Georgian Bluffs

PEARSON ENGINEERING

DESIGN ALTERNATIVE ASSESSMENT

STRUCTURE S-0005 SARAWAK KEPPEL TOWNLINE

TOWNSHIP OF GEORGIAN BLUFFS

COUNTY OF GREY

Agenda

- Project Location
- Existing Conditions
- Project Purpose
- Stakeholder Considerations
- Alternative Solutions
  - Alternative 1
  - Alternative 2A
  - Alternative 2B
  - Alternative 3
- Alternative Solution Evaluation
- Preferred Design Alternative
- Question Contacts

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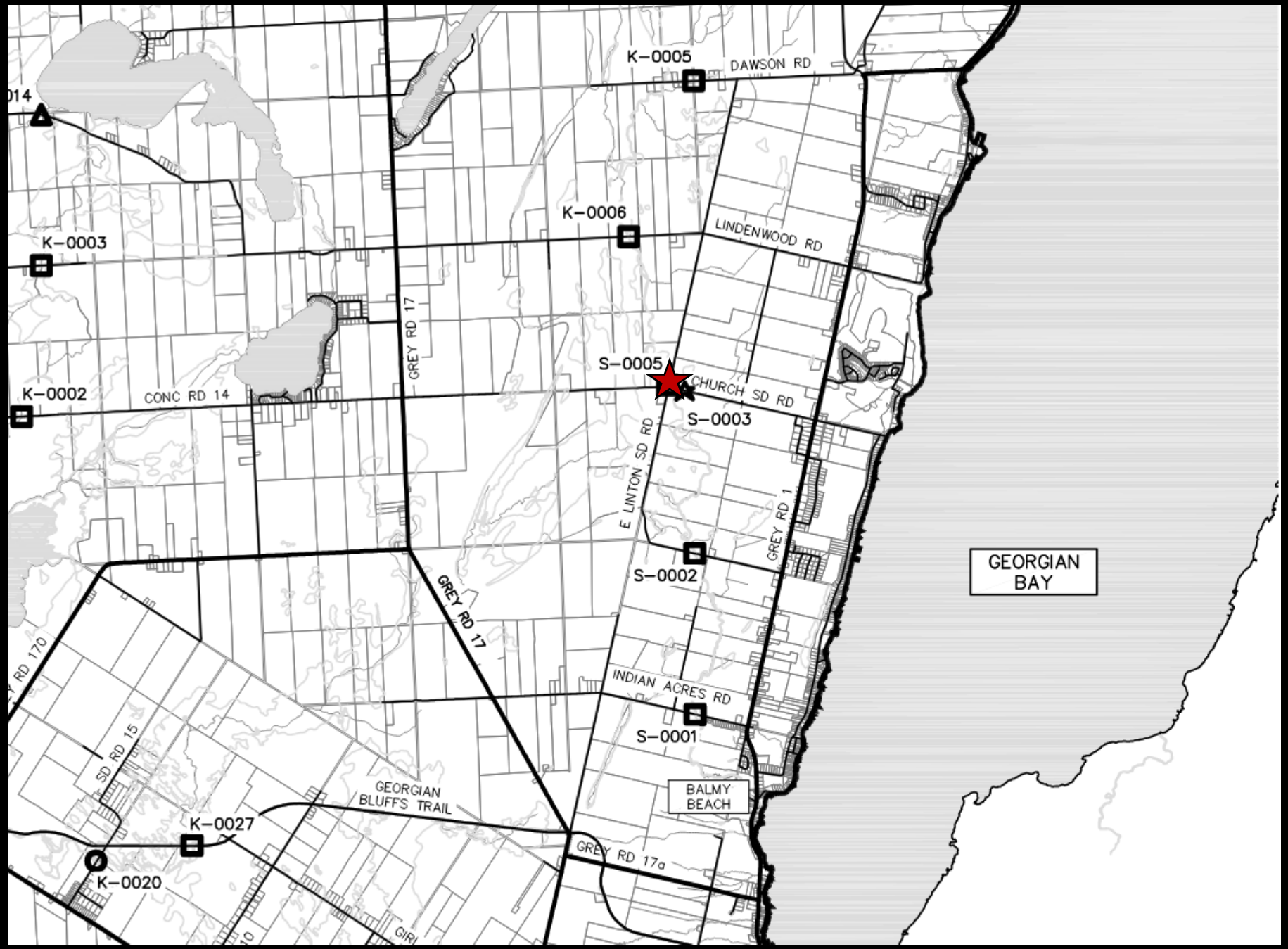

Project Location

Structure S-0005 is located in the former Township of Sarawak, now the Township of Georgian Bluffs, Ontario. The existing structure conveys flow for the Indian Creek, on Sarawak Keppel Townline.

