

January 10, 2025

KEC Ref. 2477

By e-mail

Attention: Natasha Roberts, CAO/Clerk
Municipality of Huron Shores
7 Bridge Street
Iron Bridge, ON, P0R 1H0

Re: Dean Lake Road Bridge: Alternatives for Remediation

Dear Ms. Roberts:

Kresin Engineering Corporation (KEC) has been retained by the Municipality to carry out a feasibility study for the remediation of the Dean Lake Road Bridge. The study has been prompted due to structure deterioration and maintenance/repair needs identified during routine inspections and investigations previously carried out on the structure.

During our review of the current condition of Dean Lake Road Bridge, as well as our review of historical reports and correspondence, KEC has identified concerns which have led to issuing a recommendation to immediately close the bridge. This recommendation is made to ensure the safety of bridge users and the general public.

The purpose of this letter is to present a work plan to the Municipality for development of repair and remedial action plans at Dean Lake Road Bridge.

Background

The most recent detailed inspection of the Dean Lake Road Bridge was carried out in the summer of 2019, resulting in numerous recommendations for repairs to be completed within timeframes of "now" and "<1 year". The report on the 2019 inspection concluded that if a repair plan is not in-place by the end of 2021, the bridge would be closed.

In 2021, a routine biennial visual inspection was carried out. The 2021 inspection report recommends that major structure rehabilitation take place within 1 to 5 years. The report also recommends that certain structural reinforcing be carried out within 1 year.

A routine biennial visual inspection was carried out in 2023. The inspection report includes recommendations that reinforcing at certain structural members be carried out within 1 year and major rehabilitation within 3 years. This report also includes a recommendation for increasing the inspection frequency to annually instead of the legislated biennial frequency.

Although the historical documents referenced above include recommendations for urgent repairs, records of corresponding remedial work are not captured in the subsequent reports.

Visual reviews carried out during site visits in late 2024 and early 2025 were not able to definitively confirm the status of many of these recommended urgent repairs.

Work Plan

The following work plan tasks are presented for consideration by the Municipality.

Task 1: Detailed Inspection

Prior to the development of a repair strategy, it is necessary that a detailed inspection of the Dean Lake Road Bridge be carried out, similar in scope to the inspection completed in 2019. This inspection must include the entire structure, with a focus on critical areas such as structural steel connections, main structural members, areas of severe deterioration, etc. The inspection should attempt to confirm that repairs previously recommended were implemented.

While not ideal, a detailed inspection can be carried out during winter months, provided suitable environmental conditions are present. Due to the importance of this structure and the cost and inconvenience of its closure, we recommend that the detailed inspection be scheduled at the earliest opportunity. KEC can schedule appropriate personnel and equipment to complete this work within the next two weeks.

Task 2: Interim Repair Strategy

Once the findings of the detailed inspection are available, it will be confirmed if an interim repair strategy is possible and feasible. An interim repair strategy would include addressing urgent critical deficiencies in order to expedite the re-opening of the bridge for passenger vehicles.

Based on the information in historical reports documenting the deterioration of the existing structure and our recent visual reviews of the structure, we feel it is likely that interim repairs can feasibly be made to re-open the bridge with a reduced load limit.

Implementing an interim repair strategy is intended to provide the Municipality with the time required to develop a plan for the long-term major rehabilitation of the Dean Lake Road Bridge, while eliminating the inconvenience and cost of an extended duration bridge closure (for passenger vehicles).

Task 3 – Major Rehabilitation

Major rehabilitation of the Dean Lake Road Bridge could include any of the following basic alternatives:

1. Remove the bridge and rely on existing road networks to accommodate traffic to the alternative river crossing in Iron Bridge.
2. Close the bridge to vehicular traffic and implement upgrades to accommodate pedestrian only or pedestrian and ATV/snowmobile traffic.
3. Rehabilitate the existing structure to maintain the existing 10 tonne load limit.
4. Rehabilitate the existing structure to restore the historical design load limit.
5. Replace the structure with a new bridge.

KEC is currently in the process of analyzing the feasibility of these alternatives; however, we feel it would be prudent to postpone finalizing the report until the findings of the detailed inspection in Task 1 are reviewed and considered.

The following comments on the alternatives are provided for consideration:

1. Remove the Bridge

This alternative includes decommissioning the existing river crossing and the physical removal of the bridge superstructure. In addition, upgrades to the existing road network to better accommodate the traffic which currently uses Dean Lake Road Bridge would likely be required.

Preliminary budget recommendation for superstructure removal and associated work: \$750,000.

2. Close to Vehicular Traffic

Limiting use of the bridge to pedestrian and possibly off-road vehicle use would require: some repairs to the existing structure, installation of access control devices to prohibit vehicular access, installation of pedestrian safety railings and other minor improvements. As in option 1, this alternative would also require improvements to the existing road network to accommodate the diverted vehicular traffic.

Preliminary budget recommendation for bridge upgrades: \$500,000. Note that this option will require ongoing costs related to maintenance and operation of the bridge.

3. Rehabilitate to Maintain Current 10t Load Limit

Rehabilitation of the bridge to maintain the current load limit will require replacement of the deck system – either portions of deck or the entirety of it, as well as repairs to and repainting of the structural steel trusses. Localized repairs to the piers and abutments would also be required.

Preliminary budget recommendation for option 3: \$5 million.

4. Rehabilitate to Restore the Original Load Capacity

In order to restore the Dean Lake Road Bridge to its original load capacity, in addition to the work listed in Option 3 above, a rehabilitation would need to address in-depth repairs to concrete piers and abutments as well as extensive reinforcement/reconstruction of truss elements.

Preliminary budget recommendation for option 4: \$7 million.

5. Replace the Structure with a New Bridge

There are various options available to replace the Dean Lake Road Bridge including installing a new superstructure on the existing foundations, or constructing a completely new structure. It is noted that the capacity of the existing foundations may be a limiting factor on the ultimate capacity of any new structure, and the existing foundations will require significant repairs/modifications to accommodate a new superstructure.

Preliminary budget recommendation for superstructure removal and replacement, including foundation repairs: \$15 million.

It is noted that improvements to the existing road network will likely be required for many of the described alternatives – either for a permanent solution or for limited-term detour while bridge work is carried out. Although KEC has not completed an assessment of the existing roads, it is anticipated that improvement costs could be significant.

Closure

KEC is prepared to proceed with the completion of the detailed inspection upon the receipt of direction to do so. A cost estimate is being developed for this; however, at the time of writing this letter, some costs for specialist equipment and sub-consultants have not been received. A quotation will be provided to the Municipality for approval prior to January 16, 2025.

Should you have any questions or require clarification, please call.

Thank you.

Yours Very Truly,
Kresin Engineering Corporation



Michael Kresin, P. Eng.

Consulting Engineer

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