.	0.4	_____	_____
1 or 2 deep pools separated by riffles, each with > than 30% of the pool bottom obscured. At least One shallow pool present.	0.7	_____	_____
More than two deep pools separated by riffles, each with > 30% of the bottom obscured by depth, wood or other cover. Shallow pools present.	1.0	_____	_____

3. Riffle to Riffle ratio (distance between riffles divided by the bankfull width):

*A complete riffle-pool-run segment constitutes the actual riffle to riffle distance measured

>25 times bankfull width	0	0	_____
20-25 times bankfull width	.25	_____	.25
15-20 times bankfull width	.50	_____	_____
10-15 times bankfull width	.75	_____	_____
<10 times bankfull width	1	_____	_____

4. Habitat Features* within assessment reach (12 x bankful width)

Number of structures present (10 max)	EXISTING 0 x 0.1	0	
	PLANNED 2 x 0.1		0.2

*habitat features include: Large logs, small wood accumulations, overhanging vegetation, large boulders, small boulder clusters, undercut banks, thick root mats, off-channel habitats, other non-game habitat.

See reference on page 4 or National Biology Handbook (SVAP) Subpart B, Part 614 element 12 for habitat feature definitions.
http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

TOTAL	EXISTING	PLANNED
(A) TOTAL HABITAT POINTS (MAX 4 points.)	.35	1.3
(B) HABITAT INDEX/POTENTIAL (A/4)	.0875	0.325

Eligibility:

1) If (B) existing habitat is = or >.50 there is not an eligible resource concern

2) If (B) existing habitat is less than .5 then a resource concern exists and planned habitat must be .5 or > (compliance with national quality criteria)

NRCS, Wisconsin, June 2016

References

National Biology Handbook (SVAP) Subpart B, Part 614, Elements 10,12,13

http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/ecoscience/bio/

U.S. Fish and Wildlife Service Habitat Suitability Index Models: Brook and Brown Trout, September 1986

APPENDIX 8-1

WATER QUALITY TRADE AGREEMENT
DATED JUNE 2018

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City of Arcadia
203 W. Main Street
Arcadia, WI 54612
608-323-3359
www.cityofarcadiawi.com

June 6, 2018

Trempealeau County
Department of Land Management
P O Box 67
Whitehall, WI 54773-0067

Dear Kirstie Heidenreich:

Enclosed is the signed copy of the Water Quality Trading Agreement with Trempealeau County, City of Arcadia Utility Commission and Suchla Farms LLC that was contingently approved at the Utility Commission meeting on June 6, 2018. Please proceed with design but do not incur any costs for construction until obtaining confirmation from Arcadia. We need DNR's approval of the Phosphorus credits before we commit to paying for the project. Please contact Bill Chang at City Hall if you have further questions.

The Utility Commission motion made was as follows:

Motion by Gary Bautch, seconded by James Wozney, to approve the Water Quality Trading Agreement: Trempealeau County, City of Arcadia Utility Commission and Suchla Farms LLC, contingent upon the Utility Commission confirming their funding before construction begins.

Regards,

Angela Berg
Clerk-Treasurer

Enclosure

Water Quality Trading Agreement: City of Arcadia Utility Commission and Suchla Farms LLC

Permittee Information

Credit User Name (Permittee)	Permit Number
City of Arcadia Utility Commission	WI-0023230-09-0

Credit User Address: 203 W. Main St., Arcadia, WI 54612

Broker Name	Trade Agreement Number
Trempealeau County Dept. of Land Management	

Broker Address

Street Address	City	State	ZIP Code
36245 Main St.	Whitehall	WI	54773

Project Name: Suchla-Myers Valley Creek Bank Stabilization

Name of Credit Generator (Landowner/Operator) (Last, First, M.I.): Suchla Farms LLC, Attn: Kerry Suchla

Street Address	City	State	ZIP Code
N26991 MYERS VALLEY RD	Arcadia	WI	54612

Property Information

Name of Landowner(s) (if not Operator) (Last, First, M.I.): Suchla, Duane and Renee

Street Address	City	State	ZIP Code
N26892 COUNTY RD J	Arcadia	WI	54612

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

All land located within the Northeast quarter of Section 07 and Southeast quarter of Section 06, all within Town 20N, Range 09W, Trempealeau County, Wisconsin.

Parcel ID(s):
004016610000, 004016280000, 004016240000, 004016250000, 004016230000, 004016160000

Site Locator for Construction Projects

County	Township	Range E/W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Trempealeau	20N	09W	06	SE 1/4
Trempealeau	20N	09W	07	NE 1/4
	N			
	N			

Agreement

The property described above is enrolled in a Water Quality Trade Agreement. Funds are provided by the credit user in return for the installation (by the broker), operation and maintenance (by the landowner) of best management practices (BMPs) designed to enhance water quality. This agreement commits the landowner/operator, their heirs, successors and assigns to fulfill the trade agreement until a satisfaction or release is filed by the credit user.

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

Landowner/Operator

Signed this 30th day of May, 20 18.

Kerry F Suchla
Signature of Operator

Signature of Landowner/Operator

Suchla Farms, LLC – Kerry Suchla, Member
Typed Name of Operator

Typed Name of Landowner/Operator

STATE OF WISCONSIN)
)
Trempealeau County) ss.
)
)

Personally came before me this 30 day of May, 20 18.

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

Mark E Carlson
Signature of Notary Public

Mark E Carlson
Typed Name of Notary Public

Notary Public Trempealeau County, Wisconsin

My commission (is permanent) (expires July 20, 2018).

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 30th day of May, 20 18.

Duane M Suchla
Signature of Landowner (if not operator)

Renee C Suchla
Signature of Landowner (if not operator)

Duane Suchla
Typed Name of Landowner (if not operator)

Renee Suchla
Typed Name of Landowner (if not operator)

STATE OF WISCONSIN)
)
Trempealeau County) ss.
)
)

Personally came before me this 30 day of May, 20 18.

The above named Duane Suchla, Renee Suchla to me known to be the person(s) who executed the foregoing instrument and acknowledge the same.

Mark E Carlson
Signature of Notary Public

Mark E Carlson
Typed Name of Notary Public

Notary Public Trempealeau County, Wisconsin

My commission (is permanent) (expires July 20, 2018

Credit User

Signed this 6th day of June, 20 18.

Roland Thomas
Signature of credit user

City of Arcadia Utility Commission
Typed Name of credit user/broker/exchange

STATE OF WISCONSIN)
)
Trempealeau County) ss.
)
)

Personally came before me this 6th day of June, 20 18.

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

Angela K Bey
Signature of Notary Public

Notary Public Trempealeau County, Wisconsin

My commission (is permanent) (expires 4-19-19).

Other Signer- Specify title or relationship: Trempealeau County Dept. of Land Management – Broker

Signed this 30th day of May, 20 18.

Kirstie Heidenreich
Signature

Signature

Kirstie Heidenreich, Planning & Conservation Coordinator
Typed Name

Typed Name

STATE OF WISCONSIN)
)
Trempealeau County) ss.
)
)

Personally came before me this 30 day of May, 20 18.

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

Mark E Carlson
Signature of Notary Public

Mark E Carlson
Typed Name of Notary Public

Notary Public Trempealeau County, Wisconsin

My commission (is permanent) (expires July 20, 2018).

Other Signer- Specify title or relationship: _____

Signed this _____ day of _____, 20____.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN)
)
_____ County) ss.
)
)

Personally came before me this _____ day of _____, 20____.

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) ss.
)
)

Personally came before me this _____ day of _____, 20____.

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:
A. The City of Arcadia Utility Commission will hereby be known as the Credit User. They will hereby be responsible for all monetary costs incurred with the BMP practice installation, which includes but is not limited to: site preparation, clearing, and finished to planned grades; stream shaping; limestone rock riprap and installation; liming, fertilizing, seeding and mulching. The Credit User shall have the right to access the property for inspection or maintenance.
B. The Trempealeau County Department of Land Management will be known as the Broker. The Broker will be responsible for the oversight of the BMP practice design, contractor bidding process and signed agreements, inspection of site preparation and design installation, regulation of applicable performance standards, annual inspections and monitoring of landowners' obligations in the form of performing on-site checks as needed and as stated in Section B. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.
C. Suchla Farms LLC (Operated by Kerry Suchla) and Duane and Renee Suchla will be known as the Landowners/Operators. Landowners will be responsible for all aspects of the operation and maintenance of BMP practices as outlined in Section B below.
    1. 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 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 by circumstances which are beyond the control of the Landowner.
    3. This contract will be recorded in the Trempealeau County Register of Deeds office.
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 County 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.

Section B – Landowner/Operator Shall:
1. Inspect riprap annually and after heavy storms for any erosion or displacement of rocks. The Broker should be contacted immediately and directly if any damage has occurred. Repairs should be done immediately by Landowner, at Landowner's cost.
2. Ensure that no grazing of animals will occur within 30 feet of the stream channel to prevent clogging or rerouting of water in the channel.
3. 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.
4. 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.
5. If cattle are introduced to the stream corridor, fencing must be installed to prevent unlimited access of cattle to waters of the State. If fences are installed, they shall be maintained to prevent unauthorized human or livestock access. Fencing shall be set back to allow for a 30-foot vegetative buffer along the stream corridor.
6. Periodically, mow vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 30-foot vegetated buffer from the top of the bank.
7. Eliminate all burrowing rodents and repair damage caused by them.
8. Fish habitat structures may not be altered, moved, or removed without written consent from the WI DNR.
9. Maintain the project consistent with NRCS technical standard 580.
10. Installation of this practice allows the Landowner to comply with the applicable state/local performance standard. Compliance with this performance standard shall be for a period of 20 years. This practice must be maintained or replaced with a practice which ensures continued compliance with the applicable performance standard.

TA Number	Typed Name of Landowner/Operator	Initials of Landowner/Operator	Date
	Suchla Farms, LLC – Kerry Suchla	KFS	5-30-18

The cost-share recipient shall implement and maintain all best management practices listed in this Addendum, unless otherwise amended in accordance with this agreement.