The structure is located approximately 25m north of Church Sideroad West between Lot 34, Concession 14 in Keppel, and Lot 28, Concession 1 in Sarawak.

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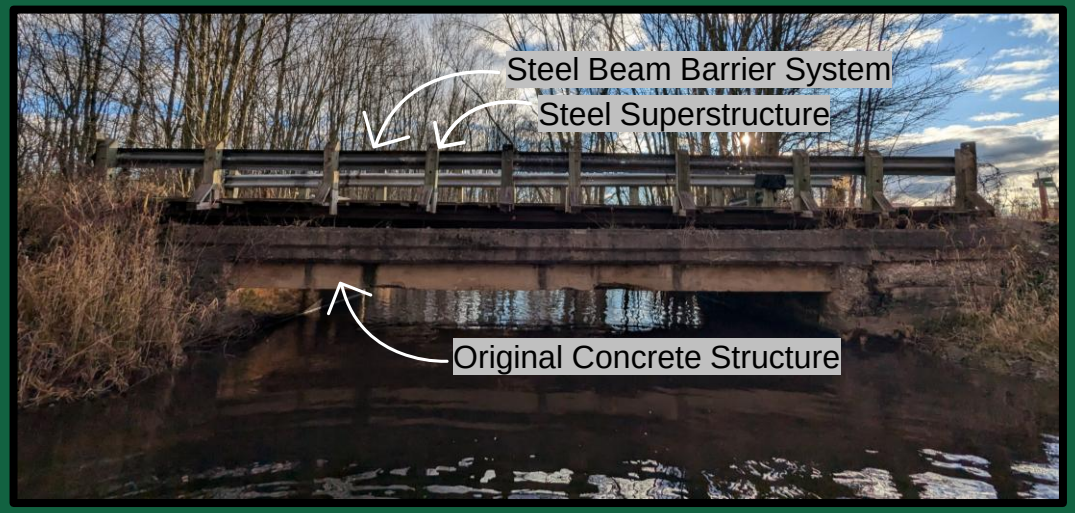
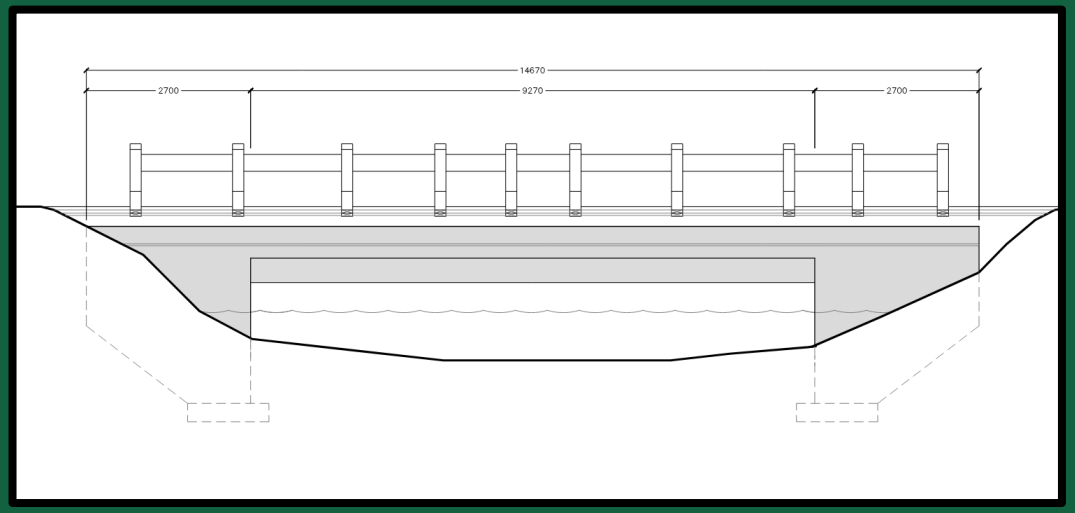
EXISTING CONDITIONS

