City of Fond du Lac Water Quality Trading Plan for Conservation Practices at the Fond du Lac County Airport

April 2026

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Acronyms

Airport	Fond du Lac County Airport
BMP	best management practice
City	City of Fond du Lac
LWCD	Fond du Lac County Land and Water Conservation Department
NRCS	Natural Resources Conservation Service
SnapPlus	Soil Nutrient Application Planner
STEPL	Spreadsheet Tool for Estimating Pollutant Loads
TMDL	*Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids, Upper Fox and Wolf Basins Report*
TSS	total suspended solids
WDNR	Wisconsin Department of Natural Resources
WPDES	Wisconsin Pollutant Discharge Elimination System
WTRRF	City of Fond du Lac Regional Wastewater Treatment and Resource Recovery Facility
WQT	Water Quality Trading

1. Background

The City of Fond du Lac Regional Wastewater Treatment and Resource Recovery Facility (City or WTRRF) evaluated watershed alternatives for phosphorus and total suspended solids (TSS) compliance as part of the 2020 Master Plan (Donohue & Associates, Inc. 2020). The facility discharge is on the shoreline of Lake Winnebago near the mouth of the Fond du Lac River. Wisconsin's Section 303(d) Impaired Waters List includes Fond du Lac River as impaired for phosphorus and Lake Winnebago as impaired for phosphorus and TSS. *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids, Upper Fox and Wolf Basins Report* (TMDL) (The Cadmus Group LLC 2020) was approved by the U.S. Environmental Protection Agency on February 27, 2020. The waste load allocations from the TMDL were used by the Wisconsin Department of Natural Resources (WDNR) to determine mass discharge limits for facilities.

The WTRRF maintains a Wisconsin Pollutant Discharge Elimination System (WPDES) permit for the outfall to Lake Winnebago near the mouth of the Fond du Lac River. The City is a municipal separate storm sewer system where its stormwater is tributary to Lake Winnebago and its branches. The City is pursuing a water quality trade to meet the TMDL limits and submitted a trading Notice of Intent during the WTRRF permit renewal application[1] (Appendix A).

This Water Quality Trading Plan (WQT Plan) identifies and quantifies phosphorus and TSS water quality trades on agricultural property owned by the Fond du Lac County Airport (Airport). The City executed a long-term lease to install conservation practices to generate water quality credits, which serves as the Trade Agreement (Agreement Number 10-31-2023)[2] between the credit generator (Airport) and the credit user (City) (Appendix B). This WQT Plan includes phosphorus credits for the WTRRF and TSS credits for the City's stormwater.

1.1 Facility Description

The WTRRF treats sewage from the City of Fond du Lac; Calumet Sanitary District No. 1; Taycheedah Sanitary Districts No. 1 and 3; Town of Fond du Lac Sanitary Districts No. 2, 3, 4, and 6; Town of Empire Sanitary Districts No. 1, 2, and 3; Town of Friendship Sanitary District No.1 and Flood District; and the Village of North Fond du Lac. The facility receives domestic, commercial, and industrial wastes and the permittee administers an industrial pretreatment program that regulates the industrial contributors. Biological treatment is provided using an activated sludge system that is designed to treat an annual average flow of 9.84 million gallons per day (MGD), and currently receives approximately 7.5 MGD on average. Phosphorous removal is provided through biological treatment in the aeration basins and ferric sulfate additions. Disinfection is provided seasonally from May through September using ultraviolet radiation to protect recreational uses of the receiving water. Sludge is stabilized by mesophilic anaerobic digestion and then dewatered by centrifuges. Construction is underway to enhance the solids handling process with a biosolids dryer to convert the Class B biosolids to Class A Exceptional Quality. Sidestream deammonification treats the centrate for ammonia removal before it is returned to the main plant for further treatment.

1.2 Existing Land Uses and History of Project Site

The Airport owns and leases agricultural land that has historically been operated by various farmers in the area. The City leased 157.6 acres of land that includes 144.0 acres of tillable land divided as Field 3,6,

[1] The Notice of Intent submitted in September 2022 with the permit renewal application was signed by the applicant as part of this document preparation.

[2] The Trade Agreement Number was selected by the City as the date of the executed lease between the Airport and City.

which totals 68.7 acres, and Field 9, which totals 75.3 acres (Figure 1-1). The existing land use of the leased land has been agricultural with past cropping rotations that included typical dairy rotations of corn, soybeans, and winter wheat. The agricultural fields have not previously been operated using conservation practices and this has resulted in significant erosion. The fields are either directly adjacent to the West Branch of the Fond du Lac River or a tributary, or they have stormwater pipes that drain the field for direct discharge to the river. For example, a stormwater pipe drains the northeastern edge of Field 3,6 (Figure 1-2).



Figure 1-1. Field 3,6 and Field 9 at the Fond du Lac County Airport Property



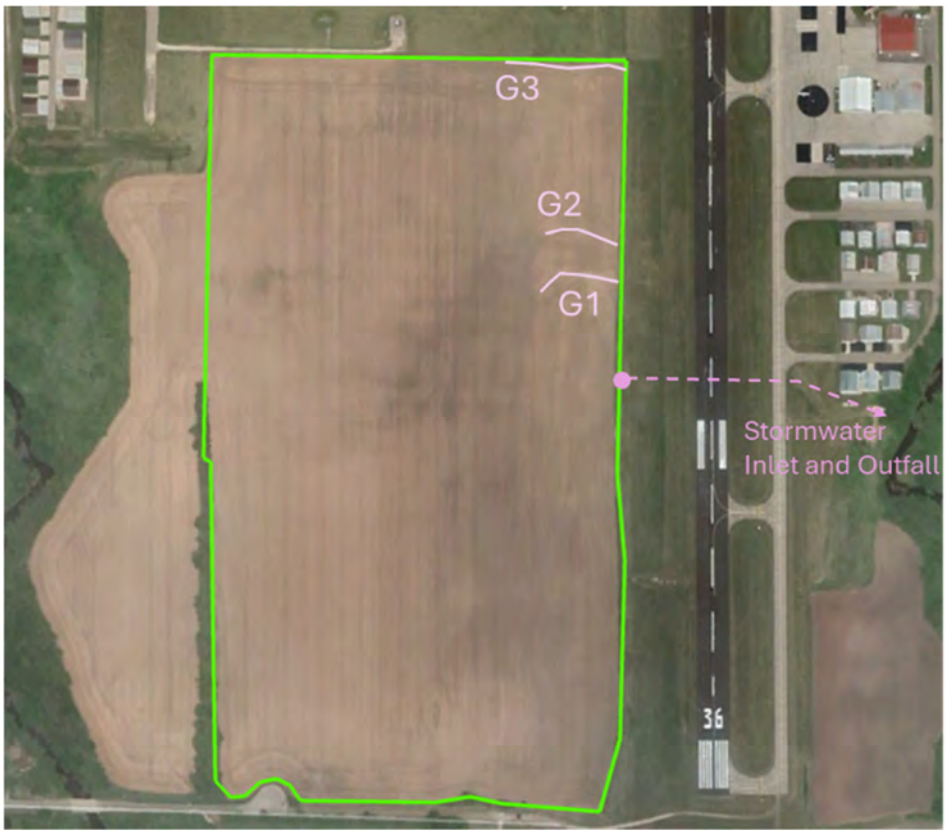
Figure 1-2. Stormwater Pipe and Outfall Draining Northeast Portion of Field 3,6

The Airport has traditionally leased the tillable land to agricultural operators with requirements to manage and maintain the land to comply with Federal Aviation Administration requirements because of the proximity to the active runways. Restrictions are intended to deter wildlife activity and maintain safe operations at the Airport. The lease agreement between the City and Airport has similar provisions, including restrictions on standing water and grasses must be maintained at heights no greater than 18 inches.

1.3 Resource Concerns

A field walk was completed by Jacobs and WTRRF staff on November 6, 2020, with additional site visits by various team members, including Tilth Agronomy and the Fond du Lac County Land and Water Conservation Department (LWCD) in 2021, 2022, 2024, and 2025 to support the development of this WQT Plan. Several gullies were observed in the fields (Figures 1-3 and 1-4), all of which have been addressed through implementation of conservation management practices (refer to Section 2). Smaller gullies reformed each year while the larger gullies that were observed by the field teams in 2020 were

estimated to form over 2 to 3 years; these were based on field observations, review of aerial photographs, conversations with the airport and contracted farmer, and professional judgment of the conservation and agronomy staff. These differences were accommodated in the modeling used for calculating estimated mass reductions (refer to Section 2.3).





Gully G1



Gully G2



Gully G3

Figure 1-3. Gullies Observed in Field 3,6





Gully G1



Gully G2



Gully G3



Gully G4 Gully G5 Gully G6

Gully G7 Gully G8

Figure 1-4. Gullies Observed in Field 9

2. Conservation Practices and Credit Summary

2.1 Conservation Management Practices

Fields 3,6 and 9 have been converted from row crop agricultural land to a permanent grass conservation cover. The land conversion is anticipated to address several of the gullies; however, the more significant gullies were constructed as grass and rock-lined waterways to achieve permanent stabilization. The installed management practices to correct the resource concerns and generate WQT credits are summarized in Table 2-1 and conceptually shown on Figures 2-1 and 2-2. NRCS standards are included in Appendix C. Drawings for the Airport runway construction are included in Appendix D. Documentation of the individual gullies, including gully dimensions and modeling inputs, and the installed management practices are included in Appendix E.

Table 2-1. Proposed Conservation Management Practices

Management Practice	Addressed Resource Concern	Example NRCS Practice Code	Redline Design Dimensions	Notes
Field 3,6				
Permanent grass for conservation cover	Field Conversion and Critical Area Planting for Gullies G2 and G3	511, 512, 342	68.6 ac	The gully area was excluded from the field areas for calculating field conversion mass reductions.
Grassed waterway (WW1)	Gullies G1	412	244 ft	
Field 9				
Permanent grass for conservation cover	Field Conversion and Gullies G5, G6, G7, G8	511, 512	75.0 ac	The gully areas were excluded from the field areas for calculating field conversion mass reductions.
Grassed waterway (WW1)	Gully G1	412	838 ft	
Rock-lined waterway	Gully G1	468	58 ft	Rock at end of WW1 where it meets the ditch provides extra armoring.
Grassed waterway (WW2)	Gully G2	412	961ft	
Grassed waterway (WW3)	Gully G3	412	955 ft	Will address Gully G3 by relocating waterway to south edge of field.
Rock-lined waterway	Gully G3	468	201 ft	Rock at beginning of WW3 for extra armoring from runoff from the Fondy Sports Park.
Grassed waterway (WW4)	Gully G4	412	596 ft	

ac = acre(s); ft = foot/feet; NRCS = Natural Resources Conservation Service; WW# = Waterway #



Figure 2-1. Gully Resource Concerns and Proposed Management Practices on Field 3,6

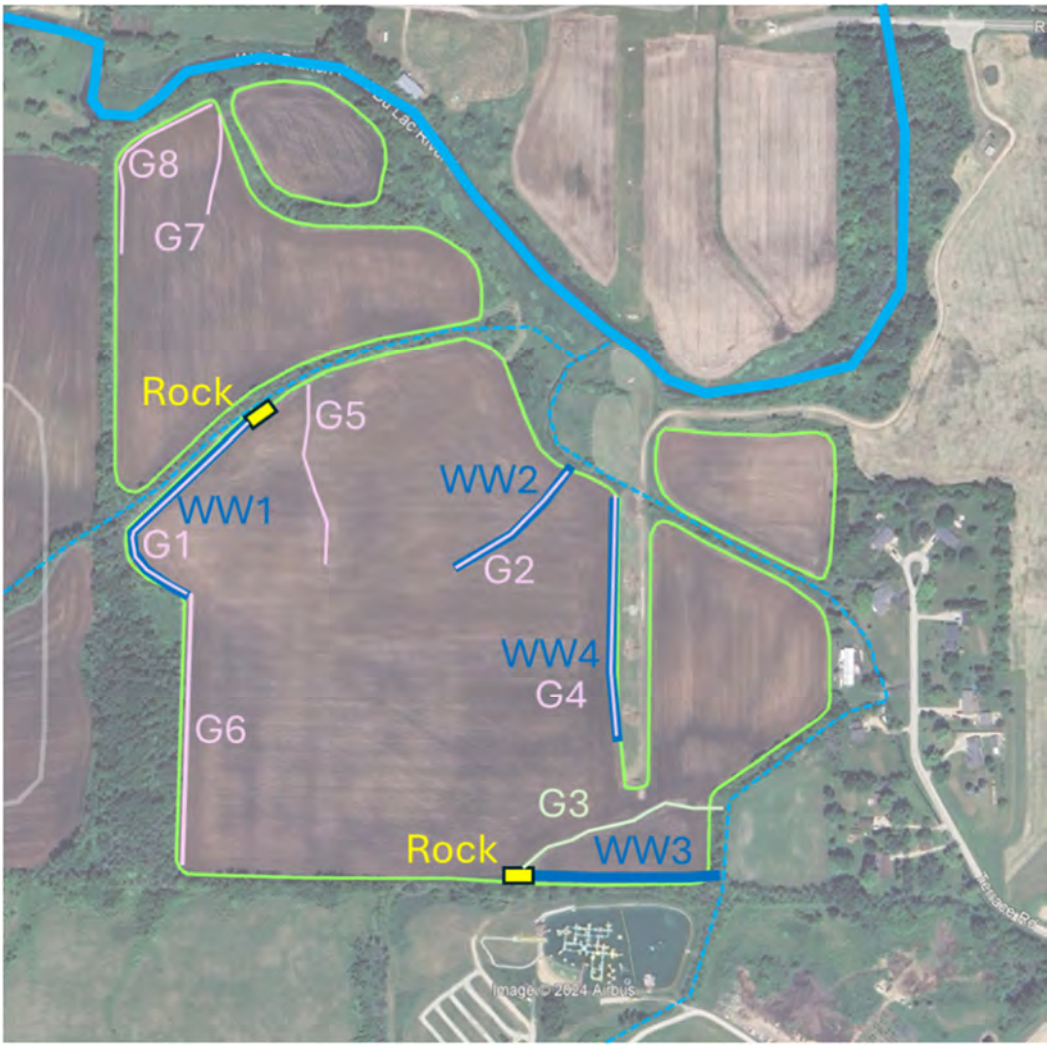


Figure 2-2. Gully Resource Concerns and Proposed Conservation Management Practices on Field 9

2.1.1 Grass/Hay Conservation Cover

The City partnered with a local farmer to convert Fields 3,6 and 9 from row crops to conservation cover, including planting the conservation cover and maintenance mowing. The grass/hay mix was planted and is being maintained consistent with Natural Resources Conservation Service (NRCS) Practice Codes 511 and 512 where the partner farmer will harvest the grass to meet Airport height requirements.

The grass/hay mix was designed by the Fond du Lac County LWCD so that the cuttings would meet the Airport height restrictions and also could be used for feed or another beneficial reuse. This mix design will assist in removing phosphorus from the fields and includes oats (nurse crop during grass establishment), versagrass (common conservation planting), and alfalfa (beneficial for feed) in the following quantities:

- 50 pounds per acre Goliath Oats
- 10 pounds per acre versagrass (2.5 pounds smooth bromegrass, 2.5 pounds orchardgrass, 2.5 pounds timothy, and 2.5 pounds perennial ryegrass)
- 10 pounds per acre Country Visions 4235 alfalfa

In areas where the grass/hay conservation cover was used to correct smaller gullies, two or more passes were completed for planting the grass/hay. This provides greater protection in these areas.

2.1.2 Grass and Rock-Lined Waterways

The design and construction of the grass and rock-lined management practices is consistent with NRCS practice codes. Some gullies did not meet design thresholds for requiring a grassed waterway and a less protective critical area planting (Practice Code 342) was sufficient. Gullies G2 and G3 on Field 3,6 did not meet design standards for a grassed waterway because the tributary area, gully length, or slope was too small. While a critical area planting may have been sufficient, the City installed a more protective grassed waterway because the observed erosion in these areas was significant and the waterways would reduce the potential for a gully to form again in the future.

The City did not apply for NRCS funding for the management practices; however, NRCS practice codes were referenced for each management practice to guide the design and the maintenance tasks and schedule.

The best management practices (BMPs) were designed by the County LWCD with engineer approval provided by the Wisconsin Department of Agriculture, Trade, and Consumer Protection. This is common practice at the Fond du Lac County LWCD. The LWCD provided bidding support, assisted with contractor selection, and provided construction oversight, construction closeout, and verification that the project was constructed consistent with the design.

2.2 Mass Reduction Modeling

Mass reductions for conservation practices were modeled using the Spreadsheet Tool for Estimating Pollutant Loads (STEPL) (version 4.4), the Soil Nutrient Application Planner (SnapPlus) (version 20.4) and the NRCS Streambank Erosion Estimator. Soil samples were collected by the City in fall 2021 and nutrient management data were obtained through conversations with the current operator, his nutrient plan writer, and the fertilizer cooperative. Direct observations also were completed through site visits and aerial photography review. SnapPlus modeling was completed to reflect current crop information, soil test values, and the conversion of all fields to grass/hay conservation cover. SnapPlus modeling inputs included:

- Soil sampling results from 2021. Field averages for phosphorus were low, between 5 and 20 parts per million.
- Actual crop data were used for years 2020 to 2023. Past cropping practices were used to project future rotations for at least 10 years from 2024 to 2036 of corn grain – soybeans – corn grain – soybeans – winter wheat.
- Fertilizer application schedules by crop type were based on data from the operator's co-op. No manure application is used.
- Tillage type was based on observed practices and included fall chisel after corn grain and no-till after soybeans.
- Cover crops have not been used.
- Following recommendations by Laura Ward-Good (SnapPlus model developer): First-year conservation cover is modeled as "oatlage with alfalfa grass seeding spring." Subsequent years, the conservation cover is modeled as "grass hay."
- No starter fertilizer is used for the conservation cover.

- Following recommendations by the County LWCD, grass/hay yield is 2 to 3 tons per acre.

SnapPlus does not account for soil and nutrient loss from gullies. Discussion with WDNR from May 2022 through February 2026 concluded that significant gullies which required constructed waterways may be calculated using STEPL or the NRCS Streambank Erosion Estimator Tool, where smaller gullies were corrected and accounted for in the SnapPlus model for field conversion. STEPL modeling was completed for individual gullies using the NRCS equation for gully erosion and Revised Universal Soil Loss Equation. Inputs for the STEPL model are detailed in Appendix E and included the following:

- The top width, bottom width, depth, and length were measured with measuring tapes during field investigations, soil sampling, and review of aerial imagery. Gully lengths were also checked by reviewing aerial photographs because field observations were completed in the same year (2020) when aerial photographs were available.
- Long waterways with variable top width, bottom width, or depth were separated into upstream and downstream portions in STEPL to acknowledge the changing geometry.
- Most of the observed gullies form after 1 year, as confirmed by field visits between 2020 and 2024, when gullies were tilled and planted through and reappeared. For the larger portions of gullies, historic aerial photos also were used to estimate the approximate number of years gullies take to form.
- A site-specific BMP Efficiency Ratio of 0.9 was approved by WDNR for use in STEPL. A Technical Memorandum, *Best Management Practice Efficiency Inputs for Modeling Phosphorus and Total Suspended Solids Reductions using the Spreadsheet Tool for Estimating pollutant Loads* (Jacobs, August 11, 2025) is included in Appendix E.
- The soil input properties were taken from the NRCS web soil survey (https://websoilsurvey.nrcs.usda.gov/app/).
- Stormwater plans for the Airport were reviewed to confirm drainage from WW1 in Field 3,6 is collected by a storm sewer near the field edge. The storm sewer outlets to a rock-lined bank on the West Branch of the Fond du Lac River. The drawings of the storm sewer infrastructure and supporting photos are included in Appendix D.
- Following discussion with WDNR, it was determined that insufficient evidence was available to document Gully 4 on Field 9 as a naturally occurring gully. The NRCS Streambank Erosion Estimator was used to estimate the sediment loss along the gully banks using lateral recession rates. Phosphorus reductions were estimated using a percent soil concentration. Inputs provided by WDNR are summarized in Appendix E.

2.3 Mass Reductions

Modeling output from mass reductions calculated from STEPL and SnapPlus are included in Appendices E and F, respectively. As shown in STEPL modeling output in Appendix E and referenced in Section 1.3, some gullies were modeled as forming annually, and some gullies (larger gullies) were modeled as forming over a longer period of time. Gully dimensions were measured in the field where average values were used to represent individual segments.

The gully areas were excluded from field conversion mass reductions calculated by SnapPlus to not double count reductions between the SnapPlus and STEPL models. Table 2-2 summarizes the mass reduction modeling results.

Table 2-2. Modeled Mass Reductions from Conservation Management Practices

Field	Proposed Conservation Management Practices	Phosphorus			TSS		
		Gully and Streambank Erosion Phosphorus Mass Reduction (lbs/yr)	Whole-field Land Conversion Phosphorus Mass Reduction (lbs/yr)	Total Field Estimated Phosphorus Mass Reduction (lbs/yr)	Gully and Streambank Erosion TSS Mass Reduction (tons/yr)	Whole-field Land Conversion TSS Mass Reduction (tons/yr)	Total Field Estimated TSS Mass Reduction (tons/yr)
3,6	Grass/hay conservation cover field conversion; Grassed waterway WW1	32	73	105	52	8	60
9	Grass/hay conservation cover; Grassed waterways WW1 to WW4; Rock-lined waterways for WW1 and WW3	47	202	249	76	34	110
	Total	**79**	**275**	**354**	**128**	**42**	**170**

lbs/yr = pound(s) per year; tons/yr = tons per year

2.4 Credits for Water Quality Trade

WDNR's *Guidance for Implementing Water Quality Trading in WPDES Permits* (June 2020) (Guidance) was used to determine the pollutant loading threshold, trade ratios, and long-term versus interim credits. The TMDL includes additional detail for executing trades that is supplemental to the Guidance document.

The trade ratio was calculated by the addition of a delivery factor, downstream factor, equivalency factor, and an uncertainty factor. The minimum trade ratio is 1.2:1. The trade ratio for the proposed BMPs is summarized by the following:

- Delivery Factor: All proposed trades are within the Fond du Lac River watershed in TMDL subbasins 75 and 44 (Figure 2-3), resulting in a delivery factor of zero.
- Downstream Factor: The trades are upstream of the WTRRF, resulting in a downstream factor of zero.
- Equivalency Factor: The equivalency factor is zero for phosphorus and TSS credits.
- Uncertainty Factor: Guidance Appendix H and subsequent discussions with WDNR resulted in the following uncertainty factors for the proposed conservation practices:
  - Converting the agricultural fields to perennial grass/hay conservation cover (NRCS Technical Standards 511 and 512) has the same functionality as a *Conservation Easement* (NRCS Technical Standard 327) with an uncertainty factor of 1.
  - Grassed waterways (NRCS Technical Standard 412) have an uncertainty factor of 2 or 3 depending on the documented connectivity to the stream.

These factors result in a trade ratio of 1.2:1 for grass/hay conservation cover and 2:1 or 3:1 for rock-lined and grassed waterways that address significant gullies.



Figure 2-3. Proposed Water Quality Trade Location within the TMDL-Numbered Subbasins

Note: The dashed circle represents the location of water quality trades. Blue lines are the National Hydrography Dataset for rivers and streams. The TMDL subbasins are in black and labeled with the corresponding numerical ID. The WTRRF outfall is noted as an orange star. The urban areas are the City of Fond du Lac.

Interim credits have a maximum lifespan of 10 years and are generated by trades that achieve the interim credit floor defined by the TMDL for each subbasin. Long-term trades are generated from a reduction of pollutant loads below the credit threshold and have a lifespan equal to the lifespan of the installed management practice.

The phosphorus and TSS baseline load and credit threshold from TMDL Appendix J, Table 1, Agricultural Phosphorus and Sediment Targets, were used for each subbasin (Table 2-3). The Guidance Appendix E advises to round the phosphorus credit thresholds to the nearest 0.5 pound per acre per year (lb/ac/yr), where total phosphorus credit thresholds between 0.01 lb/ac/yr and 0.59 lb/ac/yr are rounded to

0.50 lb/ac/yr. The highest value between either the rounded or unrounded credit threshold may be used for credit calculations.

Table 2-3. Agricultural Total Phosphorus and TSS Targets for TMDL Subbasins 75 and 44

TMDL Subbasin	Total Phosphorus Baseline from TMDL (lb/ac/yr)	Total Phosphorus Percent Reduction	Total Phosphorus Credit Threshold from TMDL (lb/ac/yr)	Total Phosphorus Credit Threshold for Calculations (lb/ac/yr)	TSS Baseline from TMDL (tons/ac/yr)	TSS Percent Reduction	TSS Credit Threshold from TMDL (tons/ac/yr)
75	2.59	83%	0.44	0.50	1.88	0%	1.88
44	3.24	83%	0.55	0.55	2.35	70%	0.70

Source: TMDL Appendix J, Table 1, Agricultural Phosphorus and Sediment Targets
tons/ac/yr = tons per acre per year

The current condition and grass/hay conversion phosphorus loadings were calculated for each field using SnapPlus. The comparison of the SnapPlus models' Phosphorus and Sediment Trade Reports (using averages between 2026 through 2030 and values in Table 2-3) allowed for the calculation of the interim and long-term credits for each agricultural field with grass/hay conservation cover using a trade ratio of 1.2:1 (Tables 2-4 and 2-5).

Table 2-4. Interim and Long-Term Phosphorus Credit Calculations for Fields with Grass/Hay

	A	B	C	D	E	F		
Field	Acres	Current Conditions Load (lb/ac/yr)	Grass/hay Conversion Load (lb/ac/yr)	Credit Threshold (lb/ac/yr)	Total Load for Interim Credit (lb/ac/yr) (B – D)	Total Load for Long-Term Credit (lb/ac/yr) (D – C)	Interim Credits (lbs) (E*A/1.2)	Long-Term Credits (lbs) (F*A/1.2)
3,6	68.6	1.10	0.03	0.50	0.60	0.47	34.1	27.1
9	75.0	2.73	0.03	0.55	2.18	0.52	136.1	32.2
						Total	**170.2**	**59.3**

Table 2-5. Interim and Long-Term TSS Credit Calculations for Fields with Grass/Hay

	A	B	C	D	E	F		
Field	Acres	Current Conditions Load (tons/ac/yr)	Land Conversion Load (tons/ac/yr)	Credit Threshold (tons/ac/yr)	Total Load for Interim Credit (tons/ac/yr) (B – D)	Total Load for Long-Term Credit (tons/ac/yr) (D – C)	Interim Credits (tons) (E*A/1.2)	Long-Term Credits (tons) (F*A/1.2)
3,6	68.6	0.12	0.00	1.88	0.00	0.12	0	6.9
9	75.0	0.46	0.01	0.70	0.00	0.45	0	28.3
						Total	**0**	**35.2**

Interim and long-term credits for STEPL and NRCS Streambank Erosion Estimator modeled reductions were determined by the percent load reduction for each subbasin in the TMDL, which was 83% for total phosphorus and 0% (subbasin 44) and 70% (subbasin 75) for TSS (Table 2-3). Table 2-6 shows the individual modeled reductions and credit calculations for each grassed waterway.

Table 2-6. Interim and Long-Term Credit Calculations for Gullies, See Also Appendix E.

Field	Gully (Refer to Figures 2-1 and 2-2 and Appendix E for locations)	A			B		
		Phosphorus Mass Reduction (lbs/yr)	Phosphorus Interim Credit (lbs/yr) (A*0.83/2)	Phosphorus Long-Term Credit (lbs/yr) (A*(1 –0.83)/2)	TSS Mass Reduction (tons/yr)	TSS Interim Credit (tons/yr) (B*0.7/2; B*0/2)	TSS Long-Term Credit (tons/yr) (B*(1 –0.7)/2; B/2)
3,6	Gully G1, upstream	8.3	2.3	0.5	13.5	0.0	4.5
3,6	Gully G1, downstream	1.8	0.5	0.1	2.9	0.0	1.0
3,6	Gully G2, upstream	8.3	2.3	0.5	13.5	0.0	4.5
3,6	Gully G2, downstream	4.1	1.1	0.2	6.7	0.0	2.2
3,6	Gully G3	9.7	2.7	0.6	15.8	0.0	5.3
9	Gully G1, upstream	13.4	5.6	1.1	21.8	7.6	3.3
9	Gully G1, downstream	4.7	2.0	0.4	7.7	2.7	1.1
9	Gully G2	10.6	2.9	0.6	17.2	4.0	1.7
9	Gully G3	14.4	6.0	1.2	23.3	8.2	3.5
9	Gully G4	3.7	1.5	0.3	5.6	2.0	0.8
	Total	**79.1**	**26.9**	**5.5**	**127.9**	**24.4**	**27.9**

A projection of future mass needs at the WTRRF concluded that 350 lbs/yr of phosphorus water quality credits are needed to meet the TMDL limit for the upcoming WPDES permit term (Appendix G). This is based on average annual conditions and the 75th percentile of a Monte Carlo simulation of the WTRRF's performance. The 75th percentile was chosen to balance cost and risk management of exceeding permit conditions, where the WTRRF can account for times beyond the average year and 75th percentile through machine learning advancements and chemical polishing to augment the biological phosphorus removal. **The conservation practices on Field 3,6 and Field 9 result in 197.1 lbs/yr of interim credits and 64.8 lbs/yr of long-term phosphorus credits (total of 261.9 lbs/yr phosphorus credits)**, which may not be sufficient to meet the needs for the upcoming permit application. The City may evaluate additional water quality trade projects if increasing flows and loads are realized in the near term. Additional chemical and optimization of the existing biological phosphorus removal process are also in progress to reduce the potential annual load discharged by the WTRRF.

The TMDL also includes TSS allocations for the WTRRF including a weekly average permit limit of 4,558 lbs/day and a monthly average permit limit of 3,558 lbs/day. As part of the WPDES permit application, the DNR performed an analysis of WTRRF performance from 9/1/2029 through 7/31/2024 which resulted in a 1-day P99 (99th percentile calculation) of 3,343 lbs/day and a 30-day P99 of 841 lbs/day. The WDNR concluded the WTRRF is already meeting the TSS TMDL mass limits and a compliance schedule is not needed. Therefore, TSS credits generated by this trade will not be needed by the WTRRF and may be utilized instead for the City's stormwater permit. **The conservation practices result in 24.4 tons/yr of interim credits and 63.1 tons/yr of long-term credits for TSS (total of 87.6 tons/yr TSS credits).**

3. Inspections, Tracking Procedures, and Maintenance

The County LWCD performed construction oversight to verify the practices were installed consistent with the designs and NRCS Technical Standards. The City will complete verification and maintenance of installed BMPs on an ongoing basis, including annual inspections to ensure practices remain in good condition and are functioning as expected and monthly inspections for the City's WTRRF Discharge Monitoring Report. Inspections that identify a maintenance need will have corrective actions completed by the City. The practice will remain on a maintenance list until subsequent inspections confirm the practice's original function is restored. Documentation of BMP inspections and subsequent maintenance activities will be included in each year's Annual Report. Should a BMP fail beyond the ability to repair with simple corrective actions (such as reseeding or securing erosion fabric), the City will notify WDNR and work with the County LWCD on a restoration plan.

All BMPs will be inspected and maintained consistent with NRCS standards. Operation and maintenance details and inspection forms are included in Appendix H.

3.1 Temporary Aircraft Parking

Consistent with the City's lease agreement with the County (Appendix B), Field 3,6 will be used temporarily to park small airplanes during the annual Experimental Aircraft Association AirVenture in Oshkosh, Wisconsin. Parking may occur for about 8 to14 days as participants may arrive early or stay later than the 8-day duration of the AirVenture. Parking will occur when the ground can support the aircraft so that no damage to the fields occurs and no airplanes get stuck in the fields. This is a common practice for this airport (and Oshkosh) during AirVenture. Figure 3-1 is an example of the aircraft parking.



Figure 3-1. Example Aircraft Parking on Grass during AirVenture

Source: Airteamimages.com, Fond du Lac Airport

4. Summary

The City identified a significant need for conservation management practices on agricultural land owned by the Airport for use by the WTRRF and City stormwater for TMDL phosphorus and TSS compliance. Conservation practices such as grass/hay conservation cover and grassed and rock-lined waterways to repair severe gully erosion on Field 3,6 and Field 9 resulted in 197.1 lbs/yr of interim phosphorus water quality trading credits and 64.8 lbs/yr of long-term phosphorus water quality trading credits (261.9 lbs/yr total phosphorus credits) and 24.4 tons/yr of interim credits and 63.1 tons/yr of long-term credits for TSS (87.6 tons/yr total TSS credits).

Interim credits will be used for up to 10 years (ending 12/31/2036), while long-term credits may be used beyond 2036. The City may reallocate the credits in the future between themselves or trade the credits with another discharger if the credits are not needed by the City. This would be completed through an amendment to the WQT Plan and coordination with WDNR. Figure 4-1 shows the timeline for implementing the water quality trade. Appendix I includes the WQT Management Practice Registration forms (Form 3400-207). Appendix J includes the WQT Checklist (Form 3400-208).

Activity	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
Field Walks, Soil Sampling, Planning	■	■	■	■														
Negotiate lease with County Airport			■	■														
Design and construct conservation practices					■													
Verify conservation practices are complete, register practices						■												
Final Water Quality Trading Plan							■											
WPDES Permit Renewal							■											
Interim Credits							■	■	■	■	■	■	■	■	■	■	■	
Long-Term Credits							■	■	■	■	■	■	■	■	■	■	■	■

Figure 4-1. Timeline for the Water Quality Trade

5. References

Donohue & Associates, Inc. 2020. *Fond du Lac Wastewater Treatment and Resource Recovery Facility Master Plan*.

The Cadmus Group LLC. 2020. *Total Maximum Daily Loads for Total Phosphorus and Total Suspended Solids, Upper Fox and Wolf Basin*. February 27.

Appendix A
Notice of Intent to Conduct Water Quality Trading

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 Fond du Lac	WI- 0023990-09-0	420004860

Facility Address	City	State	ZIP Code
700 Doty St.	Fond du Lac	WI	54935

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Cody Schoepke	700 Doty St.	Fond du Lac	WI	54935

Project Name
City of Fond du Lac/Fond du Lac County Water Quality Trade

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
Lake Winnebago	Phosphorus, TSS	040302030401

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: 040302030103 and 040302030204
- ○ 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:

Conservation practices currently being considered include the following: whole or partial field conversion from agricultural row cropping to a conservation cover, stream bank erosion control and restoration, in-field agricultural diversion, in-field grassed waterways, in-field critical area plantings, agricultural filter/buffer strips, stream and ditch crossing, and agricultural operational practices such as nutrient management, cover crops, reduced tillage, or residue management. Additional practices may be considered as planning and design proceed.

Method for quantifying credits generated:
- ☐ Monitoring
- ☒ Modeling, Names: STEPL, SnapPlus
- ☒ Other: Soil Sampling Data

Projected date credits will be available: 04/01/2025

The preparer certifies all of the following:

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

Signature of Preparer	Date Signed
Carl Schafer	6/4/24

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
Carl Schafer	6/4/24

Appendix B
Trade Agreement 10-31-2023 (Airport Lease)

LEASE OF FOND DU LAC COUNTY LAND
(Located in the Town of Fond du Lac, Airport Land)

PARTIES

This agreement of lease is executed this 31st day of October, 2023 by and between **FOND DU LAC COUNTY**, a municipal body corporate and political subdivision of the state of Wisconsin (hereinafter County) and The City of Fond du Lac(City). County and City are collectively referred to as "the parties."

NOW, THEREFORE, for and in consideration of the rental charges, covenants, and agreements herein contained, the City does hereby lease from the County the following premises, rights, and easements on and to the airport upon the following terms and conditions.

