Design Presentation

Engineering Services for the Replacement of Kinsmen Bridge

Design, Construction Tendering & Contract Administration

Introduction

- To discuss the replacement/rehabilitation of the Kinsmen Pedestrian Bridge
- Following the Public Information Consultation reaching out to committees and local groups for further consultation and data collection
- If you have any comments please reach out to Shayne Reitsma P.Eng at sreitsma@tillsonburg.ca or at 519-688-3009
- Any comments received will be collected and considered in further design steps, personal information will not be recorded.

Why are we here?

“Following an engineering assessment of the Kinsmen Bridge it was determined that the Kinsmen Bridge has many deficiencies such as delamination of the steel girders and significant corrosion on majority of the structural steel components. The deficiencies are required to be addressed in order to maintain public safety”

Existing Site Conditions/Constraints

- The existing structure was initially constructed in 1888 for use as a railroad bridge and was later converted to a pedestrian bridge. This bridge is heavily used by pedestrian traffic to access downtown shopping areas by residents west of the Stoney Creek Ravine. The 2019 Enhanced OSIM and 2021 OSIM inspections determined that, the bridge is in urgent need of repairs within five (5) years, and that the bridge had only ten years of service life remaining at the time of inspection.

- The existing abutments and stone foundations were constructed to support the loads and stresses of a train bridge, and their good condition permits that they can be retained for the new pedestrian bridge with only minor repairs.

- There are few environmental constraints for this study area. Since no major excavation will be required, impacts to the natural environment are expected to be minimal, and will require only minor remediation efforts after construction. Short-term impacts during construction will be mitigated through use of common mitigation measures and policies, including erosion control measures and re-seeding efforts. Additionally, during construction, the currently eroding banks beneath the bridge will be stabilized to minimize long-term erosion of the embankments.

Technical Studies Completed

- 2019 Enhanced OSIM Inspection – Standardized structural inspection conducted in Ontario that assess all features of a given structure. This inspection determined the 10-year remaining service life of the structure

- A Heritage Assessment was also completed in 2020. The preference from a heritage perspective is to find a suitable structure type that will be similar to the existing bridge.

- Geotechnical Investigation – No further Geotechnical investigations were required for this project given that minor rehabilitation of the stone foundations will lend them to be reused.

- Environmental studies will be limited to gaining approval from Long Point Region Conservation Authority under O.Reg 178/06, along with development of mitigation measures for construction (e.g. erosion and sediment control measures).

Design Alternatives

- During early design phases, the following alternatives were presented for this project:

- Option 1: Do Nothing – No rehabilitation or replacement. This is used as a baseline if nothing is done to replace or preserve the current structure. Includes decommision (Cost $1,369,500)
- Option 2: Repair – Recommended repairs are conducted on the bridge structure. Repairs would need to be conducted during or before 2024 and would extend the lifespan of the bridge for an additional 25-30 years. (Cost $5,240,000)
- Option 3: Like-for-Like Replacement (Hybrid)– Replacement of only the steel components of the bridge while retaining the abutments and stone piers. The replacement bridge would be designed in a manner that is similar to the existing structure. Lifespan would extend to 50-60 years. (Cost $6,602,000)
- Option 4: Prefabricated Pedestrian Bridge – This alternative would involve the removal of all existing bridge components and replace with a new, prefabricated bridge. The design of the bridge could range from basic, to very modern in design. Lifespan would extend to 74-80 years (Cost $5,000,000)
- Option 5: Prefabricated Pedestrian Bridge – This alternative would be the same as Option 4 but includes removal of the old stone foundations and replacement with new foundations. Lifespan would extend to 75-80 years (Cost $6,250,000)

Recommended Design Alternative

- **Following the PIC meeting in September, 2022 and communication with the Municipality, it was decided that the preferred design alternative would be Option 4:**