The existing load carrying superstructure of the bridge utilizes a steel frame of a flatbed trailer, which spans 14.1m over an existing concrete T-beam bridge (original structure). The concrete T-beam bridge spans 9.3m and conveys water flow for the Indian creek. The original structure was previously owned by Grey County until it was purchased by the Township in 2015/2016. After purchasing the structure, the steel superstructure was installed over the original bridge to allow the roadway to remain open.

Due to the poor condition of the bridge, the 2024 OSIM report recommended that the bridge undergo a load evaluation prior to the end of 2024 to ensure the safety of the public. As a result, the structure was recommended for temporary closure (by March 31, 2025) due to load carrying capacity limitations. It is recommended that the bridge remain closed until the Township makes a decision regarding the future usage of the structure.





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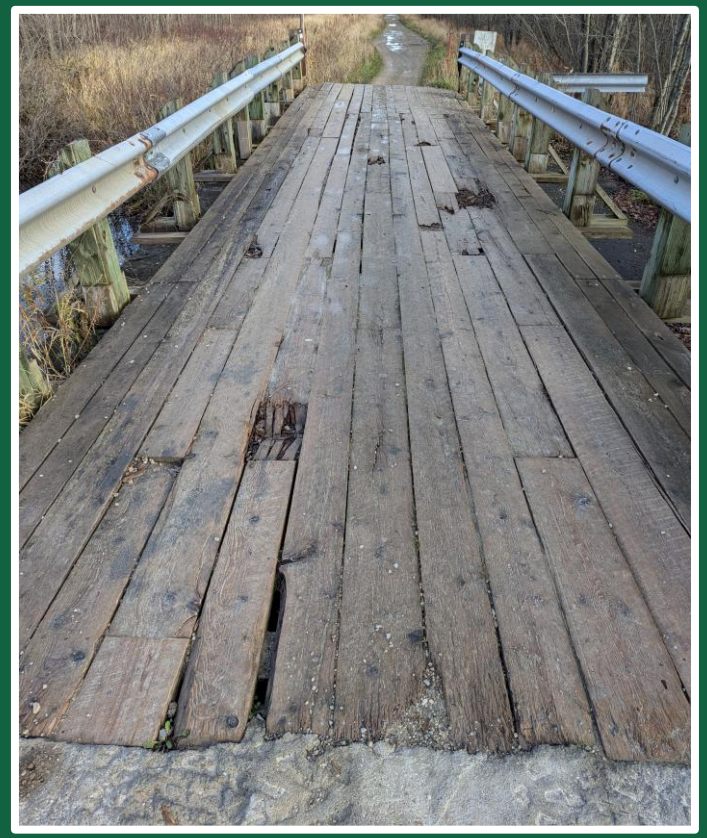
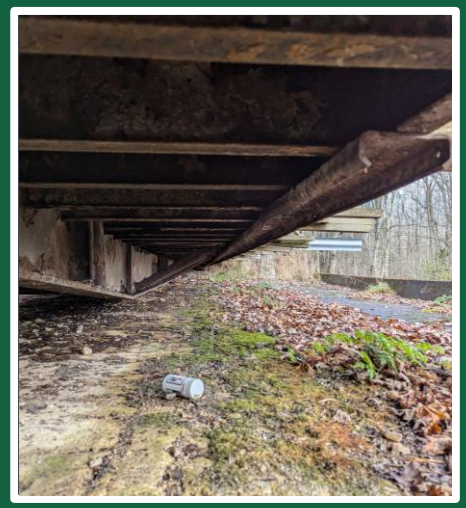
EXISTING CONDITIONS (SUPERSTRUCTURE)