1. **Premises Description**:

   The lands, subject of this contract of lease, are included in the maps (see Attachment A) described as:

   Tract 3 and Tract 6 (combined acreage 68.77 acres)
   Tract 9 (88.82 Acres)

2. **Term:** The term of this lease shall be for a period of sixty (60) calendar months commencing on **January 1, 2024** and terminating on **December 31, 2029**.

3. **Rent:** City agrees to pay to the County for the use of the premises, rights, and easements herein described, a yearly rental rate of $110 per acre, 157.59 acres for a total of $17,334.90. City shall pay an annual rent in a lump sum on or before January 30th of each contract year. All rental amounts and fees shall be made payable to Fond du Lac County and shall be remitted to the Finance Department, 160 S. Macy St., Fond du Lac, Wisconsin 54935, without further notice or demand (invoices and reminders may be provided as a courtesy, at County's discretion). The rental rate will be determined by the "USDA-National Agricultural Statistics Service" at the time of lease renewal, but a minimum increase of 10% from previous rate. The preceding rental rate shall be reviewed and revised at the expiration of each five-year lease and incorporated as part of the renewal lease process.

4. **Remaining Acreage:** If the County, after good faith efforts, bidding process, or consideration of agricultural operators identified by the City, is unable to lease remaining agricultural land (approximately 118.99 acres, see Attachment B) at a yearly rental rate at least equal to this lease agreement, this lease agreement will be amended to either:

   a. Require the City to provide subsidy payment to the County of the difference between this lease agreement's yearly rental rate and the bid amount.

   b. Add the remaining agricultural land to this agreement with provisions to allow the City to sublease any portion of the agricultural land following County approval of the terms consistent with the Airport Agricultural lease included in Attachment C.

   c. Other conditions mutually agreeable to the parties.

5. **Renewal:** City retains the option to renew in five-year increments for three additional terms provided any alterations or modifications that the County and City may require are agreed upon, including the agreed upon rental rate per acre. (See item #3) This agreement automatically renews for each successive Renewal Term unless either party notifies the other of their intention not to renew the agreement at least 90 days prior to the expiration of the Initial Term or the Renewal Term which is then in effect.

6. **Use of the Premises:** City shall have the right to use the premises solely for agricultural and land conservation, for a purpose of generating water quality trading credits, and hereby agrees to the following:

    a. The demised premises shall be planted with only low growing crops not exceeding 18 inches' height. The premises shall be mowed by City or designee to maintain the agreed upon height and/or a height as deemed by airport manager.

    b. City agrees to cultivate said premises using good husbandry methods, and to apply fertilizers, herbicides, and pesticides according to good farming practices and to hold County harmless for the application thereof. None of the land herein shall be placed in any Federal set aside programs.

    c. Any equipment brought onto the premises shall be for agricultural purposes only and only during daylight hours, unless otherwise authorized by County. No equipment, harvested crops, feed, or other materials shall be stored on the premises when not in use unless otherwise authorized by County.

    d. Any conservation practice construction on or improvement of the leased area must be approved by County in writing prior to such use, to ensure airport operations will not be disrupted. County approval will not be unreasonably withheld.

    e. City agrees to keep said premises free from all noxious weeds and grasses, and in the event any appear on said premises, City agrees to destroy the same and to prevent them from bearing seed and to comply with the statutes of this state as to the time and manner of destroying same.

    f. City shall not burn any product of the land without the expressed permission of County.

    g. City shall not create or contribute to standing water within the premises.

    h. City is responsible for the removal of all garbage from the premises.

7. **Access:** City or designee shall have the right of ingress to and egress from the demised premises via the following access routes:

    a. West Grove Street secured gate

    b. West Airport Rogersville Rd farm gate

    c. East Rogersville Road farm gate

    d. County landfill farm gate

    e. West Forest Ave. (FAA- Localizer gate)

f. Terminal area (Three gates. One is secured, the other two may be opened upon request. Access through any of these gates will require an authorized airport personnel to escort the visiting party across the active taxiway and runway.)

City agrees to repair any damage to County's property caused by City's use of said access routes. City agrees not to permit the deposit of any crops, dirt, or debris upon those areas of airport property outside of the leased premises. Enhanced diligence is required during wet periods when mud and debris from field inspections may leave mud and debris on airport surfaces.

8. **Right to Inspect:** County reserves the right to enter upon the premises at any reasonable time for the purpose of making any inspection it may deem expedient to the proper enforcement of any of the covenants or conditions of this agreement, to satisfy water quality trading credit requirements, or to the operation of the airport.

9. **Signs:** No signs or advertising matter may be erected on the leased premises without the prior written consent of the County.

10. **Mineral and Gravel Rights:** Title to all minerals or gravel on said premises shall remain in County and this lease does not convey any rights thereto.

11. **Hunting Rights:** All hunting rights and privileges are reserved to County and this lease does not convey any rights thereto.

12. **Approach Protection:** County reserves the right to take any action it considers necessary to protect the aerial approaches of the airport against obstruction, together with the right to prevent City from erecting, or permitting to be erected, any building or other structure on the airport, which, in the opinion of County, would limit the usefulness of the airport, or constitute a hazard to aircraft. County agrees to notify the City in writing prior to taking said action.

13. **Insurance Indemnification:** City will provide public liability insurance in the following amounts: $100,000.00 per occurrence, $50,000 per person for bodily injuries or property damage as a result of any one accident.

    A certificate of insurance shall be provided to the Fond du Lac County Purchasing/Risk Management Agent annually. Said insurer shall be authorized to do business in the state of Wisconsin. The cancellation or other termination of any insurance policy issued in compliance with this section shall automatically terminate this lease unless another policy has been filed and approved pursuant to this section and shall be in effect at the time of cancellation/termination of the previous policy.

    City shall indemnify the County, its agents, employees and permittees for any acts of City or their agents, and permittee upon the lands subject to lease whether in performance of agricultural or conservation activity on Fond du Lac County airport, or in the process of entering or leaving County land.

14. **Hold Harmless:** City agrees to hold County harmless and keep County free, during the term of this lease (and subsequent renewal(s)) from any and all liability and claim for damages arising out of injuries to persons or damage to property while in or upon the demised premises resulting from the negligent operation, maintenance or use of the demised premises by City.

15. All parties to this agreement are governmental entities entitled to governmental immunity under law, including Section 893.80, Wis. Stats. Nothing contained herein shall waive the rights and immunities

to which each party may be entitled under law, nor is intended to be a waiver or estoppel of City or its insurer to rely upon including all of the immunities, limitations and defenses under Sections 345.05 and 893.80, Wis. Stats., or any subsequent amendments thereof, any federal law, common law or other applicable laws. To the extent that indemnification is available and enforceable, City or its insurer shall not be liable in indemnity, contribution or otherwise for an amount greater than the limits of liability of municipal claims established by Wisconsin Law.

16. **Liens and Encumbrances:** City shall neither create, nor cause or permit to be created, any lien, encumbrance, security interest or other charge, including liens for work, labor or materials furnished, or alleged to have been furnished, on the leased premises.

17. **Land Reduction:** County reserves the right to remove from this lease all or any part of the above described premises in the event the Lessor determines that said premises are needed for aeronautical purposes. County shall give City written notice of such removal at least ninety (90) days prior to the effective date of the removal, pursuant to Wis. Stat. §704.19(3). In the event of such removal, this lease shall continue on the unaffected land, but the rent will be proportionately adjusted. In the event there are any installed or planted practices in support of WQT practices on the affected lands, County shall pay to City $100 per acre for the reimbursement of said installation and practices for that current year.

    a. In the event County removes portions of the premises from the lease for development, and it includes conservation practices such as that repaired gully erosion (e.g. grassed waterway or critical area planting) County will require the development to maintain the conservation practice, or equivalent, to provide the equivalent water quality credit.

18. **Wildlife Considerations:** At the sole discretion of County, County may direct City to remove crops/grasses which attract birds or other wildlife and pose hazards to aircraft or any area aeronautical activities. In such events, County shall reimburse City at a rate of $100 per acre for growing crops taken and expenses incurred by City for that current year.

19. **Default and Termination:**

    a. **Default Defined:** City shall be deemed in default upon

        i. Failure to pay rent or any other properly-imposed fee within 30 days after due date.

        ii. The filing of any petition under the Federal Bankruptcy Act or any amendment thereto, including a petition for reorganization.

        iii. The commencement of any proceeding for dissolution or for the appointment of a receiver.

        iv. The making of an assignment for the benefit of creditors.

        v. Violation of any of the other terms or conditions of this lease after written notice to cease and/or correct such violation has been served upon City by County, and after City has failed to correct such violation within thirty (30) days of service of such notice (or such later deadline as may be established in the Notice by City). Mailing notice by U.S. Mail, Certified Mail, shall constitute "service" of notice. In the case of a violation which cannot with due diligence be cured within a period established, City may apply to County for an extension of time within which to cure said violation.

b. **Default Defined:** County shall be deemed in default upon:

   i. Fond du Lac County breaches or prematurely terminates the lease in violation of the lease terms. County will reimburse City $100 per acre for expenses incurred by City only for the current year the violation occurs.

c. **Effect of Default:** Default by City shall authorize County, at its sole option, to declare this lease void, to cancel the same, and to re-enter and take possession of the premises.

d. **Remedies:** Except otherwise provided herein, no right or remedy herein conferred shall be considered exclusive of any other right or remedy and each and every right and remedy shall be cumulative and in addition to any other right and remedy given hereunder, or now or hereafter existing at law or in equity or by statute.

e. **Restoration of Property:** Upon termination of this lease. City shall remove all of its buildings, equipment, and property, and restore the leased premises to its original vacant condition, unless County agrees, in writing, to accept all or any part of the property which City wishes to abandon.

f. **Non-waiver:** Any intentional or unintentional waiver by County of any violation of this Contract by City shall not be construed or interpreted to be a waiver of any other prior, subsequent or contemporaneous violation.

20. **Lease Transfer:** City may not assign or transfer this agreement or any interest contained herein, nor sublet any part of the premises without the consent of County.

21. **Reversion Clause:** Upon termination of the lease, the property reverts back to the airport for aeronautical use.

22. **Subordination Clause:** This lease shall be subordinate to the provisions of any existing or future agreement between County and the United States or the state of Wisconsin relative to the operation or maintenance of the airport, the execution of which has been or may be required as a condition precedent to the expenditure of federal or state funds for the development of the airport. Furthermore, this lease may be amended to include provisions required by those agreements with the United States or the state of Wisconsin.

23. **National Emergency:** During time of war or other state or national emergency, County shall have the right to suspend this contract, and to turn over operation and control of the airport to the state of Wisconsin and/or the United States Government During any period when the airport shall be closed by any lawful authority, thereby restricting the use of the airport in such a manner as to interfere with the use of same by City, the rent shall abate, and the period of such closure shall be added to the term of this lease so as to extend and postpone the expiration thereof.

24. **Nondiscrimination:** City, as a part of the consideration hereof, does hereby covenant and agree as a covenant running with the land that:

   a. No person on the grounds of race, color, or national origin shall be excluded from participation in, denied the benefits of, or be otherwise subjected to discrimination in the use of the subject property or City's Improvements.

b. In the construction of any improvements on, over, or under such land and the furnishing of services thereon, no person on the grounds of race, color, or national origin shall be excluded from participation in, denied the benefits of, or otherwise be subjected to discrimination,

c. City shall use the premises and maintain City's Improvements in compliance with all other requirements imposed by or pursuant to Title 49, Code of Federal Regulations, Department of Transportation, Subtitle A, Office of the Secretary, Part 21, Nondiscrimination, in Federally-assisted programs of the Department of Transportation-Effectuation of Title VI of the Civil Rights Act of 1964, and as said Regulations may be amended.

25. **Arbitration:** Any controversy or claim arising out of or relating to this lease or any alleged breach thereof, which cannot be settled between the parties, may be mediated, and if that is not successful, the parties' issue will be settled by arbitration in accordance with the rules of the American Arbitration Association, and judgment upon the dispute by the arbitrator(s) shall be final and binding on the parties.

26. **Severability:** This lease shall be construed under the laws of the state of Wisconsin. Any covenant, condition, or provisions herein contained that is held to be invalid by any court of competent jurisdiction shall be considered deleted from this lease, but such deletion shall in no way affect any other covenant, condition, or provision herein contained so land as such deletion does not materially prejudice County or City in their respective rights and obligations contain in the valid remaining covenants, conditions and provisions of the lease, and when such occurs, only such other covenants, conditions or provisions shall be deleted as are incapable of enforcement.

27. **Water Quality Trading Credits:** City shall have sole ownership and discretion of the water quality trading credits generated on the premises.

COVENANTS (PROMISES)

City covenants/promises and agrees to:

a) Follow the Agricultural Performance standards and prohibitions as required by Wisconsin Administrative Code NR 151, as amended. If subject to a nutrient management plan, City shall provide annually upon demand a soil testing and results in accordance with NR 151 to the Fond du Lac County Land and Water Conservation Department,

c/o Paul Tollard
848 S. Military Rd
Fond du Lac, WI 54935

Failure to provide the same and comply with any and all state laws will constitute a Breach of this lease.

b) Refrain from allowing persons not engaged with City to enter lands without County permission.

c) Restrict movement of machinery to land leased; City shall be apprised of and obey ordinances, and other rules and regulations restricting the use of lands subject to this lease

contract. City shall not use the demised premises for any unlawful purpose, or allow any other person to do so.

d) Upon expiration of this lease, return all acreage which remains in City's control to the possession of County free of any standing weeds or detrimental growth. This requirement shall apply to all lands originally leased or any fraction remaining thereof in the event the county has previously exercised its rights under this contract to reacquire leased lands or fractions thereof.

e) City shall not commit waste on, or damage to, the demised premises, and will use due care to prevent others from doing so. City shall also not commit a nuisance on the demised premises or permit others to do so.

f) City shall comply with all Federal Aviation Administration (FAA) regulations, Chapter 18 of the Fond du Lac County Code of Ordinances and Wisconsin Board of Aeronautics (BOA) regulations pertaining to the lease of airport agricultural lands.

g) City will allow aircraft parking during the Oshkosh EAA Airventure in Tract 3 and Tract 6 after two (2) years have lapsed following the construction of the conservation practices, where the conservation practices are fully established, if allowed by the State of Wisconsin Water Quality Trading plan, and the parking arrangement will not jeopardize the availability of the water quality trading credits. City will coordinate with County for mowing. Any damage to the land will be repaired by County as soon as possible to restore the land and preserve the water quality trading credits.

NOTICES

Notices shall be sufficient if hand delivered or sent by certified mail, postage prepaid, addressed to:

LESSOR

Fond du Lac County
Attn: Airport
160 S. Macy St.
Fond du Lac, WI 54935

LESSEE

City of Fond du Lac
Attn: City Clerk
160 S. Macy St.
Fond du Lac, WI 54935

IN WITNESSES WHEREOF, the parties hereunto set their hands and seals the day and year first above written:

WITNESSES

_____

_____

_____

FOND DU LAC COUNTY

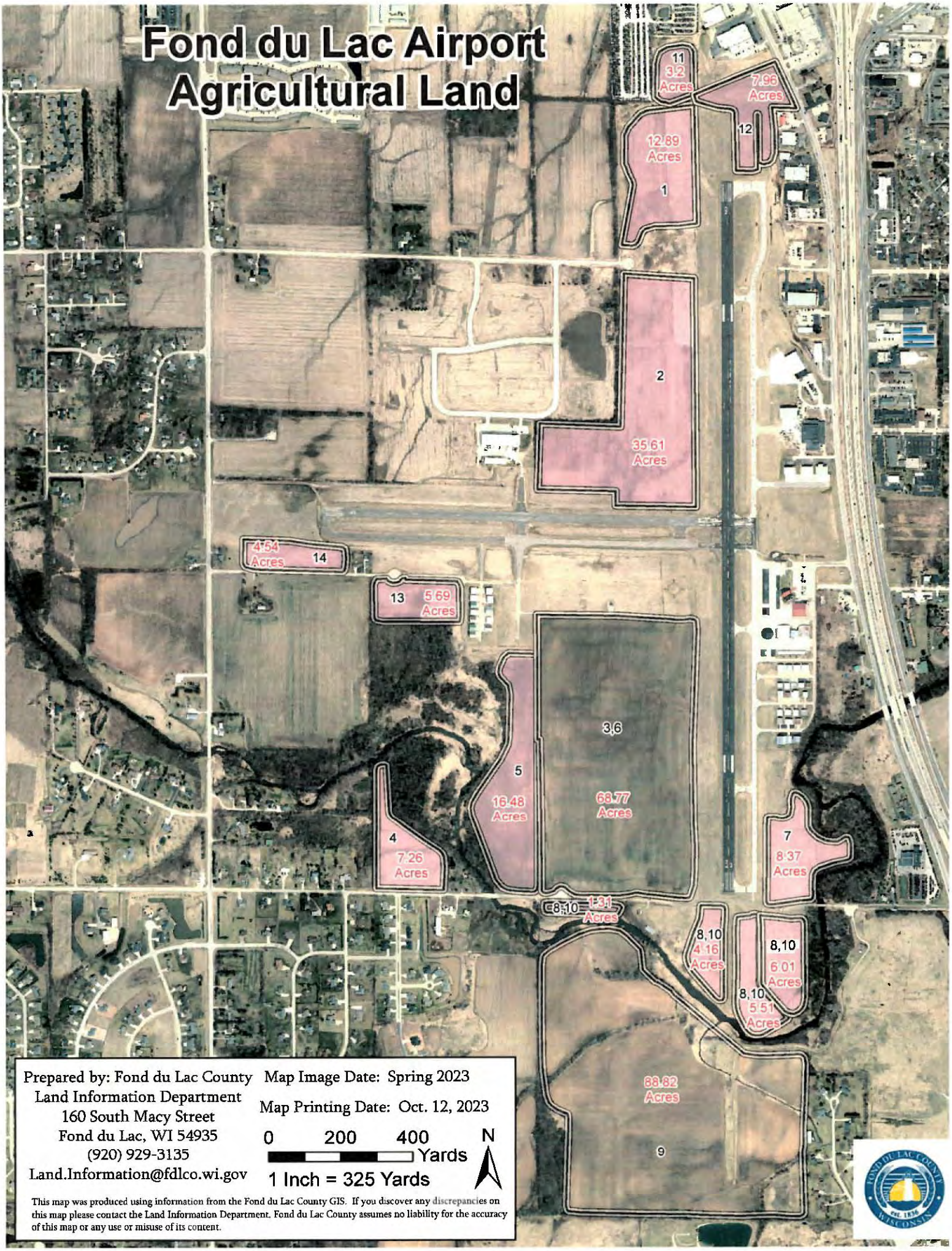
Steven Abel, County Board Chair

Lisa Freiberg, County Clerk

LESSEE:

Joe Moore, City Manager

Fond du Lac Airport Agricultural Land



Prepared by: Fond du Lac County
Land Information Department
160 South Macy Street
Fond du Lac, WI 54935
(920) 929-3135
Land.Information@fdlco.wi.gov

Map Image Date: Spring 2023

Map Printing Date: Oct. 12, 2023

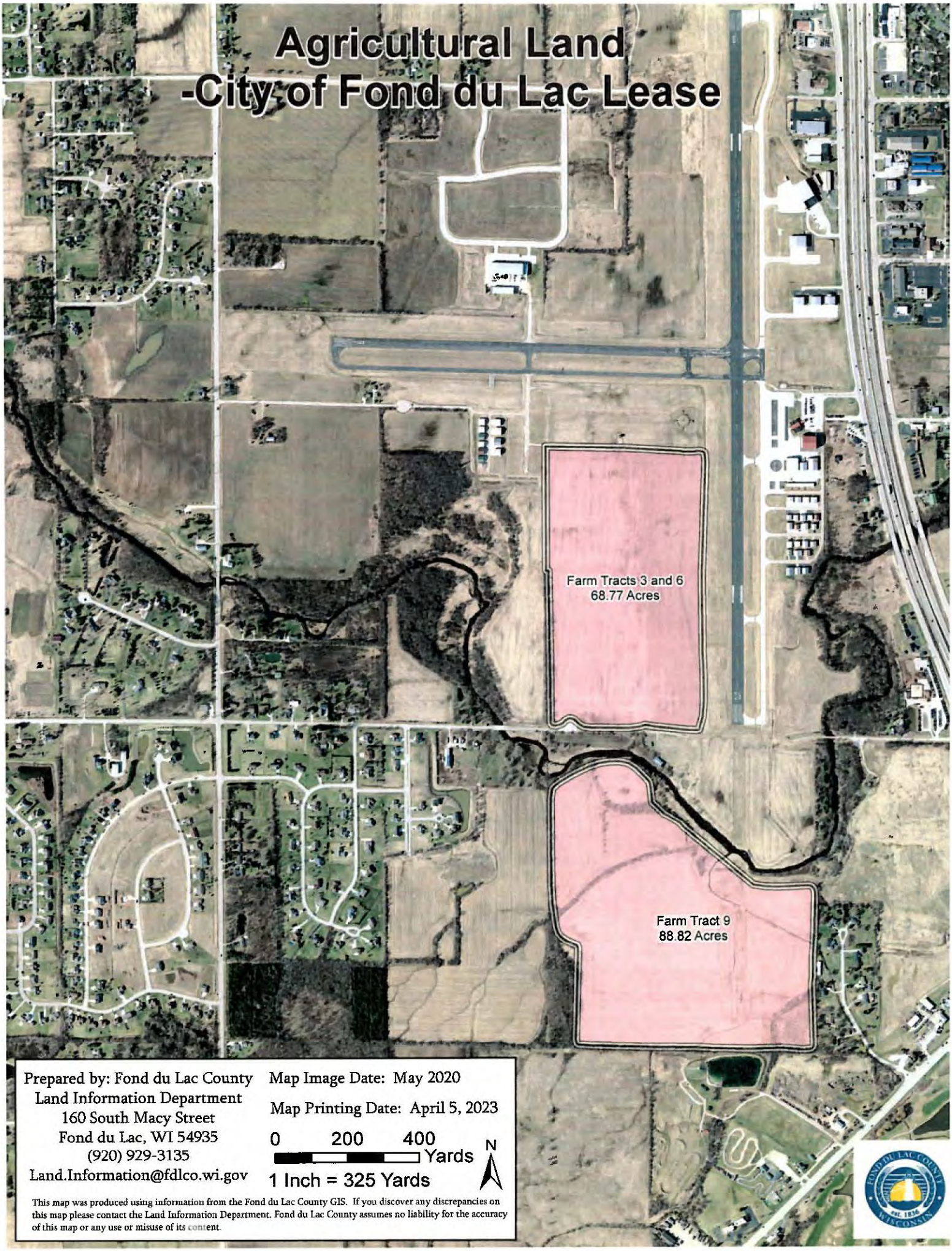
0 200 400 Yards

1 Inch = 325 Yards

N

This map was produced using information from the Fond du Lac County GIS. If you discover any discrepancies on this map please contact the Land Information Department. Fond du Lac County assumes no liability for the accuracy of this map or any use or misuse of its content.

Agricultural Land
-City of Fond du Lac Lease



Prepared by: Fond du Lac County
Land Information Department
160 South Macy Street
Fond du Lac, WI 54935
(920) 929-3135
Land.Information@fdlco.wi.gov

Map Image Date: May 2020

Map Printing Date: April 5, 2023

0 200 400 Yards

N

1 Inch = 325 Yards

This map was produced using information from the Fond du Lac County GIS. If you discover any discrepancies on this map please contact the Land Information Department. Fond du Lac County assumes no liability for the accuracy of this map or any use or misuse of its content.

Attachment C

LEASE OF FOND DU LAC COUNTY AGRICULTURAL LAND
(Located in the Town of Fond du Lac, Airport land)

I.

PARTIES

This agreement of lease is executed this _____ day of _____, _____ by and between **FOND DU LAC COUNTY**, a municipal body corporate and political subdivision of the state of Wisconsin (hereinafter County) and (example: **P.T Barnum, 123 Circus Rd., Fond du Lac, WI 54935**) (hereinafter Lessee). County and Lessee are collectively referred to as "the parties."

II.

PURPOSE OF LEASE

County authorizes, in consideration of the mutual covenants contained in this lease agreement, Lessee the use of certain vacant lands, for agricultural purposes only.

The lands, subject of this contract of lease, are included in the maps described as:

Tract 1 (12.89 Acres)
Tract 2 (35.61 Acres)
Tract 4 (7.26 Acres)
Tract 5 (16.48 Acres)
Tract 7 (8.37 Acres)
Tract 8 and Tract 10 (combined acreage 16.99 Acres)
Tract 11 (3.2 Acres)
Tract 12 (7.96 Acres)
Tract 13 (5.69 Acres)
Tract 14 (4.54 Acres)

III.

CONSIDERATION AND TERM

County and Lessee, each in consideration for the promises of the other, in addition to the mutual covenants in this agreement and for further good and valuable considerations, including payment of cash rentals in exchange for land use, agree to the following:

A. The term of the agricultural lease shall be for a period commencing January 1, 2024 and

concluding December 31, 2026. Pursuant to Wis. Stat. §704.19(3), either party shall give at least 90 days' notice of termination of tenancy.

B. The total annual rental of $_____ for 118.99 acres of land at $_____ per acres shall be paid by Lessee. Lessee shall make payments as follows:

1) Lessee shall pay the County the sum of $_____, as a non-refundable, pre-payment by_____. Failure to pay the designated amount by this date shall render this lease null and void on that date, without notice.

2) Thereafter, Lessee shall pay the difference between the amount paid under subsection 1) and the total annual rent stated, supra, as follows:

November 1, 2024 - $
November 1, 2025 - $
November 1, 2026 - $

IV.

SALES OF LANDS DURING LEASE PERIOD

The parties further agree that if County sells or otherwise converts to other usage, any portion of the lands leased or otherwise requires return of lands leased or any fraction thereof, County shall (upon giving Lessee written notice) be entitled to immediate possession of lands leased or fractions thereof.

In the event of sale, or the reacquisition of land leased, (or fraction thereof), or development by County, compensation for the reasonable value of crops and labor invested, and expenditures made, in planting and cultivating the affected lands, as of the effective date of County's notice of termination, shall be paid to Lessee by County. If the parties are uncertain as to the reasonable value of the above expenditures, the County Agricultural Agent shall be consulted and the Agent's determination of the reasonable value shall be binding on the parties.

V.

INSURANCE: INDEMNIFICATION

Lessee will provide public liability insurance in the following amounts: $100,000.00 per occurrence, $50,000.00 per person.

A certificate of insurance shall be provided to the Fond du Lac County Purchasing/Risk Management Agent annually. Said insurer shall be authorized to do business in the state of Wisconsin. The cancellation or other termination of any insurance policy issued in compliance with this section shall automatically terminate this lease unless another policy has been filed and

approved pursuant to this section and shall be in effect at the time of cancellation/termination of the previous policy.

Lessee shall indemnify County, its agents, employees and permittees for any acts of Lessee or his agents, employees and permittee upon the lands subject to lease whether in the performance of agricultural duties or in the process of entering or leaving County land.

Lessee agrees to hold County harmless and keep County free, during the term of this lease agreement from any and all liability and claim for damages arising out of injury to persons or damage to property while in or upon the demised premises resulting from the negligent operation, maintenance or use of the demised premises by Lessee.

VI.

COVENANTS (PROMISES)

Lessee covenants/promises and agrees to:

a) Use lands leased for agricultural and related purposes only, specifically for producing crops.

b) Grow only low profile crops in those areas designated by County.

c) Work the land in a prudent, sound manner, taking care to cut and eliminate weeds.

d) Adequately fertilize the soil, but also annually provide by March 31 and follow the Agricultural Performance standards and prohibitions as required by Wis. Admin. Code NR 151, as amended. Lessee shall provide a Nutrient Management plan to the:

Fond du Lac County Land and Water Conservation Department
c/o Paul Tollard
W6529 Forest Avenue
Fond du Lac, WI 54937

Failure to provide the same and comply with any and all state laws will constitute a breach of this lease.

e) Correctly plow and cultivate the land.

f) Cut standing alfalfa or other forage in a timely manner, harvesting crops as soon as they are mature and weather allows.

g) Refrain from using any lands leased for grazing of livestock, unless County gives its written consent.

h) Refrain from allowing persons not engaged with Lessee in agricultural work, to enter lands without County's permission.

i) County shall be permitted to exhibit the land to a purchaser or enter the land for any purpose which does not materially interfere with the agricultural purposes of this lease, at any time.

j) Restrict movement of machinery to land leased; Lessee shall be apprised of and obey ordinances, and other rules and regulations restricting the use of lands subject to this lease contract. Lessee shall not use the demised premises for any unlawful purpose, or allow any other person to do so.

k) Upon expiration of this lease, return all acreage which remains in Lessee's control to the possession of County free of any standing crop and tilled. This requirement shall apply to all lands originally leased or any fraction remaining thereof in the event County has previously exercised its rights under this contract to reacquire leased lands or fractions thereof.

l) Lessee shall not commit waste on, or damage to, the demised premises, and will use due care to prevent others from doing so. Lessee shall also not commit a nuisance on the demised premises or permit others to do so.

m) Lessee shall not (upon penalty of immediate forfeiture of the lease conveyed by this lease agreement) without the written consent of County, make, or permit to be made, any additions to or alterations of the demised premises. All additions to and any alterations of the demised premises shall immediately become part of the realty, and the property of County.

n) Lessee shall provide annually upon demand to County, soil testing and results in accordance with NR 151, Wisconsin Administrative Code.

VII.

COUNTY'S REMEDIES ON DEFAULT BY LESSEE

Lessee agrees that in the event Lessee should be in default of the performance of any of the terms or conditions of the lease agreement, or have otherwise breached this lease agreement, County may in addition to every remedy now and hereafter available at law or equity have the rights and remedies set forth in this lease agreement, which shall be deemed cumulative and not exclusive of those available at law or equity.

County shall have the right to re-enter the demised premises without affecting thereby the termination of this lease agreement, by giving Lessee lawful notice of such intention. County either before or after entry, may notify Lessee, if Lessee can be located, that County elects to terminate this lease agreement, or, that County elects to re-let the demised premises on Lessee's account under terms and conditions provided below. If Lessee cannot with reasonable diligence be located within 30 days after abandonment of the demised premises, County may make the election without notice to Lessee, or by such substituted notice as the law shall provide or allow.

County shall have the right to own and possess at County's election all crops both harvested and un-harvested; the right to remove all property and persons from the demised premises; and the right to store in a public warehouse at Lessee's expense all property so removed. At County's election, County may terminate this lease agreement, or without terminating it, re-let the demised premises or any part of the demised premises, upon such terms and conditions, and at such rental as to County may seem advisable, and from time to time. The term of such re-letting may be for a term beyond the term of this lease agreement.

County shall have the right to, at Lessee's expense, alter the demised premises, or any part of the demised premises, and put the demised premises in good condition and repair.

Upon such re-letting, County may elect:

l) To hold Lessee immediately liable for:

a) the expenses of re-letting, altering and repairing the demised premises:

b) the amount by which the rent reserved in this lease agreement for the period of re-letting (not exceeding the term of this lease agreement, however), exceeds the amount agreed to by the new Lessee or Lessees, to be paid as rent for the re-let

premises;

c) all indebtedness due under this lease agreement, or,

2) To apply the periodic rents received by County:

a) first, to any indebtedness (other than rent) due from Lessee to County;

b) second, to the payment of expenses incurred by County in repairing and altering the demised premises, and in re-letting the demised premises;

c) third, to the payment of rent due under this lease agreement as it shall become due and payable.

If the rent payments due from the re-letting of the demised premises are not paid at the time they become due and payable by the tenant holding under the re-letting, or are, for any reason, insufficient to pay the rent due under this lease agreement, Lessee shall immediately pay to County the total deficiency ascertained to be due under the provisions of (1) above; or, pay to County the deficiency for the period in which it occurs, under the provisions of (2) above.

VIII.

BREACH OF AGREEMENT

If either party fails to comply with or perform any term or condition of this Lease, the other party shall notify the breaching party of its breach in writing stating the specific nature of the material breach, and the breaching party shall have thirty (30) days to cure the breach. If the breach is not cured to the reasonable satisfaction of the non-breaching party within said thirty (30) day period, the non-breaching party may terminate this Lease by providing written notice of such termination to the other party. The effective date of such termination shall be thirty (30) days after said notice.

IX.

ASSIGNMENT; SUCCESSORS

The conditions and terms of this contract of lease shall not only bind the parties and their respective parties, but shall also bind the respective heirs, personal representatives and assigns of the parties.

This contract of lease shall not be assigned or sublet except by written agreement of the

parties hereto.

X.

AGRICULTURAL PRODUCTION ONLY

Lessee covenants and represents that Lessee is engaged in agricultural production only, and further represents that the nature of his business is the growing of crops and in no way constitutes doing business of any kind with the general public within the leased premises.

XI.

SURVIVAL OF CAUSE ACTION

The parties further understand that in the event injuries have occurred and occasioned termination of this lease, any County's cause of action for damage will survive the termination of this lease.

XII.

NOTICES

Notices shall be sufficient if hand delivered or sent by certified mail. postage prepaid, addressed to:

LESSOR

Fond du Lac County
Attn: Airport
160 S. Macy St.
Fond du Lac, WI 54935

LESSEE

P.T. Barnum
123 Circus Road
Fond du Lac, WI 54935

IN WITNESSES WHEREOF, the parties hereunto set their hands and seals the day and year first above written:

WITNESSES

_____

_____

FOND DU LAC COUNTY

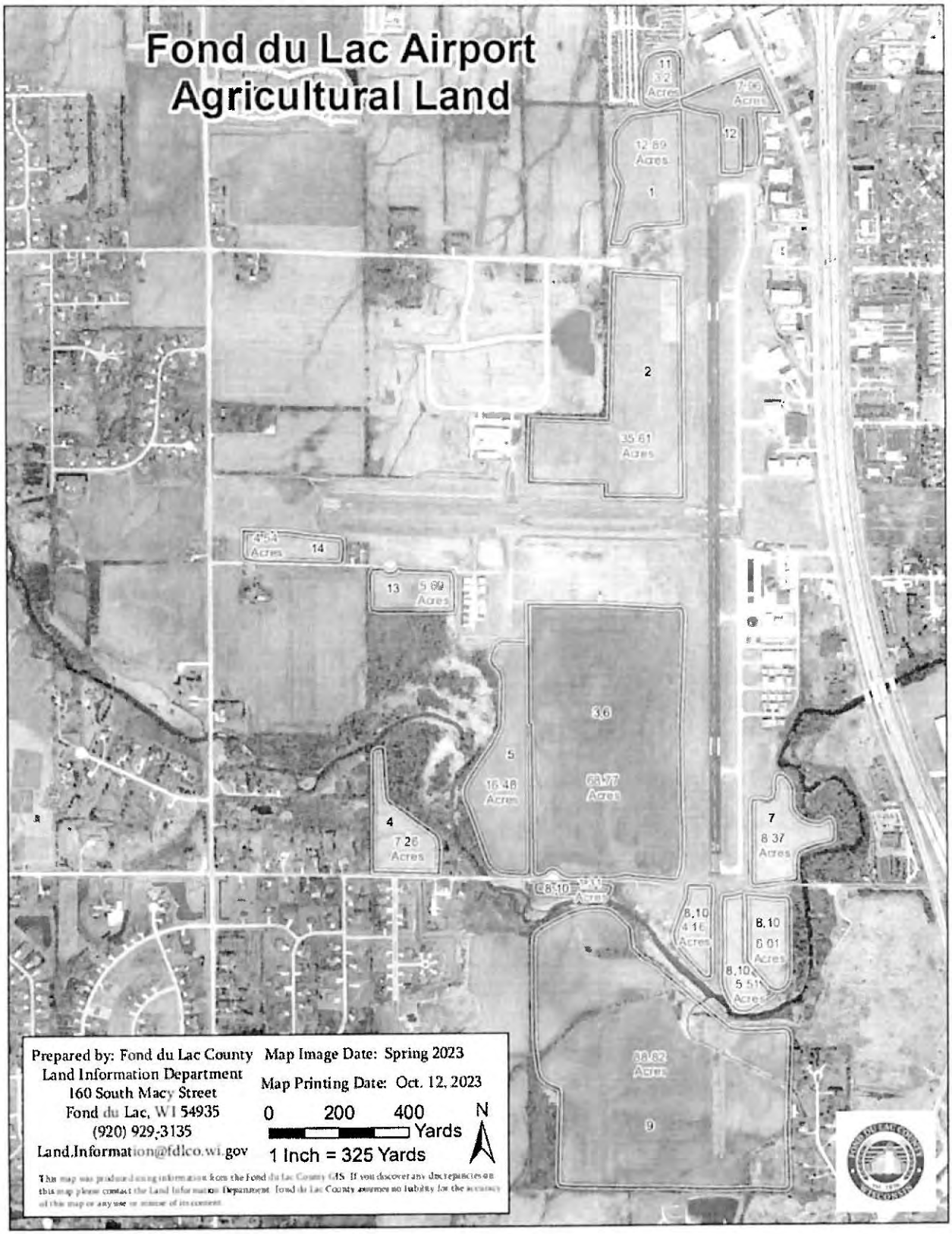
_____
Steven Abel, County Board Chair

_____
Lisa Freiberg, County Clerk

LESSEE:

_____ _____

P.T. Barnum


Fond du Lac Airport
Agricultural Land
11
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Acres
7.66
Acres
12
12.89
Acres
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Acres
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5.89
Acres
3.6
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7.26
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7
8.37
Acres
8.10
4.16
Acres
8.10
6.01
Acres
8.10
5.51
Acres
38.82
Acres
9
Prepared by: Fond du Lac County
Land Information Department
160 South Macy Street
Fond du Lac, WI 54935
(920) 929-3135
Land.Information@fdlco.wi.gov
Map Image Date: Spring 2023
Map Printing Date: Oct. 12, 2023
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Yards
1 Inch = 325 Yards
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This map was produced using information from the Fond du Lac County GIS. If you discover any discrepancies on this map please contact the Land Information Department. Fond du Lac County assumes no liability for the accuracy of this map or any use or misuse of its content.

