



Division of Ecological & Water Resources
Region 4 (Southern Region)
21371 Highway 15 South
New Ulm, MN 56073

April 22, 2021

Heron Lake Watershed District
1008 3rd Ave
Heron Lake, MN 56137
admin@hlwdonline.org

Re: Final Engineer's Report (FER) for Heron Lake Watershed District – Jackson County Judicial Ditch 3

Dear Heron Lake Watershed District Drainage Authority,

Thank you for the opportunity to review the proposed improvement of the Heron Lake Watershed District - Jackson County Judicial Ditch Number 3 (JD3). We offer comments in accordance with Minnesota Statute §103E.301 on behalf of the Commissioner of the Minnesota Department of Natural Resources (DNR).

Project Summary

This project proposes to increase the drainage capacity within the 20,122-acre JD3 watershed. The planned work includes enlarging and/or cleaning portions of the open ditch; enlarging, deepening, and/or extending more than 40 laterals/branches; and work on 18 culverts. To partially mitigate the impacts of this project, three storage areas totaling 97 ac-feet are proposed. The estimated cost of the improvement is approximately \$13,000,000 (\$650/acre on average).

Summary of Concerns

While the DNR was consulted, this project design and FER do not substantially alleviate our concerns. We have several persisting concerns related the environmental and drainage law considerations that we will identify in this letter. However, we also believe that this large and expensive project will not be able to meet several landowners' needs because much of the ditch grade often lies below the lake's water levels, creating a back water effect. When the environmental impacts, the physical limitations of draining all of this system, and the significant cost are considered together, this project may result in environmental degradation and still lack the desired drainage benefits in some areas. We urge the landowners and drainage authority to consider if there might be alternatives that would provide a better overall outcome for farmers and the environment.

Fish & Wildlife

The Heron Lake complex is a unique, natural resource and is identified as an Important Bird Area. The lake complex hosts several listed species as well as many other species in conservation need. Historically, the Lake was an important resource for birds to migrate, feed, nest, and rear. Over time with degraded water quality and excessively flashy conditions, some wildlife and aquatic species use have been negatively impacted. We expect that unmitigated drainage to South Heron Lake will further degrade conditions for fish and wildlife.

Calcareous Fen

A calcareous fen is located near the southern tip of South Heron Lake. Calcareous fens are rare and distinctive wetlands dominated by “calciphiles” or calcium-loving species depend on cold, oxygen-poor, and calcium and magnesium-rich groundwater. Because these wetlands and their necessary conditions are so rare, calcareous fens have special protection in Minnesota Statute. In summary, Minnesota Statute §103G.223 states that calcareous fens may not be filled, drained, or degraded by any activity unless the DNR determines some alteration is necessary. We are requesting modeling data to evaluate the potential impact of the proposed project on the calcareous fen. The modeling request is summarized within the modeling request section below. **Please note that further collaboration with the DNR is necessary to avoid impacts to this fen, and additional analysis could be requested.**

Water Quality

We believe that this project will increase the dissolved pollutants, specifically nitrate and phosphorus, delivered to South Heron Lake, an already impaired lake. The incorporated storage areas are far too small compared to the watershed size to be effective at dissolved nutrient removal. Sediment and sediment-bound nutrient reductions would depend on the ability of ditch banks to stabilize and for the storage areas to settle sediment. While some work is planned to stabilize these ditch banks, we are concerned that the saturated soils created by the deeper ditch and backwater effects along with increased flow from the watershed will destabilize the banks and lead to more erosion. We are also concerned that the storage areas will fill with sediment quickly and eliminate the effective settling area.

As noted in the PER, the outlet of JD3 into South Heron Lake shows a large sediment delta extending into the lake. This was created by the deposition of sediment from the JD3 watershed. Water quality information was incorporated into the FER as requested. However, the data was not adequately interpreted. Upon discussion with and cursory analysis by MPCA staff, the sampling points reported in the FER were taken from low flow or the falling limb of the hydrographs. Because of this, the reported sampling substantially underestimates sediment loading for the year. The estimated loading should reflect peak loading rates. This ditch system is providing much higher sediment concentrations during storm events.

MPCA staff informed us that the Watershed District withdrew participation in the 319 Targeted Watersheds grant program. Does this affect the storage areas or practices designed as part of the project? If so, that should be clarified in the FER and any practices that are no longer currently proposed should be removed from the modeling and/or analysis of potential watershed benefits. Also note that an updated TMDL for the lake was published in 2020.

Adequacy of Outlet

The FER notes that “After further analysis related to the adequacy of the outlet, it was concluded that the outlet did not have sufficient capacity to receive the increased peak flows generated by the improvement. Two types of storage were added to the system to offset peak flow increases to the outlet and to make the drainage system more hydrologically efficient.”

A total of 97 acre-feet of storage are proposed, 73.8 acre-feet of which is identified as necessary to ensure the outlet is adequate. We note that 97 acre-feet of storage is equivalent to 0.05” inches of runoff from the entire JD3 watershed. From a common-sense standpoint, it doesn’t seem possible for this relatively meager storage volume to influence the system in a substantial manner. Furthermore, the FER presents hydrographs which show the amount of water leaving the JD3 ditch for a 10-year storm event (one copied in below), which appear to support this.