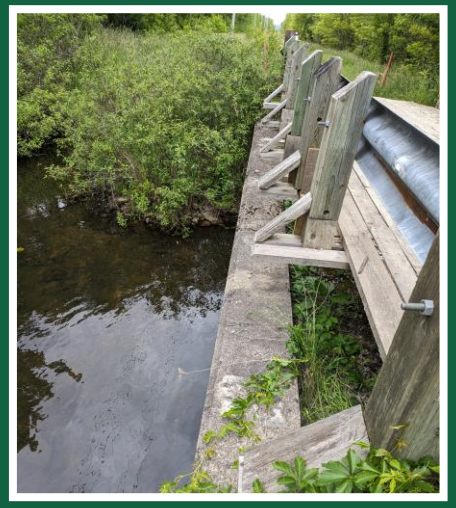
View of Structure Facing North

View of Barrier Lap Splice



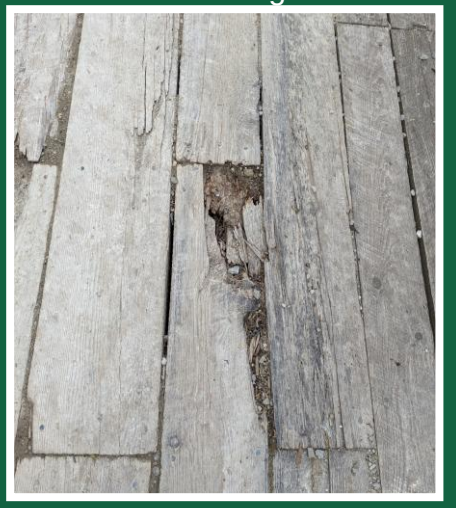
View of Superstructure Corrosion

View of Superstructure Bearing



View of Barrier System

View of Approach Facing North



View of Rotten Deck Boards

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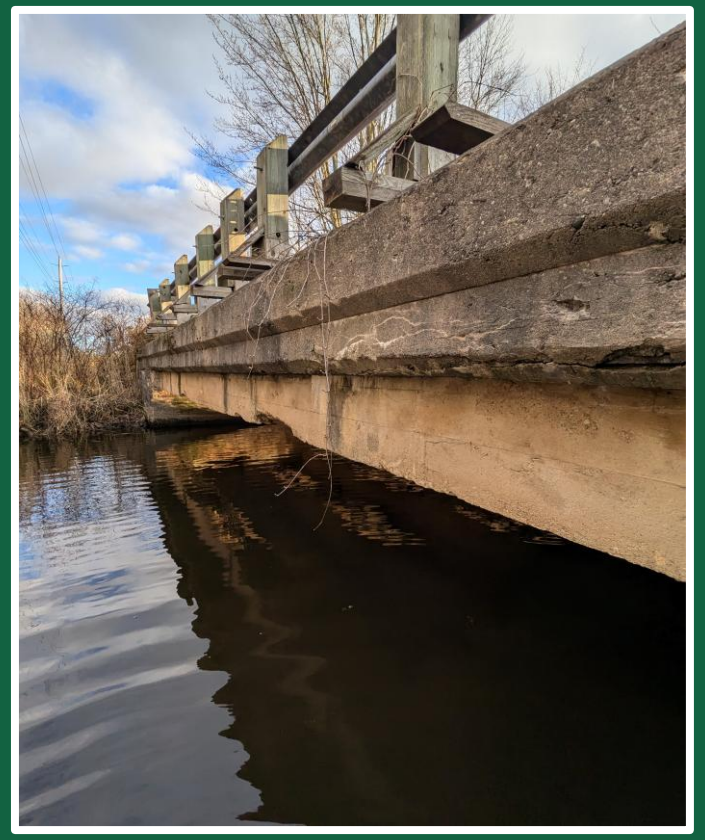
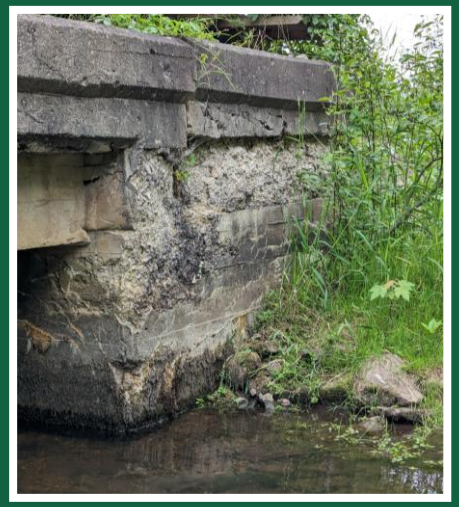
EXISTING CONDITIONS (OLD STRUCTURE)