Appendix C
Natural Resources Conservation Service Standards

Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

FORAGE HARVEST MANAGEMENT

CODE 511

(ac)

DEFINITION

The timely cutting and removal of forages as hay, green-chop, or ensilage.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Optimize quantity and quality of forage at the desired levels while promoting vigorous plant regrowth
- Manage the species composition to enhance desirable species
- Reduce excess soil nutrients
- Reduce pest pressure (insects, disease, weeds, invasive plants or plant toxins)
- Improve or protect wildlife and their habitat
- Optimize soil microbial life and aggregate stability
- Reduce soil compaction

CONDITIONS WHERE PRACTICE APPLIES

This practice applies to all land uses where forage is machine harvested.

CRITERIA

General Criteria Applicable to All Purposes

Harvest forage at a frequency and height that optimizes the desired forage stand, plant community, and stand life. Follow State cooperative extension service (CES) recommendations, when available, for forage harvest based on stage of maturity, moisture content, stubble height, length of cut, and harvest interval.

Stage of maturity

Plan forage harvest at the stage of maturity that provides the desired quality and quantity without compromising plant vigor and stand longevity.

Moisture content

Plan silage/haylage crop harvest within the optimum moisture range for the type of storage method(s) or structure(s) being utilized.

Follow CES recommendations and methods to determine and monitor optimum moisture content of the harvested crop.

Use chemical preservatives or additional dry feedstuffs to avoid fermentation and seepage losses of direct cut hay or crop silage (70% moisture content). Where containment or treatment of leachate is an issue,

evaluations are to be made in accordance with NRCS Conservation Practice Standards (CPSs) Waste Storage Facility (Code 313), Vegetated Treatment Area (Code 635), and/or Filter Strip (Code 393).

Remove harvested forage from the field within a feasible time to not jeopardize regrowth.

Stubble height
Cut forage plants at a height that will promote the vigor and health of the desired species. Cutting heights will provide adequate residual leaf area; adequate numbers of terminal, basal, or axillary tillers or buds; insulation from extreme heat or cold; and/or unsevered stem bases that store food reserves needed for full, vigorous recovery. Allow for proper regrowth after last harvest to avoid winterkill of forage species in cold climates.

Contaminants
Forage must not contain contaminants that can cause illness or death to the animal being fed or rejection of the offered forage. Contaminants could include, but are not limited to, prussic acid, nitrates, hardware (e.g., wire, etc.), and poisonous plants. Consult CES notices and cautions during extreme weather events or conditions, such as drought, that may cause the forage to accumulate nitrates, prussic acid, or other plant toxins. Follow specific recommendations for the event or conditions.

Length of cut
When harvested for ensilage, chop forage to a size appropriate for type of storage method used and optimal effective fiber.

A shorter chop length on very dry silage may help to ensure good packing and adequate silage density.

Additional Criteria to Manage the Species Composition to Enhance Desirable Species

To maintain desired stand density of reseeding annuals, harvest at a stage of maturity and frequency that ensures the production of ample viable seed or carryover of hard seed.

Harvest at optimal timing and height for the desired species.

Refer to NRCS CPS Pasture and Hay Planting (Code 512) for the desired species composition at planting.

Base frequency of harvest on the physiological conditions and regrowth of the desired species.

Additional Criteria to Reduce Excess Soil Nutrients

Employ a species and harvest schedule that removes and exports the maximum amount of targeted nutrients. Using this practice for this purpose may require more frequent harvests to increase uptake instead of managing for stand longevity. Refer to NRCS CPS Pasture and Hay Planting (Code 512) to select the best species for this purpose.

When forage harvests are managed to remove excess nitrogen or potassium from the soil, test the harvested material for levels of nitrate or potassium for possible danger to livestock. Divert the harvested material to nonfeed uses if toxicity is verified.

Additional Criteria to Reduce Pest Pressure (insects, disease, weeds, invasive plants, or plant toxins)

Follow CES guidelines when available for control of insect, disease, weed, invasive plant infestations, or plant toxins in forage.

Schedule harvest periods to aid in the control of insect, disease, weed, and invasive plant infestations and plant toxins in forage. Plan and schedule removal of invasive plants and noxious weeds. When a pesticide is used to control insects, disease, weeds, or invasive plants adhere to the specified days to harvest period stated on the pesticide label. When unwanted pests are found in the forage stand, evaluate pest

management options by planning NRCS CPS Pest Management Conservation System (Code 595) for all forage areas to be harvested.

Lessen incidence of insect damage, disease, and weed infestation by managing harvests to maintain a full, vigorous, and dense forage stand.

Mitigate impacts to pollinators when using peticides.

Refer to NRCS CPSs Herbaceous Weed Treatment (Code 315) and Brush Management (Code 314) for controlling unwanted plants in the stand.

Additional Criteria to Improve or Protect Wildlife and Their Habitat

When client objectives include providing suitable habitat for desired wildlife species, implement and maintain appropriate harvest schedule(s), refuge or escape areas, and minimum plant heights to provide suitable habitat for the desired species. Obtaining guidance from a wildlife biologist could improve wildlife habitat.

To provide wildlife protection, utilize specialized harvest techniques such as flushing bars, nontrapping harvesting sequences, and harvesting during daylight. The timing of harvest should allow the potential for pollinator forage, habitat needs, and benefits.

Time and manage harvests to benefit the desired wildlife species by utilizing a State-developed Wildlife Habitat Evaluation Guide (WHEG) or habitat evaluation to improve or protect wildlife and their habitat.

When used for this purpose, coordinate this practice with NRCS CPS Upland Wildlife Habitat Management (Code 645).

Additional Criteria to Optimize Soil Microbial Life and Aggregate Stability

Cut forage plants at a height that will reduce recovery period, maintain cooler soil temperatures, and increase root growth. These cutting heights will provide adequate residual leaf area for vigorous recovery. Schedule harvests to ensure sufficient regrowth periods for all desired species in the forage stand.

Additional Criteria to Reduce Soil Compaction

Harvest when soil moisture conditions are dry enough to lessen the risk of soil compaction.

CONSIDERATIONS

When forage will also be grazed, coordinate this practice with NRCS CPS Prescribed Grazing (Code 528). Consider timing of grazing or mechanical harvest based on management goals and purpose.

When nutrients or other soil amendments are applied, coordinate forage harvests with NRCS CPS Nutrient Management (Code 590) and/or Waste Recycling (Code 633), as appropriate. An excess or improper balance of nutrients can produce plant material that causes toxicity in some animals.

Produce stored forages at the quality needed for optimum performance of the animal being fed. Legume forages too low in fiber can lead to metabolic disorders in ruminants and an economic loss to the producer due to lowered animal performance. Consider analyzing harvested forages for feed quality. Coordinate this practice with NRCS CPS Feed Management (Code 592).

In conjunction with harvest options, consider storage and feeding options that will retain acceptable forage quality and minimize digestible dry matter loss.

Where weather conditions make it difficult to harvest the desired quality of forage, consider use of mechanical or chemical conditioners, forced-air barn curing, and/or ensile.

Consider forecasted weather and climatic conditions prior to harvest that may result in potential reduction or loss of desired species.

Consider delaying harvest if prolonged or heavy precipitation is forecast that would reduce forage quality.

Cut forages after dew, rain, or irrigation water on the leaves has evaporated, where appropriate, unless moisture is needed to reduce leaf loss.

Consider cutting forages in the afternoon to optimize water soluble carbohydrates and nutritional quality.

Consider all possible antiquality factors (e.g., ergovaline, alkaloids, nitrates, prussic acid, etc.) and how timing and conditions prior to harvest and storage method will influence forage quality and feed safety. For example, endophyte infected tall fescue dry hay typically has less ergovaline content than when ensiled, and drought or frost can increase nitrate or prussic acide content of some forages.

In regions where rainfall and/or humidity levels cause unacceptable forage quality losses, consider green-chopping or ensiling the forage to reduce or eliminate field-drying time. Other options are the use of desiccants, preservatives, or macerating implements to reduce field-drying time.

To reduce safety hazards, avoid operating harvesting and hauling equipment on field slopes over 25 percent, particularly on cross-slope traffic patterns.

Consider proper storage of harvested forage to maintain desired quality.

To enhance soil health, consider using a diverse mixture of deep-rooted and fibrous-rooted species, selected from multiple plant families including, but not limited to, grasses and legumes. Cut at a time of year when expected temperatures and rainfall are most favorable for regrowth of the greatest number of desired species. In hotter or drier regions, cut early in the year when weather is cooler. Not harvesting a field every year can protect forage vigor and diversity which enhances soil health.

PLANS AND SPECIFICATIONS

At a minimum, plans and specifications must include—

- Goals, objectives, and specific purposes (e.g., high forage quantity and quality, nutrient uptake, etc.).
- Forage species to be harvested.

For each dominant forage species harvested, show—

- Method of harvest.
- Stubble height to be left.
- Length of cut if ensiling forage.
- Stage of maturity.
- Optimal harvest moisture content.
- Harvest interval, including late harvest if applicable.
- Contaminant avoidance recommendations.

These plans and specifications will be available through implementation requirements, appropriate job sheets, and/or other information for applying the practice to achieve its intended purpose.

OPERATION AND MAINTENANCE

Include the following items in an operation and maintenance plan:

- Before forage harvest, clear fields of debris that could damage machinery, or if ingested by livestock, lead to sickness (e.g., hardware disease) or death.
- Operate all forage harvesting equipment at the optimum settings and speeds to minimize loss of leaves.

- To control insects, diseases, and spread of weeds, clean equipment between fields as needed and before storing.
- Set shear-plate on forage chopper to the proper theoretical cut for the crop being harvested. Keep knives sharp. Do not use recutters or screens unless forage moisture levels fall below recommended levels for optimum chopping action.
- Follow all agricultural equipment manufacturer's safety measures when operating forage harvesting equipment.
- Regardless of silage/haylage storage method, ensure good compaction and an airtight seal to exclude oxygen and mold or bacterial formations.
- Dispose of plastic wrap, bags, or string used to store forage in an environmentally sound manner or reuse if possible.

REFERENCES

Ball, D.M., C.S. Hoveland, and G.D. Lacefield. 2015. Southern Forages, Fifth Edition. International Plant Nutrition Institute: Norcross, GA.

Collins, M., C.J. Nelson., K.J. Moore, and R.F. Barnes. 2017. Forages, Volume 1: An Introduction to Grassland Agriculture, Seventh Edition. Wiley-Blackwell: Hoboken, N.J. ISBN: 9781119300649

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Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

GRASSED WATERWAY

CODE 412

(ac)

DEFINITION

A shaped or graded channel that is established with suitable vegetation to convey surface water at a nonerosive velocity using a broad and shallow cross section to a stable outlet.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Convey runoff from terraces, diversions, or other water concentrations without causing erosion or flooding
- Prevent gully formation
- Protect/improve water quality

CONDITIONS WHERE PRACTICE APPLIES

This practice is applied in areas where added water conveyance capacity and vegetative protection are needed to prevent erosion and improve runoff water quality resulting from concentrated surface flow.

CRITERIA

General Criteria Applicable to All Purposes

Plan, design, and construct grassed waterways to comply with all Federal, State, and local laws and regulations.

Capacity

Design the waterway to convey the peak runoff expected from the 10-year frequency, 24-hour duration storm. Increase capacity as needed to account for potential volume of sediment expected to accumulate in the waterway between planned maintenance activities. When the waterway slope is less than 1 percent, out-of-bank flow may be permitted if such flow will not cause excessive erosion. Ensure that the design capacity, at a minimum, will remove the water before crops are damaged.

Stability

Determine the minimum depth and width requirements for stability of the grassed waterway using the procedures in the NRCS National Engineering Handbook (Title 210), Part 650, Chapter 7, “Grassed Waterways,” or Agricultural Research Service Agriculture Handbook 667, “Stability Design of Grass-Lined Open Channels.” Base stability computations on the peak runoff expected from a 10-year, 24-hour duration storm.

Ensure that the vegetative species selected are suited to the site conditions and intended uses. Select species that have the capacity to achieve adequate density, height, and vigor within an appropriate time frame to stabilize the waterway.

NRCS reviews and periodically updates conservation practice standards. To obtain the current version of this standard, contact your Natural Resources Conservation Service State office or visit the Field Office Technical Guide online by going to the NRCS website at https://www.nrcs.usda.gov/ and type FOTG in the search field.

USDA is an equal opportunity provider, employer, and lender.

Width
Keep the bottom width of a trapezoidal waterway less than 100 feet unless multiple or divided waterways or other means are provided to prevent meandering of low flows.

Side slopes
Keep the side slopes flatter than a ratio of 2 horizontal to 1 vertical (2:1). Flatten the side slopes as needed to accommodate the equipment used for maintenance, tillage, and harvesting so that damage to the waterway is minimized.

Depth
The capacity of the waterway must be large enough so that the water surface of the waterway is below the water surface of the tributary channel, terrace, or diversion that flows into the waterway at design flow.

Provide 0.5 feet of freeboard above the designed depth when flow must be contained to prevent damage. Provide freeboard above the designed depth based on capacity conditions when the vegetation has the maximum expected retardance. To achieve the freeboard, extend side slopes at a slope equal to or flatter than the side slope of the design cross section.

Drainage
When needed to establish or maintain vegetation on sites having prolonged flows, high water tables, or seepage problems, use NRCS Conservation Practice Standards (CPSs) Subsurface Drain (Code 606), Underground Outlet (Code 620), or other suitable measures in waterway designs.

Where drainage practices are not practicable or adequate to solve these seepage problems, use NRCS CPS Lined Waterway or Outlet (Code 468) in place of NRCS CPS Grassed Waterway (Code 412).

Outlets
Provide a stable outlet with adequate capacity. The outlet can be another vegetated channel, an earthen ditch, a grade stabilization structure, filter strip, lined waterway, or other suitable outlet.

Vegetative establishment
Establish vegetation as soon as possible using the criteria listed under “Establishment of Vegetation” in NRCS CPS Critical Area Planting (Code 342) and/or the State planting guide. Use mulch; nurse crop; rock, straw, or hay bale dikes; fabric or rock checks; filter fences; or runoff diversion to protect the vegetation until it is established. Planting a close-growing crop (e.g., small grains or grasses) on the contributing watershed prior to construction of the grassed waterway can also significantly reduce the flow through the waterway during establishment. Provide livestock and vehicular crossings as necessary to prevent damage to the waterway and its vegetation.

CONSIDERATIONS

Where environmentally sensitive areas need to be protected from dissolved contaminants, pathogens, or sediment in runoff, consider establishment of an increased width of vegetation on the waterway above the flow area. Increasing the width of the established vegetation above the flow area will increase filtering of sediment and pathogens, and it will increase infiltration of runoff and nutrient removal.

Where sediment control is the primary concern, consider using vegetation in the waterway that can withstand partial burial and adding sediment control measures above the waterway, such as residue management. Consider increasing the channel depth and/or designing areas of increased width or decreased slope to trap and store sediment to reduce the amount of sediment that leaves a field. Provide for regular cleaning out of the waterway when trapping sediment in this manner.

Implement best management practices and use a system of additional conservation practices or a soil health management system in conjunction with the grassed waterway to minimize upstream runoff and concentrated flow.

Tillage and crop planting often takes place parallel to the waterway, resulting in preferential flow paths and erosion along the edges of the waterway. Consider installation of measures that ensure the runoff from adjacent areas will enter the waterway. Measures such as directing spoil placement or small swales can direct this preferential flow into the grassed waterway.

Livestock and vehicle crossings should occur perpendicular to the waterway. Consider locating crossings to minimize potential damage to the waterway. Crossing design must not interfere with design-flow capacity.

Avoid areas where unsuitable plant growth-limiting subsoil and/or substratum material, such as salts, acidity, root restrictions, etc., may be exposed during implementation of the practice. Where areas cannot be avoided, seek recommendations from a soil scientist for improving the condition; or, if not feasible, consider over-cutting the waterway and add topsoil over the cut area to facilitate vegetative establishment.

Avoid or protect, if possible, important wildlife habitat, such as woody cover or wetlands, when determining the location of the grassed waterway. Avoid placing trees and shrubs in or near the grassed waterway so they do not interfere with hydraulic functions or send roots into associated subsurface drainage. Medium or tall bunch grasses and perennial forbs may also be planted along waterway margins to improve wildlife habitat. Waterways with these wildlife features are more beneficial when connecting other habitat types (e.g., riparian areas, wooded tracts, and wetlands). When possible, select plant species that can serve multiple purposes, such as benefiting wildlife, while still meeting the basic criteria needed for providing a stable conveyance for runoff.

Water-tolerant vegetation may be an alternative to subsurface drains or stone center waterways on some wet sites.

Use irrigation in dry regions or supplemental irrigation as necessary to promote germination and vegetation establishment.

Wildlife habitat benefits can be provided by adding width of appropriate vegetation to the sides of the waterway. Care should be taken to avoid creating small isolated planting zones for wildlife. These can become population sinks where wildlife attracted to an area experience reproductive loss due to predation. Mowing may be appropriate to enhance wildlife values, but should be conducted to avoid peak nesting seasons and reduced winter cover whenever possible.

Consider planting diverse legumes, forbs, and flowering plants, such as milkweeds, that provide pollen and nectar for native bees and other pollinators adjacent to the waterway. In dry regions, these sites may be able to support flowering forbs with higher water requirements and thus provide bloom later in the summer.

For all organic or transitioning-to-organic operations, follow all National Organic Program rules.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for a grassed waterway that describe the requirements for applying the practice according to this standard. As a minimum, include—

- A plan view of the layout of the grassed waterway.
- Dimensions of the waterway, including length, grade, top width, bottom width, depth, and side slopes as applicable.
- Disposal requirements for excess soil material.
- Site-specific construction specifications that describe in writing the installation of the grassed waterway. Include specification for control of concentrated flow during construction and vegetative establishment.
- Vegetative establishment requirements.

OPERATION AND MAINTENANCE

Provide an operation and maintenance plan to review with the landowner. Include the following items and others as appropriate in the plan:

- Establish a maintenance program to maintain waterway capacity, vegetative cover, and outlet stability. Vegetation damaged by machinery, herbicides, or erosion must be repaired promptly.
- Protect the waterway from concentrated flow by using diversion of runoff or mechanical means of stabilization, such as silt fences, mulching, hay bale barriers, etc., to stabilize grade during vegetation establishment as necessary.
- After vegetation is established, remove any temporary measures, such as diversions or silt fences, that were installed so as to not interfere with design flow.
- Minimize damage to vegetation by excluding livestock whenever possible, especially during wet periods. Permit grazing in the waterway only when a controlled grazing system is being implemented.
- Inspect grassed waterways regularly, especially following heavy rains. Fill, compact, and reseed damaged areas immediately. Remove sediment deposits to maintain capacity of the grassed waterway.
- Avoid use of herbicides or pesticides that would be harmful to the vegetation or pollinating insects in and adjacent to the waterway area.
- Avoid using waterways as turn rows during tillage and cultivation operations.
- Mow or periodically graze vegetation to maintain capacity, reduce sediment deposition, and maintain suitable plant composition and vigor.
- Apply supplemental nutrients as needed to maintain the desired species composition and stand density of the waterway.
- Control noxious weeds.
- Do not use waterways as a field road. Avoid crossing with heavy equipment when wet.
- Lift tillage equipment and turn off chemical application equipment when crossing the waterway.

REFERENCES

USDA Agricultural Research Service. 1987. Stability Design of Grass-Lined Open Channels. Agriculture Handbook Number 667. Washington, D.C. https://naldc-legacy.nal.usda.gov/catalog/CAT87216054

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Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

LINED WATERWAY OR OUTLET

CODE 468

(ft)

DEFINITION

A waterway or protected outlet section having an erosion-resistant lining of concrete, stone, synthetic turf reinforcement fabrics, or other permanent material.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Provide safe conveyance of runoff from conservation practices or other flow concentrations without causing erosion or flooding
- Prevent or stabilize existing gully erosion or scour
- Protect and improve water quality

CONDITIONS WHERE PRACTICE APPLIES

This practice applies if conditions similar to one or more of the following exist:

- Concentrated runoff, pipe flow, steep grades, wetness, prolonged base flow, seepage, or piping is such that a lining is needed to prevent erosion
- Use by people or animals precludes vegetation as suitable cover
- Site restrictions necessitate limited waterway or outlet widths with design velocities that require lining protection
- Soils are highly erosive or other soil or climatic conditions preclude using vegetation only

CRITERIA

General Criteria Applicable to All Purposes

Capacity

The minimum capacity must be adequate to carry the peak rate of runoff from a 10-year, 24-hour frequency storm with the following exceptions:

- When the lined waterway or outlet slope is less than 1 percent, minimum design capacity may be reduced to the capacity of the waterway leading to it
- When the immediate downstream conveyance capacity of the channel, structure, or pipe is less than that resulting from a 10-year, 24-hour frequency storm, minimum design capacity may be reduced to the capacity of downstream conveyance

For a lined outlet downstream of a pipe, provide a lined waterway or outlet adequate to contain the outflow from the design flow event.

NRCS reviews and periodically updates conservation practice standards. To obtain the current version of this standard, contact your Natural Resources Conservation Service State office or visit the Field Office Technical Guide online by going to the NRCS website at https://www.nrcs.usda.gov/ and type FOTG in the search field.

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Velocity
Compute velocity using Manning's equation with a coefficient of roughness appropriate for the selected lining material.

Design maximum velocity and rock gradation limits for rock riprap-lined channel sections and outlets from concentrated flow area using the National Engineering Handbook (NEH) (Title 210), Part 650, Chapter 16, Appendix 16A, "Size Determination for Rock Riprap," or 210-NEH, Part 654, Technical Supplement (TS) 14C, "Stone Sizing Criteria," unless a detailed design analysis appropriate to the specific slope, flow depth, and hydraulic conditions indicate that a higher velocity is acceptable.

Do not exceed manufacturer's recommendations for maximum design velocity for synthetic turf reinforcement fabrics and grid pavers.

For concrete lined channels, use figure 1 to determine the maximum design velocity.

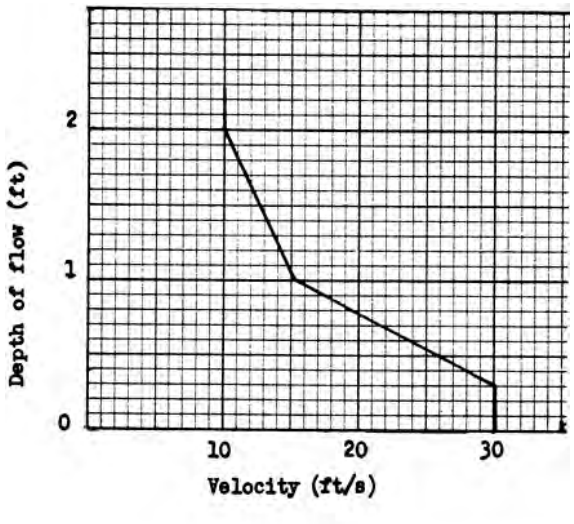


Figure 1. Maximum velocity versus depth of flow for concrete-lined channels

Avoid channel slopes between 0.7 and 1.3 of the critical slope except for short transition sections. Restrict supercritical flow to straight reaches. Waterways or outlets with supercritical flow must discharge into an energy dissipator to reduce discharge velocity to less than critical.

Cross section
The cross section of the lined waterway or outlet with a defined channel must be triangular, parabolic, or trapezoidal. A cross section made of monolithic concrete may be rectangular.

Freeboard
The minimum freeboard for lined waterways or outlets must be 0.25 feet above design high water in areas where erosion-resistant vegetation cannot be grown adjacent to the paved or reinforced side slopes. No freeboard is required if vegetation can be grown and maintained.

Side slope
The steepest permissible side slopes must not exceed the values given in table 1.

Table 1. Steepest permissible side slopes for each material type.

Material	Slope (horizontal to vertical)
Nonreinforced concrete	
Height of lining, 1.5 ft or less	Vertical

Material	Slope (horizontal to vertical)
Hand-placed screeded concrete or mortared-in-place flagstone	
Height of lining, less than 2 ft	1 to 1
Height of lining, more than 2 ft	2 to 1
Slip form concrete	
Height of lining, less than 3 ft	1 to 1
Rock riprap	2 to 1
Synthetic turf reinforcement fabrics	2 to 1
Grid pavers	1 to 1

Lining thickness
Minimum lining thickness must not be less than indicated in table 2.

Table 2. Minimum lining thickness for various materials.

Material	Lining Thickness
Concrete	4 in. (minimum thickness is 5 in. if the liner is reinforced)
Rock riprap	Maximum stone size plus thickness of filter or bedding
Flagstone	4 in., including mortar bed
Synthetic turf reinforcement fabrics and grid pavers	Manufacturer's recommendations

Lining durability
Nonreinforced concrete or mortared flagstone linings may only be used in areas of low shrink-swell soils that are well drained or where subgrade drainage facilities are installed.

Related structures
Side inlets, drop structures, and energy dissipators must meet the hydraulic and structural requirements for the site. Grade stabilization structures must meet the criteria of NRCS Conservation Practice Standard (CPS) Grade Stabilization Structure (Code 410).

Outlets
All lined waterways and outlets must have a stable outlet with adequate capacity to prevent erosion and flooding damages.

Geotextiles
Use geotextiles where appropriate as a separator between rock, flagstone, or concrete linings and soil to prevent migration of soil particles from the subgrade, through the lining material. Specify geotextile requirements in accordance with the American Association of State Highway and Transportation Officials (AASHTO) M288, Section 7.3; 210-NEH-654-TS 14D, "Geosynthetics in Stream Restoration"; or NRCS 210-Technical Note, Design Engineering, Design Note 24, "Guide for the Use of Geotextiles."

Install and anchor turf reinforcement mats in accordance with manufacturer's recommendations and ensure intimate contact between mesh and base soil.

Filters or bedding
Use filters or bedding to prevent piping, where appropriate. Use drains to reduce uplift pressure and to collect water, as required. Design filters, bedding, and drains in accordance with 210-NEH, Part 633, Chapter 26, "Gradation Design of Sand and Gravel Filters." Weep holes may be used with drains if needed.

Concrete
Proportion concrete so that it is plastic enough for thorough consolidation and stiff enough to stay in place on side slopes. A dense, durable product is required. Specify a mix that can be certified as suitable to

produce a minimum strength (28 day) of 3,000 pounds per square inch. Specify requirements for curing in the construction specifications.

Contraction joints
Contraction joints in concrete linings, if required, must be formed transversely to a depth of approximately one-third the thickness of the lining, at a uniform spacing between 8 to 15 feet. Provide steel reinforcement or other uniform support to the joint to prevent unequal settlement.

Site and subgrade preparation
Proper site preparation is necessary to provide a stable, uniform foundation for the waterway lining. The site should be graded to remove any rutting or uneven surfaces and to provide good surface drainage throughout the construction period and the design life of the waterway or outlet. Proof rolling can be used to identify soft pockets of soil, additional rutting, or other soil conditions that require removal and replacement by compacted soil to provide a uniform surface for base, subbase, or concrete liner.

Articulating concrete block revetment
Design articulating concrete block revetment using 210-NEH-654-TS 14L, "Use of Articulating Concrete Block Revetment Systems for Systems for Stream Restoration and Stabilization Projects."

Tractive stress
Tractive stress may be used as an alternative to velocity criteria for design of the selected lining material.

Compute maximum shear stress using U.S. Army Corp of Engineers Engineer Research and Development Center (ERDC)-TN-EMRRP-SR-29, "Stability Thresholds for Stream Restoration Materials."

Do not exceed manufacturer's recommendations for maximum shear stress for the lining material.

CONSIDERATIONS

Incorporate trees, shrubs, forbs, and grasses adjacent to the lined portions of the channel. This may improve aesthetics and habitat benefits as well as reduce erosion potential. Plantings are especially beneficial where the channel transitions to natural ground. However, such plantings are not appropriate in all circumstances. Maintain the flow channel free from obstruction. Guidance on the use of plantings is available in 210-NEH-654-TS 14I, "Streambank Soil Bioengineering" and 14K, "Streambank Armor Protection with Stone Structures," and in NRCS CPS Streambank and Shoreline Protection (Code 580).

Cultural resources need to be considered when planning this practice. Where appropriate, local cultural values need to be incorporated into practice design in a technically sound manner.

Filter strips established on each side of the waterway may improve water quality.

Consideration should be given to livestock and vehicular crossings, as necessary, to prevent damage to the waterway. Crossing design must not interfere with design-flow capacity. Guidance can be found in NRCS CPS Stream Crossing (Code 578).

Reinforcement of concrete liners should be considered where high pore-water pressures exist in the subgrade, movement of the subgrade may occur, or in reaches where failure would endanger public safety or property.

General Considerations for Fish and Wildlife Resources
This practice may impact important fish and wildlife habitats such as streams, creeks, riparian areas, floodplains, and wetlands.

Seepage from unlined waterways may benefit wetlands, migratory bird habitat, and floodplain recharge. Consider site-specific resource concerns with regard to efficient water delivery and instream flow as compared to wetland habitat benefits.

Aquatic organism passage concerns (e.g., velocity, depth, slope, air entrainment, screening, etc.) should be evaluated to minimize negative impacts. Swimming and leaping performance for target species should be considered.

Consider mesh size of 0.2 inches or smaller where turf reinforcement mats are used to reduce impacts on fish and wildlife.

Important fish and wildlife habitat, such as woody cover or wetlands, should be avoided or protected if possible when siting the lined waterway. If trees and shrubs are incorporated, they should be retained or planted in the periphery of the grassed portion of the lined waterways so they do not interfere with hydraulic functions and roots do not damage the lined portion of the waterway. Mid- or tall-bunch grasses and perennial forbs may also be planted along waterway margins to improve wildlife habitat.

Plant selections that benefit pollinators should be incorporated into the design. Waterways with these wildlife features are more beneficial when connecting other habitat types (e.g., riparian areas, wooded tracts, and wetlands).

PLANS AND SPECIFICATIONS

Prepare plans and specifications for lined waterways or outlets that describe the requirements for applying the practice to achieve its intended purpose(s).

As a minimum the plans and specifications must include—

- A plan view of the layout of the lined waterway or outlet.
- Typical cross section of the lined waterway or outlet.
- Profile of the lined waterway or outlet.
- Specifications for the lining material.
- Disposal requirements for excess soil material.
- Site-specific construction specifications that describe the installation of the lined waterway or outlet. Include a specification for control of concentrated flow during construction if required.

OPERATION AND MAINTENANCE

Prepare an operation and maintenance plan for use by the client. As a minimum, the plan shall address the following items:

- Regular inspection of lined waterways, especially following heavy rains. Promptly repair damaged areas and remove sediment deposits to maintain capacity of lined waterways.
- Control noxious weeds. Avoid areas where forbs have been established when applying herbicides.
- Avoid using the lined waterways as turn-rows during tillage and cultivation operations.
- Prescribed burning and mowing may be appropriate to enhance wildlife values, but must be conducted to avoid peak nesting seasons and reduced winter cover.
- Do not use the lined waterway as a field road.
- Avoid crossing the lined waterway or outlet with heavy equipment.

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Natural Resources Conservation Service

CONSERVATION PRACTICE STANDARD

PASTURE AND HAY PLANTING

CODE 512

(ac)

DEFINITION

Establishing adapted and compatible species, varieties, or cultivars of perennial herbaceous plants suitable for pasture or hay production.

PURPOSE

This practice is used to accomplish one or more of the following purposes:

- Improve or maintain livestock nutrition and health
- Provide or increase forage supply during periods of low forage production
- Reduce soil erosion
- Improve water quality
- Improve air quality
- Improve soil health

CONDITIONS WHERE PRACTICE APPLIES

This practice applies on all lands suitable for the one-time establishment of perennial species for forage production that will likely persist for 5 years. This practice does not apply to the establishment of annually planted and mechanically harvested food, fiber, or oilseed crops planted on designated cropland.

CRITERIA

General Criteria Applicable to All Purposes

Select plant species and their cultivars based on—

- Climatic conditions, such as annual precipitation and its distribution, growing season length, temperature extremes, and the USDA Plant Hardiness Zones.
- Soil condition and landscape position attributes such as pH, available water holding capacity, aspect, slope, drainage class, fertility level, salinity, depth, flooding and ponding, and levels of phytotoxic elements that may be present. Utilize ecological site description pasture states and forage suitability groups if available.
- Intended use, level of management, realistic yield estimates, stage of vegetative growth for planned harvest, and compatibility with other species.
- Resistance to disease and insects common to the site or location.

Follow recommendations for planting rates, methods, and dates obtained from the NRCS Plant Materials Program, NRCS State guidance, land grant university extension, and applicable published research documents.

NRCS reviews and periodically updates conservation practice standards. To obtain the current version of this standard, contact your Natural Resources Conservation Service State office or visit the Field Office Technical Guide online by going to the NRCS website at https://www.nrcs.usda.gov/ and type FOTG in the search field.

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Calculate seeding rates to be consistent with State and local criteria.

Plant at a depth appropriate for the seed size or plant material, while assuring uniform contact with soil.

Implement site preparation and seedbed preparation methods that avoid restricting plant emergence.

Plant when soil moisture is adequate for germination and establishment.

Utilize seed and planting materials that will meet State quality standards.

Do not plant Federal, State, or local noxious species.