							Installation Period			
							From (MM/YY) 04/18		To (MM/YY) 08/19	
Field #	DNR BMP Code	Practice Name	Quantity	Unit	Unit Cost	Estimated Total Cost	Reimburs-ement Rate (%)	Estimated Cost-Share Amt.	Cost-Share Amt. From Other Programs*	Estimated Year to be Installed
	NRCS 580	Streambank Stabilization and Shoreline Protection (stream shaping)	12,500	ft	$2.00	$25,000				2018-2019
	NRCS 580	Streambank Stabilization and Shoreline Protection (liming, seeding, fertilizing)	10	acre	$1,500	$15,000				2018-2019
	NRCS 580	Streambank Stabilization and Shoreline Protection (limestone rock riprap)	4630	cu. yds.	$40.00	$185,200				2018-2019
	NRCS 580	Streambank Stabilization and Shoreline Protection (site prep, clearing)	12,500	ft	$1.20	$15,000				2018
	NRCS 395	Stream Habitat Improvement & Management	2	Fish Structure	$1,000	$2,000				2019
					TOTALS	$240,200				

* Identify Program Names:_____

CSA Number	Typed Name of Landowner/Operator	Initials of Landowner/Operator	Date
	Suchla Farms, LLC – Kerry Suchla	KFS	5-30-18

Document Number | Document Title

8073064
Tx:4053125

457771
Rose Ottum, Register
OFFICE OF REGISTER OF DEEDS
Trempealeau County, WI
Recd for Record
11/18/2019 02:41 PM
PAGES: 7
EXEMPT #
TRANSFER FEE:

Recording Area

Name and Return Address

Kostner, Koslo & Brovold LLC
108 W. Main Street
Arcadia, WI 54612

30.00 chg

004-01668-0000;
004-01661-0000; 004-01628-0000;
004-01624-0000; 004-01625-0000;
004-01623-0000 & 004-01616-0000

Real property in the County of Trempealeau, Town of Arcadia, State of Wisconsin, being that part of the NW ¼ of the SW ¼ of Section 8, Township 20 North, Range 9 West, Trempealeau County, Wisconsin, lying Southwest of Haines Lane and Northeast of Myers Valley Road.

THIS PAGE IS PART OF THIS LEGAL DOCUMENT - DO NOT REMOVE

This document was drafted by:
Attorney Terrence J. Madden.

AMENDMENT TO WATER QUALITY TRADE AGREEMENT

THIS AMENDMENT TO WATER QUALITY TRADE AGREEMENT (hereinafter "Amendment") is made and entered into as of the 5 day of Nov, 2019 (hereinafter the "Effective Date", by and among the City of Arcadia, a Wisconsin municipal corporation (hereinafter "Credit User"), the County of Trempealeau, a subdivision of the State of Wisconsin (hereinafter "Broker"), Duane and Renee Suchla, husband and wife (hereinafter "Landowner"), and Suchla Farms LLC, a Wisconsin limited liability company (hereinafter "Operator").

RECITALS

On or about June 6, 2018, Credit User, Broker, Landowner, and Operator entered into a Water Quality Trading Agreement (hereinafter the "Agreement") concerning certain changes in agricultural practices on and uses of Landowner's property that Operator agreed to undertake. The Agreement was recorded in the office of the register of deeds for Trempealeau County, Wisconsin, on August 23, 2018, 2018, at Volume 1097 of Records, on Page 410, as Document Number 451698. Credit User, Broker, Landowner, and Operator now want to amend the Agreement by making the Credit User's participation contingent on DNR approval of Phosphorus credits for Credit User and to specify that additional property owned by Landowner will be subject to the Agreement. The Agreement is incorporated herein by reference.

TERMS AND CONDITIONS

NOW, THEREFORE, the parties agree as follows:

1. The Agreement is hereby amended to make the real estate described in Exhibit A, which is attached hereto and incorporated herein by this reference, subject to all of the terms and conditions of the Agreement, effective as of the Effective Date.

2. Following Broker's filing of the Management Practice Registration for the full project and final DNR approval of Phosphorus Credits, Credit User shall pay Landowner $12,000.00 as full and final payment for Landowner's costs for seed and seeding, loss of cattle feed, loss of rent for the area unusable during construction and all other expenses incurred by Landowner in performing its obligations under the Agreement..

2 Credit User, Broker, Landowner and Operator acknowledge and agree that construction of the BMPs and the other obligations under the Agreement are contingent on the State of

Wisconsin Department of Natural Resources ("Wisconsin DNR") approving a sufficient number of Phosphorus credits for the project, as determined by Credit User in Credit User's sole discretion, on or before December 31, 2020. In the event the Wisconsin DNR does not approve a sufficient number of Phosphorus credits as specified above on or before such date, Credit User shall have the option of terminating the Agreement, as amended, by delivering written notice of its decision to terminate the Agreement to Broker, Landowner, and Operator within 30 days of such date. In the event Credit User elects to terminate the Agreement and provides the notice as hereinabove specified, the Agreement, as amended, shall terminate effective as of the date of such notice and Credit User, Broker, Landowner and Operator shall have no further obligations under the Agreement, as amended.

3. Each of the parties to this Amendment agree that Credit User, Broker, Landowner, or Operator may record a copy of the Amendment in the office of the register of deeds for Trempealeau County, Wisconsin, but that the party recording a copy of the Amendment shall be solely responsible for the cost of recording it.

4. The Recitals are incorporated herein by reference. Capitalized terms used herein and not otherwise defined herein shall have the meanings assigned to them in the Agreement.

5. Credit User, Broker, Landowner, and Operator each acknowledge and affirm that the Agreement, as hereby amended, is ratified and confirmed in all respects and all terms, conditions and provisions, and, except as amended by this Amendment, shall remain unmodified and in full force and effect. All references to the Agreement contained in any document or instrument are hereby amended and shall hereinafter refer to the Agreement as amended by this Amendment.

6. This Amendment, from and after the date hereof, embodies the entire agreement and understanding between the parties hereto and supersede and have merged into them all prior oral and written agreements on the same subjects by and between the parties hereto and with the effect that this Amendment shall control with respect to the specific subjects hereof and thereof.

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be executed as of the date and year first above written.

CITY OF ARCADIA

By: _____
Robert Reichwein, Mayor

Attest: _____
Angela Berg, Clerk

COUNTY OF TREMPEALEAU

By _____
Kirstie Heidenreich
Planning + Conservation Coordinator

SUCHLA FAMILY FARMS LLC

By: _____
Kerry Suchla, Member

LANDOWNER

By: _____
Duane Suchla, Individually

By: Renee C Suchla
Renee Suchla, Individually

STATE OF WISCONSIN)
) **SS**
TREMPEALEAU COUNTY)

Personally came before me this 12 day of ~~May~~ November, 2019, the above-named ROBERT REICHWEIN and ANGELA BERG to me known to be the people who executed the foregoing instrument and acknowledged the same.

Sally Sylla

Notary Public, State of Wisconsin
My commission is/expires 11-22-2023.

STATE OF WISCONSIN)
) **SS**
TREMPEALEAU COUNTY)

Personally came before me this 5 day of November, 2019, the above-named KERRY SUCHLA to me known to be the person who executed the foregoing instrument and acknowledged the same.

Notary Public, State of Wisconsin
My commission is/expires 2/4/2023.

STATE OF WISCONSIN)
) **SS**
TREMPEALEAU COUNTY)

Personally came before me this 5 day of November, 2019, the above-named DUANE SUCHLA and RENEE SUCHLA to me known to be the people who executed the foregoing instrument and acknowledged the same.

Notary Public, State of Wisconsin
My commission is/expires 2/4/2019.

STATE OF WISCONSIN)
) **SS**
TREMPEALEAU COUNTY)

Personally came before me this 5 day of November, 2019, the above-named Kirstie Heidenreich to me known to be the person who executed the foregoing instrument and acknowledged the same.

Notary Public, State of Wisconsin
My commission is/expires 2/4/2023.

This Instrument was Drafted by:

Terrence J. Madden

CITY OF ARCADIA
UTILITY COMMISSION

By: Roland Thomas
Roland Thomas, Utility Commission President

Attest: Angela Berg
Angela Berg, Clerk

STATE OF WISCONSIN)
) **SS**
TREMPEALEAU COUNTY)

Personally came before me this 6th day of November, 2019, the above-named ROLAND THOMAS and ANGELA BERG to me known to be the people who executed the foregoing instrument and acknowledged the same.

Sally Sylla
Sally Sylla
Notary Public, State of Wisconsin
My commission expires 11-22-23

EXHIBIT A

Legal Description of Added Property

That part of the NW ¼ of the SW ¼ of Section 8, Township 20 North, Range 9 West, Trempealeau County, Wisconsin, lying Southwest of Haines Lane and Northeast of Myers Valley Road.

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APPENDIX 9-1

SOIL SAMPLE TEST RESULTS

Soil and Forage Analysis Laboratory
2611 Yellowstone Dr, Marshfield, WI 54449
Phone 715-387-2523

University of Wisconsin
Madison/Extension

Trempealeau County Land Management
PO Box 67
Whitehall WI 54773
Arcadia WQT Project

Date 4/24/19
Acct # 558654
Lab # **1716**

Soil Nutrient Analysis

Sample	**Total Leachable P** nitric/peroxide *%*	
1	0.10	MVC upstream
2	0.07	southside

Soil and Forage Analysis Laboratory
2611 Yellowstone Dr, Marshfield, WI 54449
Phone 715-387-2523

University of Wisconsin
Madison/Extension

Trempealeau County Land Management
PO Box 67
Whitehall WI 54773
Arcadia Potential WQT Project

Date 8/25/17
Acct # 558654
Lab # **4656**

Soil Nutrient Analysis

Sample	**Total Leachable P** nitric/peroxide %
1	0.06
2	0.06
3	0.07
4	0.07
5	0.07
6	0.12
Average	0.08

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APPENDIX 9-2

SOIL SAMPLE LOCATION MAP

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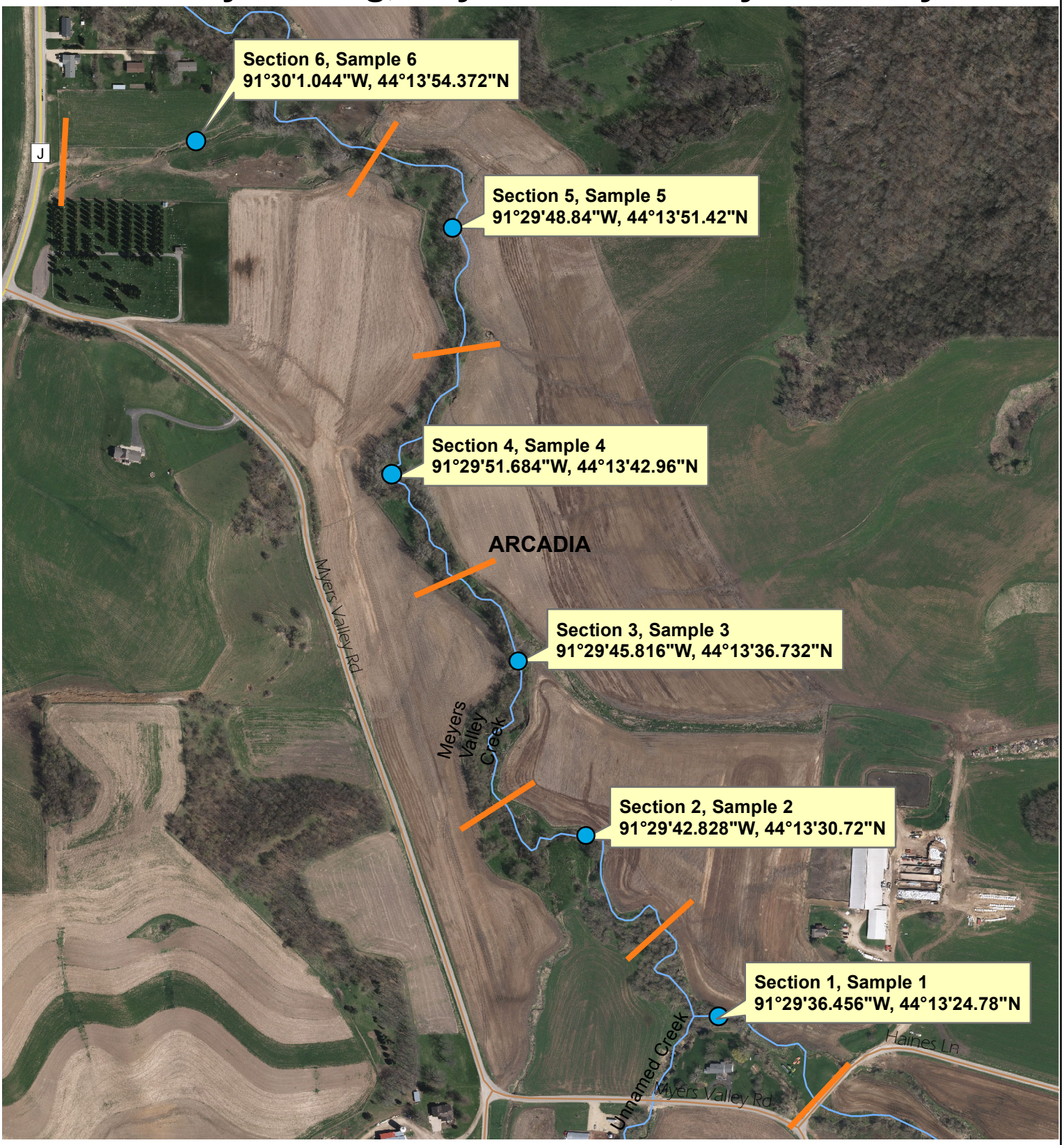
Water Quality Trading, City of Arcadia, Meyer's Valley Creek