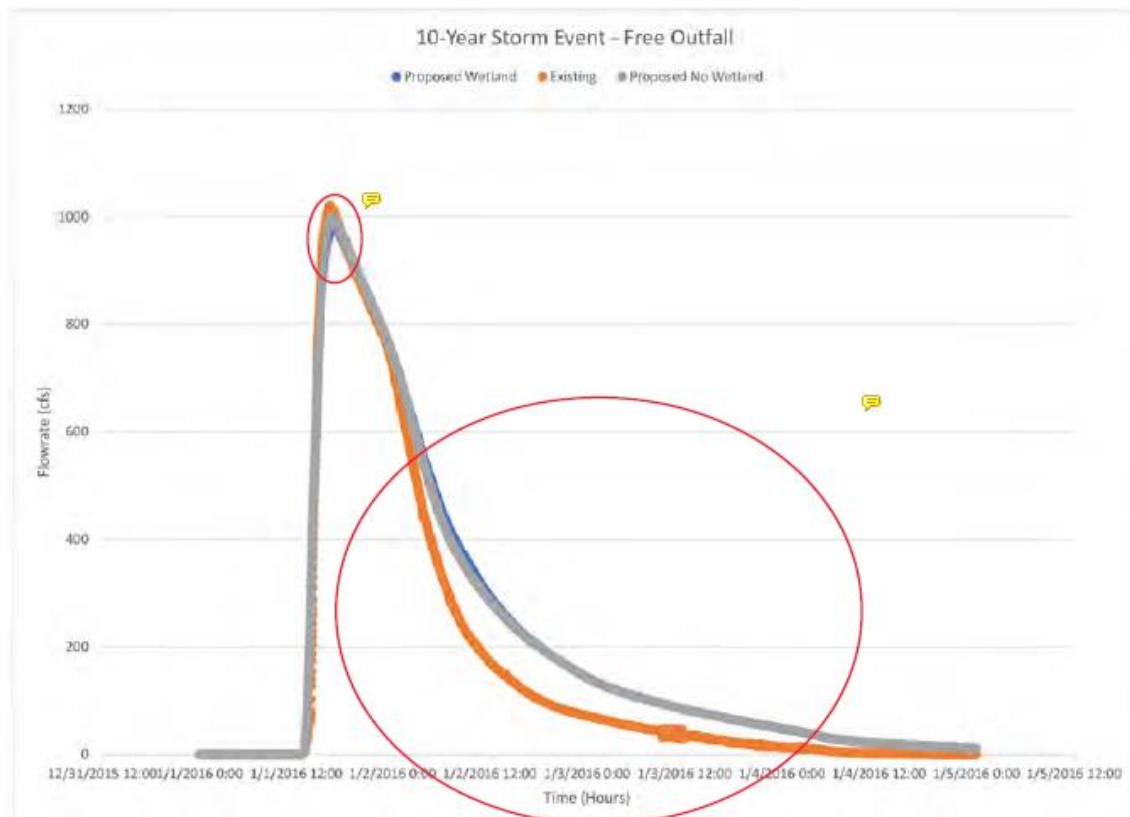
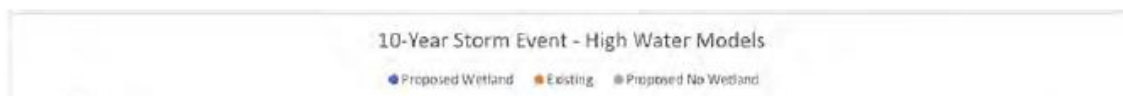


Figure 11: Outlet Hydrograph (10-Year Storm Event - Free Outfall)



The proposed conditions scenarios - with wetland (blue line) and without wetland (grey line) - are extremely similar. By implementing the proposed storage, the hydrograph shows a minor decrease in peak flow of the proposed system (refer to the small circle at the peak of the graph). However, the hydrographs clearly show a significant increase in the total storm event volume (refer to the large circle on the falling limb of the graph).

The total volume of storm events may be more likely to affect the adequacy of this outlet than the peak flow rate because the JD3 outlet is controlled by the South Heron Lake outlet. We ask that the original justification of the inadequate outlet be discussed as well as specifically describe how adding the storage areas allow the outlet to be adequate, even though it makes almost no change to the peak of the hydrograph. We also request additional modeling information be included in a modeling report. The modeling request is incorporated in the Modeling Request Section below.

Public Waters

South Heron Lake is a Public Water. Per MN Statute 103G.245, a permit is required to change or diminish the course, current, or cross section of public waters, entirely or partially within the state. As such, potential impacts to the lake water levels and sediment volumes should be modeled to assess the potential impact. We request additional modeling information regarding the potential impact to South Heron Lake as summarized in the below section. Furthermore, the Drainage Authority should note that we may request cumulative impact analysis of lake impacts for future proposed drainage improvements that drain to South Heron Lake.

As noted in the water quality section, a large sediment delta is visible at the outlet of JD3. Also as discussed, we are concerned that sediment reduction measures will not be effective. We would like the project to note that the DNR does not intend to issue any permits to allow excavation of the lake to move the sediment delta unless more comprehensive sediment prevention practices are incorporated.