Apply all plant nutrients and soil amendments for establishment purposes according to a current soil test taken within 3 years of the proposed planting date. Nutrient application rates, methods, and dates are obtained from the NRCS Plant Materials Program, NRCS State guidance, land grant university extension, and applicable published research documents.

When planting legumes, use preinoculated seed, inoculum coated seed, or inoculate with the proper viable strain of rhizobia immediately before planting.

Exclude livestock until the plants are well established. Ensure the plants have reached the full start grazing heights or the recommended hay cutting heights (late elongation phase or later) before the first grazing or cutting begins. See NRCS CPSs Prescribed Grazing (Code 528) and Forage Harvest Management (Code 511) for details. There may be conditions and time of the growing season that require letting the plants reach maturity before any haying or grazing takes place to avoid the risk of killing the new plants.

Additional Criteria for Improving or Maintaining Livestock Nutrition and Health

Use forage species that will meet the desired level of nutrition (quantity and quality) for the kind and class of the livestock to be grazed or fed.

Select species mixtures with similar palatability to avoid selective grazing.

Select species with low or no toxic effects on grazing livestock.

Additional Criteria for Improving Water Quality

Use State and locally recommended species from the NRCS Plant Materials Program, NRCS State guidance, land grant university and extension, and other reputable scientific sources to support planting recommendations when using this purpose for filtering runoff.

Additional Criteria for Improving Air Quality

Select deep rooted perennial plants that are recommended for sequestering carbon and reducing greenhouse gases. Use site preparation and planting techniques that minimize airborne particulate matter generation and transport.

Additional Criteria for Improving Soil Health

Minimize soil disturbance by using seedbed preparation and planting techniques, such as chemical burn-down and no-till drilling of forages, to protect soil aggregates. Nonchemical seedbed preparation methods that are low-disturbance can include soil spading, rototilling (set at reduced speeds with faster forward driving speeds), roller crimping, or timing planting to correspond with natural senescence of the preceding crop.

Planting a perennial with a specific nurse crop can quickly maximize ground cover during the establishment period.

Maximize biodiversity by selecting plants from at least two of the four functional groups (cool-season grass, cool-season broadleaf, warm-season grass, warm-season broadleaf).

Additional Criteria for Reducing Soil Erosion

Select plants that provide maximum ground cover for protection of the soil from wind and water erosion.

CONSIDERATIONS

In areas where animals congregate, consider establishing persistent species that can tolerate close grazing and trampling.

Follow criteria for protecting pasture plants and soil to promote soil health provided in NRCS CPS Prescribed Grazing (Code 528). This includes selecting appropriate plant species that increase deep rooting, soil carbon, and plant resiliency. Use native species if practicable.

Select plants that will help meet livestock forage demand during times that normal forage production is not adequate.

For organic and transitioning-to-organic systems, all materials and methods used in the implementation of this NRCS CPS should comply with the National Organic Program Rules.

For the wildlife species of concern, select and plant species in a designated manner that will meet their cover and critical life cycle needs. Where wildlife and pollinator concerns exist, consider plant selection by using an approved habitat evaluation procedure using native species if at all practicable. For pollinator needs, consider appropriate pollinator seed mixes for planting. When wildlife habitat is the primary concern, use NRCS CPS Wildlife Habitat Planting (Code 420) where planting herbaceous plants.

If planting forage for feedstocks for biofuel, select herbaceous plants that provide adequate kinds and amounts of plant materials needed for the desired fuel and energy production.

Refer to NRCS Conservation Practice Standard (CPS) Nutrient Management (Code 590) for details for managing nutrients.

The criteria in NRCS CPS Forage Harvest Management (Code 511), Herbaceous Weed Treatment (Code 315), or Prescribed Grazing (Code 528) can be helpful in establishing and maintaining vigorous pasture and hay plantings.

PLANS AND SPECIFICATIONS

Prepare plans and specifications for each site or management unit according to the requirements of this standard. Record these specifications using the appropriate implementation requirement documents to provide the information to the land manager.

Address the following elements in the plan to meet the intended purpose:

- Field number and acres
- Species of plants to be established
- Activities needed to ready the planting area and the establishment procedure to be used
- Seeding rates and depth of seeds planted
- Seeding dates
- Rates, timing, and forms of nutrient application and other soil amendments (if needed) from

approved soil test analysis results and recommendations
- Type of legume inoculant to be used (if applicable)
- Seed analysis (tag)
- All seed coating details (if applicable)
- Supplemental water for plant establishment (if applicable)
- Protection of plantings (if applicable), such as livestock exclusion periods and through use of NRCS CPSs Forage Harvest Management (Code 511) and Prescribed Grazing (Code 528), as needed.
- Description of successful establishment and when evaluation of establishment should be completed (e.g., minimum percent ground or canopy cover, percent stand, and stand density)

OPERATION AND MAINTENANCE

The operation and maintenance plan will include, as a minimum, the following requirements:

- Inspect and calibrate equipment prior to use
- Continually monitor equipment during planting to ensure proper rate, distribution, and depth of planting material is maintained
- Monitor new plantings for water stress
    - Depending on the severity of drought, water stress may require reducing weeds, early harvest of any companion crops, irrigating when possible, or replanting failed stands.
    - Monitor new plantings for prolonged wet conditions, which may cause failure of the plant establishment.

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Appendix D
Airport Stormwater Draining Field 3,6

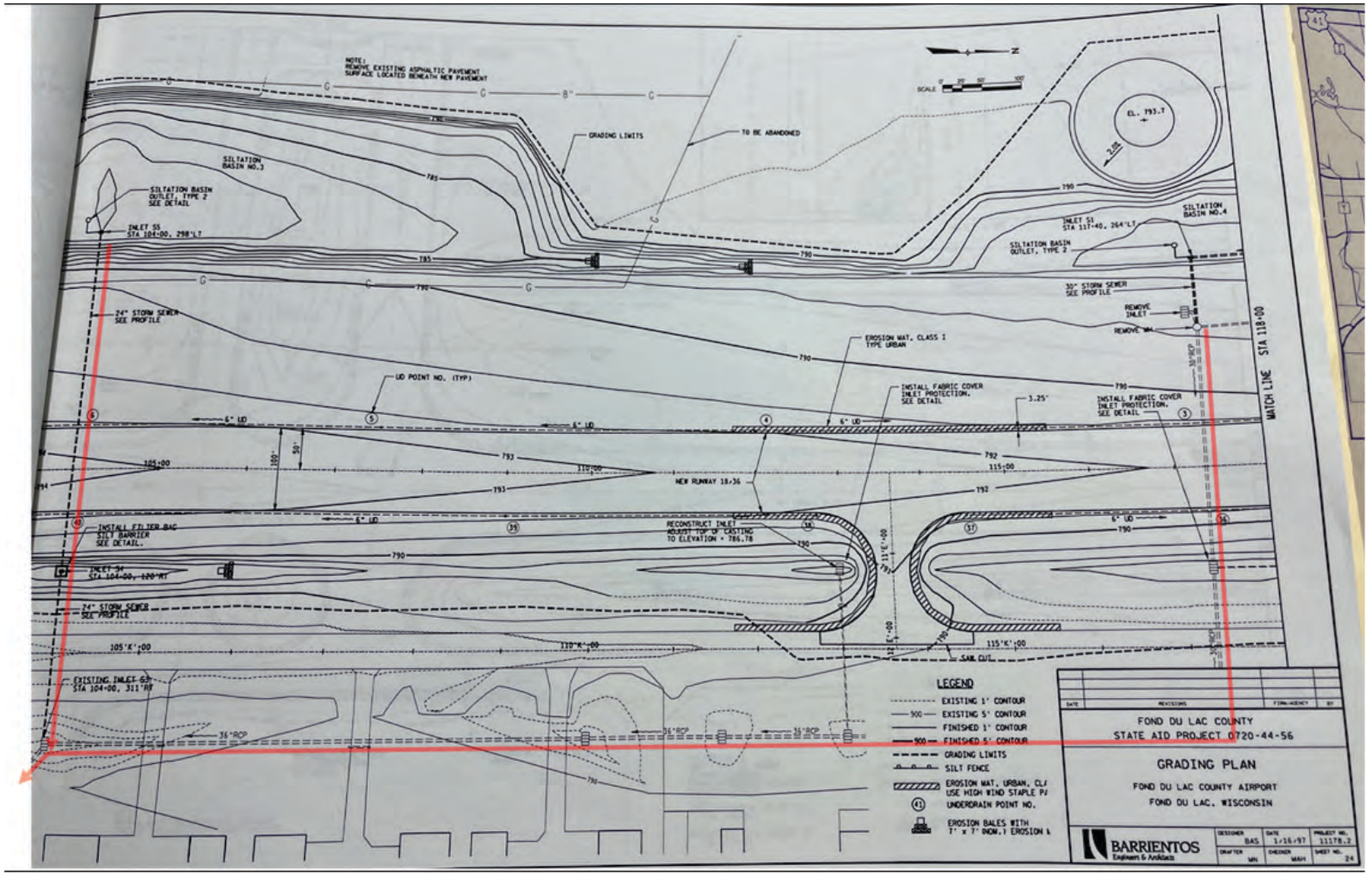


Figure D-1. 1997 Grading Plan for Runway 18/36 Extension & Widening, Grading, Paving, Lighting, Marking Wind Tee, Wind Cone, HIRL, MALSR

Red line shows the drainage pipe alignment that collects runoff from Field 3,6 and routes under the runway to outlet to the West Branch of the Fond du Lac River.



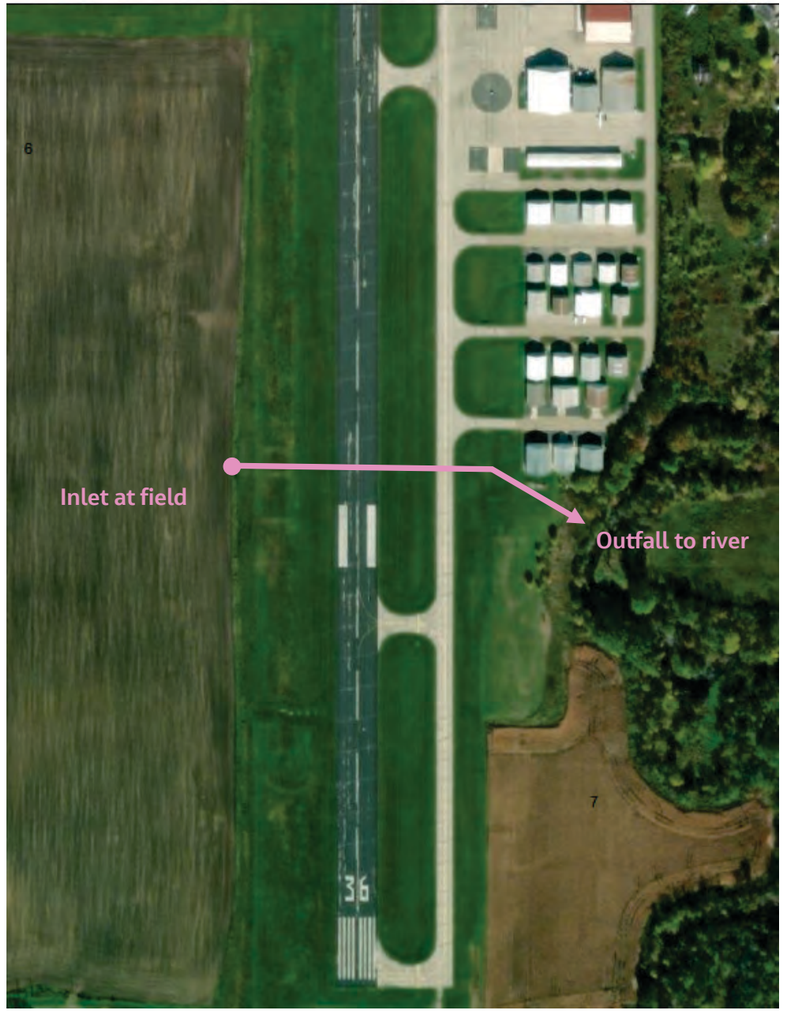


Figure D-2. Stormwater Outfall to the West Branch of the Fond du Lac River (left) and Pipe Alignment from Field 3,6 to the River (right)

Appendix E
Gully Documentation and Modeling Output

Memorandum

Jacobs

Best Management Practice Efficiency Inputs for Modeling Phosphorus and Total Suspended Solids Reductions using the Spreadsheet Tool for Estimating Pollutant Loads

Date: August 11, 2025

Project name: Fond du Lac Wastewater Treatment and Resource Recovery Facility Water Quality Trade and Permit Support

Project no: C1X41200

Attention: Wisconsin Department of Natural Resources

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U.S. Environmental Protection Agency (EPA) developed a Spreadsheet Tool for Estimating Pollutant Loads (STEPL) that calculates nutrient and sediment loads from different land uses and the pollutant load reductions from implementation of various Best Management Practices (BMPs). STEPL model inputs are flexible but require proper input and judgement for each site-specific area. Designating a BMP Efficiency in STEPL is customizable model input to reflect the site conditions and potential load reductions.

STEPL's gully calculator can be used to qualify load reductions from ephemeral and classic gullies in agricultural fields that are addressed by installing permanent vegetated swales. Rill erosion is typically not modeled using STEPL. The Natural Resources Conservation Service (NRCS) *Ephemeral and Classic Gully Erosion Worksheet* defines rills, ephemeral gullies, and classic gullies as:

- Rills: less than 4 inches deep and may appear at different locations each year.
- Ephemeral gullies: may be any size, but usually greater than 4 inches deep, recur in the same area each time they form and are partially or totally erased by tillage operations.
- Classic gullies: permanent gullies and channels too deep for normal tillage operations to erase, may grow larger from year to year, and may begin as an ephemeral gully that was left in the field.

The gully erosion calculations in STEPL are based on a volumetric equation for soil loss on a per year basis. Nutrient loads are calculated by applying a concentration percentage of the soil loss based on the soil parameters (e.g. hydrologic soil group, soil texture, nutrient concentrations). A BMP efficiency is applied as a percentage to the calculated nutrient loads to determine the final per-year mass reduction expected when the area is stabilized and erosion is eliminated or reduced. For example, if an ephemeral gully in an agricultural field appears each year in a concentrated flow area, and the average phosphorus load eroding annually from that gully is 50 lbs/year, then a vegetated swale with a 95 percent efficiency would estimate that the mass reduction after the implementation of the BMP would be 0.95*50 lbs/year, or 47.5 lbs/year of mass reduction.

BMP efficiencies are site-specific and determined for each unique scenario. There are no established BMP efficiencies provided in the *STEPL 4.4 User Guide* or the *Guidance for Implementing Water Quality Trading in WPDES Permits*, although a default value is automatically suggested by BMP Type (*STEPL Training August 5, 2014*, Wisconsin Department of Natural Resources; *EPA STEPL 4.4 Training*, Environmental Protection Agency). For gully erosion stabilized by permanent vegetated swales, the training documentation recommends a BMP efficiency of 0.95 as a default.

In general, the selection of a site-specific BMP efficiency should consider:

- The land use and stabilization before and after the BMP installation.
- The type of management practice installed.
- The proximity to the stream.

- The function and maintenance of the BMP.

The City of Fond du Lac's Wastewater Treatment and Resource Recovery Facility (WTRRF) used STEPL to quantify mass reductions from BMPs installed as part of a Water Quality Trade. Two agricultural fields adjacent to the Fond du Lac County Airport (Airport) were identified with severe classic gully erosion, as well as several ephemeral gullies and rills. The WTRRF installed BMPs in the fall of 2024 and spring of 2025. All eroded ephemeral and classic gully areas were stabilized with permanent vegetated swales using a combination of grassed waterways and critical area plantings. The upland crop area was planted in a permanent conservation cover of a grass and alfalfa mix to eliminate rills, improve infiltration, and reduce sheet erosion; SnapPlus was used to model appropriate mass reductions for the land conversion.

The ephemeral and classic gullies were modeled in STEPL to determine the nutrient and sediment load reductions from implementation of the ephemeral and classic gully BMPs installed, using site-specific data collected from field visits, historic aerial imagery, and first-hand knowledge of the previous grower's operations. Rills were not included in the mass reduction modeling. A site-specific BMP efficiency was determined for the STEPL model using the recommended considerations summarized in Table 1. Figures 1 and 2 show supporting maps and photos of the site.

Table 1. Considerations for the Selection of a BMP Efficiency for STEPL Modeling of Vegetated Swales at the Fond du Lac County Airport.

Consideration	Applicability to Vegetated Swales at the Airport
Best Management Practices Installed for Gully Erosion	Permanent vegetated swales were installed in all areas where ephemeral or classic gullies were observed in the field. Grassed waterways and critical area plantings were installed according to the Natural Resources Conservation Service (NRCS) design standards: • **Grassed Waterway (NRCS 412):** A shaped or graded channel that is established to convey surface water at a non-erosive velocity using a broad and shallow cross section to a stable outlet. • **Critical Area Planting (CAP NRCS 342):** Establishing permanent vegetation on sites that have, or are expected to have, high erosion rates, and on sites that have physical, chemical, or biological conditions that prevent the establishment of vegetation with normal seeding/planting methods. The benefits of the vegetated swales include: • **Filtration:** Vegetated swales, functioning as open, gently sloping channels with dense vegetation, effectively filter suspended pollutants and sediments from runoff as it flows through the swale. The grass blades and stems physically trap these particles, preventing them from reaching waterways. • **Sedimentation:** By slowing the runoff velocity, vegetated swales promote the settling of sediments and associated pollutants within the swale channel before they can enter streams and rivers. • **Plant Uptake:** Plants within the swales, chosen for their tolerance to varying moisture conditions and ability to thrive in the local climate, absorb nutrients and other dissolved pollutants from the runoff as they

	grow. This biological uptake removes pollutants from the water and incorporates them into plant biomass.
Land Use and Stabilization	The agricultural fields were previously planted in row crops with a soybean-corn-winter wheat rotation; and tillage of fall and spring cultivation and fall chisel no disk depending on the rotation year. The operator tilled through each gully in the spring and fall to smooth out the area before planting, and ephemeral gullies re-appeared annually in concentrated flow areas. The stabilization of the upland area will further protect the vegetated swales in the concentrated flow areas, leading to less overall erosion, greater infiltration, and more opportunity for plant uptake. Figure 1 demonstrates an area of erosion of Field 3, 6 before and after BMP implementation. A grass/hay conservation cover (NRCS 511 and 512) [*50 pounds oats (nurse crop during grass establishment), 10 pounds per acre versagrass (2.5 pounds smooth bromegrass, 2.5 pounds orchardgrass, 2.5 pounds, and 10 pounds per acre Country Visions 4235 alfalfa*], was planted on the upland crop area. SnapPlus modeling of the agricultural operations before and after result in a reduction of phosphorus of 98 percent for the conversion of the upland agricultural land from row crops to conservation cover (based on Phosphorus Trade Report outputs), indicating the entire field area will be more stable and the vegetated swales in concentrated flow areas will be more effective in combination with the conservation cover. Grasses and alfalfa have a dense root system that help contribute to improved soil structure, organic matter content, and soil microbiome. The improved organic matter in the soil improves soil structure, water holding capacity, helps break up compacted soils, and helps capture moisture. Adding grasses to the mix can prevent winter kill to the alfalfa because grasses will survive standing water or ice in low spots.
Proximity to the Stream	Both agricultural fields are in close proximity to the stream meaning the erosion and nutrient load was directly entering a blue-line stream with no controls, shown in Figure 2. The vegetated swales in combination with the permanent upland cover will directly reduce the loading to the stream.
Function and Maintenance of the BMP	The City will complete verification and maintenance of installed BMPs on an ongoing basis. This includes annual inspections to ensure practices remain in good condition and are functioning as expected and monthly inspections for the City's WTRRF Discharge Monitoring Report. Grassed waterways and critical area plantings are inspected according to the NRCS O&M standards. Conservation cover will be inspected for weeds, erosion, winter kill, and grass density. If grass density doesn't match designed planting the operator will interseed more grass into the alfalfa mix.



Before: row crops and severe erosion present in vulnerable concentrated flow areas



After: land use in permanent cover and stabilized concentrated flow areas

Figure 1. Erosion observed in agricultural field and subsequent stabilization in permanent cover.



Field 3, 6 outlets directly to the stream via stormwater infrastructure under the airport runway.



Field 9 directly adjacent to stream.

Figure 2. Location of Fields and Proximity to the Stream.

Based on the severity of the field conditions, the design and stability of the improvements made to the landscape, and a conservative approach to not overestimate mass reductions, a BMP efficiency of 0.90 is proposed for the STEPL modeling of the vegetated swales installed on the Airport fields. This is lower than the default efficiency of 0.95 referenced in the EPA and DNR training documentation. In addition to the selection of the BMP efficiency, several other conservative assumptions were made in the STEPL model including:

- Separated classic gullies from ephemeral gullies in STEPL to recognize longer years-to-form for classic gullies.
- Average lengths for ephemeral gullies were used according to historic air photos, rather than the maximum length observed or the length of the gully in a single year.

- Gullies were separated into multiple parts if the gully dimensions change significantly over the length of the gully, so as not to overestimate the nutrient loading from the erosion.
- Rills and smaller ephemeral gullies were excluded from the STEPL model. All gullies modeled were greater than 6 inches in depth at the shallowest depth.

The City WTRRF will document the pre-project field conditions, the BMP installations, the modeling approach and pollutant mass reductions, and the operation and maintenance plan of the BMPs in a Water Quality Trading Plan, which will be part of the City WTRRF Wisconsin Pollutant Discharge Elimination System (WPDES) Permit. The STEPL modeling inputs and application of the BMP efficiency discussed in this memorandum represent a modeling approach that does not intend to over- or underestimate mass reductions for the implemented BMPs. The modeled mass reductions are converted to water quality trading credits for the WTRRF to meet the WPDES permit requirements so that this watershed approach benefits the Fond du Lac River and Lake Winnebago watersheds beyond the fence line of the facility.

References:

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Wisconsin Department of Natural Resources. (2020, June 1). *Guidance for implementing water quality trading in WPDES permits*. Retrieved from https://dnr.wisconsin.gov/topic/Wastewater/WaterQualityTrading.html

Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

Field, Gully	**Type of Gully**	**Installed Conservation Practice**	**STEPL Inputs** *Gully Dimensions (TWxBWxDxL, ft), years-to-form, BMP Efficiency*	**Maximum Credit Calculation Using Trade Ratio of 3:1** *Credits = Mass Reduction/Trade Ratio* *TMDL Subbasin 75: 83% TP Watershed Reduction, 0% TSS Watershed Reduction for interim vs long-term credit calculation*
Field 3,6 Gully 1	The larger "downstream" portion of the gully is considered 'classic' as the dimensions were too large for the growers' equipment to fill in after severe rainfall in 2018. The 'upstream' portion was tilled through and planted annually and is considered ephemeral.	Grassed waterway (412) Designed and installed in 2024 by FDL County LCD	Upstream: 2 x 1 x 1 x 235 ft 1 year-to-form 0.9 BMP Efficiency Downstream: 5 x 2.5 x 4 x 50 ft 10 years-to-form 0.9 BMP Efficiency	

	A			B		
Gully	**Phosphorus Mass Reduction (lbs/yr)**	**Phosphorus Interim Credit (lbs/yr) (A*0.83/1.2)**	**Phosphorus Long-Term Credit (lbs/yr) (A*(1 –0.83)/1.2)**	**TSS Mass Reduction (tons/yr)**	**TSS Interim Credit (tons/yr) (B*0.7/1.2; B*0/1.2)**	**TSS Long-Term Credit (tons/yr) (B*(1 –0.7)/1.2; B/1.2)**
Field 3,6: G1 Upstream	8.3	2.3	0.5	13.5	0	4.5
Field 3,6: G1 Downstream	1.8	0.5	0.1	2.9	0	1.0

Photos, EVAAL Results, Air Photos (see full-size photos in appendix):

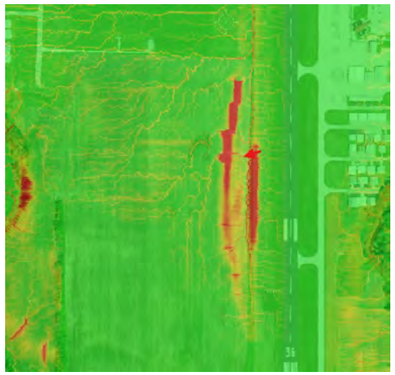
Site Visit 2020



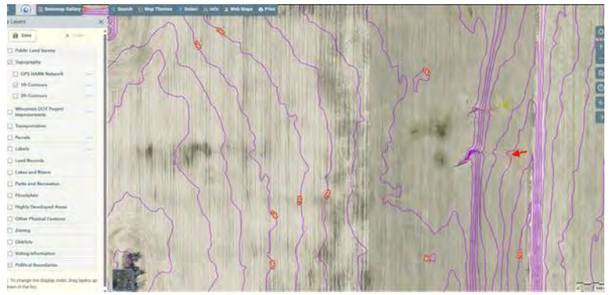
Site Visit 2020



EVAAL Result



Contour Map FDL County GIS



Gully Length FDL County GIS



FDL County 2018 Aerial Shows Upstream Erosion



Field Notes



As Built



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

Field, Gully	**Type of Gully**	**Installed Conservation Practice**	**STEPL Inputs** *Gully Dimensions (TWxBWxDxL, ft), years-to-form, BMP Efficiency*	**Maximum Credit Calculation Using Trade Ratio of 3:1** *Credits = Mass Reduction/Trade Ratio* *TMDL Subbasin 75: 83% TP Watershed Reduction, 0% TSS Watershed Reduction for interim vs long-term credit calculation*
Field 3,6 Gully 2	The larger "downstream" portion of the gully is considered 'classic' as the dimensions were too large for the growers' equipment to fill in after severe rainfall in 2018. The 'upstream' portion was tilled through and planted annually and is considered ephemeral.	Critical Area Planting (342) *Gully was filled, compacted, shaped, and seeded twice with field conversion mix in 2024 by FDL County LCD and seeded by the grower.	Upstream: 2 x 1 x 1 x 235 ft 1 year-to-form 0.9 BMP Efficiency Downstream: 4 x 3 x 3 x 50 ft 3 years-to-form 0.9 BMP Efficiency	

	A			B		
Gully	**Phosphorus Mass Reduction (lbs/yr)**	**Phosphorus Interim Credit (lbs/yr) (A*0.83/1.2)**	**Phosphorus Long-Term Credit (lbs/yr) (A*(1 –0.83)/1.2)**	**TSS Mass Reduction (tons/yr)**	**TSS Interim Credit (tons/yr) (B*0/1.2)**	**TSS Long-Term Credit (tons/yr) (B/1.2)**
Field 3,6: G2 Upstream	8.3	2.3	0.5	13.5	0	4.5
Field 3,6: G2 Downstream	4.1	1.1	0.2	6.7	0	2.2

Photos, EVAAL Results, Air Photos (see full-size photos in appendix):

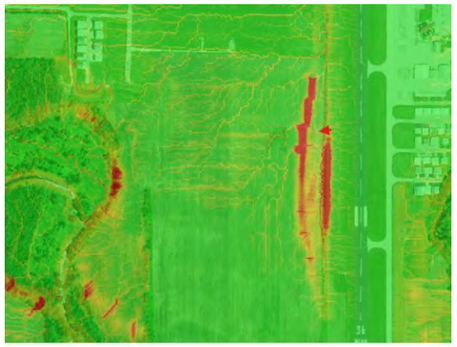
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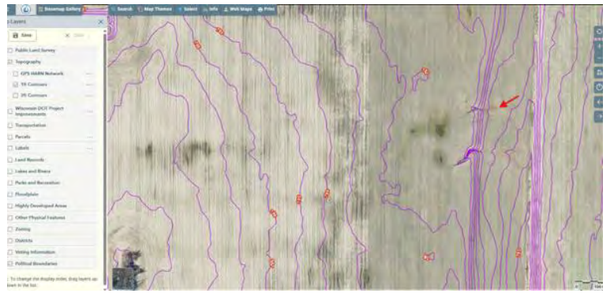
Site Visit 2020



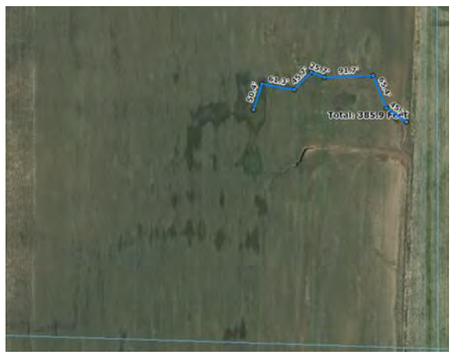
EVAAL Result



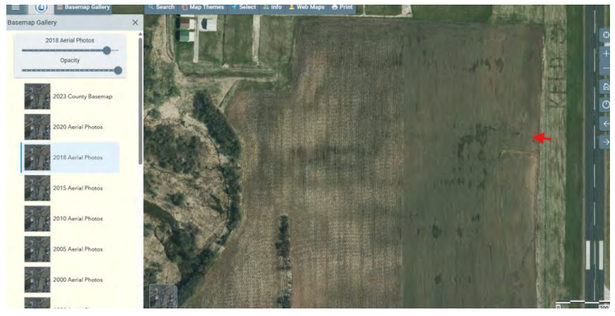
Contour Map FDL County GIS



Gully Length FDL County GIS



FDL County 2018 Aerial Shows Erosion



Field Notes



As Built



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

Field, Gully	**Type of Gully**	**Installed Conservation Practice**	**STEPL Inputs** *Gully Dimensions (TWxBWxDxL, ft), years-to-form, BMP Efficiency*	**Maximum Credit Calculation Using Trade Ratio of 3:1** *Credits = Mass Reduction/Trade Ratio* *TMDL Subbasin 75: 83% TP Watershed Reduction, 0% TSS Watershed Reduction for interim vs long-term credit calculation*
Field 3,6 Gully 3	Gully was tilled through and planted annually and is considered ephemeral.	Critical Area Planting (342) *Gully was filled, compacted, shaped, and seeded twice with field conversion mix in 2024 by FDL County LCD and seeded by the grower.	2 x 1 x 1 x 275 ft 1 year-to-form 0.9 BMP Efficiency	

	A			B		
Gully	**Phosphorus Mass Reduction (lbs/yr)**	**Phosphorus Interim Credit (lbs/yr) (A*0.83/1.2)**	**Phosphorus Long-Term Credit (lbs/yr) (A*(1 –0.83)/1.2)**	**TSS Mass Reduction (tons/yr)**	**TSS Interim Credit (tons/yr) (B*0/1.2)**	**TSS Long-Term Credit (tons/yr) (B/1.2)**
Field 3,6: G3	9.7	2.7	0.6	15.8	0	5.3

Photos, EVAAL Results, Air Photos (see full-size photos in appendix):

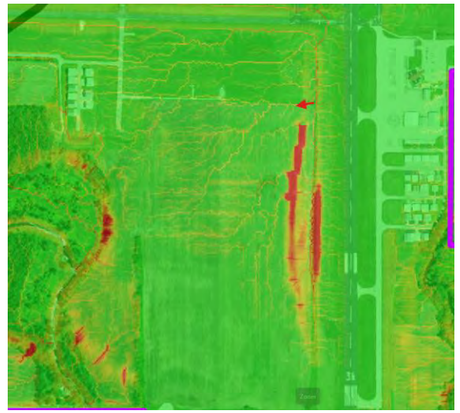
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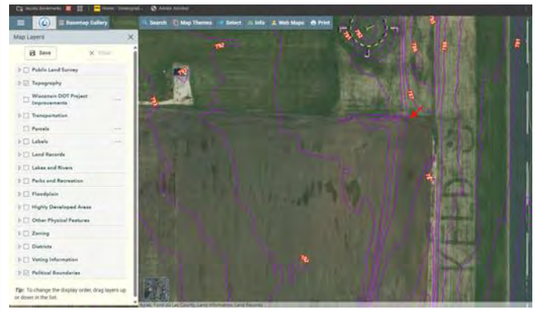
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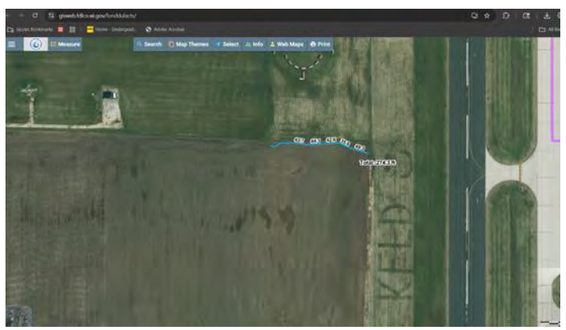
EVAAL Result



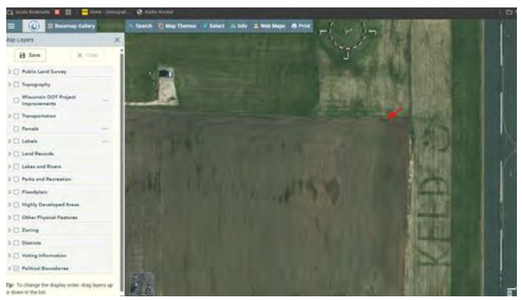
Contour Map FDL County GIS



Gully Length FDL County GIS



FDL County 2018 Aerial Shows Erosion



Field Notes



As Built



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

Field, Gully	**Type of Gully**	**Installed Conservation Practice**	**STEPL Inputs** *Gully Dimensions (TWxBWxDxL, ft), years-to-form, BMP Efficiency*	**Maximum Credit Calculation Using Trade Ratio of 2:1** *Credits = Mass Reduction/Trade Ratio* *TMDL Subbasin 44: 83% TP Watershed Reduction, 70% TSS Watershed Reduction for interim vs long-term credit calculation*
Field 9 Gully 1	The larger "downstream" portion of the gully is considered 'classic' as the dimensions were too large for the growers' equipment to till and plant. The 'upstream' portion was tilled through and planted annually and is considered ephemeral.	Grassed waterway (412) *Designed and installed in 2024 by FDL County LCD	Upstream: 2 x 1 x 0.5 x 760 ft 1 year-to-form 0.9 BMP Efficiency Downstream: 5 x 3 x 3 x 50 ft 3 years-to-form 0.9 BMP Efficiency	

	A			B		
Gully	**Phosphorus Mass Reduction (lbs/yr)**	**Phosphorus Interim Credit (lbs/yr) (A*0.83/1.2)**	**Phosphorus Long-Term Credit (lbs/yr) (A*(1 –0.83)/1.2)**	**TSS Mass Reduction (tons/yr)**	**TSS Interim Credit (tons/yr) (B*0.7/1.2)**	**TSS Long-Term Credit (tons/yr) (B*(1 –0.7)/1.2)**
Field 9: G1 Upstream	13.4	5.6	1.1	21.8	7.6	3.3
Field 9: G1 Downstream	4.7	2.0	0.4	7.7	2.7	1.1

Photos, EVAAL Results, Air Photos (see full-size photos in appendix):

Site Visit 2020

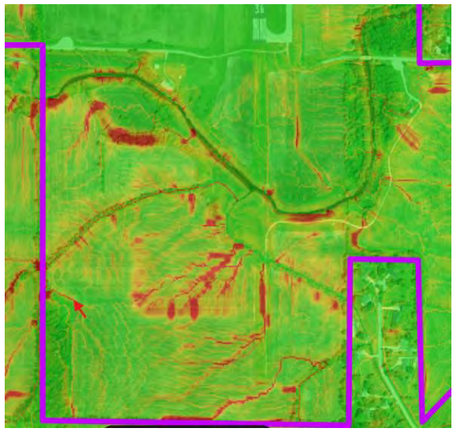




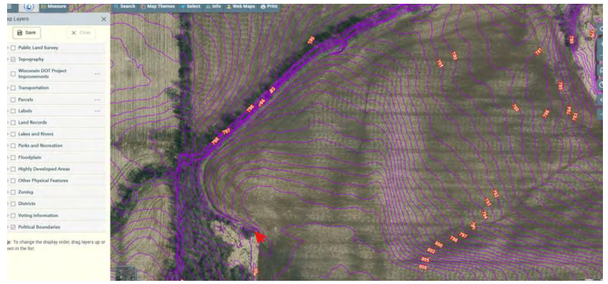
2024 Drone Imagery Showing Upstream Extent (see also drone video):



