



PEOPLE | ENGINEERING | ENVIRONMENTS

March 16, 2021
Our File: 212326

Via Email: gfurtney@brockton.ca

Municipality of Brockton
100 Scott Street, Box 68
Walkerton, ON N0G 2V0

Attention: Mr. Gregory Furtney

Re: Review of Bridge Replacement Alternatives
Greenock Bridge Structure No. 2
Riversdale Bridge
Municipality of Brockton

Dear Gregory,

In consideration of the Municipality of Brockton Staff Report PW2021-02 and the presentation by GM BluePlan to Council on February 9, 2021 respecting the Schedule 'B' Municipal Class Environmental Assessment (EA) for Bridge No.0002, also known as the Riversdale Bridge, Council selected and approved a Preferred Solution, which was to replace the structure with a vehicular bridge. However, replacement with a one-lane or two-lane structure remained unresolved (i.e. Alternative 3A or Alternative 3B, respectively). While it is possible to complete the EA process without specifying the number of lanes for the replacement bridge, it would be beneficial to establish a more concise decision prior to publishing the Notice of Completion, which will conclude the EA process. A decision specifying the desired number of lanes for the bridge replacement would serve to better direct the future planning efforts and associated costs.

In our February 9, 2021 presentation to Council, we recommended that if the replacement alternative is chosen, a two-lane bridge would be preferable to a one-lane bridge. The Municipality subsequently requested that GMBP provide more details to support this recommendation, which is the purpose of this letter. The following outlines our consideration of various aspects to support our opinion.

1. Road Design Standards:

The Transportation Association of Canada Geometric Design Guide for Canadian Roads - June 2017 (TAC) notes that for a given classification of road, *"cross section elements should desirably be the same everywhere"*. A situation to be avoided is the creation of incompatibilities between the road cross section and its horizontal and vertical alignments. TAC further states that *"narrow bridges, where the width of the preceding section of road is not reduced, also represent an expectancy violation for the driver. This is especially true when the bridges are located on curves or dips, where they are difficult to perceive"*. A one-lane bridge would create increased collision potential. Therefore, in order to meet the intent of the TAC design standards, a two-lane bridge would be required, to suit the two-lane road approaches.

We acknowledge that the poor horizontal alignment and road cross section change to one-lane is less of a concern in an area where the road mainly services local residents, since most drivers would be familiar with this inconsistency. But nonetheless, the sharp curve east of the bridge still presents a potential challenge for opposing traffic. A two-lane bridge would improve site lines and better mitigate the potential for conflicts between opposing traffic at the structure.

2. Agricultural Traffic:

Equipment used in agriculture nowadays tends to be very wide. A two-lane bridge would be better suited to accommodate a wider range of agricultural equipment, allowing more of this traffic to avoid the use of Highway 9 and Bruce Road 20.

3. Potential for Impact Damage:

A one-lane bridge will be much more prone to impact damage, either from traffic, or from road maintenance operations (snow clearing and grading of gravel approaches).

4. Emergency Services:

Although somewhat remote, it could be argued that a one-lane bridge could offer greater potential for slight delays in response times, in the event that emergency vehicles must yield to oncoming traffic (especially given the poor site lines east of the crossing).

5. Detour Route:

In the event of the temporary closure of the MTO bridge on Highway 9 (i.e. maintenance), or an emergency closure of Highway 9 and/or Bruce Road 20, the Riversdale Bridge offers an additional detour route. With a one-lane bridge, assuming that westbound traffic is routed across the bridge, an alternate route for eastbound traffic would need to be considered. Alternatively, if used to accommodate both westbound and eastbound traffic, a one-lane bridge would create a bottleneck for oncoming traffic and would require police assistance to direct traffic at the bridge.

6. Alternate Winter Route:

In the event of the closure of Highway 9 due to inclement weather, the Riversdale Bridge offers an additional detour route. Similar to the concerns noted above for the detour route, a one-lane bridge could create a bottleneck for oncoming traffic.

7. Active Transportation and Recreational Vehicles:

A two-lane bridge will provide significantly increased safety for pedestrians, cyclists and recreational vehicles (snowmobiles and ATV's) that may use the bridge.

8. Natural Environment:

A two-lane bridge will disturb a larger area on the riverbanks. However, these disturbances would be mitigated by constructing appropriate riverbank features to ensure long-term stability and environmental compatibility.

9. Replacement and Maintenance Costs:

Itemized preliminary cost estimates for one-lane and two-lane bridge replacement alternatives are enclosed. These are intended to be conservative, high level estimates based on our experience with other bridge projects around southwestern Ontario. They will be refined during the detailed design process, after the EA is complete. Ultimately, the project will be tendered, which will establish the actual price for replacement. Normally, the successful bid comes in below our estimates. However, the cost of labour, energy and materials can be volatile at times, which is difficult to predict, so this is not always the case. Note that the two-lane alternative is estimated to be between 15% and 25% greater than the one-lane option. When considered relative to the 75-year service life of the bridge, these costs are not that significant. Long-term maintenance costs would be marginally higher for a two-lane bridge, due to its larger size.