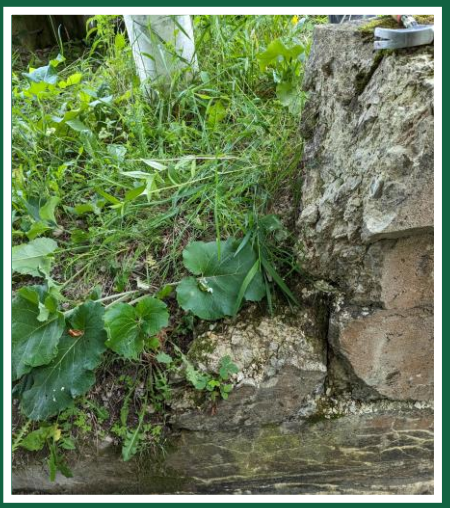


View of East Exterior Soffit and Curb



View of Deteriorated Abutment/wingwall

View of Wingwall Deterioration



View of Spalled Wingwall

View of Exposed Rebar in Concrete T-Beam

View of Concrete Curb and Deck Top

View of Spalled T-Beams

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PROJECT PURPOSE

Prior to 2024, Structure S-0005 was not a part of the Township's Biennial OSIM Inspection Program. Based on the OSIM inspection completed by Pearson Engineering in 2024, the structure appeared to be in overall poor condition due to significant deterioration.

The existing structure is currently set to be closed by March 31, 2025 to all traffic (vehicle, pedestrian and recreational) due to safety concerns. The structure currently supports a portion of the OFSC Trail Network and a Hydro One utility corridor and is located within a GSCA and NEC regulated area.

As a result of the upcoming temporary closure of the bridge, the Township has completed a review of various design alternatives that are available to be implemented in the future. This presentation has been prepared to outline the advantages and disadvantages of each option

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STEAKHOLDER CONSIDERATIONS

GREY SAUBLE CONSERVATION AUTHORITY (GSCA)

Since the structure is located within the Grey Sauble Conservation Authority (GSCA) regulated limits, permit approval will be required. Conservation authorities regulate activities to manage natural hazards and protect ecosystems. The permitting process ensures that the project will not negatively impact the environment, particularly the watercourse and wetlands.

2025 Grey County Maps – Public GIS Site

ONTARIO FEDERATION OF SNOWMOBILE CLUBS (OFSC)

Currently, Structure S-0005 is being utilized as part of the OFSC trail system. Snowmobile trails often attract tourists, contributing to the local economy through spending on fuel, food, and other services. The design alternative evaluation for the structure should consider the limited availability for a detour route, due to the local wetlands and adjacent escarpment.