EVAAL Result



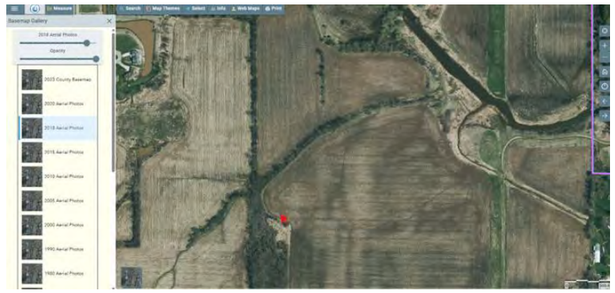
Contour Map FDL County GIS



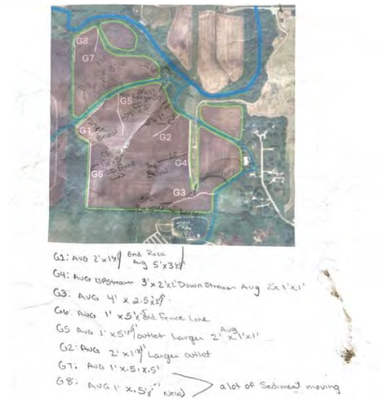
Gully Length FDL County GIS



FDL County 2018 Aerial Shows Erosion



Field Notes



As Built



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

Field, Gully	**Type of Gully**	**Installed Conservation Practice**	**STEPL Inputs** *Gully Dimensions (TWxBWxDxL, ft), years-to-form, BMP Efficiency*	**Maximum Credit Calculation Using Trade Ratio of 3:1** *Credits = Mass Reduction/Trade Ratio* *TMDL Subbasin 44: 83% TP Watershed Reduction, 70% TSS Watershed Reduction for interim vs long-term credit calculation*
Field 9 Gully 2	Gully was tilled through and planted annually and is considered ephemeral.	Grassed waterway (412) *Designed and installed in 2024 by FDL County LCD	2 x 1 x 1 x 300 ft 1 year-to-form 0.9 BMP Efficiency	

	A			**B**		
Gully	**Phosphorus Mass Reduction (lbs/yr)**	**Phosphorus Interim Credit (lbs/yr) (A*0.83/1.2)**	**Phosphorus Long-Term Credit (lbs/yr) (A*(1 –0.83)/1.2)**	**TSS Mass Reduction (tons/yr)**	**TSS Interim Credit (tons/yr) (B*0.7/1.2)**	**TSS Long-Term Credit (tons/yr) (B*(1 –0.7)/1.2)**
Field 9: G2	10.6	2.9	0.6	17.2	4.0	1.7

Photos, EVAAL Results, Air Photos (see full-size photos in appendix):

Site Visit 2020



FDL County Site Visit 2024



EVAAL Result



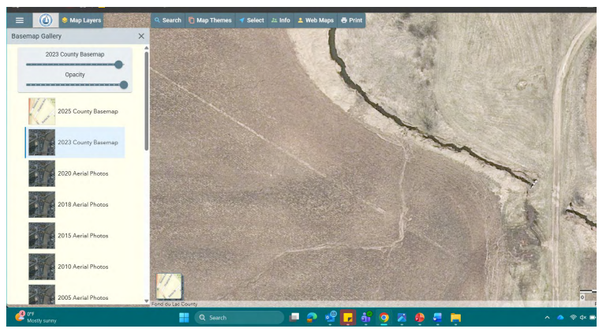
Contour Map FDL County GIS



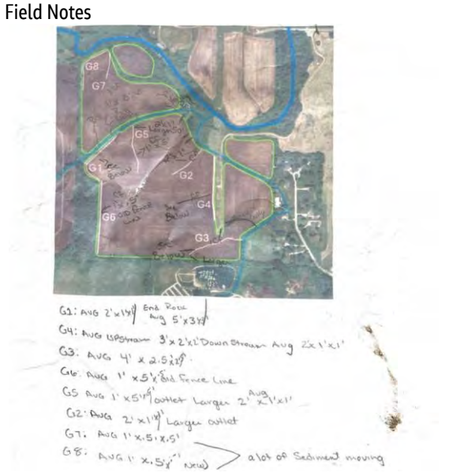
Gully Length FDL County GIS



Fon du Lac 2023 Aerial Shows Erosion and Delivery to Stream



Field Notes



As Built



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

Field, Gully	**Type of Gully**	**Installed Conservation Practice**	**STEPL Inputs** *Gully Dimensions (TWxBWxDxL, ft), years-to-form, BMP Efficiency*	**Maximum Credit Calculation Using Trade Ratio of 2:1** *Credits = Mass Reduction/Trade Ratio* *TMDL Subbasin 44: 83% TP Watershed Reduction, 70% TSS Watershed Reduction for interim vs long-term credit calculation*
Field 9 Gully 3	The gully is considered 'classic' as the dimensions were too large for the growers' equipment to till and plant.	Critical Area Planting (342) And Grassed waterway (412) *Gully was filled, compacted, shaped, and seeded. A grassed waterway was installed along the field edge to capture the water from reaching the current gully. *Both practices were designed and installed in 2024 by FDL County LCD	4 x 2.5 x 2.5 x 600 ft 8 years-to-form 0.9 BMP Efficiency	

	A			B		
Gully	**Phosphorus Mass Reduction (lbs/yr)**	**Phosphorus Interim Credit (lbs/yr) (A*0.83/1.2)**	**Phosphorus Long-Term Credit (lbs/yr) (A*(1 –0.83)/1.2)**	**TSS Mass Reduction (tons/yr)**	**TSS Interim Credit (tons/yr) (B*0.7/1.2)**	**TSS Long-Term Credit (tons/yr) (B*(1 –0.7)/1.2)**
Field 9: G3	14.4	6.0	1.2	23.3	8.2	3.5

Photos, EVAAL Results, Air Photos (see full-size photos in appendix):

Site Visit 2020



FDL County Site Visit 2024



EVAAL Result



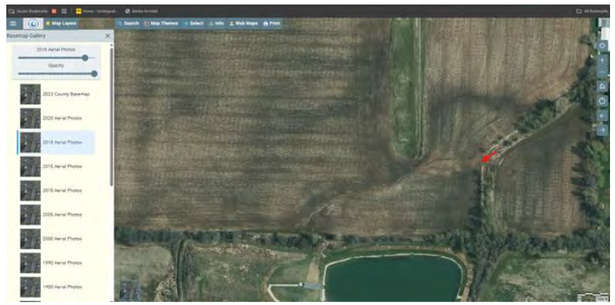
Contour Map FDL County GIS



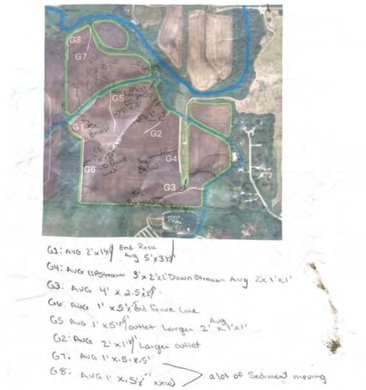
Gully Length FDL County GIS



FDL County 2018 Aerial Shows Erosion



Field Notes



As Built



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

Field, Gully	Type of Gully	Installed Conservation Practice	NRCS Streambank Erosion Estimator Inputs *Bank Dimensions (LxW, ft), lateral recession rate, Silt Loam Soil, 0.033% Phosphorus*	Maximum Credit Calculation Using Trade Ratio of 2:1 *Credits = Mass Reduction/Trade Ratio* *TMDL Subbasin 44: 83% TP Watershed Reduction, 70% TSS Watershed Reduction for interim vs long-term credit calculation*
Field 9 Gully 4	The larger "Upstream" portion of the gully is considered 'classic' as the dimensions were too large for the growers' equipment to till and plant. The 'downstream' portion was tilled through and planted annually and is considered ephemeral. The Department determined that there was insufficient evidence the gully was naturally occurring to generate mass reductions.	Grassed waterway (412) *Designed and installed in 2024 by FDL County LCD	Bank Number 1: 32.3 x 2.0 ft 0.96 ft/yr Bank Number 2: 8.9 x 2.0 ft 0.80 ft/yr Bank Number 3: 24.0 x 2.0 ft 0.88 ft/yr	

	A			B		
Gully	Phosphorus Mass Reduction (lbs/yr)	Phosphorus Interim Credit (lbs/yr) (A*0.83/1.2)	Phosphorus Long-Term Credit (lbs/yr) (A*(1 –0.83)/1.2)	TSS Mass Reduction (tons/yr)	TSS Interim Credit (tons/yr) (B*0.7/1.2)	TSS Long-Term Credit (tons/yr) (B*(1 –0.7)/1.2)
Field 9: G4 Upstream	3.7	1.5	0.3	5.6	2.0	0.8

Photos, EVAAL Results, Air Photos (see full-size photos in appendix):

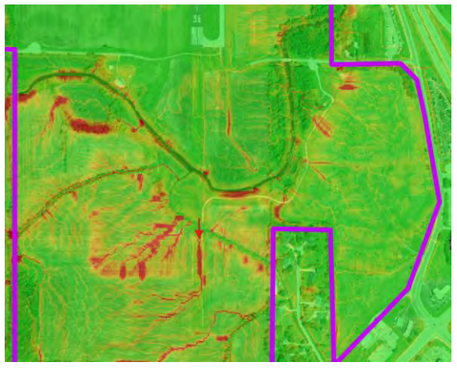
Site Visit 2020



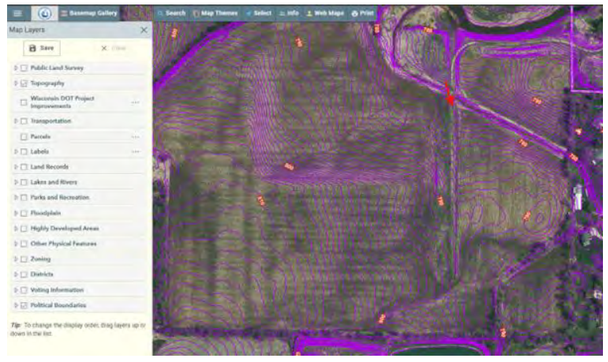
FDL County Site Visit 2024



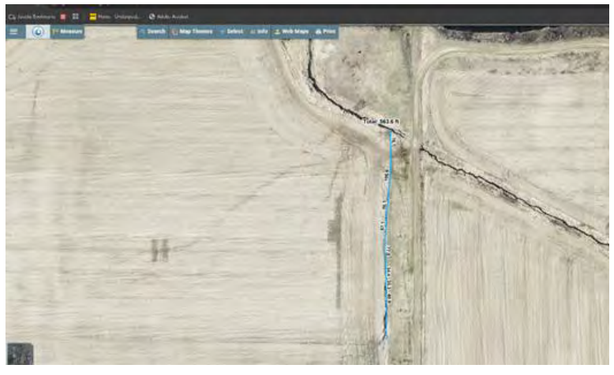
EVAAL Result



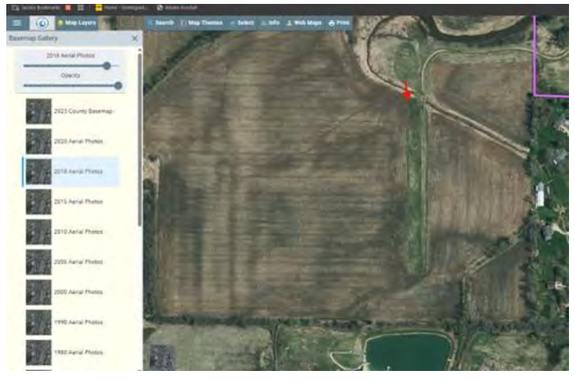
Contour Map FDL County GIS



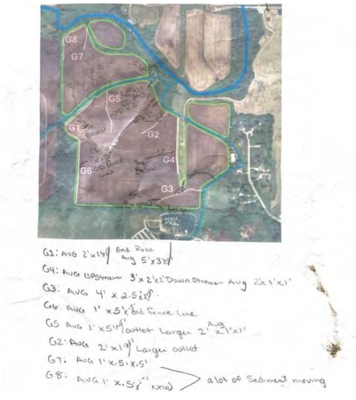
Gully Length FDL County GIS



Fon du Lac 2018 Aerial Shows Erosion



Field Notes



As Built



APPENDIX E: FULL-RESOLUTION PHOTOS

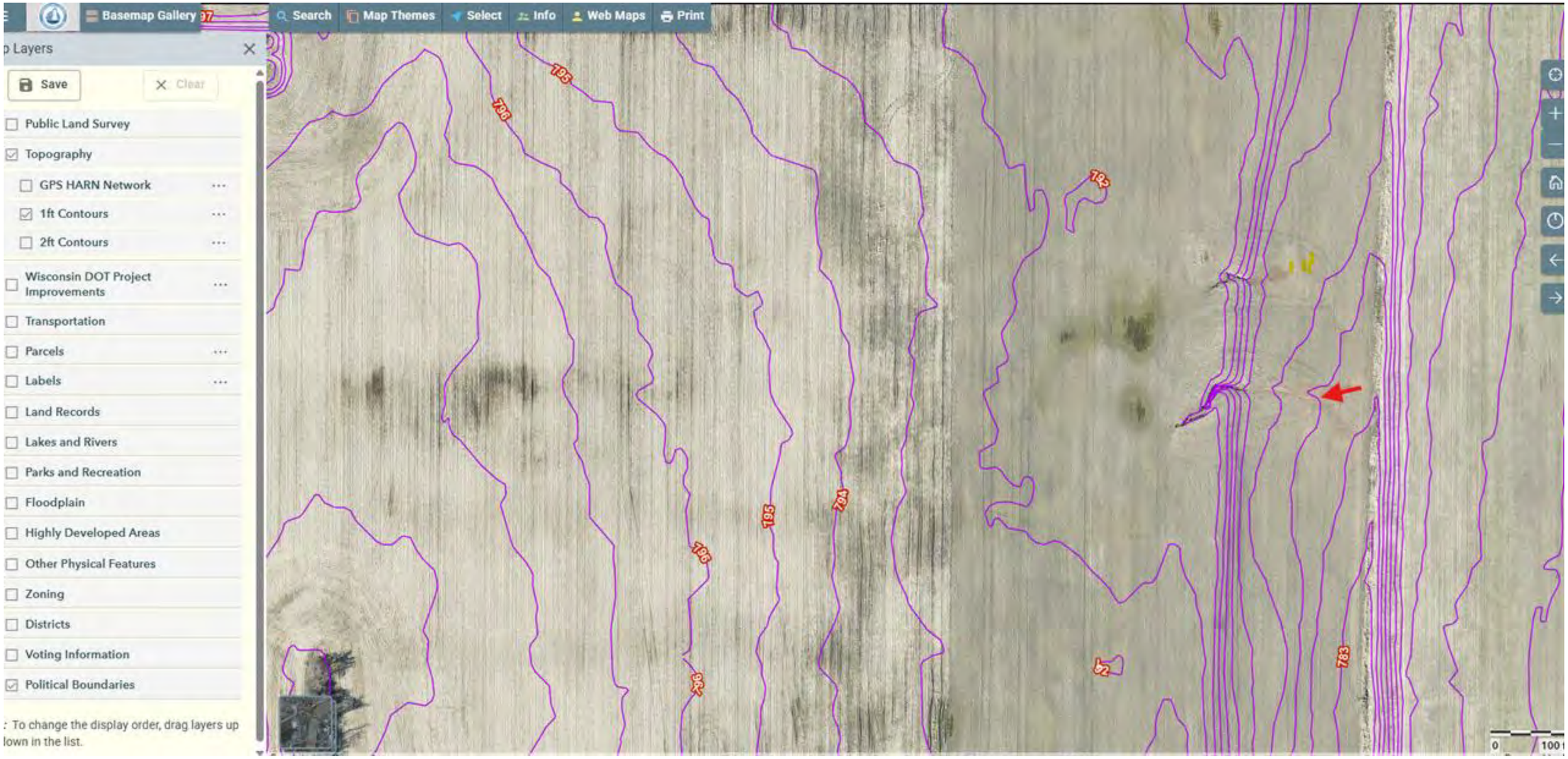
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 3,6-G1: 2018 Aerial



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 3,6-G1: Contour Map



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 3,6-G1: Measurements



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 3,6-G1: Picture A





Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

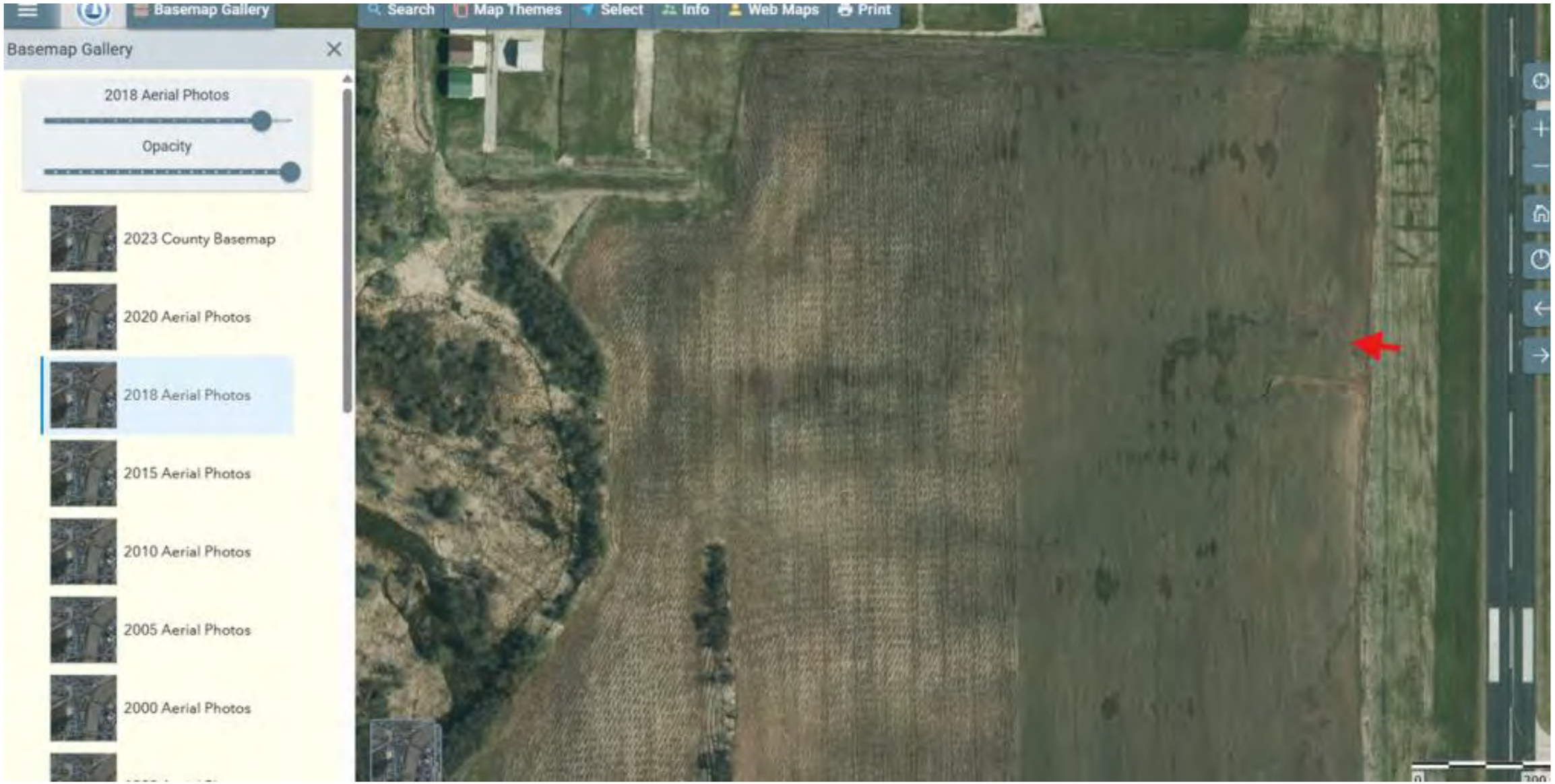
FIELD 3,6-G1: Picture B





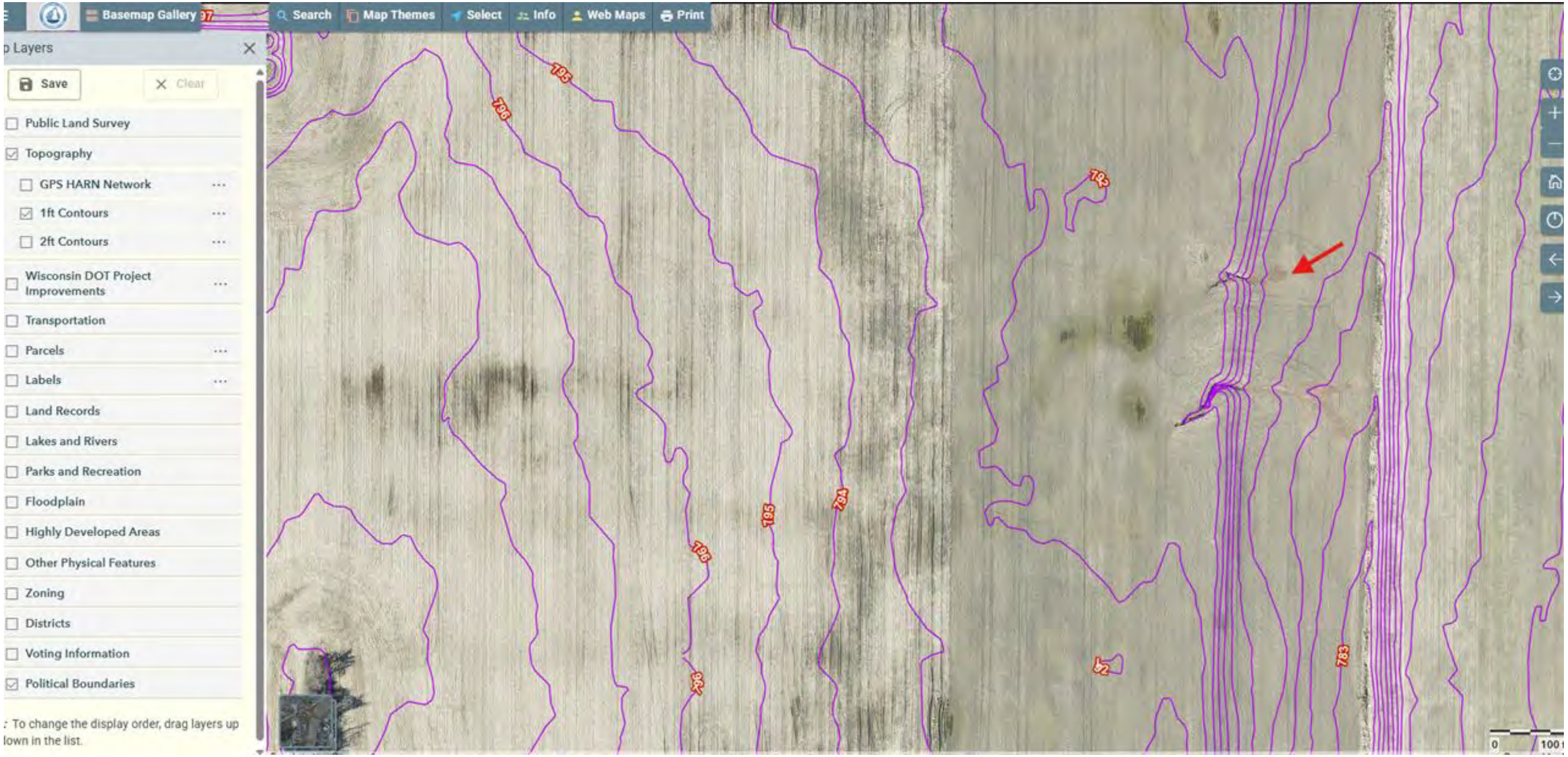
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 3,6-G2: 2018 Aerial



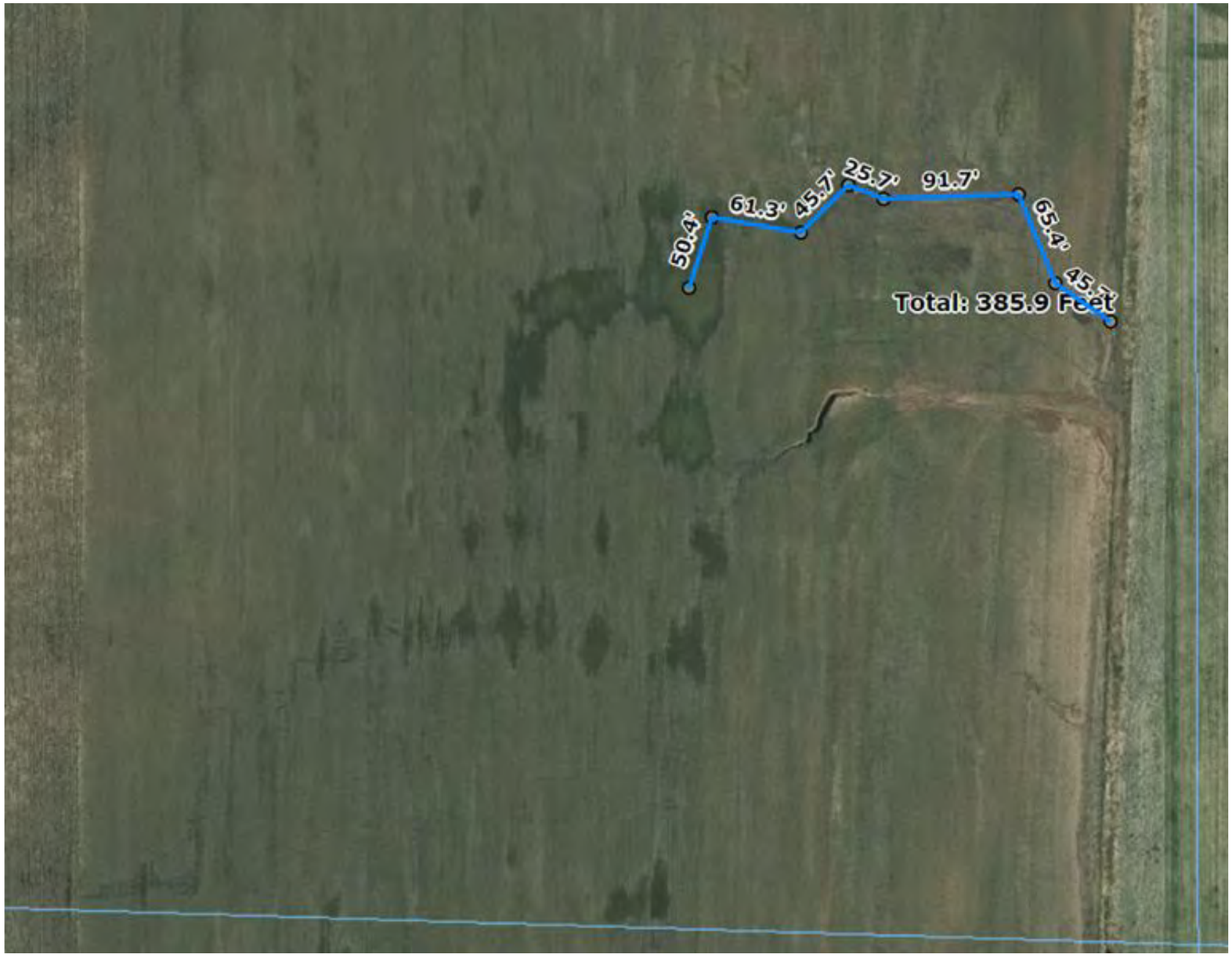
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 3,6-G2: Contour Map



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

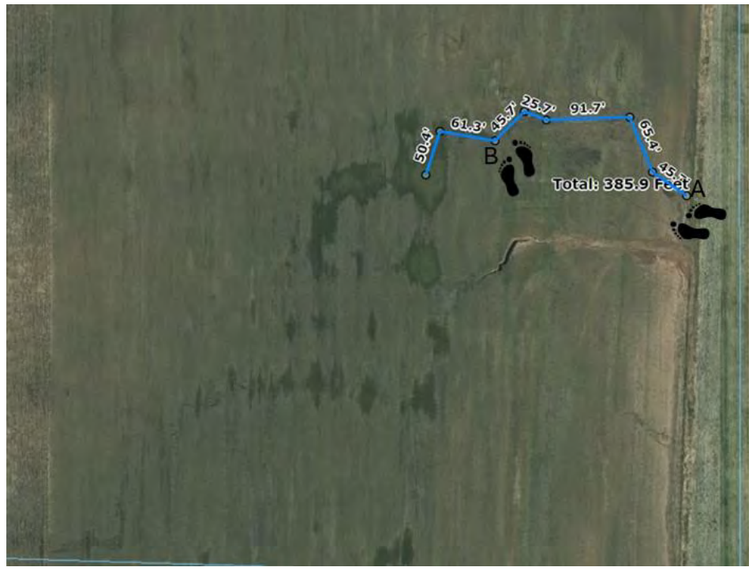
FIELD 3,6-G2: Measurements



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 3,6-G2: Picture A





Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

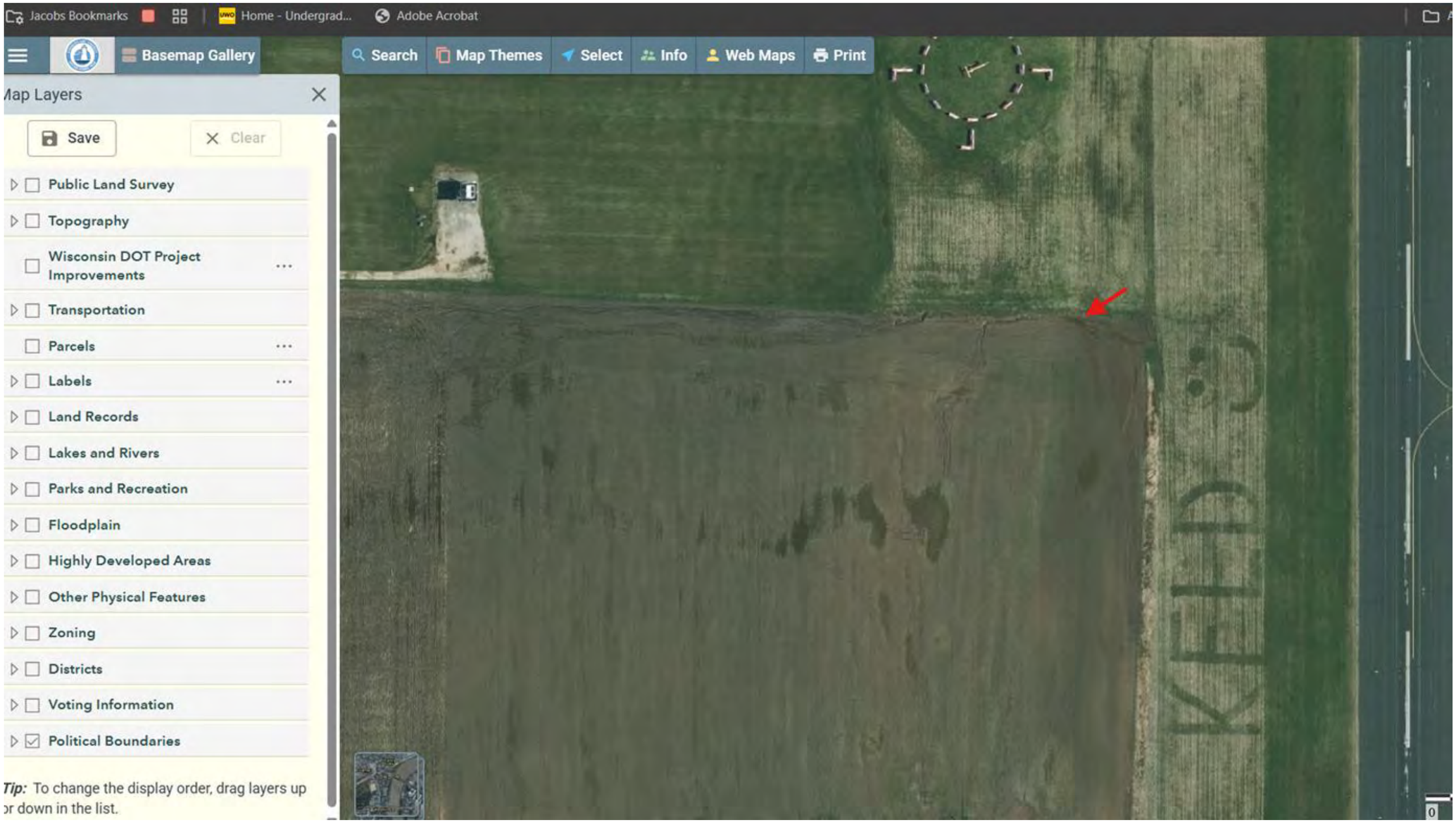
FIELD 3,6-G2: Picture B





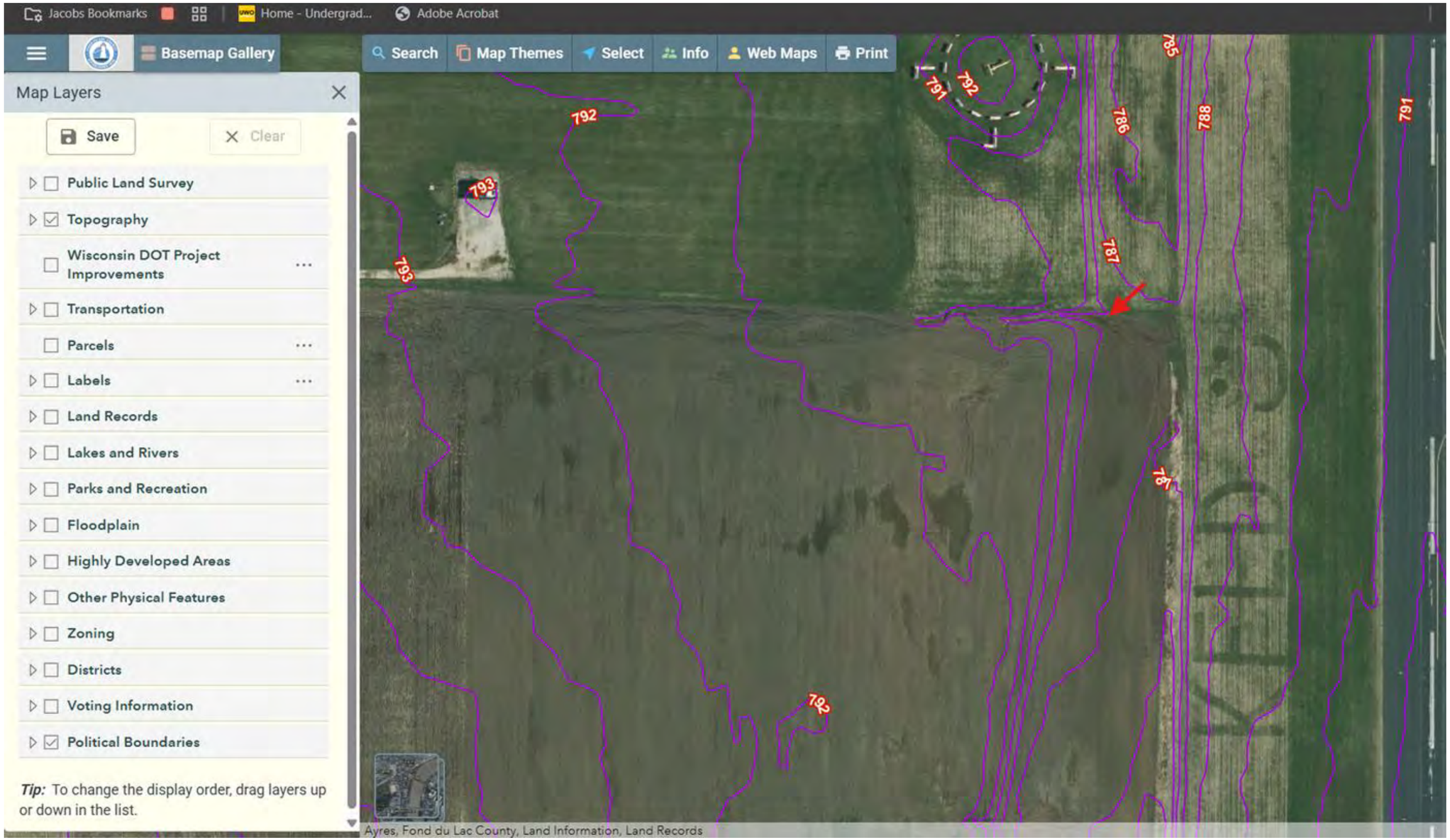
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 3,6-G3: 2018 Aerial