Legend

Roads

- County Rd
- Town Rd
- Private Rd

- Streams/Creeks
- Soil Sample

N

0 170 340 680 1,020 Feet

All boundaries on this image are general representations and should not be used for any legal documentation, boundary determinations, or other property related issues. Trempealeau County is not responsible for any use of this data. All data is distributed in an "as is" format with no guarantees or warranties.

APPENDIX 9-2

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APPENDIX 9-3

FARM USE LIMITATION BARNY RESULTS

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BUFFER DESIGN USING BARNY (existing conditions)

OWNER: 0 DESIGNER: 0 DATE: 1/0/1900

CHK BY: DATE:

	Input	Output	
Closest City of similar climate:	4		1 Madison, 2 Appleton, 3 Wausau, 4 Eau Claire
Paved lot area:	6,212		sq ft
Earth lot area:	17,000		sq ft
Animal Lot size:		23,212	sq ft
Is there a DESIGNED settling basin	2		Yes= 1; No= 2
Animals on lot:	40 number	12 number	
Type of animal:	1	2	(Dairy = 1; Beef=2)
Ave. Animal Weight:	1,200 lbs	1,000 lbs	
Lot Use:	1		1= Heavy; 2= Medium; 3= Light)

TRIBUTARY AREAS

Tributary area:	176,896	sq ft		sq ft
Runoff Curve Number:	82			
Roof area:	13,670	sq ft		

347.7 lbs P per year at D.S. Lot edge:

Maximum permissible P Output that can be released: 0 lbs

Your choice based on impacted resources- Max is 15

BUFFERS - Size by trial and error

First Buffer	Length:		ft (See Note Below)
	Slope:		
	"c" :		
Second Buffer	Length:		ft
	Slope:		
	"c" :		

P (lbs) after the buffers: 347.7 lbs P per year

NO GOOD - Too much P released

"c" Value Table	
Permanent Meadow	0.59
Woods, Heavy Litter	0.59
Woods, Lt Ltr	0.29
Well managed grazing	0.44
Fair managed grazing	0.29
Good Pasture	0.22
Fair Pasture	0.15
Small Grain	0.29
Legume	0.29
Contoured Row Crop	0.29
Non-contoured row crop	0.05

BUFFER SIZING

	26,318	sq ft	Min. Acceptable Buffer Area
Chosen Buffer Width		feet	
	0	feet	Min. Bfr. Len. Based on BARNY
	#DIV/0!	feet	Min. Bfr. Len. Based on Area
Chosen Buffer Length		feet	#DIV/0!

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APPENDIX 9-4

MILKHOUSE VOLUME & PHOSPHORUS CALCULATIONS

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Milking Center Waste Volume

Ver. 12.05

CLIENT: Steve Haines COUNTY: Trempealeau DATE:
DSN BY: CHK BY: _____ DATE: _____
COMMENTS:

Milk Production (lbs/cow/yr) 21,000

Note: Pink Cells are for data entry.

Number of Milking Cows 42

Wash Water Requirements for Milking Systems

Feet of Milkline	Line Diameter	Multiplier Gal/ft of line	Gallons/Cycle Milkline
0	4"	0.12	0.0
0	3"	0.07	0.0
0	2.5"	0.05	0.0
100	2"	0.03	2.9
0	1.5"	0.02	0.0

Feet of Wash, Draw and Milk Transfer Line	Line Diameter	Multiplier Gal/ft of line	Gallons/Cycle Wash, Draw and Transfer Line(s)
0	3"	0.34	0.00
0	2.5"	0.23	0.00
55	2"	0.15	7.98
0	1.5"	0.09	0.00

Receiver(s) Volume		Multiplier	Gallons/Cycle - Receiver(s)
30	Gallons/Receiver	0.33	9.90
0	Gallons/Receiver	0.33	0.00

Number of Milking Units		Multiplier	Gallons/Cycle - Milking Units
5	Milking Units	0.25	1.25

Number of Milk Meters		Multiplier	Gallons/Cycle - Milk Meters
1	Meters	0.25	0.25

Feet of Milk Hose	Hose Diameter	Multiplier	Gallons/Cycle - Milk Hose
0	9/16"	0.01	0.00
80	5/8"	0.02	1.28

Number of Precoolers/Plate Coolers		Multiplier	Gallons/Cycle - Precoolers
0	Precooler(s)	2.00	0.00

Number of Wash Vats		Multiplier	Gallons/Cycle - Wash Vats
1	Vats	8.00	8.00

Total Gallons		
	31.6	Total Gallons/Cycle
	4	Number of Wash & Sanitize Cycles Per Cleaning
	2	Milkings Per Day
Milking System Wash to Treatment (Gal/Day)	252	Total Gallons Per Day
Milking System Wash to Treatment (Cu Ft/Day)	33.8	Total Cu Ft Per Day

Milking Center Waste Volume

Ver. 12.05

CLIENT: Steve Haines COUNTY: Trempealeau DATE:
DSN BY: CHK BY: _____ DATE: _____
COMMENTS:

Plate Cooler

		Cu Ft/Day
Plate Cooler water to Treatment?		
1= Yes, 0 = No, recycled to drinking water	0	
Ratio of water to milk (lbs/lbs)	0	0

Parlor Wash Down

Recycle Milkline & Bulk Tank wash water?		
1 =Yes, 0 = No	0	
Wash water flow rate (5 gal/min)	0	
Number milkings per day	2	
Wash time per milking (minutes)	0	0

Milk House Wash Down

Wash water flow rate (5 gal/min)	5	
Number milkings per day	2	
Wash time per milking (minutes)	25	33

Bulk Tank Wash

Bulk Tank Volume (gallons)	500	
Milk Pick Up Frequency (days)	0.5	
Water use (5% of Bulk Tank Capacity)	5	7

Water Softener

Cycle Volume (gallons)	0	
Cycle Frequency (days)	1	0

Leaky Faucets and Hoses

		Cu Ft/Day
Number of leaky Faucets and Hoses	2	
Rate of leak (0.01gal/min/each)	0.01	4

Udder Wash Water

Pail capacity (gal)	0	
Proportion used each time (%)	0	
Number of pails per milking	0	0

Waste Milk to Treatment

% of Total Milk Production is Waste	2	1

Foot Baths

Number of Foot Baths	0	
Footbath Width (ft)	0	
Length of each footbath (ft)	0	
Depth of liquid in footbath (inches)	0	
Frequency of emptyings (days)	1	0

Calf Pail/Bottle Wash

Feedings per day	2	
Volume per Wash (gal/wash)	8	2

MILKING CENTER SUMMARY

Source	Quantity Cu Ft/Day	Quantity Gallons/Day
Milking System	34	252
Plate Cooler	0	0
Parlor Wash	0	0
Milk House Wash	33	250
Bulk Tank	7	50
Water Softener	0	0
Leaks	4	29
Udder Wash	0	0
Waste Milk	1	6
Foot Baths	0	0
Calf Pail/Bottle Wash	2	16
TOTAL	81	603

Milking Center Waste Volume

Ver. 12.05

CLIENT: Steve Haines COUNTY: Trempealeau DATE:
DSN BY: CHK BY: _____ DATE: _____
COMMENTS:

Storage Period Days	Quantity Cu Ft	Quantity Gallons
3	242	1,809
6	484	3,618
10	806	6,030
210	16,929	126,631

This spreadsheet was developed in August, 2005 by:

Brian Holmes
Extension Agricultural Engineer
University of Wisconsin - Madison
460 Henry Mall
Madison WI 53706

608-262-0096
bjholmes@wisc.edu

The washwater requirements section was originally developed by:
D.J. Reinemann, UWMRIL, November, 1994.