2025 OFSC Mapping

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STEAKHOLDER CONSIDERATIONS

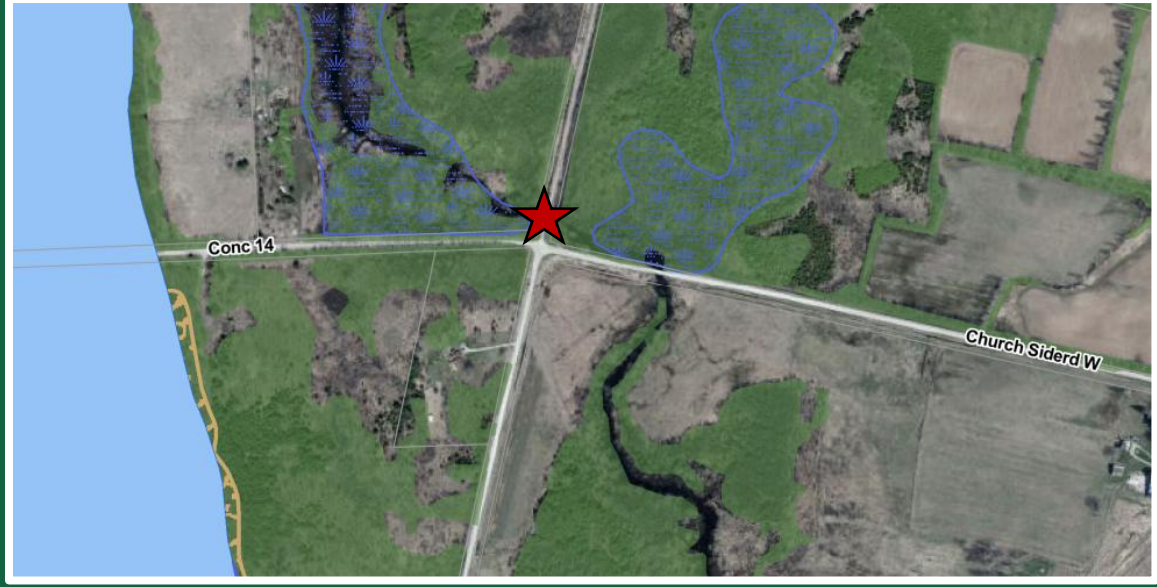
LOCAL UTILITIES

The Sarawak Kepple Townline currently supports a Hydro-One utility corridor located on the east side of the roadway. This segment of the roadway does not currently provide access to any private residential dwellings. It is unknown at this time if there are any other utility services located on the roadway adjacent to the existing bridge structure.

Google Maps Street View - June 2021

NIAGARA ESCARPMENT COMMISSION (NEC)

The Niagara Escarpment Plan has designated the bridge location as a regulated area. Further bridge development in this location will be limited. The NEC has designated the location of S-0005 as 'Natural Area' which strictly regulates construction. If the structure is fully removed; the establishment of a future crossing in this area will be difficult.



2025 Grey County Maps – Public GIS Site

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STEAKHOLDER CONSIDERATIONS

TOWNSHIP OF GEORGIAN BLUFFS

- The Township of Georgian Bluffs currently boasts an inventory of 16 bridges and 30 culverts.
- Based on the asset management information prepared by Pearson Engineering during the 2024 Biennial OSIM Inspection Program, the average replacement cost of the Township's bridge and culvert inventory is approximately $1,250,000 per structure (2024 $).
- As per the '10-Year Capital Works Plan' prepared by Pearson Engineering in 2024, 13% of all bridges and 16% of all culverts in the Township's inventory are considered in poor condition.
- A total of 35 rehabilitation / replacement projects are recommended between 2026 to 2034.
- The total project cost estimate for '10-Year Capital Needs Plan' is ± $19,000,000 assuming 3% inflation per year.

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EVALUATION CRITERIA

General	• Ability to address the Problem Statement.
Natural	• Protection of the natural and physical environment. • Includes considerations for water, wildlife, air and vegetation, as well as species at risk environmentally sensitive habitats.
Social	• Road usage, traffic movements and availability of alternative routes. • Access to emergency services. • Active transportation networks include connection to trail systems.
Cultural	• Protection of archaeological and/or cultural heritage resources. • Cultural landscapes, fixed archaeological structures on land and water, and built environments.
Economic	• Construction costs, long term operating costs and maintenance costs. • Overall municipal transportation system and potential capital commitments. • Potential risks associated with Townships liability.
Technical	• Type and complexity of construction. • Future maintenance requirements (short and long term). • CHBDC and road design standards.

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ALTERNATIVE SOLUTIONS

The following alternatives were identified to address the structural deficiencies, continued deterioration and safety risks associated with Structure D-0007.

#	Alternative	Construction Duration	Estimated Useful Service Life	Estimated Construction Cost	Description
1	Do Nothing (Maintain Existing Structure)	1 Week	N/A	<$10K	Fully close bridge to all pedestrian and vehicular traffic. Install permanent dead-end barricades and signage reassess in 3 to 5 years.
2A	Minor Rehabilitation	2-3 Weeks	5-10 Years	$50K-75K	Replacement of existing deteriorated wood deck system with laminated wood deck. Replacement of existing barrier system with steel beam guiderail and timber post system.
2B	Major Rehabilitation	3-5 Weeks	10-15 Years*	$100K-125K	Full replacement of upper superstructure with four steel girders and laminated wood deck system. Replacement of existing barrier system with steel beam guiderail system.
3	Permanent Removal	4-6 Weeks	N/A	$150K-175K	Full removal of steel superstructure and original concrete structure. Installation of dead-end barricades and signage.