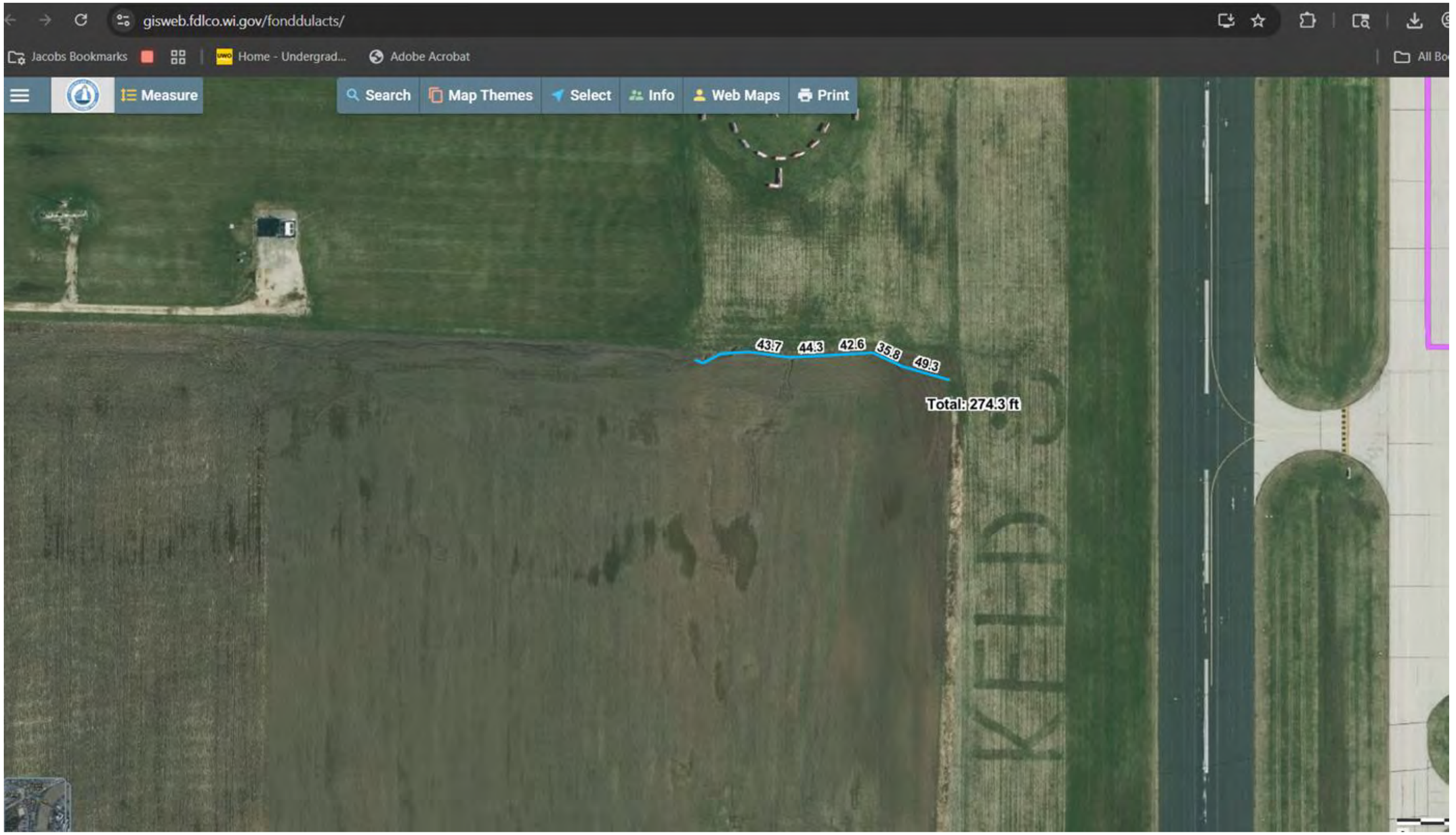
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 3,6-G3: Contour Map



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

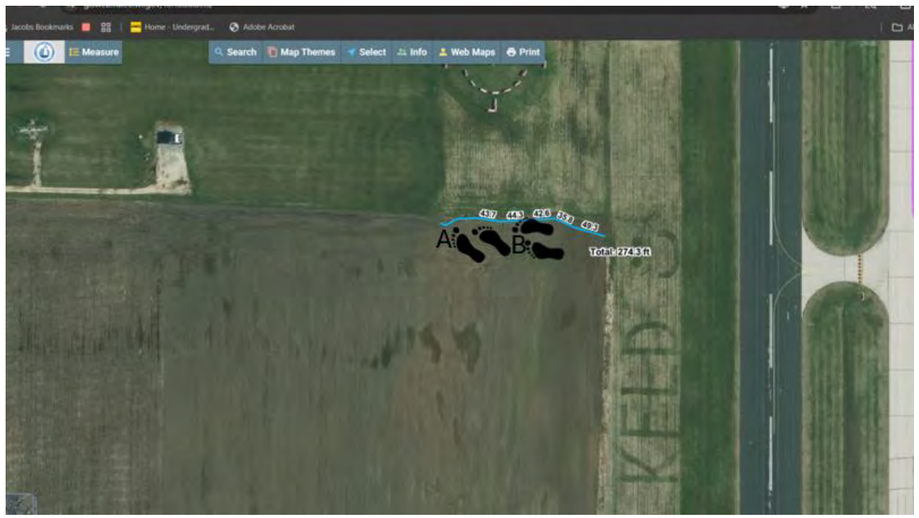
FIELD 3,6-G3: Measurements



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 3,6-G3: Picture A

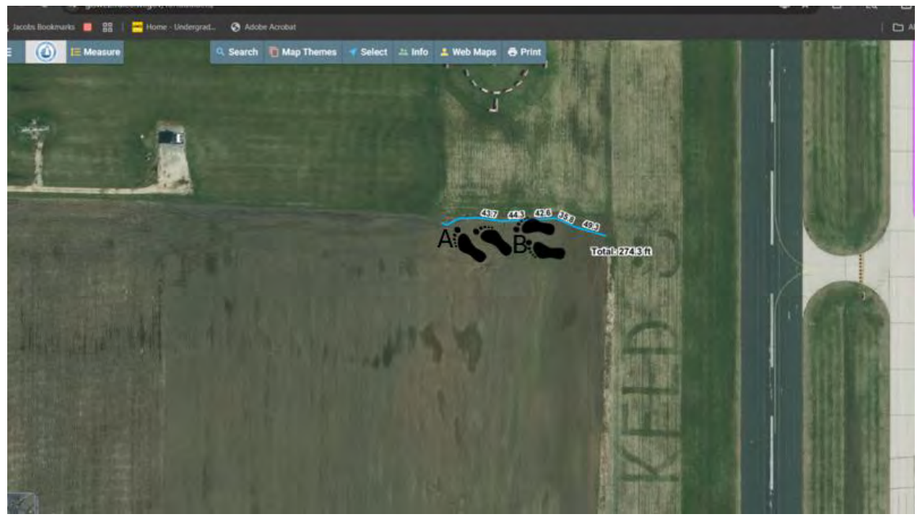




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

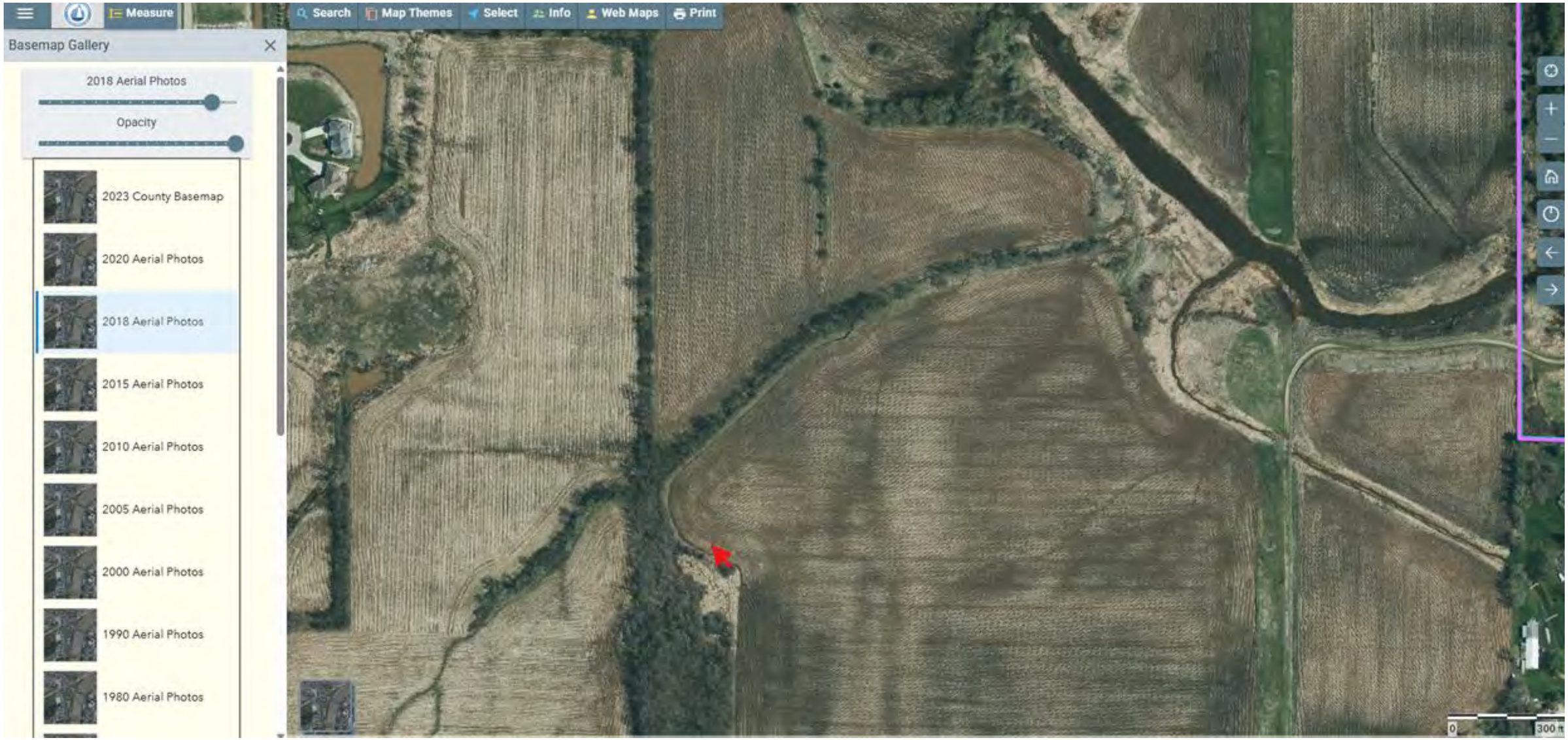
FIELD 3,6-G3: Picture B





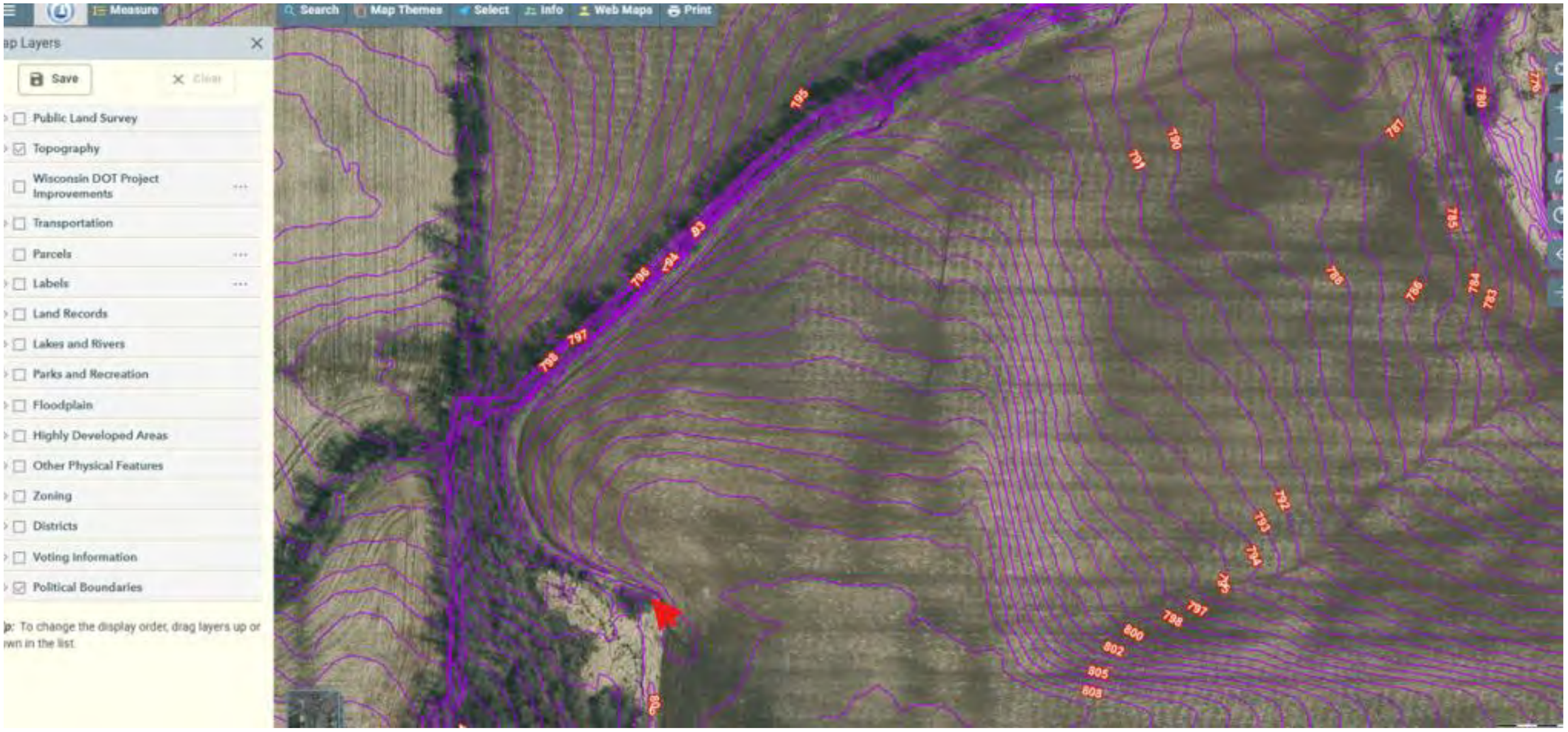
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G1: 2018 Aerial



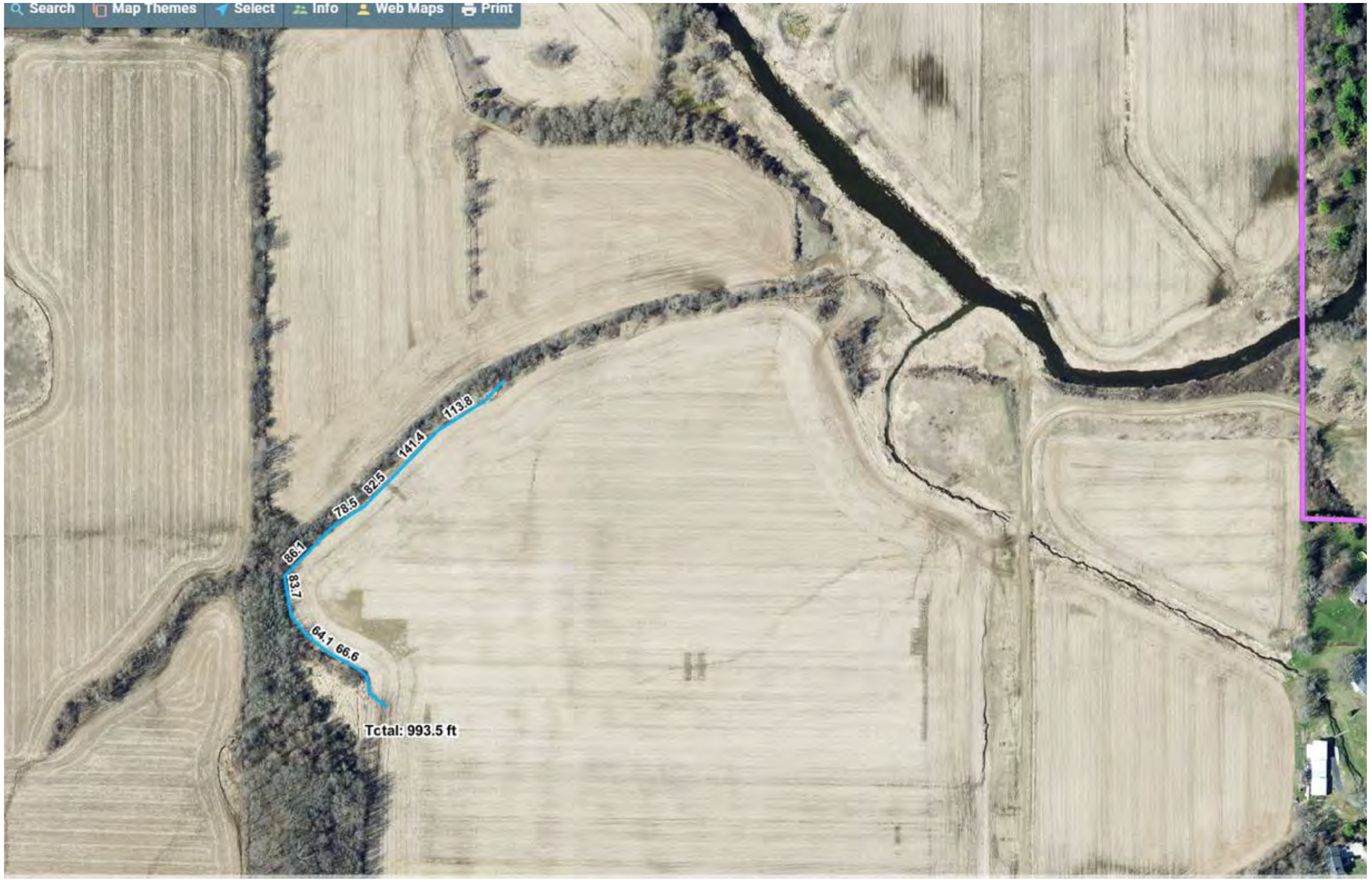
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G1: Contour Map



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

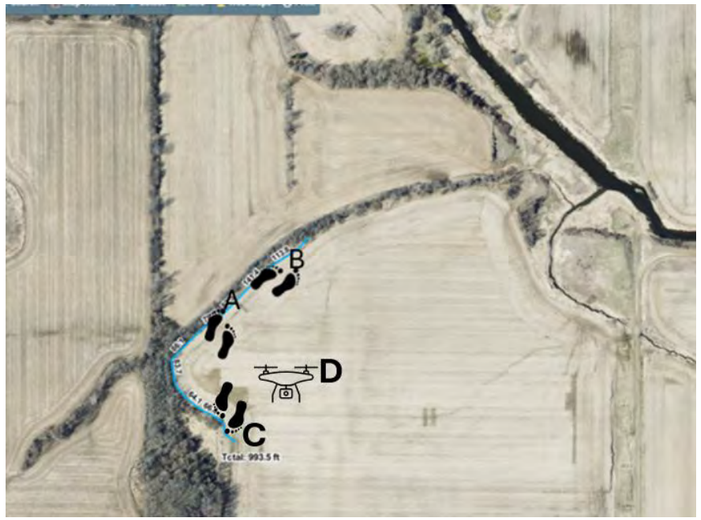
FIELD 9 -G1: Measurements



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G1: Picture A

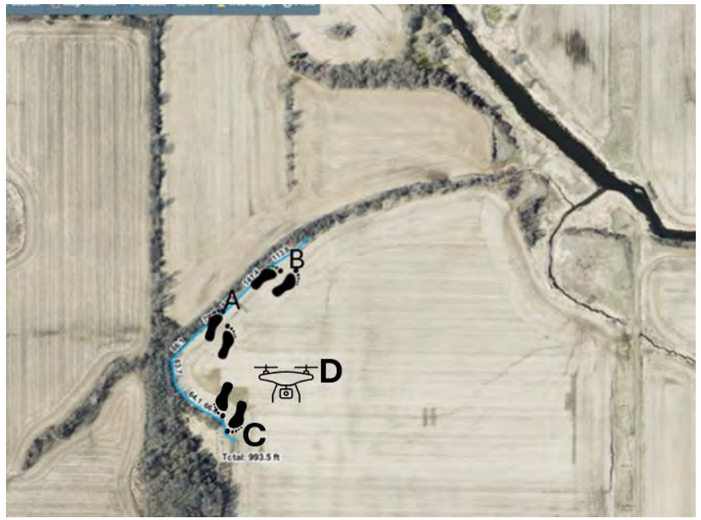




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G1: Picture B

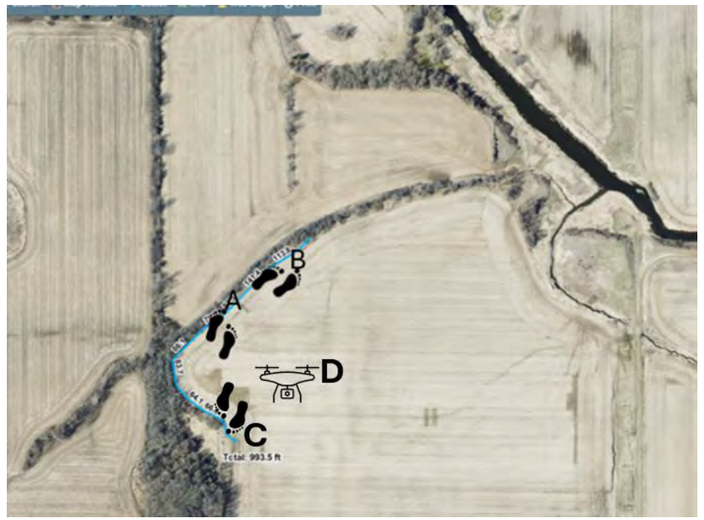




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G1: Picture C

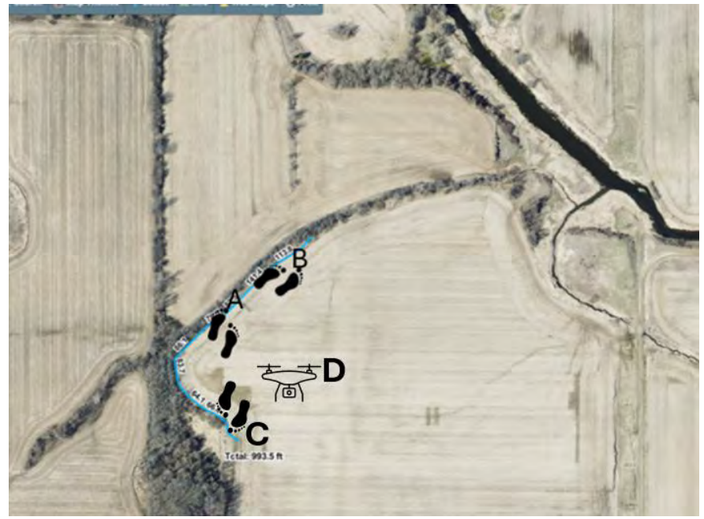




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

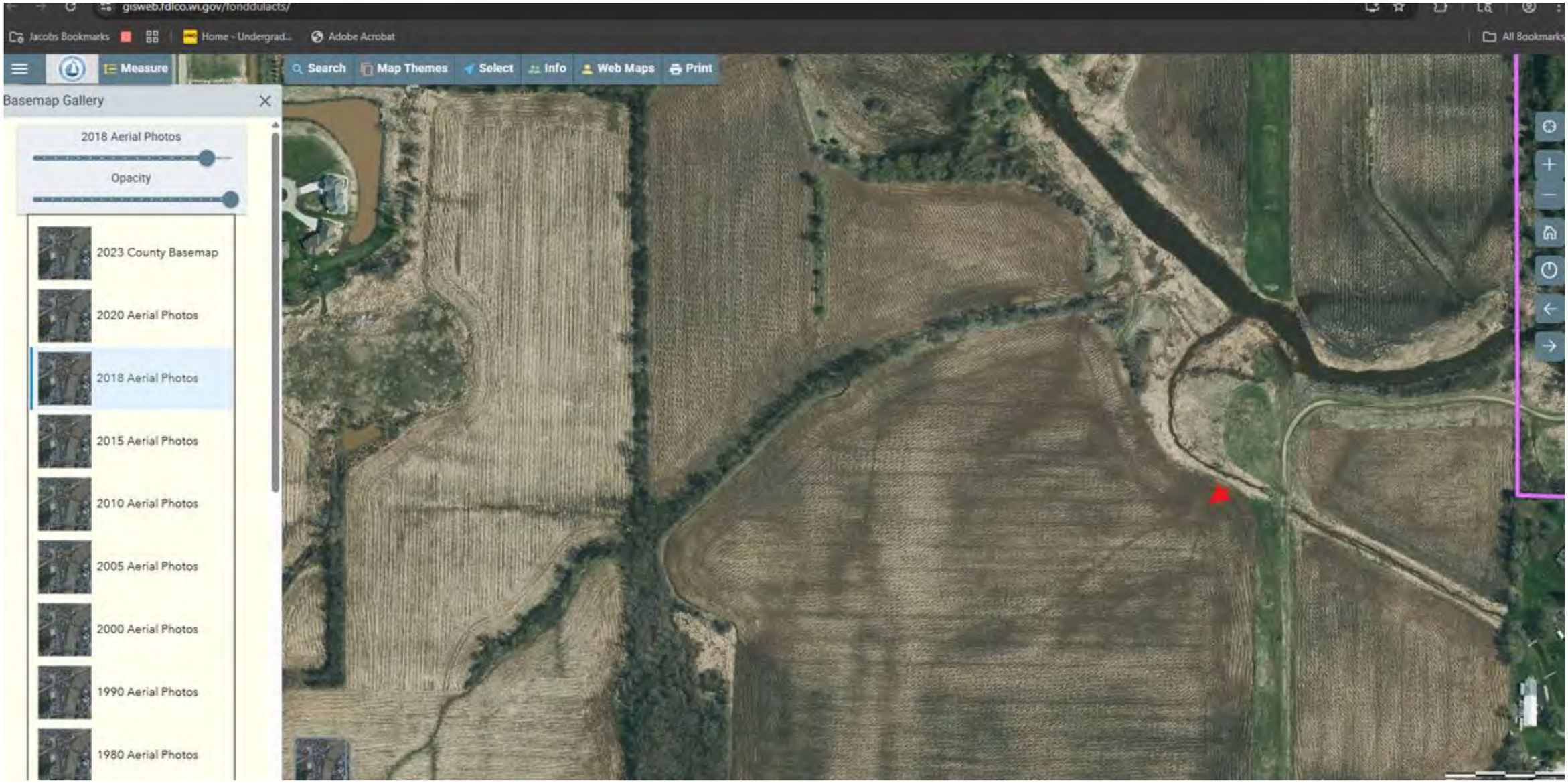
FIELD 9 -G1: Picture D





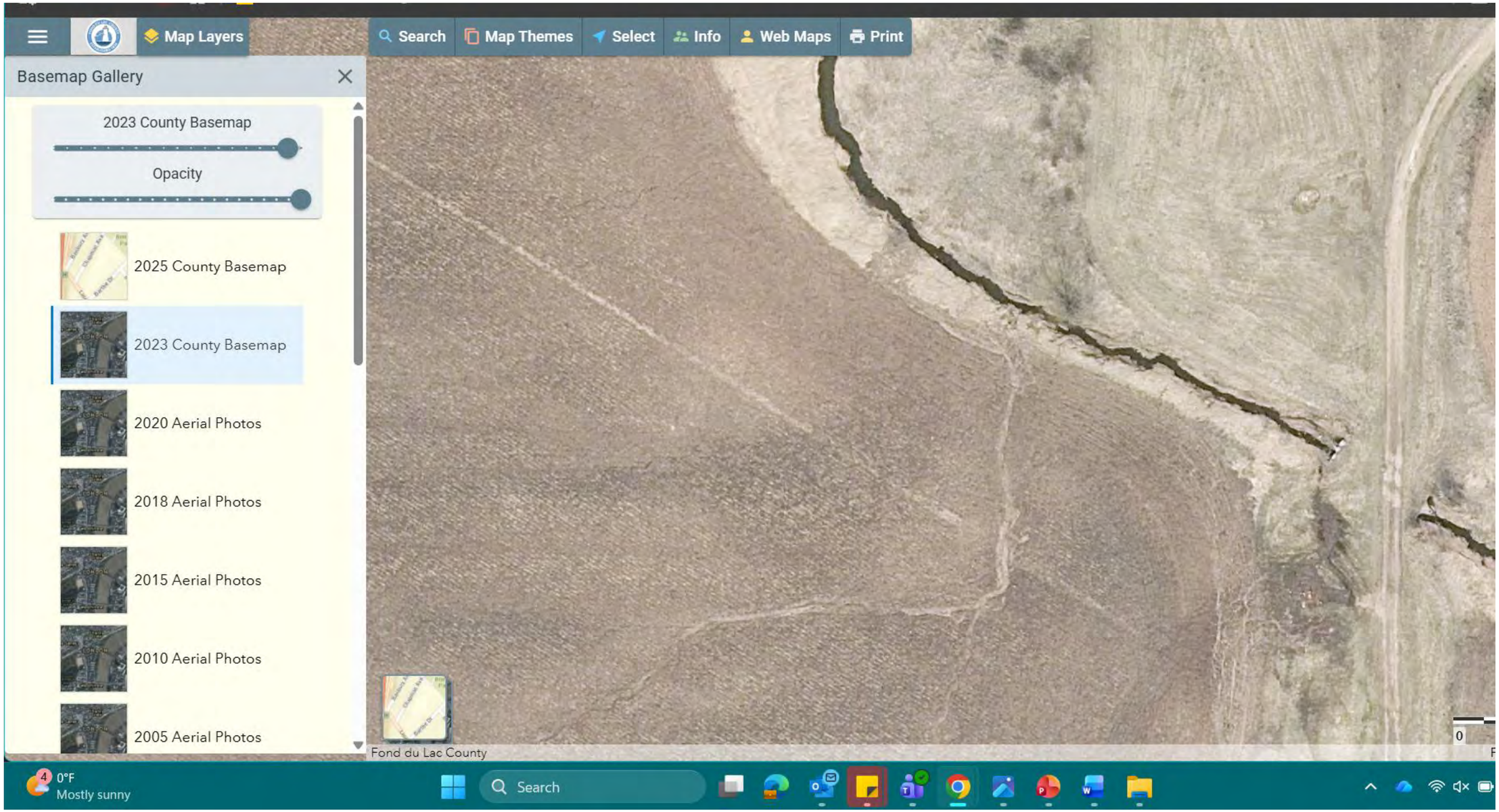
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G2: 2018 Aerial



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G2: 2023 Aerial



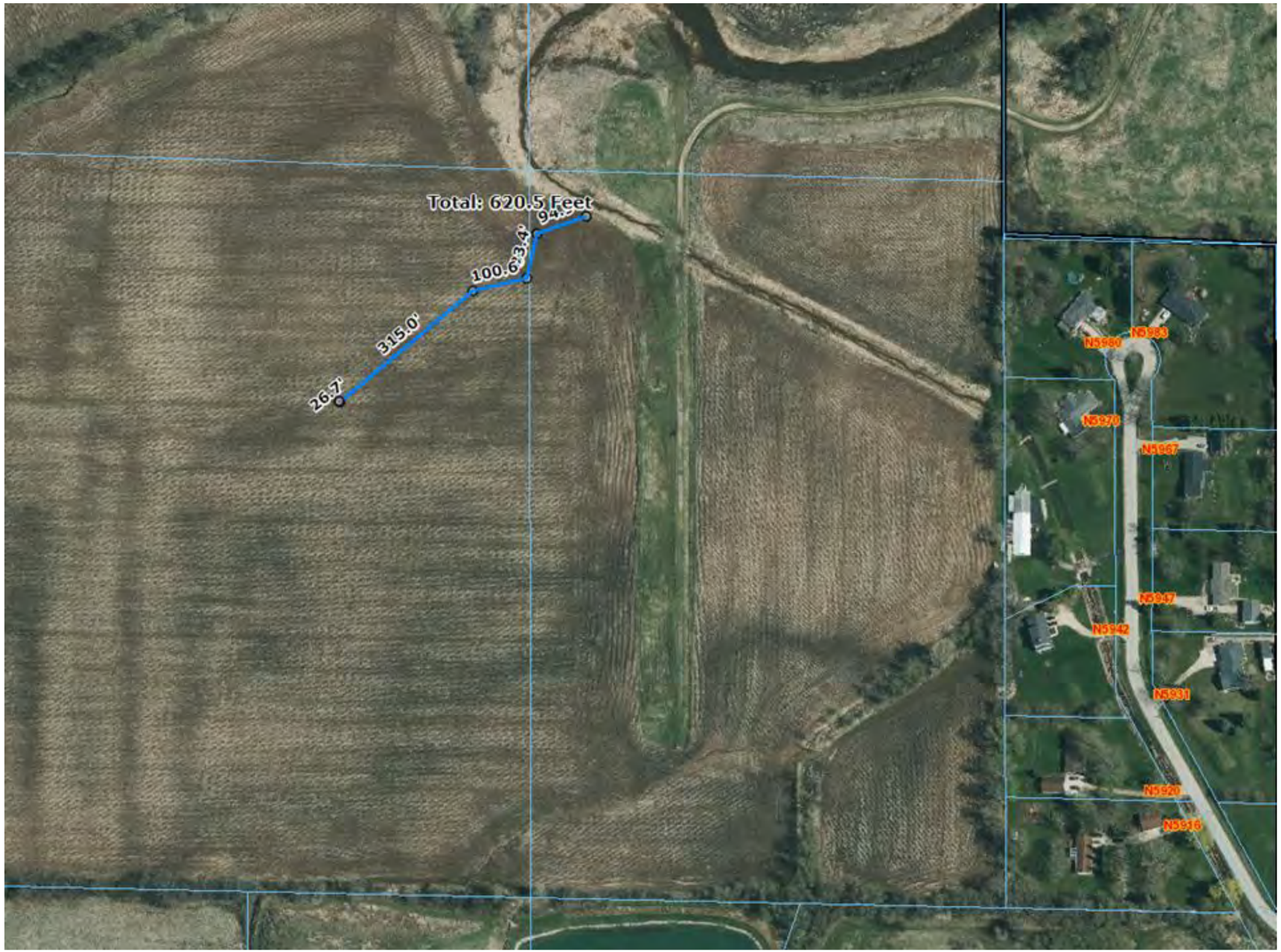
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G2: Contour Map