Steve Haines Milkhouse Phosphorus Reduction

Given:

Milkhouse Waste Volume	603	GPD	Per Milkhouse Wast Volume Calculations
P concentration in Milk Center Wastewater	175	mg/L	Per NCRS 629, pg. 8
Conversion Factor, 1 gallon =	3.79	Liters	
Conversion Factor, 1 gram =	0.002205	lbs	

Calculations:

Phosphorus produced from Milkhouse waste is based on the calculated Milkhouse Waste Volume above

$$P\ Reduction\ = \frac{(603\ GPD)(175\ {}^{mg}/_{L})\left(3.79\ {}^{L}/_{gal}\right)\left(0.00205\ {}^{lbs}/_{gram}\right)\left(365\ {}^{Days}/_{Year}\right)}{1000\ {}^{mg}/_{gram}}$$

P reduction	**322**	**lbs of P / year**

APPENDIX 14-1

LOCATION MAP

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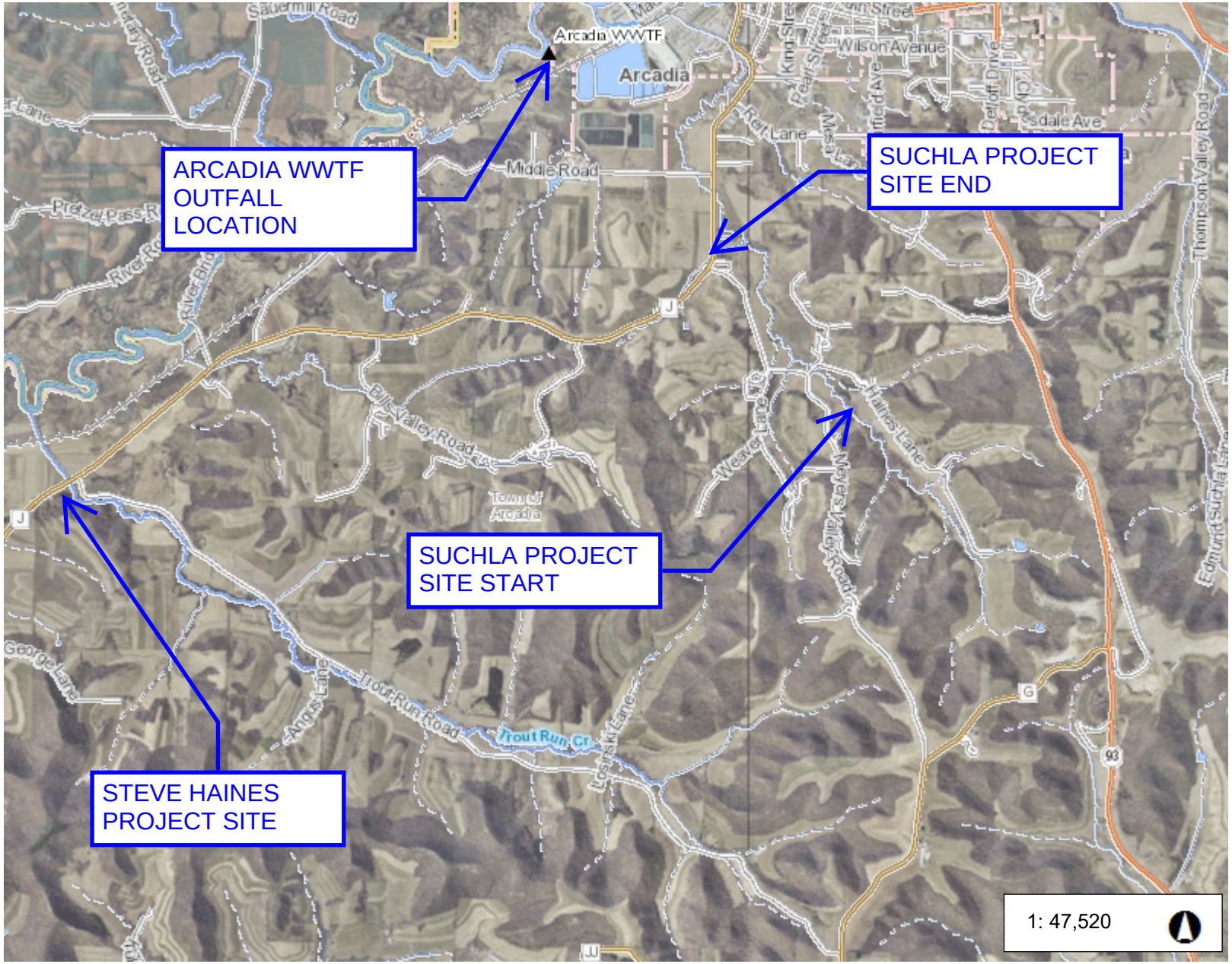
LOCATION MAP



Legend

▲ Surface Water Outfalls

Notes

1.5 0 0.75 1.5 Miles

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APPENDIX 17-1

COST ESTIMATE

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PRELIMINARY COST ESTIMATE
WATER QUALITY TRADE PROJECTS
ARCADIA, WISCONSIN

Suchla Sections 1-6

Quantity	Unit	Item	Unit Price	Total
1	L.S.	Mobilization, Site Preparation, clearing, and grading	$ 35,000.00	$ 35,000.00
6,482	cu. yd.	Limestone rock riprap D50 size 8" Diameter	$ 40.00	$ 259,280.00
10.0	Acres	Liming, fertilizing, seeding and mulching	$ 1,500.00	$ 15,000.00
		Subtotal		**$ 309,280.00**

Suchla Buffers 1- 6

Quantity	Unit	Item	Unit Price	Total
1	L.S.	Site Preparation, clearing, and grading	$ 750.00	$ 750.00
9.0	Acre	Liming, fertilizing, seeding and mulching	$ 1,500.00	$ 13,500.00
		Subtotal		**$ 14,250.00**

Suchla Upstream

Quantity	Unit	Item	Unit Price	Total
1	L.S.	Mobilization, Site Preparation, clearing, and grading	$ 8,750.00	$ 8,750.00
2,113	cu. yd.	Limestone rock riprap D50 size 8" Diameter	$ 40.00	$ 84,520.00
4,748	sq. yd.	Geotexile Fabric, Type SAS	$ 3.00	$ 14,244.00
5.0	Acres	Liming, fertilizing, seeding and mulching	$ 1,500.00	$ 7,500.00
		Subtotal		**$ 115,014.00**

Suchla Upstream Buffer

Quantity	Unit	Item	Unit Price	Total
1	L.S.	Site Preparation, clearing, and grading	$ 750.00	$ 750.00
2.5	Acre	Liming, fertilizing, seeding and mulching	$ 1,500.00	$ 3,750.00
		Subtotal		**$ 4,500.00**

Total of all Projects	**$ 443,044.00**

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APPENDIX 19-1

WQT AMENDMENT #1

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AMENDMENT #1

WATER QUALITY TRADING PLAN

PHOSPHORUS WASTEWATER TREATMENT

ARCADIA, WISCONSIN

NOVEMBER 2019

1405-300.010

AMENDMENT #1

WATER QUALITY TRADING PLAN

PHOSPHORUS WASTEWATER TREATMENT

ARCADIA, WISCONSIN

DAVY ENGINEERING CO.
CONSULTING ENGINEERS
LA CROSSE, WISCONSIN
PROJECT NO. 1405-300.010
NOVEMBER 2019

1.0 REASON FOR AMENDMENT #1

The Water Quality Trade (WQT) Plan for the City of Arcadia was completed in May 2019. At that time, DNR had approved of the report and was to submit executed trade agreements. Trempealeau County has been working with the landowners for several months; however, the landowners would not accept the offer the City provided during negotiations. Due to the stalemate for a mutual agreement, the Haines project is no longer a viable project.

Since the City cannot meet the WQT requirements without the credits from the Haines project, other projects have been found to make up for the shortfall. This amendment has been requested by the Department of Natural Resources (DNR) to show the new projects meet the WQT criteria for phosphorus credits to be used by the City of Arcadia.

2.0 INTRODUCTION

The Arcadia WQT Plan is a plan to achieve phosphorus credits through watershed improvements. The Suchla project is still within the plan, but a new project has been identified to replace the Haines project. The new project is located along Turton Creek. The remaining portion of this amendment will discuss the location, calculations to show the phosphorus credits, trade ratio, and overall credits of all projects. These project sites are all streambank restoration; therefore, the original report dated May 2019 covers the maintenance procedures for these projects as well.

3.0 PROJECT DESCRIPTION

The project site is located along Turton Creek, which discharges to the Trempealeau River upstream of the WWTF discharge. The project site location map can be seen in **Appendix 3-1**.

The Weltzien Site is brush along the streambank and surrounded by agricultural land. The streambank restoration project contains 4,200 linear feet with twelve (12) foot high banks. Turton Creek can experience high velocities during flood periods and a conservative recession rate of 0.30 was assigned to this project by the Trempealeau County Land Conservation Staff.

The NRCS Streambank Erosion Estimator (Direct Volume Method) spreadsheet was used to calculate the phosphorus credits. The percent phosphorus in the soil was collected by the Trempealeau County Land Conservation Staff and tested by the University of Wisconsin Soil and Forage Analysis Laboratory. The test results can be seen in **Appendix 3-2**. The percent phosphorus was shown to be 0.05%, which yields 643 pounds of phosphorus per year. The calculations can be seen in **Appendix 3-3**.

4.0 TRADE RATIO

The trade ratios in this section are preliminary estimates. The Wisconsin Department of Natural Resources will make the ultimate decision on the trade ratio to be applied to each project. The estimated ratio is derived from the following formula:

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

4.1 Delivery Factor

Per the *Guidance for Implementing Water Quality Trading in WPDES Permits*, the Delivery Factor in section 2.11.1 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. 14). The delivery factor is often zero when in the same HUC 12, however the outfall is not in the same HUC 12 as the project site. See **Appendix 4-1** for the HUC 12 Watershed Basin Map. The project is located upstream of the WWTF outfall. Furthermore, the credit generator and credit user have the same ratio per the SPARROW program, as shown on the DNR Surface Data Viewer; therefore, the delivery factor is zero.

4.2 Downstream Factor

The credit generator (Project Site) is upstream of the credit user (WWTF); therefore, the downstream factor is dropped from the above equation. The downstream factor is zero (0).

4.3 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* from the Wisconsin Department of Natural Resources (2013), 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. 17). The equivalency factor is zero (0).

4.4 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 can be seen on pages 20-23 in the *Guidance for Implementing Water Quality Trading in WPDES Permits* (Wisconsin Department of Natural Resources, 2013). For bank stabilization, WDNR has assigned a value of three (3); therefore, these projects have an uncertainty value of three (3).

4.5 Habitat Adjustment

The habitat adjustment factor is the factor given for implementing fishery habitat within a stream. The habitat adjustment can only be applied to an impaired body of water of the pollutant in which the credit is being obtained, in this case the pollutant is phosphorus. Per the DNR website, https://dnr.wi.gov/water/waterDetail.aspx?WBIC=1777100, Turton Creek is an impair stream due to phosphorus; therefore, the habitat adjustment may be used. See **Appendix 4-2** for a printout of the above website. The habitat adjustment factor is given a value of one (1).

4.6 Summary

In summary, the delivery factor was determined to be a zero (0) due to the proximity of the water quality trading to the discharge point of the credit user. The downstream factor was also determined to be zero (0) because the credit generator is upstream of the WWTF outfall of the credit user. The equivalency factor is zero (0) because the differences between the soluble and sediment-bound P have been accounted for in the delivery factor. The uncertainty factor was determined to be a three (3) based upon bank stabilizations in table 4 of the *Guidance for Implementing Water Quality Trading in WPDES Permits.* The habitat adjustment was found to be a one (1). Based upon the discussed factors, the trade ratio equation with the values substituted becomes the following:

Trade Ratio = 0 + 0 + 0 + 3 – 1 : 1 = > 2:1

5.0 METHOD FOR QUANTIFYING CREDITS

The NRCS has developed a spreadsheet to calculate soil loss on streambanks. The spreadsheet was designed for just the soil and did not take into account the amount of phosphorus. The spreadsheet was modified to account for the percent phosphorus in the soil, and the units were converted to pounds per year. The DNR has accepted this spreadsheet as a viable way to calculate the amount of phosphorus that will be prevented from entering the stream. The spreadsheet calculations are dependent upon the amount of phosphorus in the soil. The soil sample testing can be found in **Appendix 3-2** and the calculations can be found in **Appendix 3-3**.