* Service-life is subject to change based on condition and rate of deterioration of original concrete structure

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ALTERNATIVE 1
DO NOTHING (TEMPORARY CLOSURE)

Pros	Cons
Cost Effective No Immediate design, construction or contract administration costs.	**Temporary Solution** Temporary closure of the structure does not present a long-term solution for transportation.
Impact No environmental, cultural, archaeological impact due to no construction activates.	**Social Impact** Full closure of the structure prevents the crossing of Indian Creek for local traffic, trail users and Hydro-One utility vehicles.
	Potential Increased Cost Prolonging the removal, rehabilitation or replacement of the structure adds inflated construction costs for future work.
	Municipal Inventory The Township has many structures that are up for rehabilitation or replacement in the next 10 years. Delaying action on Structure S-0005 may result in a budgetary overload in future years.

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ALTERNATIVE 2A
MINOR REHABILITATION

Pros	Cons
Cost Effective Minor rehabilitation is generally less expensive than more strenuous alternatives, making it a budget friendly alternative.	**Temporary Solution** A minor rehabilitation only provides a temporary fix, further repair will be required in the future.
Impact Low environmental, cultural, archaeological or social impact due to minimal construction activities.	**Load Restrictions** Due to the limited capacity of the steel superstructure, a load posting will be required limiting traffic loads on the bridge to 4 tonnes after the bridge rehabilitation.
Extended Lifespan By addressing the bridge deck deterioration and barrier instability, the bridge useful service-life can be extended by approximately 5-10 years. Service-life may be adjusted in the future based on condition of steel superstructure and original concrete structure.	**Potential Increased Cost** Prolonging the full removal or replacement of the structure adds inflated construction costs for future work.
Construction Duration Minor rehabilitation requires less on-site construction time due to limited scope of work. This results in less impacts to traffic and public.	**Municipal Inventory** The Township has many structures that are up for rehabilitation or replacement in the next 10 years. Prolonging full removal/replacement on Structure S-0005 may result in a budgetary overload in future years.

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ALTERNATIVE 2B
MAJOR REHABILITATION

Pros	Cons
Municipal Inventory The Township has many structures that are up for rehabilitation or replacement in the next 10 years. By completing a major rehabilitation, it will increase the useful service life of the structure, reducing near future budgetary needs.	**Social Impact** A major rehabilitation of the structure temporarily disrupts the crossing of Indian Creek for trail users and Hydro-One utility vehicles.
Impact Low environmental, cultural, archaeological or social impact due to minor construction activities.	**Cost** The cost of major rehabilitation is significant when considering the potential service-life of the rehabilitated structure, which is dictated by the condition and rate of deterioration of the original concrete structure.
Extended Lifespan By addressing the bridge superstructure/deck deterioration and barrier instability, the bridge useful service life can be extended by roughly 10-15 years.	**Construction Duration** Major rehabilitation requires more on-site construction time due to increased scope of work. This results in an increased impact to traffic and the public.
Load Capacity By replacing the entire steel superstructure, the load carrying capacity of the bridge can be increased. To support recreation use and maintenance vehicles, a load limit of 10 tonnes would be sufficient.	

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ALTERNATIVE 3
PERMANENT REMOVAL

Pros	Cons
Future Cost Full removal of the structure will be more cost effective in the long-term. No future maintenance, rehabilitation or replacement costs.	**Social Impact** A full removal of the structure prevents the crossing of Indian Creek for trail users and Hydro-One utility vehicles.
Reduced Maintenance Over time maintenance needs can be significant. By permanently removing the bridge, there are no ongoing maintenance needs in the future.	**Initial Cost** Full removal of both the superstructure and the original structure is the most expensive construction cost of all alternatives. This is due to longer construction times, environmental protection and equipment needs.
Environmental Restoration Full removal of the structure requires temporary environmental impacts, but reinstates the natural watercourse embankments and improves the hydraulic capacity of the watercourse at the crossing.	
Municipal Inventory The Township has many structures that are up for rehabilitation or replacement in the next 10 year. Full removal of the structure decreases the Township's inventory, which reduces strain on the future capital works budget.	