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

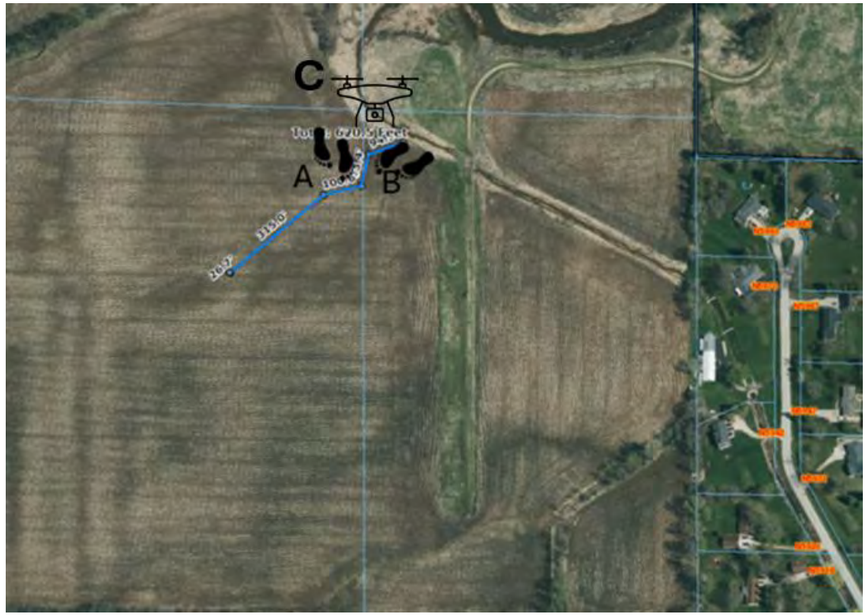
FIELD 9 -G2: Measurements



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G2: Picture A

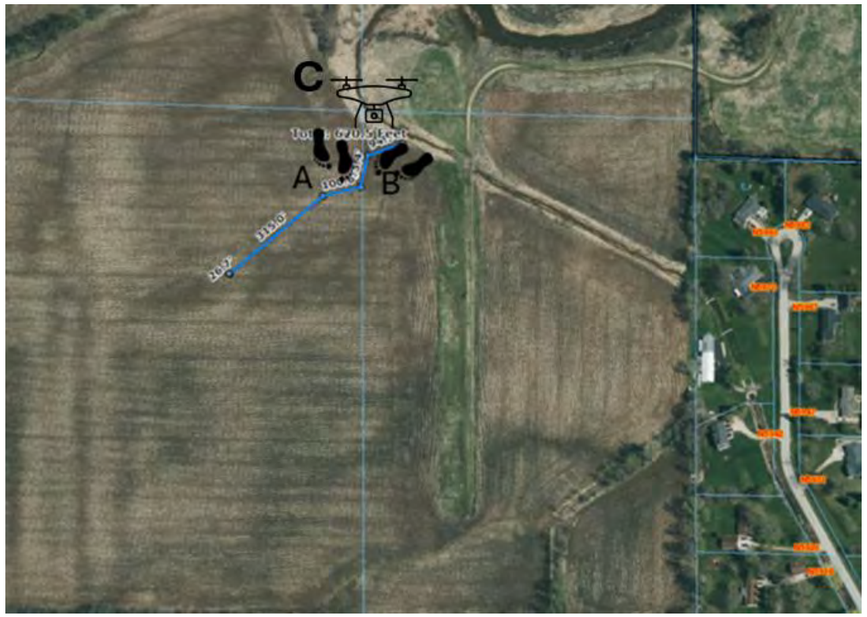




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G2: Picture B

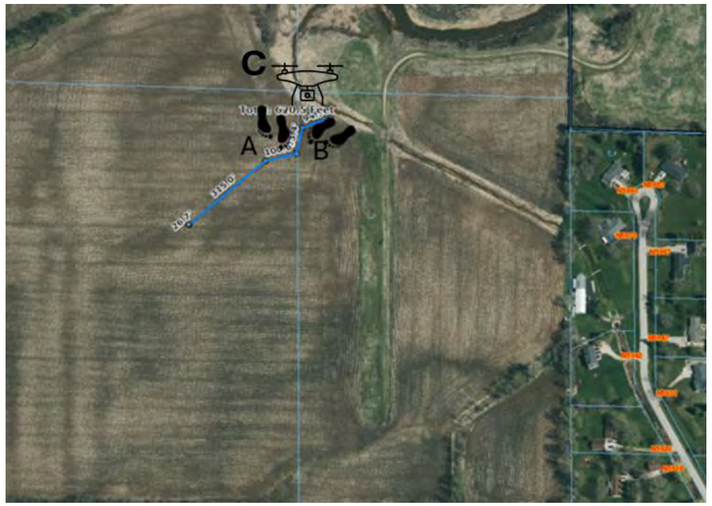




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

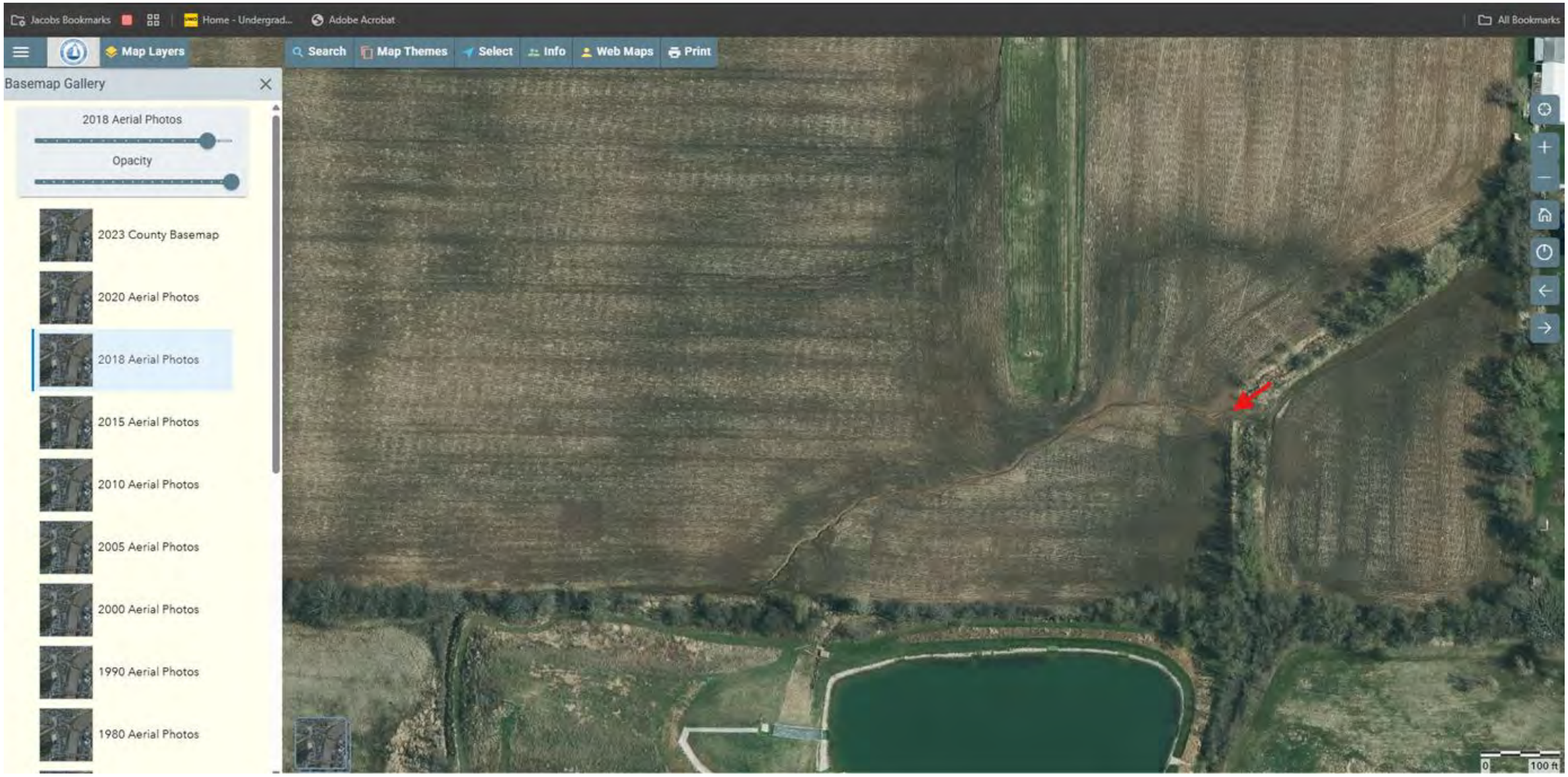
FIELD 9 -G2: Picture C





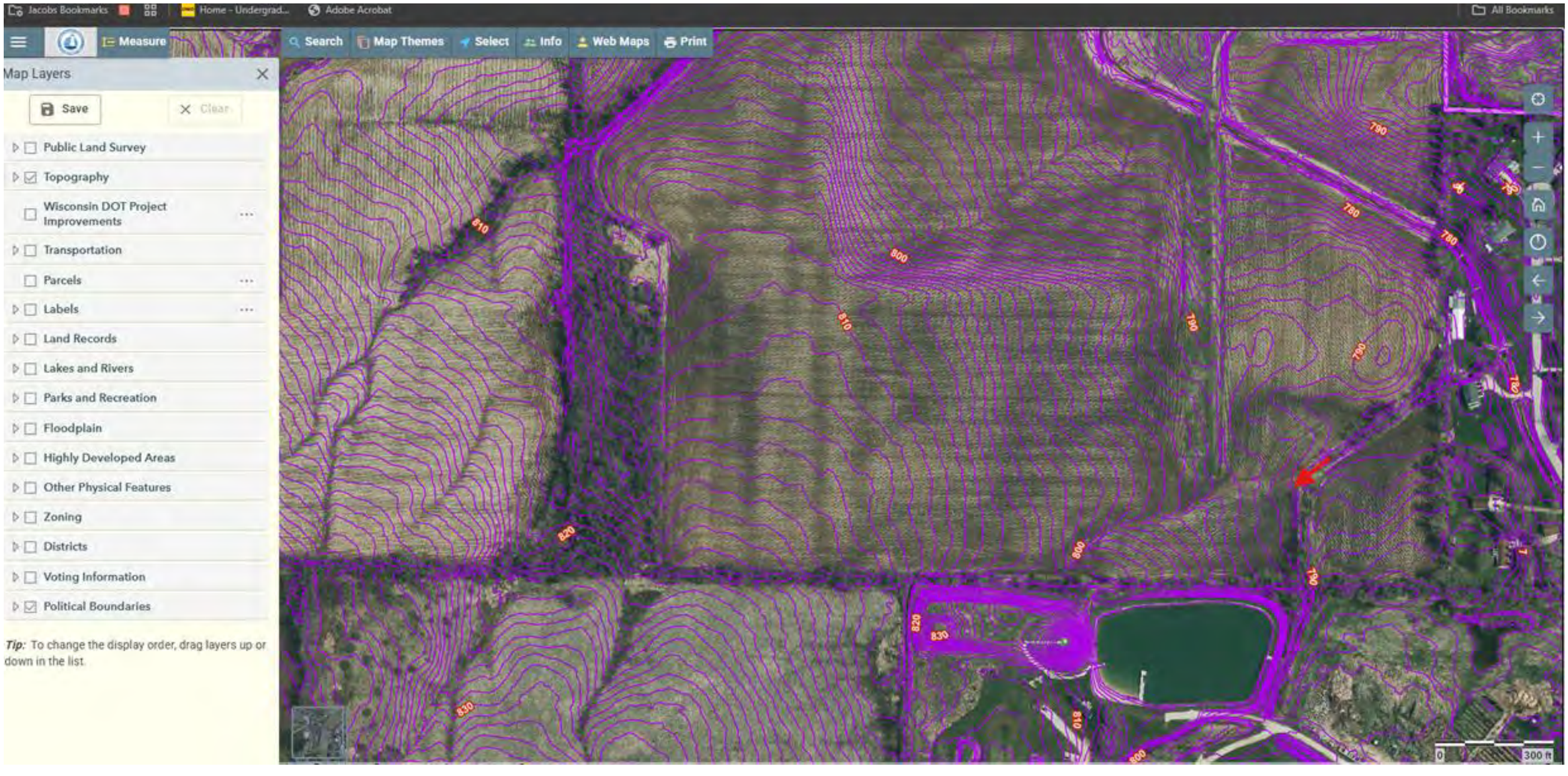
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G3: 2018 Aerial



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G3: Contour Map



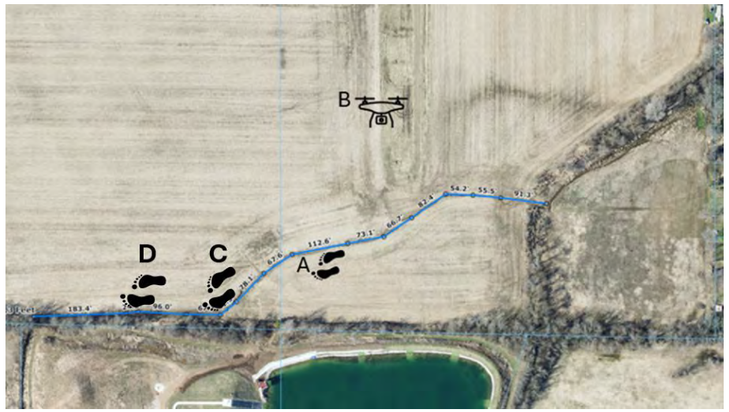
FIELD 9 -G3: Measurements



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G3: Picture A

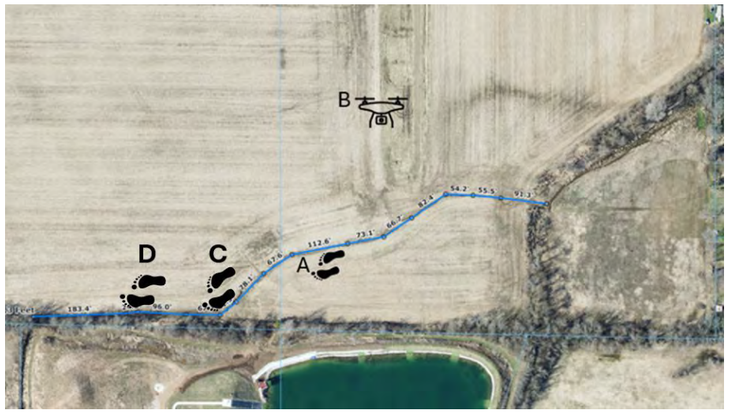




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G3: Picture B

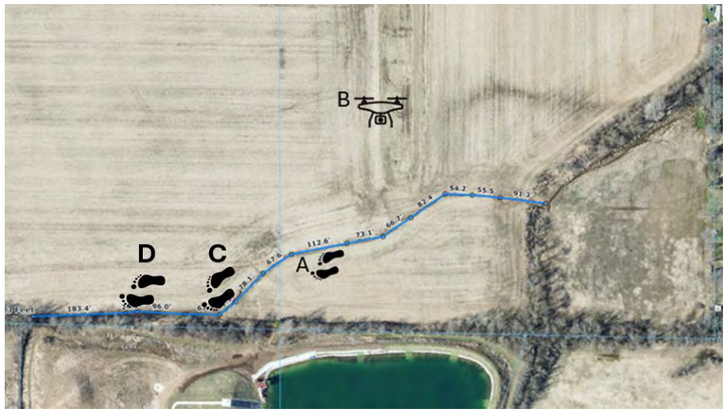




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

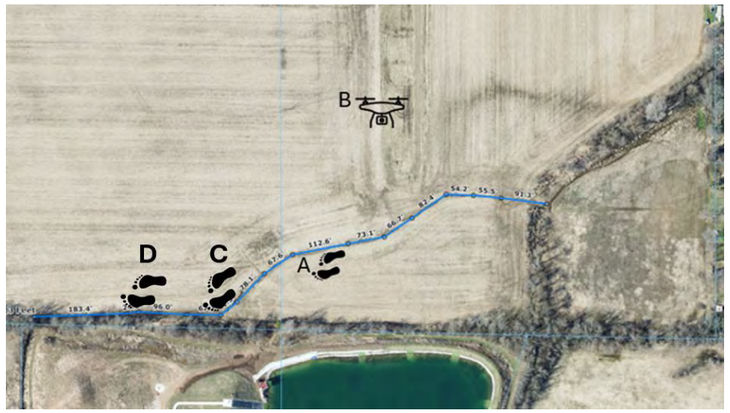
FIELD 9 -G3: Picture C





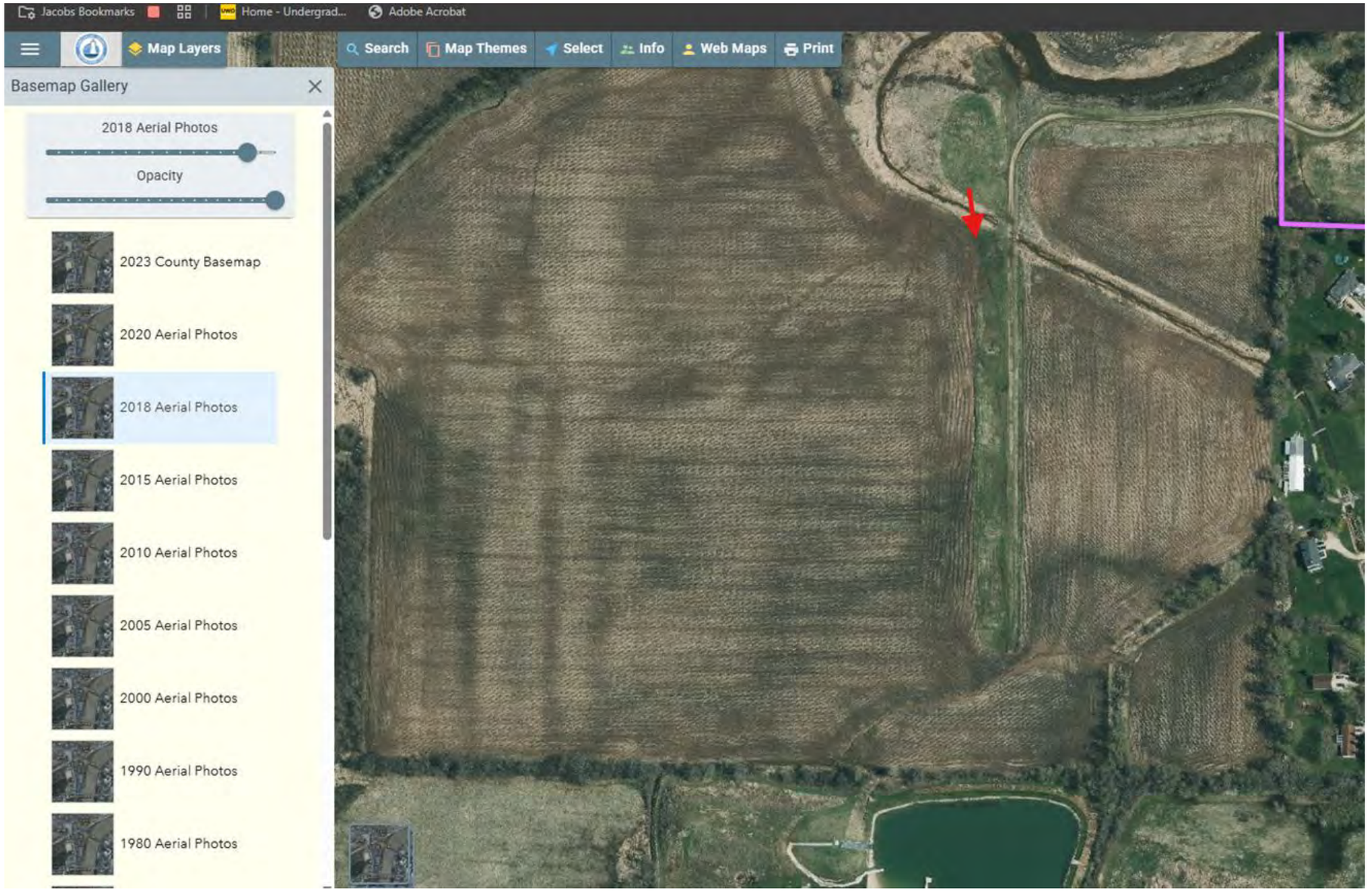
FIELD 9 -G3: Picture D





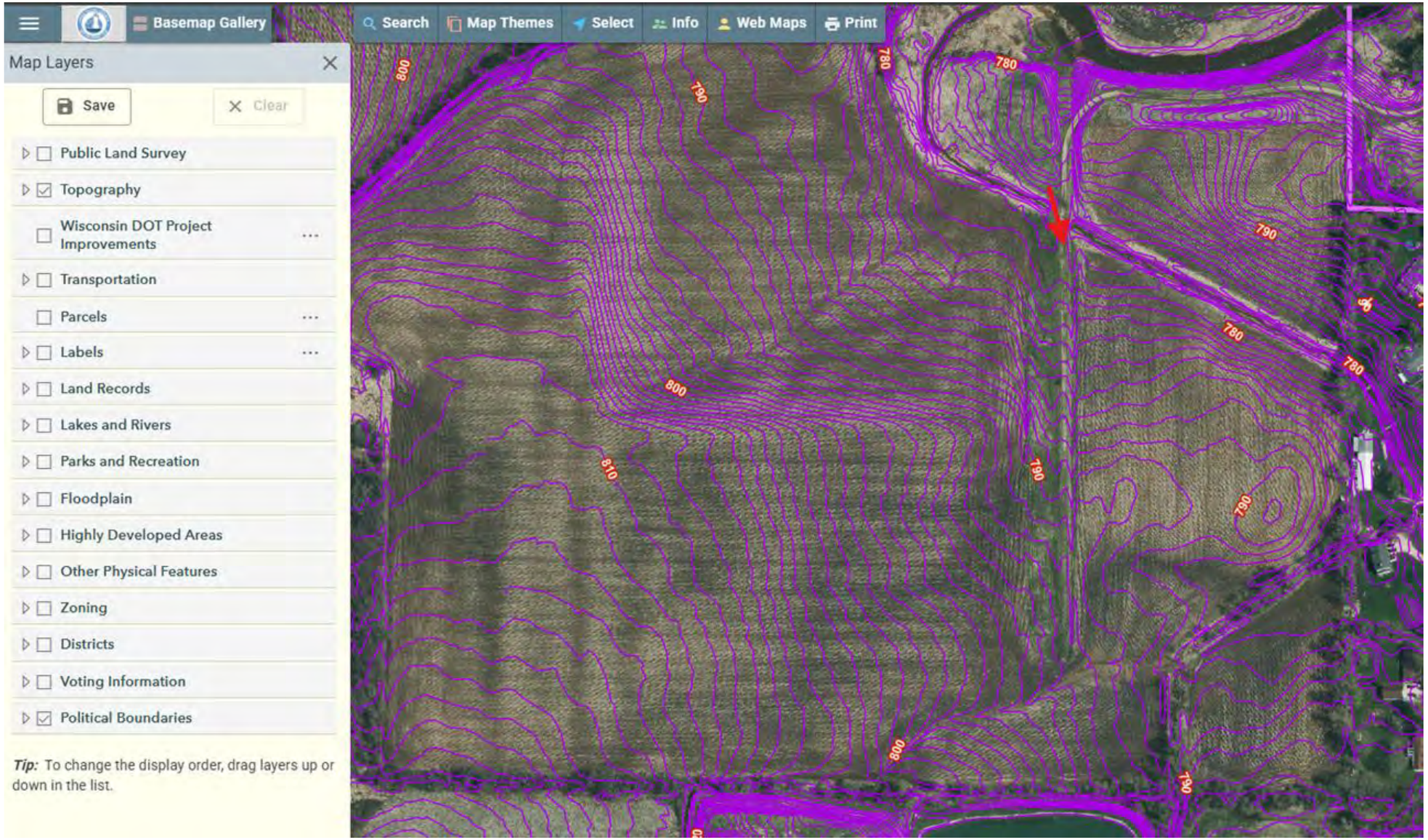
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G4: 2018 Aerial



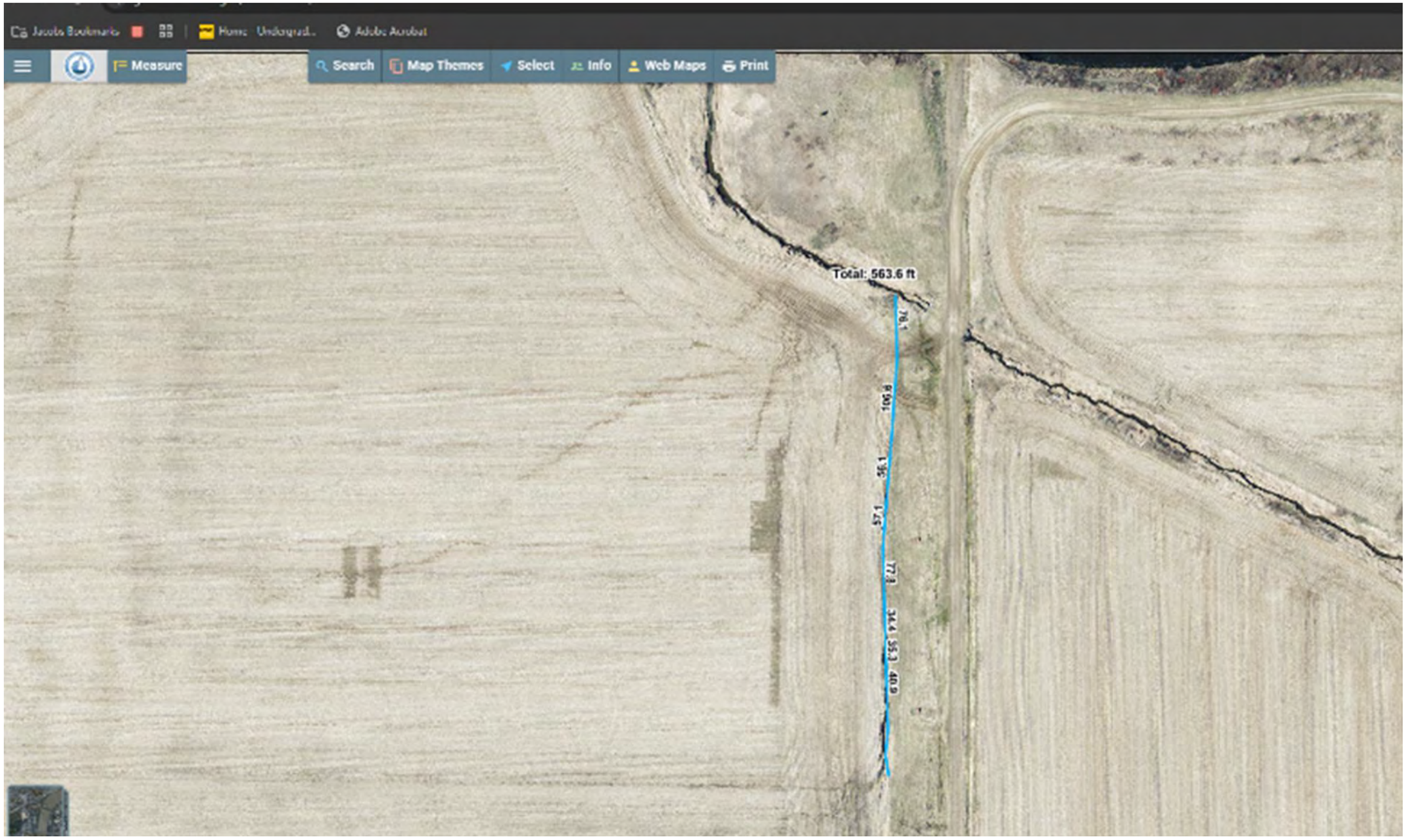
Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G4: Contour Map



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

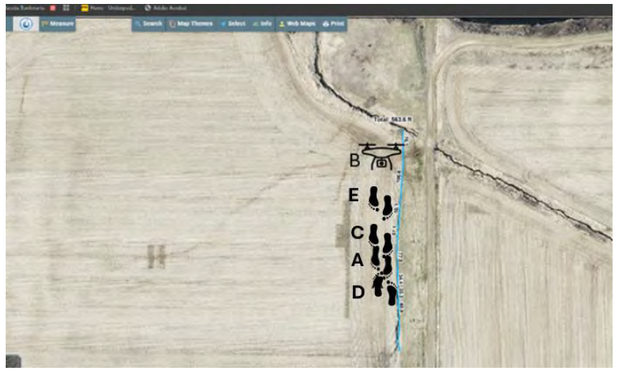
FIELD 9 -G4: Measurements



Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G4: Picture A

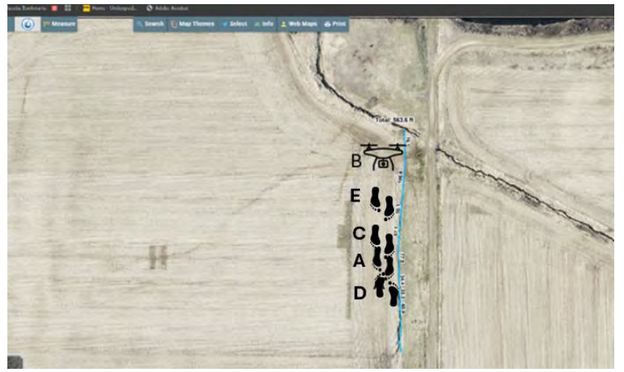




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G4: Picture B

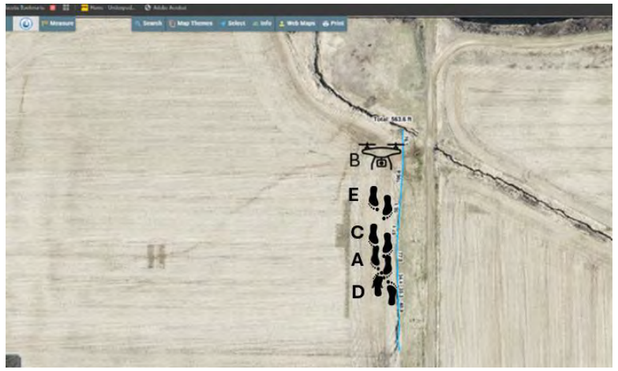




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G4: Picture C

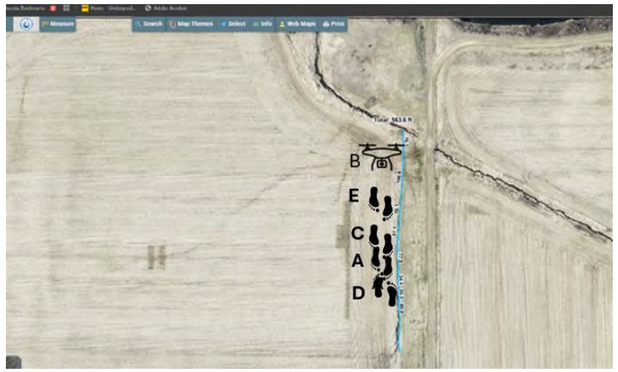




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G4: Picture D

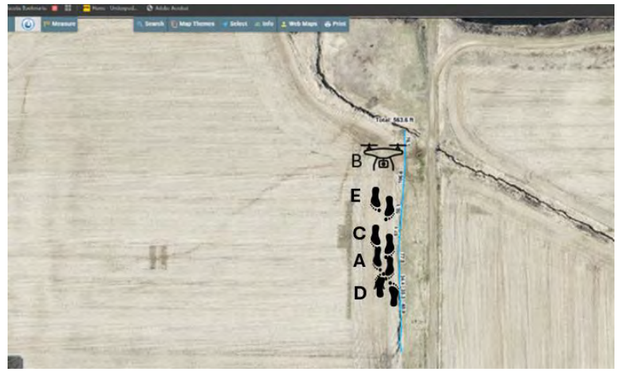




Appendix E
Gully Documentation and Modeling Output
Fond du Lac Airport Fields 3,6 and 9

FIELD 9 -G4: Picture E





Appendix F
SnapPlus Modeling Output

WQ1: P Trade Report

Reported For	FDL Airport
Printed	2024-06-14
Plan Completion/Update Date	2024-06-13
SnapPlus Version 20.4 built on 2021-06-03	
C:\Users\tcsch\Documents\Todd_Clients\Fond Du Lac Co Airport \2024.06.12 Databases Update Sent\FDL Airport_2024SNAP_CurrentFallChisel.snapDb	

Prepared for:
FDL Airport
attn:FDL Airport

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

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

Questions? Please contact DNRphosphorus@wisconsin.gov

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

P Trade Report				PTP											
Field Name	Soil Series	Soil Symbol	Acres	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
03 06	KEWAUNEE	KnA	69	52	90	74	55	62	54	148	65	48	59	53
09	KEWAUNEE	KnB	75	114	118	361	192	137	180	147	371	194	137	180
Total			**144**	**166**	**209**	**435**	**248**	**199**	**234**	**295**	**436**	**242**	**196**	**233**

PTP			
2033	2034	2035	2036
147	65	48	59
147	371	194	137
294	**436**	**242**	**196**

WQ1: P Trade Report

Reported For	FDL Airport
Printed	2024-06-14
Plan Completion/Update Date	2024-06-13
SnapPlus Version 20.4 built on 2021-06-03	
C:\Users\tcsch\Documents\Todd_Clients\Fond Du Lac Co Airport \2024.06.12 Databases Update Sent\FDL Airport_2024SNAP_GrassHay.snapDb	

Prepared for:
FDL Airport
attn:FDL Airport

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

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P Trade Report				PTP										
Field Name	Soil Series	Soil Symbol	Acres	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
03 06	KEWAUNEE	KnA	69	52	90	50	12	5	2	1	1	0	0	0
09	KEWAUNEE	KnB	75	114	119	103	25	8	2	1	1	1	1	0
Total			**144**	**166**	**209**	**153**	**37**	**13**	**4**	**2**	**1**	**1**	**1**	**1**

PTP			
2033	2034	2035	2036
0	0	0	0
0	0	0	0
1	**1**	**1**	**1**

WQ2: Sediment Trade Report

Reported For	FDL Airport
Printed	2024-06-14
Plan Completion/Update Date	2024-06-13
SnapPlus Version 20.4 built on 2021-06-03	
C:\Users\tcsch\Documents\Todd_Clients\Fond Du Lac Co Airport \2024.06.12 Databases Update Sent\FDL Airport_2024SNAP_CurrentFallChisel.snapDb	

Prepared for:
FDL Airport
attn:FDL Airport

The Sediment Trade Report estimates the annual tons of sediment in surface runoff from cropland entering surface waters. These sediment delivery calculations are based on RUSLE2 estimates of sheet and rill erosion for the predominant soil. Sediment losses from concentrated flow channel or gully erosion within a field are not included in these calculations. Field sediment yields are calculated for each year as US tons/field/year. Fields are only included if there at least 2 years of crops before the selected start year. Before using this report as part of a Water Quality Trade activity, sediment losses must be converted into 'credits' according to DNR guidance.