Modeling Requests

As noted already, we are requesting additional modeling information to evaluate the adequacy of the outlet and potential impacts to the public water and calcareous fen. We request the following edits and additions are incorporated into the model and a detailed and comprehensive modeling report is prepared.

They FER notes that additional laterals that have not been approved are included in the modeling. The existing system should be modeled as it exists, not accommodating future potential improvements. (The effect of these future laterals should be considered in future engineering reports in the context of the cumulative impacts of prior system upgrades if those system additions are pursued.) Please ensure the existing conditions model does reflect the true existing conditions of the watershed and drainage network.

Also ensure that the proposed condition reflects the system that is planned. So if any changes were made based on funding changes, ensure the model reflects this for the proposed model scenarios.

We are requesting that as part of the modeling report, you include hydrographs for all modeled storm events, for both the existing conditions and the proposed condition.

We are requesting model information to illustrate any (or no) potential impact to the South Heron lake level and water quality. We are requesting lake level hydrographs in a graphed format where the number of days/hours (x-axis) and lake elevation (y-axis) are presented for both the existing and proposed scenario, for all storm events. From these lake level graphs, describe any changes to the lake level or duration. Specifically identify the number of days/hours that the lake elevation of 1405' is exceeded for each scenario. Please ensure these scenarios are run for low and high tail water conditions for both existing and proposed scenarios. Include all graphs and analysis in the modeling report.

We are requesting updated modeling for sediment loading using data sediment volume points on the rising and peak hydrograph points for the existing and proposed conditions. Please include updated information for all potential storm scenarios for existing and proposed conditions.

We are requesting: 1) an encrypted model that can be viewed in XP SWMM Viewer, 2) all output files, and 3) a modeling report. The modeling report needs to provide a narrative description and interpretation of the model assumptions, details, and nuances. Please incorporate all of the modeling information and results into the modeling report. Detailed model set up and assumptions as well as output should be documented, including but not limited to:

- A map indicating the modeled systems and the mapped locations corresponding to output data
- Any changes to the model in the pre and post project scenarios
- How the model is routing and storing water
- How private tile is incorporated into the model
- References for what sources were used for input parameters to the model
- How optional modeling methods were selected (eg. infiltration method)
- How the modeled storm events were determined, including the rainfall depth, distribution, and duration
- How the critical storm duration was determined
- Estimates for surface runoff, subsurface drainage, and total runoff volume, and storage for the design storm events, pre and post project
- Output hydrographs and flooding maps of the pre-project and post project for the design storm events
- More details on the modeled storage pond, including the amount of storage currently in place at this location, the mechanics/design of the pond, and other relevant information
- How quickly the pond will fill for the design storm events and describe and illustration of flooded areas when the outlet culvert backs up water
- Any errors or model discrepancies, including an interpretation and relevance to the project

Conclusion

In addition to the outstanding environmental and drainage law concerns outlined in this letter, we want to again reiterate that we believe that this large and expensive project will not be able to meet some landowners' drainage needs because some of the ditch grade lies below the lake's water level. When considering the environmental impacts, the physical limitations of draining all of this system, and the significant cost, this project may still cause environmental degradation and fail to provide the desired drainage benefits in some areas of the JD3 drainage system. We urge both the landowners and drainage authority to consider if there might be alternatives that would provide a better overall outcome for farmers and the environment.

We encourage the drainage authority and landowners to develop solutions that manage water while improving the sustainability of their farms and the environment by looking more holistically at the demands for moving water through the entire Heron Lake watershed. Adding conservation lands such as wetland restorations or conservation cover coupled with the implementation of soil health practices would offer multiple benefits. Soil health practices are proven to increase soil organic matter, water holding capacity, soil biologic activity and diversity, and evapotranspiration. These benefits could help manage excess water within the project area.

In accordance with 103E.301, we offer that:

- (1) The report is not complete; the incomplete portions are identified in this letter.
- (2) The proposed establishment will not improve drainage for all properties under wet conditions in the project area as described in this letter.
- (3) The DNR does not approve the plan until further detailed analysis and a modeling report addressing our concerns are supplied and reviewed.
- (4) The drainage improvement does not provide public benefits.
- (5) A soil survey is not necessary.

Please send a copy of the modeling report, response to comments and/or revised document, meeting minutes, Finding of Fact, and any Order issued by the Drainage Authority regarding the proposed improvement to the DNR when they become available. Please submit these documents or any questions about this letter to Regional Drainage email at Region4Drainage.dnr@state.mn.us.

Sincerely,



Todd Kolander

DNR Southern Region, Ecological and Water Resources South District Manager

cc: Joanne Boettcher, DNR Regional Environmental Assessment Ecologist
Tom Kresko, DNR Area Hydrologist
Megan Benage, DNR Regional Ecologist
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Jim Sehl, Tim Gieseke, Robert Collett & Scott Roemhildt, South Region DNR EWR Management
Katherine Pekarek-Scott & Paul Davis, MPCA
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Chuck Brandel, Project Engineer