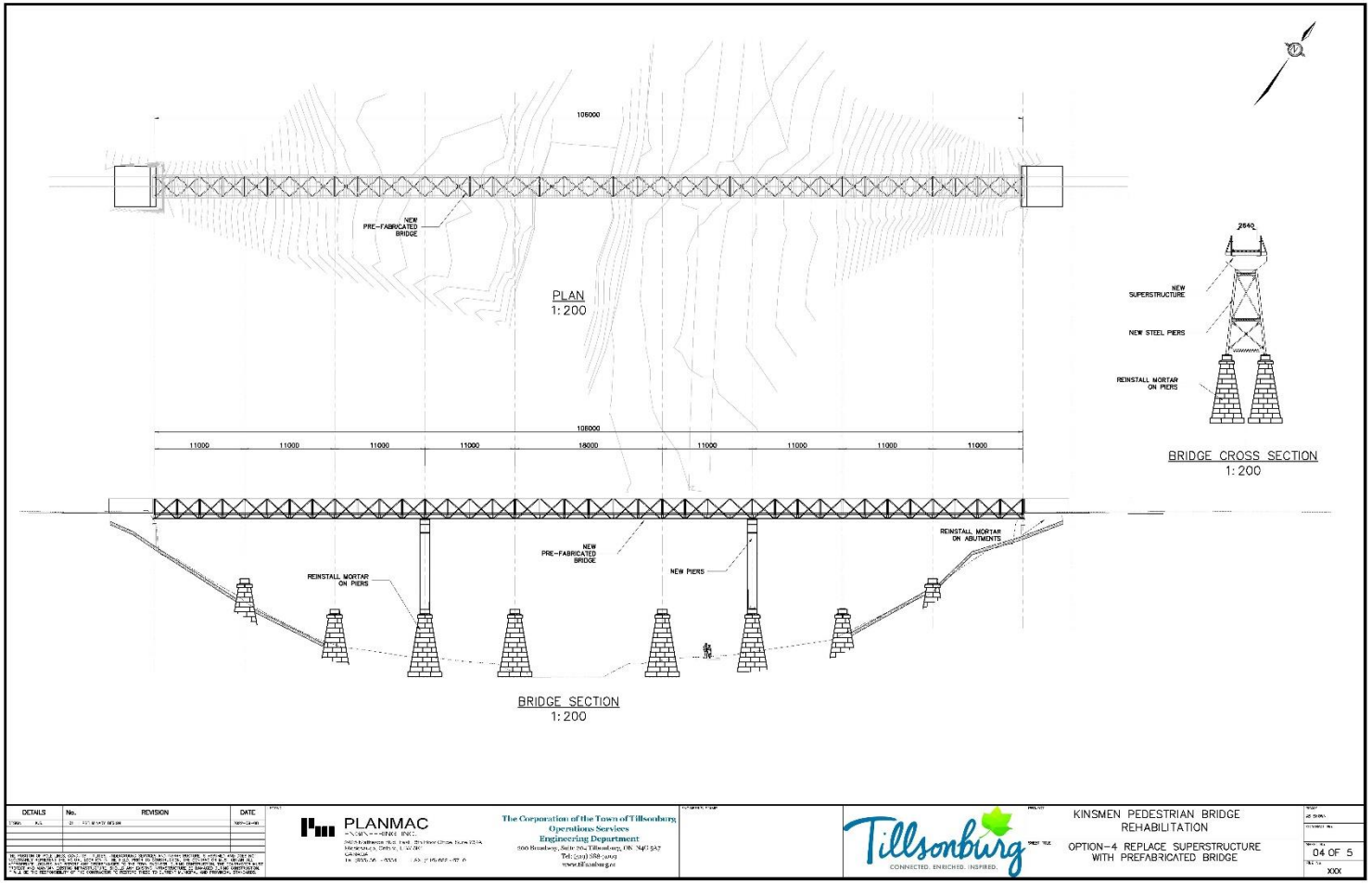
- This option will refresh the look and feel of the area/bridge, while ensuring the safety and accessibility of all pedestrians. This will be achieved through replacement of the heavily corroded old bridge and fencing with a new steel replacement structure supported on existing foundations.
- Option 4 will allow more improvements to sediment retention.
- Option 4 will also be the most environmentally friendly, due to not needing to excavate and replace the footings. This option will use the least overall new materials in bridge replacement.

Option 4: Replace Superstructure, Repairing Foundations

(Estimated $5,750,000 over 75-80 Years Service Life)

Pros	Cons
Optimized cost	Different Aesthetic Design – May change look and feel of the park area
No Earth or In-Water works required	
Long Service Life	
Shortest Construction time	
Lowest overall environmental impact/emissions	
Creative space in the design process – Bridges could range from basic to modern designs	

Design Drawings: Option 4: Replace Superstructure, Repairing Foundations



Design/Construction Considerations

- Fortification of the embankments will be necessary for the long term viability of the bridge.
- Environmental impacts will be taken into consideration through implementation of construction methods and procedures to minimize impact on several different aspects of the study area. This includes considering the impact on vegetation, erosion and sediment control and soil contamination.
- All applicable legal regulations pertaining to engineering design and environmental impact mitigation will be followed during the design and pre-construction process.

Next Steps

- Start Detail Design
- Obtain funding
- Prepare Construction Tender Document.
- Receive permitting from Long Point Region Conservation Authority and complete the Detailed Design.