6.0 TRADE AGREEMENT

The phosphorus credit projects are to be completed on private property. As discussed in Section 1.0 of this report, the reason for the amendment is due to the previous planned project landowner and the City not agreeing to the terms of an agreement.

The new planned project landowner has agreed with the terms and has signed a Trade Agreement for the project. Please see **Appendix 6-1** for the Trade Agreement for Ray Weltzien and **Appendix 6-2** for the amendment to the Trade Agreement for the Suchla project discussed in the original report.

7.0 REQUIRED PHOSPHORUS CREDITS

The phosphorus mass loadings and the required WQT are summarized in the following table, which was Table 17.1 in the approved WQT report:

TABLE 7.1: REQUIRED PHOSPHORUS MASS OFFSET

Description	Units	Amount
Annual Average Daily Existing Flow	MGD	1.56
Effluent Phosphorus Concentration	mg/L	0.70
Target P Concentration	mg/L	0.10
Annual Mass of Phosphorus	lbs/year	3,324
WQT Target Mass of Phosphorus	lbs/year	475
Baseline Mass (Existing - Target)	**lbs/year**	**2,849**

The following table includes the Suchla project from the approved WQT plan dated May 2019 and has replaced Haines projects with the project discussed in this Amendment #1.

TABLE 7.2: WATER QUALITY TRADING PROJECT PHOSPHORUS MASS CREDITS

	Project	BMP Type	TR	P lbs/year	TRxP lbs/year
1	Suchla Section 1	Streambank Stabilization	2	647	324
2	Suchla Section 2	Streambank Stabilization	2	647	324
3	Suchla Section 3	Streambank Stabilization	2	755	378
4	Suchla Section 4	Streambank Stabilization	2	755	378
5	Suchla Section 5	Streambank Stabilization	2	755	378
6	Suchla Section 6	Streambank Stabilization	2	1,294	647
7	Suchla Buffer 1-6	Buffer	3	159	53
	Subtotal			**5,012**	**2,480**
8	Suchla Upstream	Streambank Stabilization	2	193	96
9	Suchla Upstream Buffer	Buffer	3	15	5
	Subtotal			**208**	**101**
11	Weltzien	Streambank Stabilization	2	705	353
	Subtotal			**705**	**353**
	Total			**5,925**	**2,934**

The required phosphorus credits needed to satisfy the WQT Plan is 2,849 pounds of phosphorus per year. The amount of phosphorus prevented from entering the streams based upon the amendment to the WQT plan is 2,934 pounds per year; therefore, the City of Arcadia meets the required facility regulations.

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APPENDICES

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APPENDIX 3-1

WELTZIEN PROJECT LOCATION MAP

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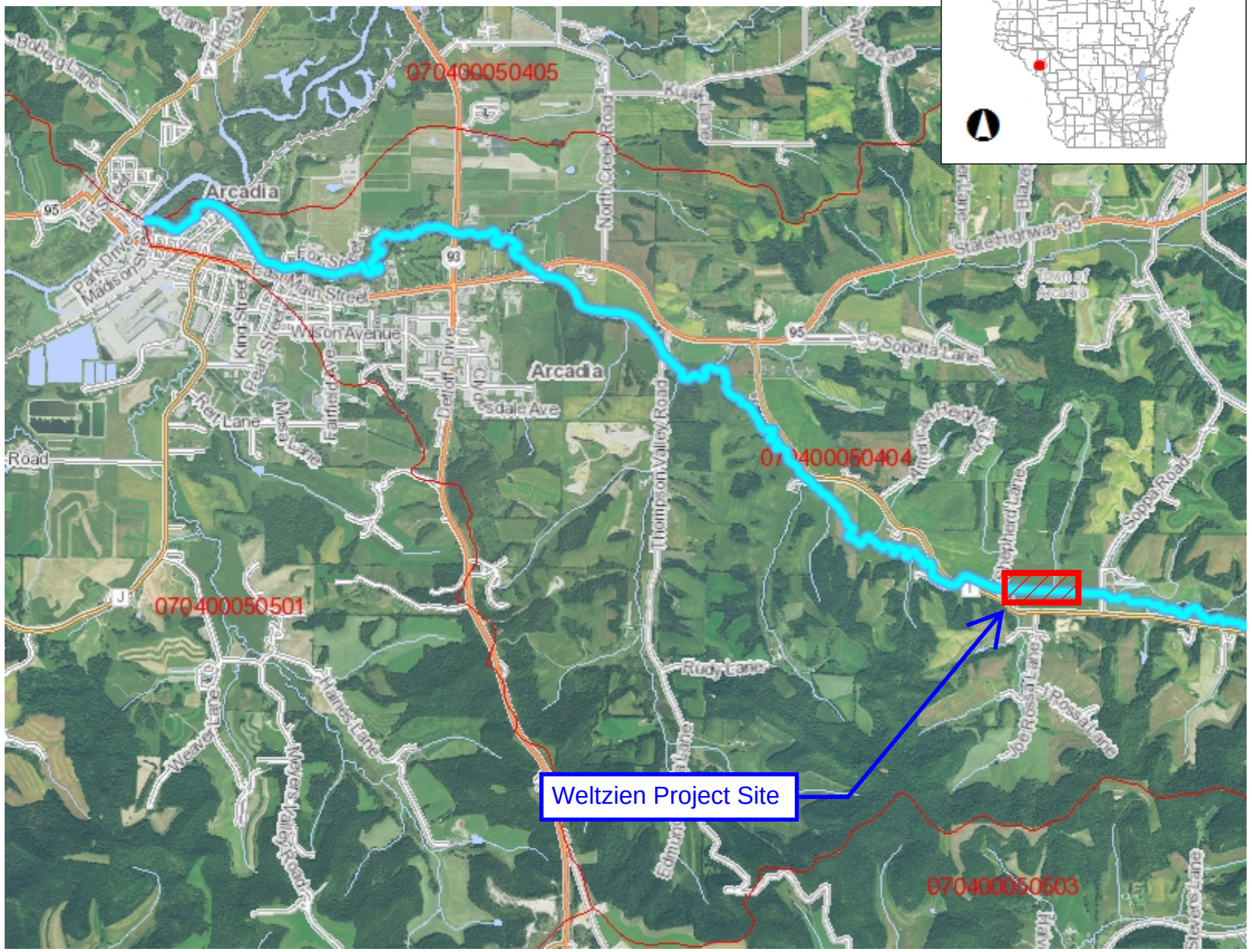
Weltzien Project Location Map



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

Notes

1.5 0 0.75 1.5 Miles

NAD_1983_HARN_Wisconsin_TM

1: 47,520

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APPENDIX 3-2

PHOSPHORUS SOIL TESTING
WELTZIEN SITE

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Soil and Forage Analysis Laboratory
2611 Yellowstone Dr, Marshfield, WI 54449
Phone 715-387-2523

University of Wisconsin
Madison/Extension

Trempealeau County Land Management
PO Box 67
Whitehall WI 54773
Arcadia Water Quality Trading

Date 8/8/19
Acct # 558654
Lab # **3737**

Soil Nutrient Analysis

Sample	**Total Leachable P** nitric/peroxide %
Ray Weltzien 1	0.03
Ray Weltzien 2	0.05
Ray Weltzien 3	0.04
Ray Weltzien 4	0.04
Ray Weltzien 5	0.05
Ray Weltzien 6	0.07
Average	**0.05**

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APPENDIX 3-3

PHOSPHORUS LOSS CALCULATIONS
WELTZIEN SITE

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

Farmer / Cooperator Name:	Ray Weltzien	Evaluated By:	Kirstie Heidenreich
Tract Number:	Turton Creek	Evaluation Date:	August 8, 2019

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)
	1	700.0	20.0	14,000	0.30	4,200.0	Silt Loam	85	178.5
	2	700.0	8.0	5,600	0.30	1,680.0	Silt Loam	85	71.4
	3	700.0	6.0	4,200	0.30	1,260.0	Silt Loam	85	53.6
			Total Estimated Annual Streambank or Ditch Erosion Soil Loss (Tons):						303.5
			Percent Leachable Phosphorus in the Soil (nitric/peroxide):						0.05%
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons):						0.152
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):						**303**

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

Farmer / Cooperator Name:	Ray Weltzien	Evaluated By:	Kirstie Heidenreich
Tract Number:	Turton Creek	Evaluation Date:	August 8, 2019

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)
	4	700.0	15.0	10,500	0.30	3,150.0	Silt Loam	85	133.9
	5	700.0	20.0	14,000	0.30	4,200.0	Silt Loam	85	178.5
	6	700.0	10.0	7,000	0.30	2,100.0	Silt Loam	85	89.3
			Total Estimated Annual Streambank or Ditch Erosion Soil Loss (Tons):						401.6
			Percent Leachable Phosphorus in the Soil (nitric/peroxide):						0.05%
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (Tons):						0.201
			Total Estimated Annual Streambank or Ditch Erosion Phosphorus Loss (lbs):						**402**

Total Phosphorus Loss for sum of reaches (lbs/yr):	**705**

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

Streambank or Ditch Erosion Calculation Formula:

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

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APPENDIX 4-1

ARCADIA WWTF HUC 12
WELTZIEN HUC 12

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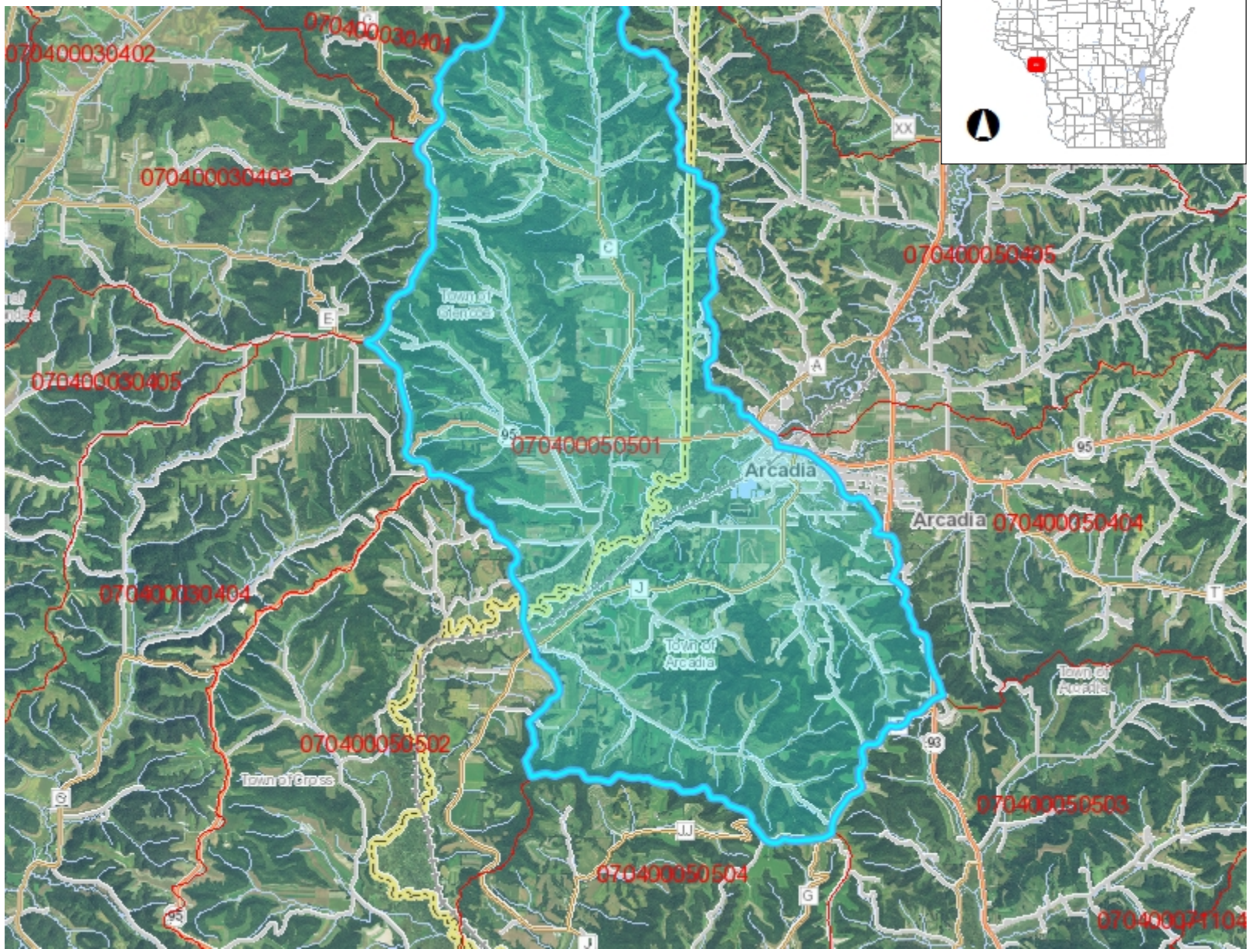
Arcadia WWTF HUC 12



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

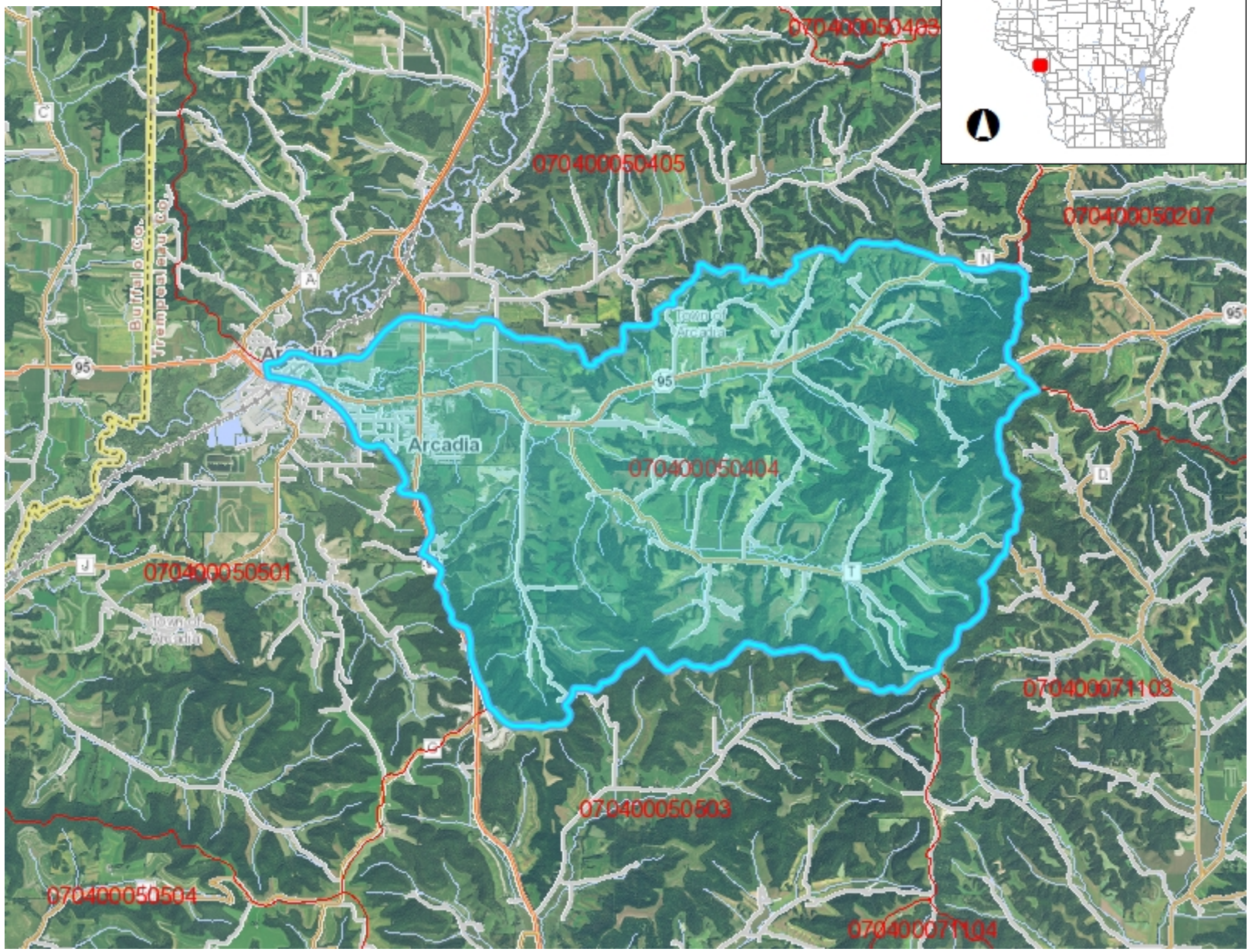
Notes

4.0 0 2.00 4.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 126,720

Weltzien Project HUC 12



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

Notes

3.0 0 1.50 3.0 Miles

NAD_1983_HARN_Wisconsin_TM

1: 95,040

APPENDIX 4-2

TURTON CREEK DNR IMPAIRED WATER

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Turton Creek, Middle Trempealeau River Watershed (BT02)
Turton Creek (American Valley Creek) (1777100)

Return to Search Go to Watershed

Size	2.87 Miles
Segment	0 - 2.87
Natural Community	Cool-Cold Mainstem
Year Last Monitored	2015
General Condition	Poor
	This river is impaired
Impairments include	High Phosphorus Levels
Pollutants include	Total Phosphorus

Overview | Conditions | Goals | Monitoring & Projects | Ecosystem Challenges | Fish & Habitat | Photo Gallery | Map Gallery

Overview

Turton Creek is a 3.6-mile-long tributary to the Trempealeau River. The stream is severely degraded by animal waste, livestock pasturing on the streambanks, cropland erosion, channelization and flooding.

Date 1991

Author Aquatic Biologist

Counties	Trempealeau
Trout Water	No
Outstanding or Exceptional	No
Impaired Water	Yes

Fish and Aquatic Life

Current Use	FAL
Attainable Use	FAL
Designated Use	Default FAL

General Condition

Turton Creek (American Valley Creek) (WBIC 1777100) about 0.05 miles west of Thompson Valley Road to the headwaters was assessed during the 2018 listing cycle; new biological (fish Index of Biotic Integrity (IBI) scores) sample data were clearly below the 2018 WisCALM listing thresholds for the Fish and Aquatic Life use. This water was meeting this designated use and was not considered impaired.

Date 2017

Author Ashley Beranek

Impaired Waters

The 2018 assessments of Turton Creek (mouth with Trempealeau River to Mill Road/HWY 95; Unnamed Trib (WBIC 1778300) to headwaters) showed impairment

by phosphorus; available total phosphorus sample data overwhelmingly exceeded the 2018 WisCALM listing criteria for the Fish and Aquatic Life use. However, available biological data did not indicate impairment (i.e. no macroinvertebrate or fish Index of Biotic Integrity (IBI) scored in the "poor" condition category). Based on the most updated information, this water was proposed for the impaired waters list.

Date 2017

Author Ashley Beranek

Impaired Waters

Turton Creek (1777100) from the mouth to about 0.05 miles west of Thompson Valley Road (0 - 3.6 miles) was placed on the impaired waters list in 2014. The 2016 assessments showed continued impairment by phosphorus; total phosphorus sample data overwhelmingly exceeded 2016 WisCALM listing thresholds for the Fish and Aquatic Life use, however, available biological data do not indicate impairment (i.e. no macroinvertebrate or fish Index of Biotic Integrity (IBI) scored in the "poor" condition category). Based on the most updated information, no change in existing impaired waters listing is needed.

Date 2015

Author Aaron Larson

Condition

Wisconsin has over 84,000 miles of streams, 15,000 lakes and milllions of acres of wetlands. Assessing the condition of this vast amount of water is challenging. The state's water monitoring program uses a media-based, cross-program approach to analyze water condition. An updated monitoring strategy (2015-2020) is now available. Compliance with Clean Water Act fishable, swimmable standards are located in the Executive Summary of Water Condition in 2018. See also the 'monitoring and projects' tab.

Reports

- Comprehensive 2018 River/Stream Water Quality Assessments
- Torton Creek American Valley Creek Checklist (1777100)
- Torton Creek American Valley Creek (1777100) Fish Survey
- Comprehensive 2016 Rivers Stream Assessments
- Changes to the Draft 2014 Total Phosphorus/Biology Assessments
- Rivers TP Summary 2012

Recommendations

• Monitor Water Quality or Sediment	Modeled NC is incorrect, verified as coldwater in 2013 by Mark Hazuga. Other surveys indicate natural community is coldwater, but numbers are very low. Needs follow up monitoring.

Management Goals

Wisconsin's Water Quality Standards provide qualitative and quantitative goals for waters that are protective of Fishable, Swimmable conditions [Learn more]. Waters that do not meet water quality standards are considered impaired and restoration actions are planned and carried out until the water is once again fishable and swimmable

Management goals can include creation or implementation of a Total Maximum Daily Load analysis, a Nine Key Element Plan, or other restoration work, education and outreach and more. If specific recommendations exist for this water, they will be displayed below online.

Monitoring

Monitoring the condition of a river, stream, or lake includes gathering physical, chemical, biological, and habitat data. Comprehensive studies often gather all these parameters in great detail, while lighter assessment events will involve sampling physical, chemical and biological data such as macroinvertebrates. Aquatic macroinvertebrates and fish communities integrate watershed or catchment condition, providing great insight into overall ecosystem health. Chemical and habitat parameters tell researchers more about human induced problems including contaminated runoff, point source dischargers, or habitat issues that foster or limit the potential of aquatic communities to thrive in a given area. Wisconsin's Water Monitoring Strategy was recenty updated.