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

Questions? Please contact DNRphosphorus@wisconsin.gov

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

Sediment Trading

Field Name	Soil Series	Soil Symbol	Acres	Sediment (US Tons)						
				2022	2023	2024	2025	2026	2027	2028
03 06	KEWAUNEE	KnA	68.7	5.6	10.5	8.3	6.8	7.5	6.7	14.4
09	KEWAUNEE	KnB	75.3	19.1	20.7	55.4	33.8	24.1	31.2	26.2
Total				24.7	31.2	63.7	40.6	31.6	37.9	40.7

Sediment (US Tons)							
2029	2030	2031	2032	2033	2034	2035	2036
8.1	5.9	7.1	6.6	14.3	8.1	5.9	7.1
57.4	34.2	24.2	31.2	26.3	57.4	34.2	24.2
65.5	40.1	31.3	37.8	40.6	65.5	40.1	31.3

WQ2: Sediment Trade Report

Reported For	FDL Airport
Printed	2024-06-14
Plan Completion/Update Date	2024-06-13
SnapPlus Version 20.4 built on 2021-06-03	
C:\Users\tcsch\Documents\Todd_Clients\Fond Du Lac Co Airport \2024.06.12 Databases Update Sent\FDL Airport_2024SNAP_GrassHay.snapDb	

Prepared for:
FDL Airport
attn:FDL Airport

The Sediment Trade Report estimates the annual tons of sediment in surface runoff from cropland entering surface waters. These sediment delivery calculations are based on RUSLE2 estimates of sheet and rill erosion for the predominant soil. Sediment losses from concentrated flow channel or gully erosion within a field are not included in these calculations. Field sediment yields are calculated for each year as US tons/field/year. Fields are only included if there at least 2 years of crops before the selected start year. Before using this report as part of a Water Quality Trade activity, sediment losses must be converted into 'credits' according to DNR guidance.

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Questions? Please contact DNRphosphorus@wisconsin.gov

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

Sediment Trading

Field Name	Soil Series	Soil Symbol	Acres	Sediment (US Tons)						
				2022	2023	2024	2025	2026	2027	2028
03 06	KEWAUNEE	KnA	68.7	5.6	10.5	6.0	1.4	0.6	0.2	0.1
09	KEWAUNEE	KnB	75.3	19.1	20.8	19.8	5.4	1.7	0.4	0.2
Total				24.7	31.3	25.8	6.8	2.2	0.6	0.4

Sediment (US Tons)							
2029	2030	2031	2032	2033	2034	2035	2036
0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1

Appendix G
Credit Needs Analysis

BLACK & VEATCH

TECHNICAL MEMORANDUM

City of Fond du Lac
WWTRRF
Re: Effluent Phosphorus WQT Analysis March 10, 2025

To: Cody Schoepke

From: Leon S. Downing, Ph.D., P.E.; Isaac Avila, P.E.,

The City of Fond du Lac (the City) is currently awaiting final compliance limits for effluent phosphorus discharge limits from the Wastewater Treatment and Resource Recovery Facility (WWTRRF). Black & Veatch previously conducted a statistical evaluation of anticipated effluent quality based on historical flows from January 2023 to August of 2022, and effluent total phosphorus from January 2021 to August of 2022. Results of this evaluation were provided to the City in the *Effluent Phosphorus Distribution TM* (September 15, 2022). The City asked for an update to this evaluation based on recent data to support Water Quality Trading (WQT) decision making.

Process data was compiled from January 1, 2013, to February 26, 2025. The dataset was evaluated to identify appropriate analysis periods. For total phosphorus (TP), the calendar year selected was 2024. This year was selected at is it represented a typical performance year in line with the previous 4 years (2020 – 2023). Approximately 95 – 96% removals (Figure 1 and Figure 2).

For flows, the entire dataset was considered as is includes periods of wet years, dry years, and typical years (Figure 3). To ensure accurate mass flow accounting, effluent flow reported in Figure 3 was estimated from the process data using the following formula in Equation 1. Effluent TP mass flow used lab measured Effluent TP (mg/L-P) and the Effluent Flow (mgd) to determine effluent TP mass discharge.

Equation 1: $Effluent\ Flow\ (mgd) = Primary\ Effluent\ Flow\ (mgd) - WAS\ Flow\ (mgd)$

Probability density functions (PDF) were generated for Effluent Flow and TP mass discharge. Resulting parameters for each PDF are summarized in Table 1. Due to logarithmic functions used in PDF determination, Effluent TP was converted to micrograms per liter (µg/L) and then converted to milligrams per liter (mg/L) for figures or mass calculations. Effluent Flow and TP distributions are summarized in Figure 4.

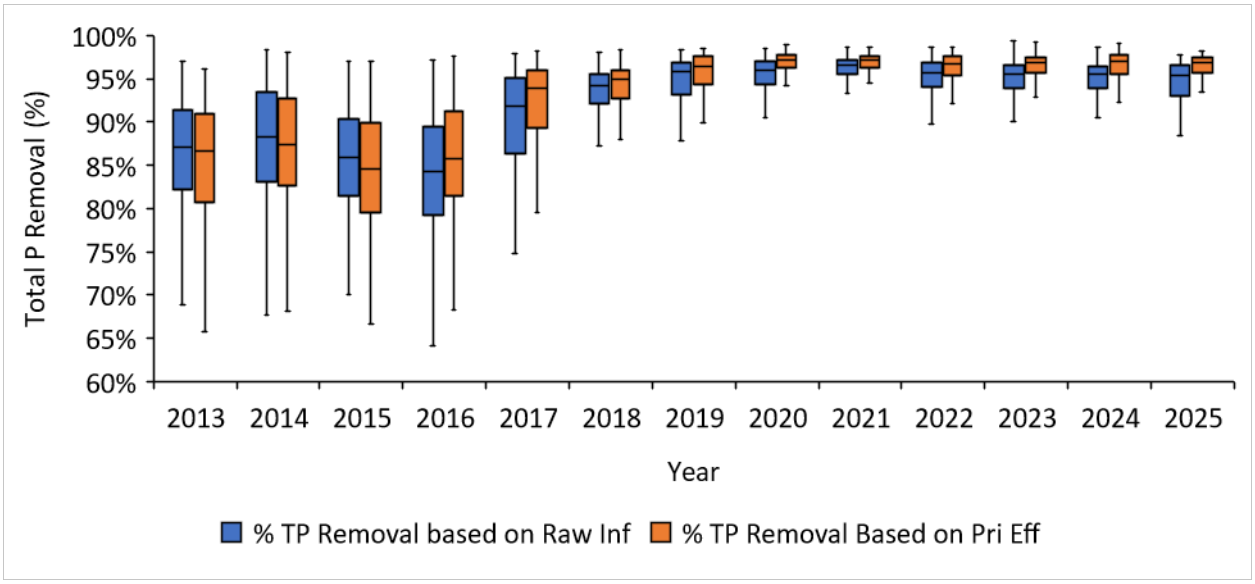


Figure 1. Summary of Total P Removals from 2013 to 2025.

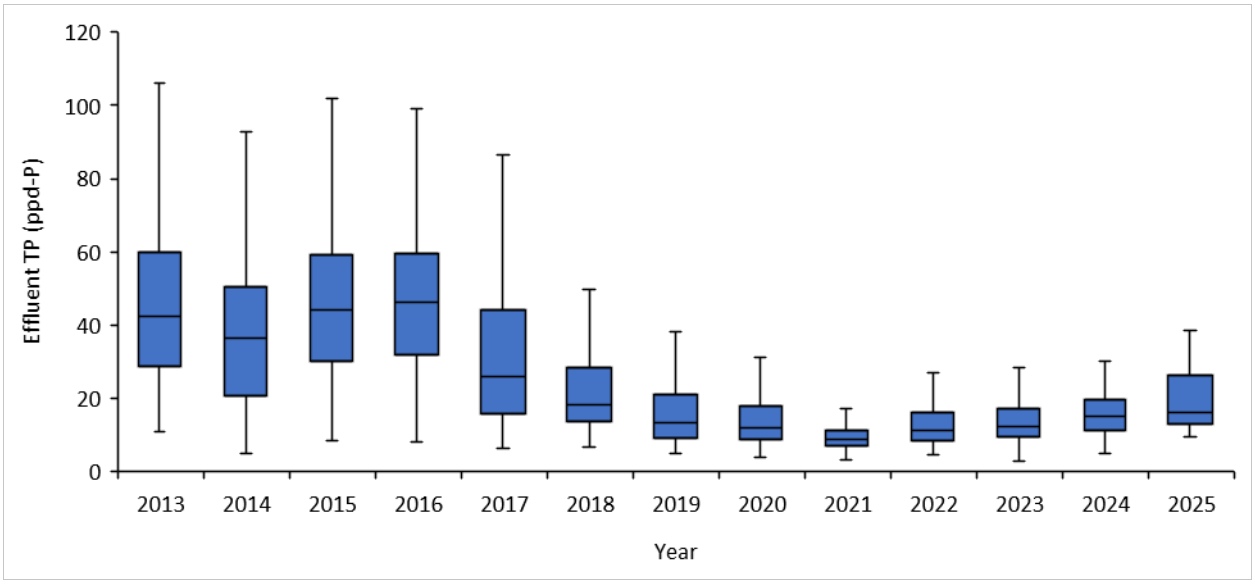


Figure 2. Summary of effluent total phosphorus mass from 2013 to 2025.

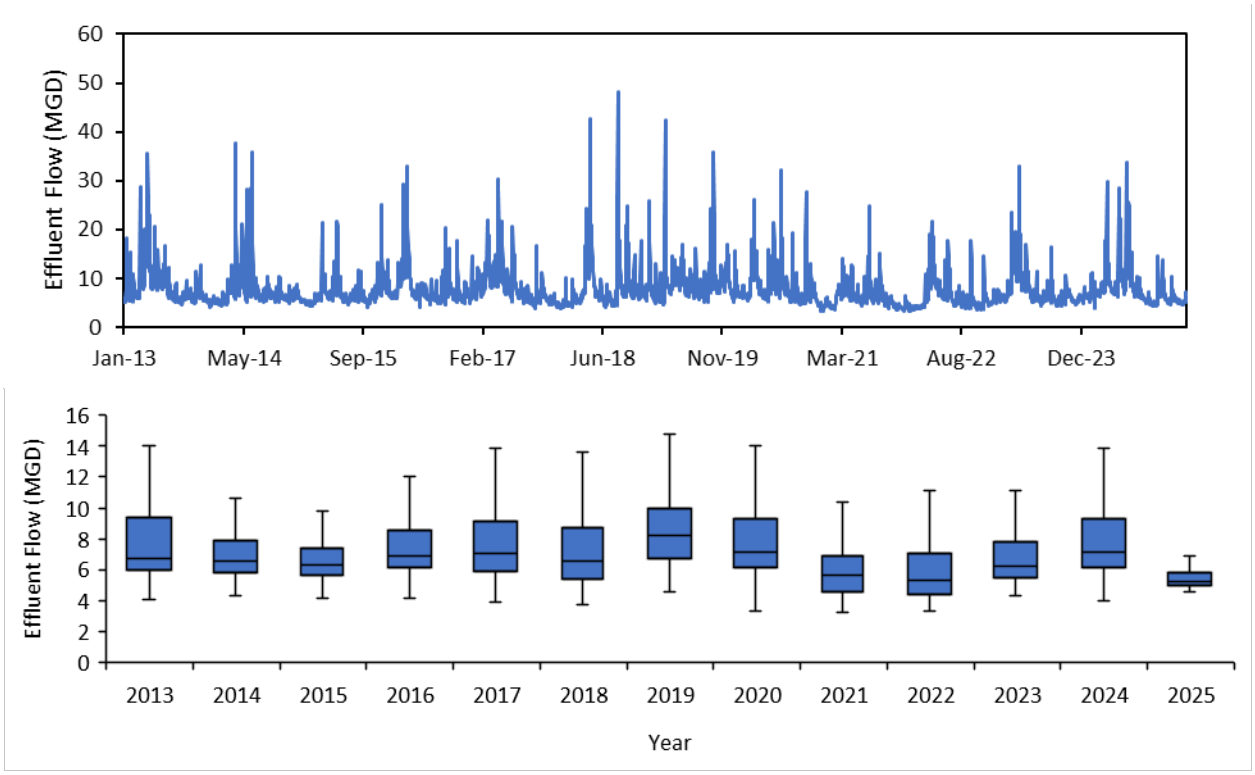


Figure 3. Effluent flow summary from 2013 to 2025.

Table 1. Parameters for lognormal probability density functions

Parameter	Effluent Flow	Effluent TP
Location (μ)	1.97	5.48
Scale (σ)	0.36	0.43
Median	7.15 mgd	239 μg/L
Mean	7.64 mgd	262 μg/L
Mode	6.26 mgd	199 μg/L

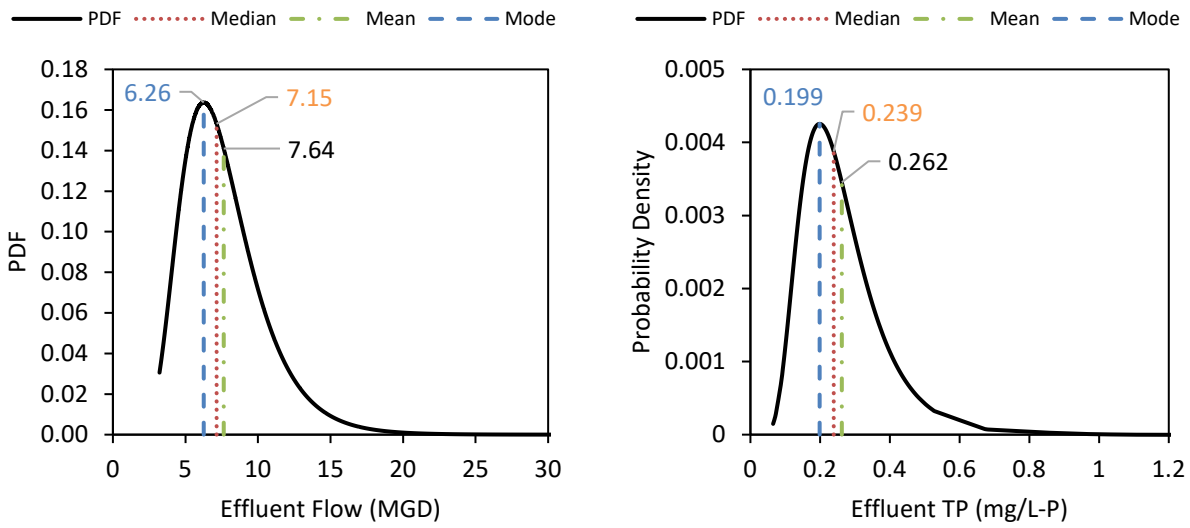


Figure 4. Effluent Flow (left) and Effluent TP (right) distribution. Effluent Flow PDF developed from 2013 – 2025 dataset. Effluent TP PDF developed from 2024 calendar year.

Potential variability of future effluent TP loads was assessed by randomly sampling values from the fit lognormal distribution for each day of flow data and combining with randomly sampled effluent concentrations to generate 14,600 daily iterations (~40 years of iterations). The resulting daily effluent TP loads and corresponding total annual TP discharge are summarized in Figure 5.

The key takeaways from evaluation of the results in Figure 5 are:

- The top whisker of the total annual effluent TP (7,126 lbs-P) would represent the worst case annual phosphorous discharge for the Fond du Lac WWTRRF.
- The top of the box (6,806 lbs-P) would represent the 75th percentile value that is exceeded 25% of the years.
- The line through the box (6,681 lbs-P) would represent the typical case occurring 50% of the years.
- The bottom of the box (6,501 lbs-P) would represent the 25th percentile value.
- When looking at the permitted discharge mass of 6,338 lbs-P, the difference between the permitted discharge mass and these numbers can be used to inform deciding on the degree of WQT credits needed. Table 2 summarizes these differences.

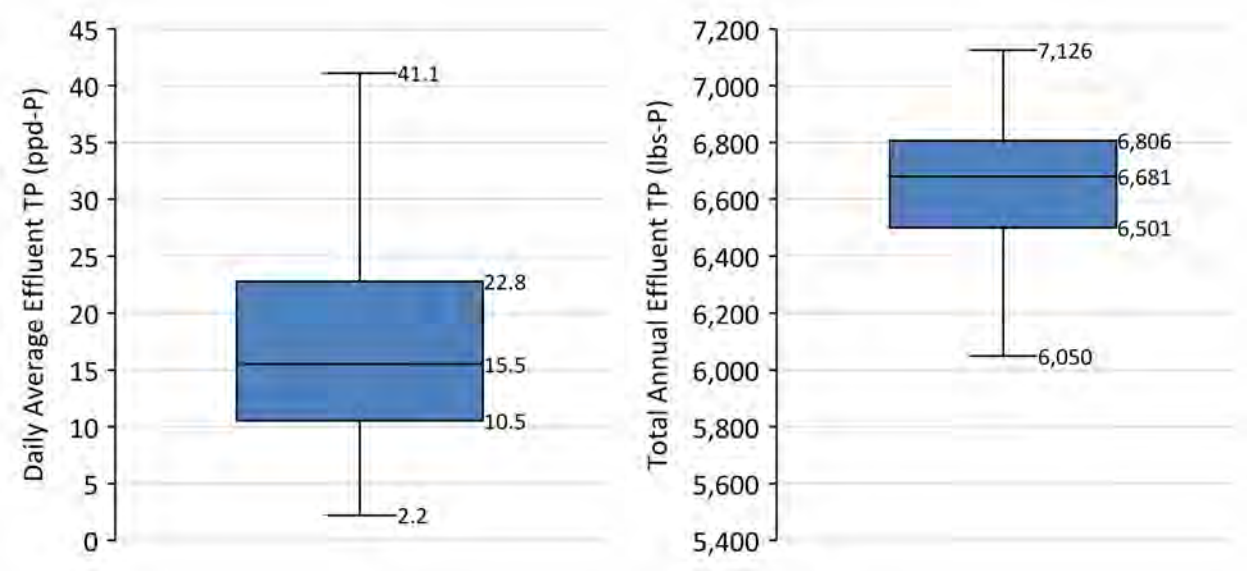


Figure 5. Projected daily effluent phosphorus loads (left) and annual phosphorus loads (right).

Scenario	WQT Credit Needed	Units
Worst Case	788	lbs-P
75th Percentile	468	lbs-P
Median	343	lbs-P
25th Percentile	163	lbs-P

Appendix H
Planting and Maintenance Plan with Inspection Forms

Appendix H. Planting and Maintenance Plan with Inspection Forms

The general schedule for preparing the fields and implementing the field conversions and conservation practices was developed by the Fond du Lac County Land and Water Conservation Department. It includes the following sequence:

2024

- Pre-plant: Spray herbicide to kill existing weeds.
    - [Completed May 2024]
- Seeding: No-till plant conservation cover grass/hay mix (oats, versagrass, and hay mix)
    - [Completed June 2024]
- After planting: Cut and harvest oatlage roughly 2 months after planting. Cut and harvest grass/hay mix about 4 months after planting.

Spring, Annually Starting in 2025

- Determine fertilizer requirements based on soil test and cutting removal rates.
- Spread potash fertilizer.

Summer and Fall, Annually Starting in 2025

- Cut and harvest grass/hay mix to meet Fond du Lac County Airport height restrictions. This is anticipated about 3 times per year.

Operation and maintenance of the field conversion to grass/hay conservation cover, rock-lined waterways, and grassed waterways will be guided by the Natural Resources Conservation Service (NRCS) practice code documentation. Operation and maintenance are anticipated to include the following:

- Field conservation to grass/hay conservation cover (511 Forage Harvest Management and 512 Pasture and Hay Planting)
    - Inspect annually to confirm conservation practice function and conformity to NRCS practice guidelines.
    - Harvest at a frequency to maintain desired height of no more than 18 inches per the lease agreement with the airport.
    - Harvest when soil moisture conditions are dry enough to lessen the risk of soil compaction and ruts.
    - Mowing or herbicide applications will be used as necessary to control competitive weeds.
    - Inspect annually and interseed with additional alfalfa/grass if needed.
- Lined waterway (468)
    - Inspect annually to confirm conservation practice function and conformity to NRCS practice guidelines.
    - Avoid using the lined waterways as turn-rows during tillage, cultivation, or harvesting operations.

    - Do not use the lined waterway as a field road.
    - Do not cross the lined waterway with heavy equipment.
    - Inspect annually for sediment deposits, weeds, and woody debris. Repair damaged areas and remove sediment deposits to maintain capacity of lined waterways.
- Grassed waterway (412)
    - Inspect annually to confirm conservation practice function and conformity to NRCS practice guidelines.
    - Plant a nurse crop (for example, oats) during initial establishment to reduce soil erosion.
    - Clip waterway vegetation during the first (growing season) year of seeding establishment to allow seeded grasses to effectively compete with weed species.
    - Mow waterway to meet airport vegetation height restrictions and to prevent woody vegetation. Conduct mowing when soil conditions are dry enough to prevent ruts or damage to the area.
    - Restrict tillage, animal waste spreading, and herbicide spraying in waterway and along side slopes.
    - After vegetation is established, remove temporary measures, such as diversions or silt fences, that were installed so they do not interfere with design flow.
    - Avoid using waterways as turn-rows during tillage and cultivation operations.
    - Inspect waterway dimensions (to confirm design capacity), vegetative cover, and outlet stability annually and following heavy rains until vegetation is established and functioning.

Annual inspections are anticipated to meet permit requirements. The inspections will include visual observations of the practices. Photographs will be included when appropriate. The Annual Inspection Form will be used.

Inspection Form

City of Fond du Lac
First on the Lake

Date:	Weather:
Field ID: 3,6 or 9 (circle one)	
Inspector Name:	

Waterway

Waterway number: WW1 WW2 WW3 WW4 (circle one)

Vegetation damaged by machinery or herbicides?	Yes	or	No	(if yes, explain in notes)
Noxious weeds present?	Yes	or	No	(if yes, explain in notes)
Erosion or sediment deposition present in or around the waterway?	Yes	or	No	(if yes, explain in notes)
Downed trees or other blockage of flow present?	Yes	or	No	(if yes, explain in notes)
Evidence of standing or pooling water present?	Yes	or	No	(if yes, explain in notes)
Burrowing animals present in or around the waterway?	Yes	or	No	(if yes, explain in notes)
Overall, BMP meeting NRCS standard?	Yes	or	No	(if no, explain in notes)
Annual mowing complete?	Yes	or	No	(if no, explain in notes)
Outlet stable?	Yes	or	No	(if no, explain in notes)
Follow-up action needed?	Yes	or	No	(if yes, explain in notes)

Notes:

Picture(s):

Inspection Form

City of Fond du Lac
First on the Lake

Date:	Weather:
Field ID: 3,6 or 9 (circle one)	
Inspector Name:	

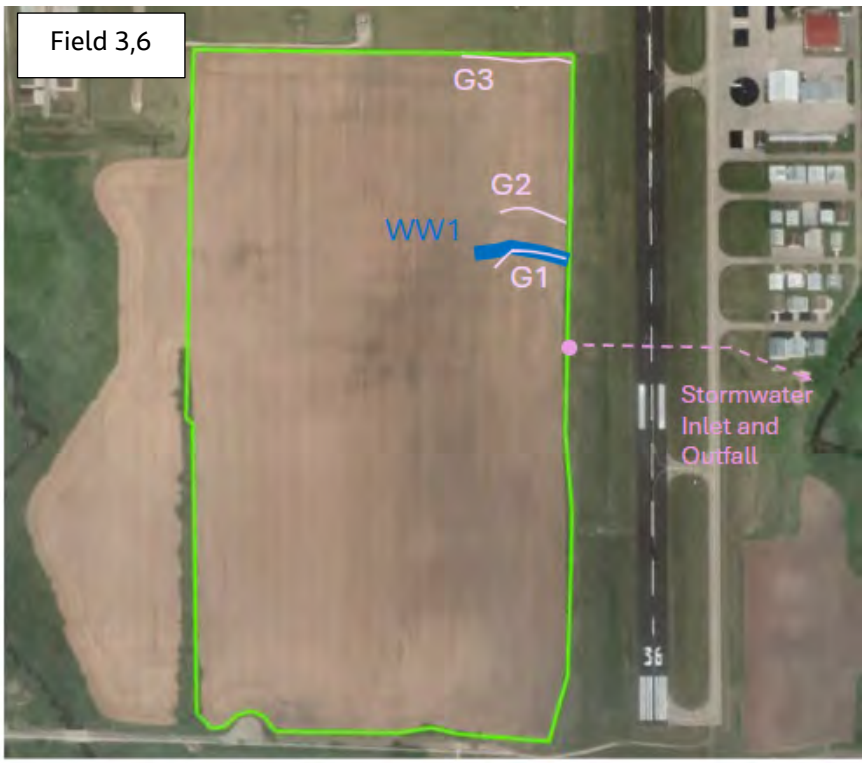
Grass/Hay Conservation Cover Field Conversion

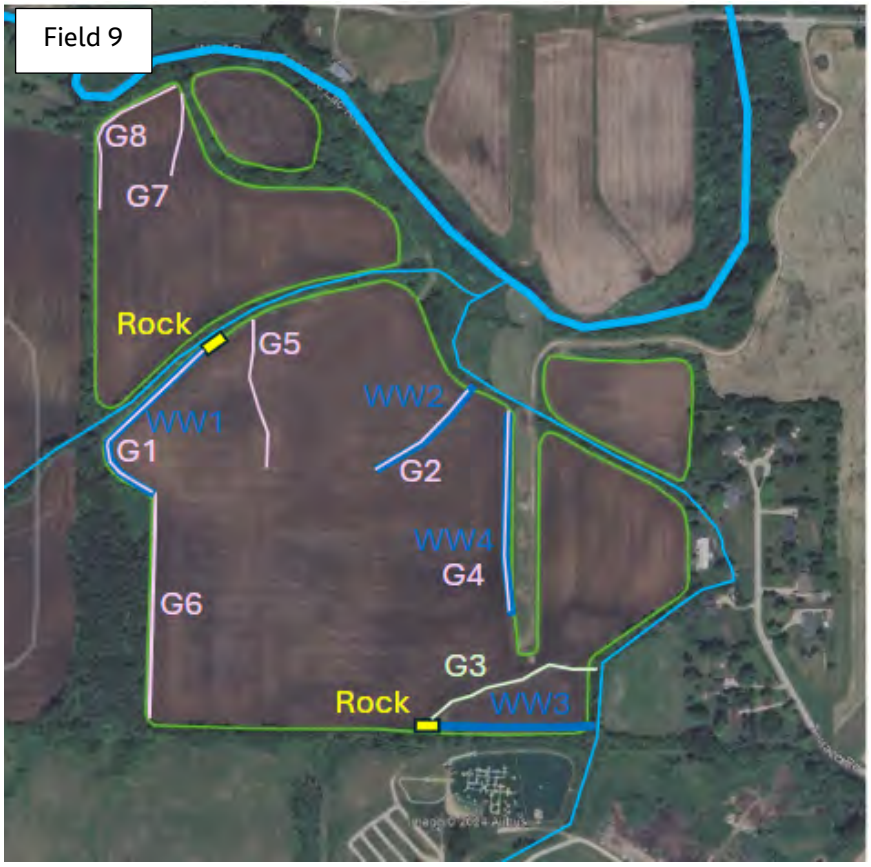
BMP meeting NRCS standard? (Check for any vegetation damaged by machinery or following temporary EAA airplane parking, herbicides, erosion, sediment deposition, downed trees, burrowing animals, and noxious weeds.)	Yes or No (if no, explain in notes)
Grass height under 18 inches?	Yes or No (if no, explain in notes)
Any active erosion, such as Gully G3 in Field 3,6 or Gullies G3, G5-G8 in Field 9?	Yes or No (if yes, explain in notes)
Follow-up action needed?	Yes or No (if yes, explain in notes)

Notes:

Picture(s):

Reference Maps





Appendix I
WQT Management Practice Registration (Form 3400-207)

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

Water Quality Trading Management Practice Registration

Form 3400-207 (R 1/14)

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

Applicant Information

Permittee Name	Permit Number	Facility Site Number
City of Fond du Lac	WI- 0023990-09-00	420004860

Facility Address	City	State	ZIP Code
700 Doty St	Fond du Lac	WI	54935

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Cody Schoepke	700 Doty St	Fond du Lac	WI	54935

Project Name
City of Fond du Lac/Fond du Lac County Water Quality Trade

Broker/Exchange Information (if applicable)

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

Broker/Exchange Organization Name	Contact Name

Address	Phone Number	Email

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

Type	Trade Agreement Number	Practices Used to Generate Credits	Anticipated Load Reduction	Trade Ratio	Method of Quantification
○ Urban NPS ◉ Agricultural NPS ○ Other	10-31-2023	Field conversion to grass/ hay conservation cover; Rock lined waterway; Grassed waterway	354	1.2:1 for grass/hay conservation cover field conversion & 2:1 or 3:1 for waterways	SnapPlus, STEPL

County	Closest Receiving Water Name	Land Parcel ID(s)	Parameter(s) being traded
Fond Du Lac	W. Branch Fond du Lac River	Field 3,6 and 9	Phosphorus

The preparer certifies all of the following:

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

Signature of Preparer	Date Signed
[signature]	4/10/26

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]	4/10/26

Leave Blank – For Department Use Only

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

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

Water Quality Trading Management Practice Registration

Form 3400-207 (R 1/14)

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Applicant Information

Permittee Name	Permit Number	Facility Site Number
City of Fond du Lac	WI- S050075	31070

Facility Address	City	State	ZIP Code
160 S. Macy St	Fond du Lac	WI	54935

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Chris Johnson	PO Box 150	Fond du Lac	WI	54935

Project Name
City of Fond du Lac/Fond du Lac County Water Quality Trade

Broker/Exchange Information (if applicable)

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

Broker/Exchange Organization Name	Contact Name	
Address	Phone Number	Email

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

Type	Trade Agreement Number	Practices Used to Generate Credits	Anticipated Load Reduction	Trade Ratio	Method of Quantification
○ Urban NPS ◉ Agricultural NPS ○ Other	10-31-2023	Field conversion to grass/ hay conservation cover; Rock lined waterway; Grassed waterway	170	1.2:1 for grass/hay conservation cover field conversion & 2:1 or 3:1 for waterways	SnapPlus, STEPL

County	Closest Receiving Water Name	Land Parcel ID(s)	Parameter(s) being traded
Fond Du Lac	W. Branch Fond du Lac River	Field 3,6 and 9	TSS

The preparer certifies all of the following:

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

Signature of Preparer	Date Signed
[signature]	9/10/26

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]	9/10/26

Leave Blank – For Department Use Only

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

Appendix J
WQT Checklist (Form 3400-208)

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

Water Quality Trading Checklist

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

Applicant Information

Permittee Name	Permit Number	Facility Site Number
City of Fond du Lac	WI- 0023990-09-0	420004860

Facility Address	City	State	ZIP Code
700 Doty St	Fond du Lac	WI	54935

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Cody Schoepke	700 Doty St	Fond du Lac	WI	54935

Project Name
City of Fond du Lac/Fond du Lac County Water Quality Trade

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
Lake Winnebago	Phosphorus	040302030401

Credit Generator Information

Credit generator type (select all that apply):
- ☐ Permitted Discharge (non-MS4CAFO)
- ☐ Permitted MS4
- ☐ Permitted CAFO
- ☐ Urban nonpoint source discharge
- ☒ Agricultural nonpoint source discharge
- ☐ Other - Specify:

Are any of the credit generators in a different HUC 12 than the applicant?
- ◉ Yes; HUC 12: 040302030204
- ○ No

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

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

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

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

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

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

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

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

Discharge Type	Practices Used to Generate Credits	Method of Quantification	Trade Agreement Number	Have the practice(s) been formally registered?
○ Urban NPS ◉ Agricultural NPS ○ Other	Field conversion to grass/hay cover	Snap Plus	10-31-2023	◉ Yes ○ No ○ Only in part
○ Urban NPS ◉ Agricultural NPS ○ Other	Rock lined waterway	STEPL	10-31-2023	◉ Yes ○ No ○ Only in part
○ Urban NPS ◉ Agricultural NPS ○ Other	Grassed waterway	STEPL	10-31-2023	◉ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part

Does plan have a narrative that describes:			Plan Section
a. Description of existing land uses	◉ Yes	○ No	1.1
b. Management practices used to generate credits	◉ Yes	○ No	2.1
c. Amount of credit being generated	◉ Yes	○ No	2.4
d. Description of applicable trade ratio per agreement/management practice	◉ Yes	○ No	2.4
e. Location where credits will be generated	◉ Yes	○ No	2.1
f. Timeline for credits and agreements	◉ Yes	○ No	4
g. Method for quantifying credits	◉ Yes	○ No	2.2

Does plan have a narrative that describes:			Plan Section
h. Tracking procedures	◉ Yes	○ No	3
i. Conditions under which the management practices may be inspected	◉ Yes	○ No	3
j. Reporting requirements should the management practice fail	◉ Yes	○ No	3
k. Operation and maintenance plan for each management practice	◉ Yes	○ No	3
l. Location of credit generator in proximity to receiving water and credit user	◉ Yes	○ No	2.4
m. Practice registration documents, if available	◉ Yes	○ No	Appendix G
n. History of project site(s)	◉ Yes	○ No	1.1
o. Other: _____	○ Yes	○ No	

The preparer certifies all of the following:

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

Signature of Preparer	Date Signed
[signature]	4/10/26

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]	4/10/26

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

Water Quality Trading Checklist

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

Applicant Information

Permittee Name	Permit Number	Facility Site Number
City of Fond du Lac	WI- S050075	31070

Facility Address	City	State	ZIP Code
160 S. Macy St	Fond du Lac	WI	54935

Project Contact Name (if applicable)	Address	City	State	ZIP Code
Chris Johnson	PO Box 150	Fond du Lac	WI	54935

Project Name
City of Fond du Lac/Fond du Lac County Water Quality Trade

Receiving Water Name	Parameter(s) being traded	HUC 12(s)
Lake Winnebago	TSS	040302030401, 040302030204

Credit Generator Information

Credit generator type (select all that apply):

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

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

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

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

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

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

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

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

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

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

Discharge Type	Practices Used to Generate Credits	Method of Quantification	Trade Agreement Number	Have the practice(s) been formally registered?
○ Urban NPS ◉ Agricultural NPS ○ Other	Field conversion to grass/hay cover	Snap Plus	10-31-2023	◉ Yes ○ No ○ Only in part
○ Urban NPS ◉ Agricultural NPS ○ Other	Rock lined waterway	STEPL	10-31-2023	◉ Yes ○ No ○ Only in part
○ Urban NPS ◉ Agricultural NPS ○ Other	Grassed waterway	STEPL	10-31-2023	◉ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part
○ Urban NPS ○ Agricultural NPS ○ Other				○ Yes ○ No ○ Only in part

Does plan have a narrative that describes:			Plan Section
a. Description of existing land uses	◉ Yes	○ No	1.1
b. Management practices used to generate credits	◉ Yes	○ No	2.1
c. Amount of credit being generated	◉ Yes	○ No	2.4
d. Description of applicable trade ratio per agreement/management practice	◉ Yes	○ No	2.4
e. Location where credits will be generated	◉ Yes	○ No	2.1
f. Timeline for credits and agreements	◉ Yes	○ No	4
g. Method for quantifying credits	◉ Yes	○ No	2.2

Does plan have a narrative that describes:			Plan Section
h. Tracking procedures	◉ Yes	○ No	3
i. Conditions under which the management practices may be inspected	◉ Yes	○ No	3
j. Reporting requirements should the management practice fail	◉ Yes	○ No	3
k. Operation and maintenance plan for each management practice	◉ Yes	○ No	3
l. Location of credit generator in proximity to receiving water and credit user	◉ Yes	○ No	2.4
m. Practice registration documents, if available	◉ Yes	○ No	Appendix G
n. History of project site(s)	◉ Yes	○ No	1.1
o. Other: _____	○ Yes	○ No	

The preparer certifies all of the following:

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

Signature of Preparer	Date Signed
Carl Schultz	4/10/26

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
Carl Schultz	4/10/26