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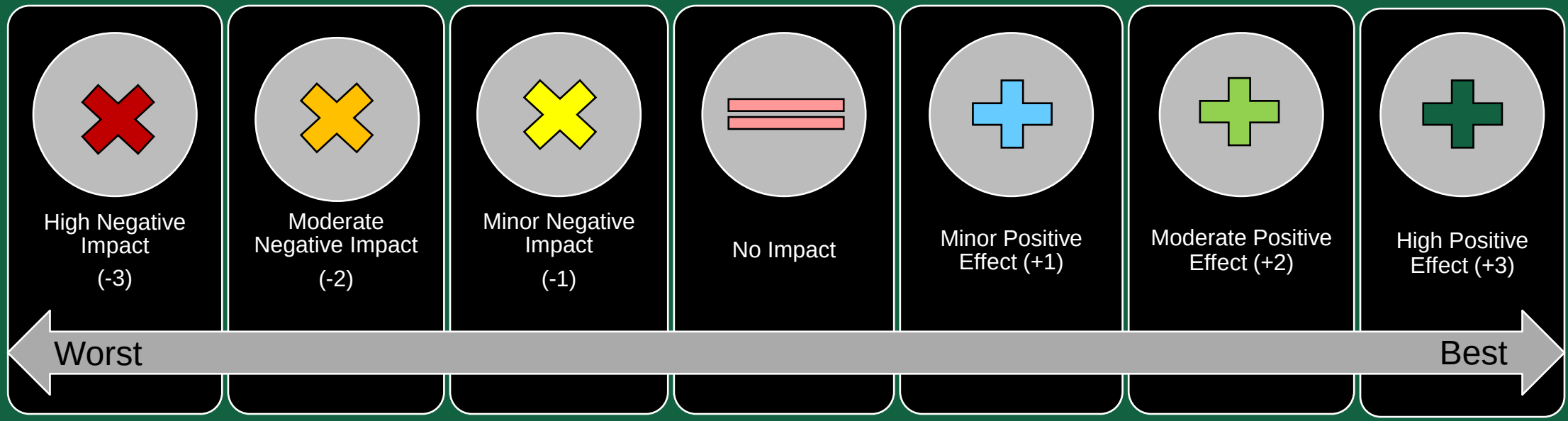
ALTERNATIVE SOLUTION EVALUATION



Each design alternative is assigned a score based on the significance of their impact for each criteria (previous slide). The symbols above are used to identify their effect on a scale from (-3) to (+3).

±3 – High Importance
±2 – Moderate Importance
±1 – Minor Importance

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DESIGN ALTERNATIVE EVALUATION

Evaluation Criteria	Alternative 1 Do Nothing	Alternative 2A Minor Rehabilitation	Alternative 2B Major Rehabilitation	Alternative 3 Permanent Removal
Natural Environment				
Social Environment				
Transportation				
Economic Environment				
Technical				
Overall Scoring	**-7**	**+1**	**+2**	**+5**

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PREFERRED DESIGN ALTERNATIVE
ALTERNATIVE 3: PERMANENT REMOVAL

Based on the results of the Design Alternative Evaluation, the preliminary preferred design solution is ‘Alternative 3’, which recommends the permanent removal of the existing bridge structure. Key parameters to consider as part of this evaluation are as follows:

- The Keppel Sarawak Townline is a no maintenance roadway with a narrow road surface.
- The maximum detour distance created by the structure removal is approximately 6.3km.
- A majority of the traffic utilizing Structure S-0005 is recreational. Therefore, a permanent bridge closure / removal will have minimal impacts to Township traffic network.
- The roadway does not currently provide access to private residential dwellings, only agricultural fields which can all be accessed via the surrounding properties.
- The Ontario Federation of Snowmobile Clubs (OFSC) will be required to develop an alternative route for the connecting link from Church Sideroad West, north to the Lindenwood Sideroad.
- The proximity of the bridge to the intersection, the grading of the approaches, width of the bridge / roadway and the lack of guiderail systems increases safety concerns at the crossing.

Photo example from Orchardville Bridge

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QUESTION CONTACTS

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