Grants and Management Projects

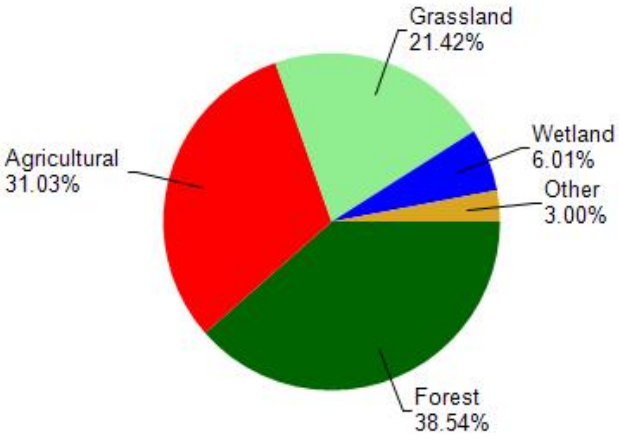
Project Name (Click for Details)	Year Started
Fish Propagation Actions	2001
CITY OF ARCADIA: TID4 Stormwater Detention Pond	2002

Monitoring Projects

WBIC	Official Waterbody Name	Station ID	Station Name	Earliest Fieldwork Date	Latest Fieldwork Date	View Station	View Data
1777100	Turton Creek	10021140	Turton Creek Railroad Crossing Behind Feed Mill	1/1/2015	1/1/2015	Map	Data
1777100	Turton Creek	10030618	Turton Creek at Oak Street	10/13/2009	1/1/2015	Map	Data
1777100	Turton Creek	10040690	Turton Creek US STH 93	7/3/2013	1/1/2015	Map	Data

Watershed Characteristics

Turton Creek is located in the Middle Trempealeau River watershed which is 205.47 mi². Land use in the watershed is primarily forest (38.50%), agricultural (31%) and a mix of grassland (21.40%) and other uses (9.00%). This watershed has 489.89 stream miles, 396.56 lake acres and 5,115.26 wetland acres.



Nonpoint Source Characteristics

This watershed is ranked Not Available for runoff impacts on streams, Not Available 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. For more information, go to surface water program grants.

Natural Community

Turton Creek (American Valley Creek) is considered a **Cool-Cold Mainstem** under the state's Natural Community Determinations.

Natural communities (stream and lake natural communities) represent model resultsand DNR staff valiation processes that confirm or update predicted conditions based on flow and temperature modeling from historic and current landscape features and related variables. Predicated flow and temperatures for waters are associated predicated fish assemblages (communities). Biologists evaluate the model results against current survey data to determine if the modeled results are corect and whether biological indicators show water quaity degradation. This analysis is a core component of the state's resource management framework. Wisconsin's Riverine Natural Communities.

Cool (Cold-Transition) Mainstem streams are moderate-to-large but still wadeable perennial streams with cold to cool summer temperatures. Coldwater fishes are common to uncommon, transitional fishes are abundant to common, and warm water fishes are uncommon to absent. Headwater species are common to absent, mainstem species are abundant to common, and river species are common to absent.

Fish Stocking

APPENDIX 6-1

RAY WELTZIEN
TRADE AGREEMENT

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Document Number | Document Title

8073665
Tx:4053583

458135
Rose Ottum, Register
OFFICE OF REGISTER OF DEEDS
Trempealeau County, WI
Recd for Record
12/13/2019 12:01 PM
PAGES: 6
EXEMPT #
TRANSFER FEE:

Recording Area

Name and Return Address

City of Arcadia
203 West Main Street
Arcadia, WI 54612 #30.00chg

004-01716-0000 & 004-01746-0000
Parcel Identification Number (PIN)

The NW¼ of the NW¼ of Section 12-20-9 West;
EXCEPTING THEREFROM that part of the NW¼ of the NW¼ of Section 12-20-9 West lying South of the centerline of County Highway "T".

The North ½ of the NE¼ of Section 11-20-9 West;

EXCEPTING THEREFROM that part of the NE¼ of the NE¼ of Section 11-20-9 West, lying South of the centerline of County Highway "T" and East of the centerline of the Town Road known as Joe Rossa Lane.

ALSO EXCEPTING THEREFROM that part of the Northwest Quarter of the Northeast Quarter, and the Northeast Quarter of the Northeast Quarter of Section 11, all in Township 20 North, Range 9 West, Town of Arcadia, Trempealeau County, Wisconsin, described as follows:
Beginning at the northwest corner of said Section 11;
thence S 89°55'32" E a distance of 1318.76 feet to the southwest corner of the Southeast Quarter of the Southwest Quarter of Section 2;
thence N 00°02'49" E a distance of 1325.35 feet to the northwest corner of said Southeast Quarter of the Southwest Quarter;
thence S 89°51'39" E, along the north line of said forty, a distance of 150.96 feet to the centerline of County Road "T"; the next twelve courses are along said road centerline;
thence along a curve turning to the right with an arc length of 476.11 feet, with a radius of 500.00 feet, with a chord bearing of S 53°28'35" E, with a chord length of 458.33 feet to a point of tangency;
thence S 26°11'50" E a distance of 772.84 feet to a point of curvature;
thence along a curve turning to the left with an arc length of 532.38 feet, with a radius of 700.00 feet, with a chord bearing of S 47°59'06" E, with a chord length of 519.64 feet to a point of tangency;
thence S 69°46'23" E a distance of 314.27 feet;
thence S 69°22'14" E a distance of 762.27 feet;
thence S 67°54'52" E a distance of 220.74 feet to a point of curvature;
thence along a curve turning to the right with an arc length of 360.39 feet, with a radius of 920.00 feet, with a chord bearing of S 56°41'33" E, with a chord length of 358.09 feet to a point of tangency;
thence S 45°28'13" E a distance of 45.79 feet;
thence S 39°15'58" E a distance of 81.77 feet to a point of curvature;
thence along a curve turning to the left with an arc length of 355.22' feet, with a radius of 350.00 feet, with a chord bearing of S 68°20'29" E, with a chord length of 340.17 feet to a point of tangency;
thence N 82°35'01" E a distance of 375.32 feet to the intersection with the centerline of Joe Rossa Lane;
the next two courses are along said road centerline;
thence S 03°47'03" W a distance of 251.14 feet;
thence S 00°13'38" E a distance of 237.27 feet to the south line of the North Half of the Northeast Quarter of Section 11; thence N 89°50'05" W, along said south line, a distance of 2211.13 feet to the southeast corner of the North Half of the Northwest Quarter of said section;
thence N 89°50'07" W, along the south line of the North Half of the Northwest Quarter, a distance of 2622.48 feet; thence N 00°05'14" W a distance of 1294.08 feet to the point of beginning.

THIS PAGE IS PART OF THIS LEGAL DOCUMENT - DO NOT REMOVE

This document was drafted by:
Attorney Terrence J. Madden.

Water Quality Trading Agreement: City of Arcadia and Ray J. Weltzien

Permittee Information

Credit User Name (Permittee)	Permit Number
City of Arcadia Utility Commission	WI-0023230-09-0

Credit User Address

203 W. Main St.. Arcadia. WI 54612

Broker Name	Trade Agreement Number
Trempealeau County Dept. of Land Management	

Broker Address

Street Address	City	State	ZIP Code
36245 Main St.	Whitehall	WI	54773

Project Name

Ray Weltzien – Turton Creek Bank Stabilization

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

Ray J. Weltzien

Street Address	City	State	ZIP Code
W23918 Holcomb Coulee Rd	Galesville	WI	54630

Property Information

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

Street Address	City	State	ZIP Code

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

Parcel ID(s):

Parcels 004017160000, 004017460000

Site Locator for Construction Projects

County	Township	Range E/W	Section	Quarter/Quarter (e.g., NW ¼ of the NE ¼)
Trempealeau	20N	09W	11	PT NE NE
Trempealeau	20N	09W	12	NW NW *N OF COUNTY RD T*
	N			
	N			

Agreement

The property described above is enrolled in a Water Quality Trade Agreement. Funds are provided by the credit user in return for the installation (by the broker), operation and maintenance (by the landowner) of best management practices (BMPs) designed to enhance water quality. This agreement commits the landowner/operator, their heirs, successors and assigns to fulfill the trade agreement until a satisfaction or release is filed by the credit user.

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

Landowner/Operator

Signed this 5th day of Nov., 20 19.

Ray Weltzien
Signature of Operator

Signature of Landowner/Operator

Ray J. Weltzien, Operator/Landowner
Typed Name of Operator

Typed Name of Landowner/Operator

STATE OF WISCONSIN)
Trempealeau County) ss.
)

Personally came before me this 5 day of November, 20 19.

The above named Ray J. Weltzien to me known to be the person(s) who executed the foregoing instrument and acknowledge thesame.

Signature of Notary Public

Tess Johnson
Typed Name of Notary Public

Notary Public Trempealeau County, Wisconsin

My commission (is permanent) (expires 2/4/2023).

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)
_____ County) ss.
)

Personally came before me this _____ day of _____, 20 19.

The above named _____ to me known to be the person(s) who executed the foregoing instrument and acknowledge thesame.

Signature of Notary Public

Typed Name of Notary Public

Notary Public _____ County, Wisconsin

My commission (is permanent) (expires _____).

Credit User

Signed this 6th day of November, 20 19.

Roland Thomas
Signature of credit user

City of Arcadia Utility Commission
Typed Name of credit user/broker/exchange

STATE OF WISCONSIN)
Trempealeau County) ss.
)

Personally came before me this 6th day of November, 20 19.

The above named Roland Thomas to me known to be the person(s) who executed the foregoing instrument and acknowledge thesame.

Sally Sylla
Signature of Notary Public

Notary Public Trempealeau County, Wisconsin

My commission (is permanent) (expires 11-22-2023).

Other Signer- Specify title or relationship: Trempealeau County Dept. of Land Management – Broker

Signed this 5 day of Nov, 20 19.

Signature

Signature

Kirstie Heidenreich, Planning & Conservation Coordinator
Typed Name

Typed Name

STATE OF WISCONSIN)
Trempealeau County) ss.
)

Personally came before me this 5 day of November, 20 19.

The above named Kirstie Heidenreich to me known to be the person(s) who executed the foregoing instrument and acknowledge thesame.

Signature of Notary Public

Typed Name of Notary Public

Notary Public Trempealeau County, Wisconsin

My commission (is permanent) (expires 2/4/2023).

Other Signer- Specify title or relationship: _____

Signed this _____ day of _____, 20_____.

Signature

Signature

Typed Name

Typed Name

STATE OF WISCONSIN)
_____ County) ss.
)

Personally came before me this _____ day of _____, 20_____.

The above named _____ to me known to be the person(s) who executed the foregoing instrument and acknowledge thesame.

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) ss.
)

Personally came before me this _____ day of _____, 20_____.

The above named _____ to me known to be the person(s) who executed the foregoing instrument and acknowledge thesame.

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:
A. The *City of Arcadia Utility Commission* will hereby be known as the Credit User. They will hereby be responsible for all monetary costs incurred with the BMP practice installation, which includes but is not limited to: site preparation, clearing, and finished to planned grades; stream shaping; limestone rock riprap and installation; liming, fertilizing, seeding and mulching. The Credit User shall have the right to access the property for inspection or maintenance.
B. The Trempealeau County Department of Land Management will be known as the Broker. The Broker will be responsible for the oversight of the BMP practice design, contractor bidding process and signed agreements, inspection of site preparation and design installation, regulation of applicable performance standards, annual inspections and monitoring of landowners' obligations in the form of performing on-site checks as needed and as stated in Section B. The Broker shall not have any financial obligation for this project except as expressly stated in this agreement.
C. Ray J. Weltzien will be known as the Landowner/Operator. Landowner will be responsible for all aspects of the operation and maintenance of BMP practices as outlined in Section B below.

1. 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 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 by circumstances which are beyond the control of the Landowner.
3. This contract will be recorded in the Trempealeau County Register of Deeds office.

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 County 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.

D. The Broker reserves the right to enter the property to verify the information on the inspection report is accurate.
E. 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.
* F. Credit User's obligations under this Agreement are contingent on DNR approval of the necessary phosphorus credits on or before April 15, 2020.

R.W. 12-13-19 KH 12-13-19

Section B – Landowner/Operator Shall:
1. Inspect riprap annually and after heavy storms for any erosion or displacement of rocks. The Broker should be contacted immediately and directly if any damage has occurred. Repairs should be done immediately by Landowner, at Landowner's cost.
2. Ensure that no grazing of animals will occur within 30 feet of the stream channel to prevent clogging or rerouting of water in the channel.
3. 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.
4. 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.
5. If cattle are introduced to the stream corridor, fencing must be installed to prevent unlimited access of cattle to waters of the State. If fences are installed, they shall be maintained to prevent unauthorized human or livestock access. Fencing shall be set back to allow for a 20-foot vegetative buffer along the stream corridor.
6. Periodically, mow vegetative buffer to control weeds and invading brush. All farm equipment and row crops must remain outside of the agreed upon 20-foot vegetated 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 this practice allows the Landowner to comply with the applicable state/local performance standard. Compliance with this performance standard shall be for a period of 20 years. This practice must be maintained or replaced with a practice which ensures continued compliance with the applicable performance standard.
10. The landowner agrees that the annual inspections are to be performed on inspection forms, which will be provided by the Broker. The landowner will be required to take pictures of the BMP for the annual report, which will be submitted with the inspection form to the Broker. **The landowner agrees to submit the annual inspection and pictures by September 30th each year.** Should the landowner fail to submit the annual inspection to the Broker within 30 days of the due date, then the Broker may enter the Landowner's property to perform the inspection. Should the Broker need to perform the inspection due to failure of the Landowner to submit the inspection, then the Landowner will be responsible for a **$250 inspection fee payable to the Broker.**

TA Number	Typed Name of Landowner/Operator	Initials of Landowner/Operator	Date
	Ray J. Weltzien R W 11-5-19		

The cost-share recipient shall implement and maintain all best management practices listed in this Addendum, unless otherwise amended in accordance with this agreement.							Installation Period			
							From (MM/YY) 05/2020		To (MM/YY) 11/2020	
Field #	DNR BMP Code	Practice Name	Quantity	Unit	Unit Cost	Estimated Total Cost	Reimbursement Rate (%)	Estimated Cost-Share Amount	Cost-Share Amt. From Other Programs*	Estimated Year to be Installed
	NRCS 580	Mobilization	1	L.S.	$ 500.00	$				2020
	NRCS 580	Site Preparation, clearing, and grading	1	L.S.	$ 1000.00	$				2020
	NRCS 580	Limestone rock riprap D50 size 8" Diameter		cu. yd.	$ 40.00	$				2020
	NRCS 580	Geotextile Fabric, Type SAS		sq. yd.	$ 3.00	$				2020
	NRCS 580	Liming, fertilizing, seeding and mulching		sq. yd.	$ 4.00	$				2020
	NRCS 580	Erosion Control	1	L.S.	$ 1,000.00	$				2020
		Sub-Total				$				
		Contingencies (10%)				$				
Note: These estimates are based on an overall project of three parcels of land. The estimated values were broken up through an assumed percentage of land. The exact values in the field may differ from above.					**TOTALS**	**$ 215,000**	**$ -**	**$ -**	**$ -**	
* Identify Program Names:										
CSA Number		Typed Name of Landowner / Operator Ray J. Weltzien				Initials of Landowner/Operator RW			Date 1-5-7	

APPENDIX 6-2

AMENDED SUCHLA TRADE AGREEMENT
REVISION TO LEGAL DESCRIPTION

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AMENDMENT TO WATER QUALITY TRADE AGREEMENT

THIS AMENDMENT TO WATER QUALITY TRADE AGREEMENT (hereinafter "Amendment") is made and entered into as of the 5 day of Nov, 2019 (hereinafter the "Effective Date", by and among the City of Arcadia, a Wisconsin municipal corporation (hereinafter "Credit User"), the County of Trempealeau, a subdivision of the State of Wisconsin (hereinafter "Broker"), Duane and Renee Suchla, husband and wife (hereinafter "Landowner"), and Suchla Farms LLC, a Wisconsin limited liability company (hereinafter "Operator").

RECITALS

On or about June 6, 2018, Credit User, Broker, Landowner, and Operator entered into a Water Quality Trading Agreement (hereinafter the "Agreement") concerning certain changes in agricultural practices on and uses of Landowner's property that Operator agreed to undertake. The Agreement was recorded in the office of the register of deeds for Trempealeau County, Wisconsin, on August 23, 2018, 2018, at Volume 1097 of Records, on Page 410, as Document Number 451698. Credit User, Broker, Landowner, and Operator now want to amend the Agreement by making the Credit User's participation contingent on DNR approval of Phosphorus credits for Credit User and to specify that additional property owned by Landowner will be subject to the Agreement. The Agreement is incorporated herein by reference.

TERMS AND CONDITIONS

NOW, THEREFORE, the parties agree as follows:

1. The Agreement is hereby amended to make the real estate described in Exhibit A, which is attached hereto and incorporated herein by this reference, subject to all of the terms and conditions of the Agreement, effective as of the Effective Date.

2. Following Broker's filing of the Management Practice Registration for the full project and final DNR approval of Phosphorus Credits, Credit User shall pay Landowner $12,000.00 as full and final payment for Landowner's costs for seed and seeding, loss of cattle feed, loss of rent for the area unusable during construction and all other expenses incurred by Landowner in performing its obligations under the Agreement..

2 Credit User, Broker, Landowner and Operator acknowledge and agree that construction of the BMPs and the other obligations under the Agreement are contingent on the State of

Wisconsin Department of Natural Resources ("Wisconsin DNR") approving a sufficient number of Phosphorus credits for the project, as determined by Credit User in Credit User's sole discretion, on or before December 31, 2020. In the event the Wisconsin DNR does not approve a sufficient number of Phosphorus credits as specified above on or before such date, Credit User shall have the option of terminating the Agreement, as amended, by delivering written notice of its decision to terminate the Agreement to Broker, Landowner, and Operator within 30 days of such date. In the event Credit User elects to terminate the Agreement and provides the notice as hereinabove specified, the Agreement, as amended, shall terminate effective as of the date of such notice and Credit User, Broker, Landowner and Operator shall have no further obligations under the Agreement, as amended.

3. Each of the parties to this Amendment agree that Credit User, Broker, Landowner, or Operator may record a copy of the Amendment in the office of the register of deeds for Trempealeau County, Wisconsin, but that the party recording a copy of the Amendment shall be solely responsible for the cost of recording it.

4. The Recitals are incorporated herein by reference. Capitalized terms used herein and not otherwise defined herein shall have the meanings assigned to them in the Agreement.

5. Credit User, Broker, Landowner, and Operator each acknowledge and affirm that the Agreement, as hereby amended, is ratified and confirmed in all respects and all terms, conditions and provisions, and, except as amended by this Amendment, shall remain unmodified and in full force and effect. All references to the Agreement contained in any document or instrument are hereby amended and shall hereinafter refer to the Agreement as amended by this Amendment.

6. This Amendment, from and after the date hereof, embodies the entire agreement and understanding between the parties hereto and supersede and have merged into them all prior oral and written agreements on the same subjects by and between the parties hereto and with the effect that this Amendment shall control with respect to the specific subjects hereof and thereof.

IN WITNESS WHEREOF, the parties hereto have caused this Amendment to be executed as of the date and year first above written.

CITY OF ARCADIA

By: _____
Robert Reichwein, Mayor

Attest: _____
Angela Berg, Clerk

COUNTY OF TREMPEALEAU

By Kirstie Heidenreich
Kirstie Heidenreich
Planning + Conservation Coordinator

SUCHLA FAMILY FARMS LLC

By: K F Suchla
Kerry Suchla, Member

LANDOWNER

By: Duane M Suchla
Duane Suchla, Individually

By: Renee C Suchla
Renee Suchla, Individually

STATE OF WISCONSIN)
) **SS**
TREMPEALEAU COUNTY)

Personally came before me this _ day of May, 2019, the above-named ROBERT REICHWEIN and ANGELA BERG to me known to be the people who executed the foregoing instrument and acknowledged the same.

_____

Notary Public, State of Wisconsin
My commission is/expires _____.

STATE OF WISCONSIN)
) **SS**
TREMPEALEAU COUNTY)

Personally came before me this 5 day of November, 2019, the above-named KERRY SUCHLA to me known to be the person who executed the foregoing instrument and acknowledged the same.

Yvonne Johnson

Notary Public, State of Wisconsin
My commission is/expires 2/4/2023.

STATE OF WISCONSIN)
) **SS**
TREMPEALEAU COUNTY)

Personally came before me this 5 day of November, 2019, the above-named DUANE SUCHLA and RENEE SUCHLA to me known to be the people who executed the foregoing instrument and acknowledged the same.

Yvonne Johnson

Notary Public, State of Wisconsin
My commission is/expires 2/4/2019.

STATE OF WISCONSIN)
) SS
TREMPEALEAU COUNTY)

Personally came before me this 5 day of November, 2019, the above-named Kirstie Heidenreich to me known to be the person who executed the foregoing instrument and acknowledged the same.

Notary Public, State of Wisconsin
My commission is/expires 2/4/2023.

This Instrument was Drafted by:

Terrence J. Madden

EXHIBIT A

Legal Description of Added Property

9

That part of the NW ¼ of the SW ¼ of Section 8, Township 20 North, Range 8 West, Trempealeau County, Wisconsin, lying Southwest of Haines Lane and Northeast of Myers Valley Road.

EXHIBIT A

Legal Description of Added Property

That part of the NW ¼ of the SW ¼ of Section 8, Township 20 North, Range 9 West, Trempealeau County, Wisconsin, lying Southwest of Haines Lane and Northeast of Myers Valley Road.