Since you have indicated several times to us that Council is interested in exploring the use of a timber for this project, we have included the cost for a timber superstructure. This includes estimates for the complete project (i.e. pile foundations, concrete abutments, approach reconstruction and slope treatments), not just the cost of the superstructure alone.

Based on the foregoing, it is our opinion that a two-lane bridge would better serve the municipality as a whole, as compared to the one-lane replacement alternative. Enclosed with this letter is a detailed comparison of the pros and cons of one-lane and two-lane bridge alternatives, including consideration for the 'local' versus 'broader' community.

We wish to reiterate that the Schedule 'B' EA process is intended to determine the preferred alternative for the bridge (i.e. bridge replacement, removal, etc.). Design alternatives, details and associated costs for a given style of bridge (e.g. timber, concrete or steel) would be subject to further review during the planning and design phase for the bridge replacement project, and will be considered after the 30-day review period following publication of the Notice of Completion.

I trust this summary meets your needs at this time. Should you have any questions, please do not hesitate to contact me, and thank you for choosing GM BluePlan Engineering for your engineering needs.

Yours truly,

GM BLUEPLAN ENGINEERING LIMITED

Per:

A handwritten signature in black ink, appearing to be 'B. Willis'.

Brent Willis, P.Eng.
AHN/mr

cc: Municipality of Brocton: John Strader - jstrader@brockton.ca
Municipality of Brocton: Cally Mann - cmann@brockton.ca
GMBP: Drea Nelson, M.Sc. - drea.nelson@gmblueplan.ca
File No. 212326

RIVERSDALE BRIDGE
COMPARATIVE ASSESSMENT OF THE ONE-LANE AND TWO-LANE BRIDGE ALTERNATIVES

KEY CONSIDERATIONS	VEHICULAR STRUCTURE		COMMENTS
	ONE-LANE	TWO-LANE	
Usage			
i. Vehicular	Y	Y	
ii. Pedestrian/Cyclists/ATVs	Y	Y	
iii. Snowmobile Trail (OFSC)	Y	Y	At this time, the trail has been re-routed to the south of Highway 9.
Road Design Standards			
i. Proximal Sharp Turn (Southbound)	Does not meet	Does not meet	1. Lack of visibility to oncoming traffic would be less of a concern if two lanes were available. 2. Mitigation: Appropriate signage, including stop controls, are recommended.
ii. Type of Structure	Does not meet	Does Meet	
Other			
1. Safety	Less	More	The combined sharp turn leading onto a one-lane bridge raises concerns regarding safety. With a lack of visibility around this corner the two-lane bridge is preferred.
2. Capital Cost Estimate	\$1.5M to \$2.0M	\$2.0M to \$2.3M	1. Subject to detailed design. Cost would depend on the design alternative selected. 2. In general, it is estimated that the cost for the two-lane alternative would be in the range of 15% to 25% greater than for a comparable one-lane structure. This marginal cost difference over the life expectancy of the bridge is minimal.
3. Future Bridge Usage (Versatility)	Less Versatile	More Versatile	Future uses are not predictable. A two-lane bridge would provide more versatility.
4. Maintenance/Repairs	Standard	Standard	Would be minimal for approximately the first 25 years.
5. Potential for Unforeseen Repairs	Potentially Greater	Standard	Based on the Municipality's experience with other one lane structures, periodic damage from larger vehicles may occur, resulting in periodic closures and unforeseen repairs.

One of the key considerations in the assessment of the alternatives for the structure was that bridge usage would primarily be limited to the local community, with little benefit to the Municipality as a whole. The comparative analysis provided below expands on this concept, with a focus on the public concerns identified during the consultation process.

OTHER PUBLIC CONCERNS	Potential Relevance to Local vs. Broader Community					COMMENTS
	ONE-LANE		TWO-LANE			
	LOCAL	BROADER	LOCAL	BROADER	BROADER	
Emergency Services	Bridge does not provide improved access or travel times					
Alternate Route in the Winter	Y	Limited	Y	Y	Limited	Limited due to it's connection to Highway 9. Can't travel further west.
Detour Route: Highway 9 Closure (Accidents/MTO Bridge Work)	Y	Limited	Y	Y	Y	1. A detour route across a one-lane structure could only be established for one travel direction. 2. Reconstruction for detour route purposes, particularly if significant bridge repairs (or replacement) where required on the MTO Bridge to the south on Highway 9, would benefit from 2-lanes.
Agricultural Community and Traffic Movements	Y	Y	Y	Y	Y	A larger structure could accommodate a greater range of agricultural equipment. Agricultural equipment could use this route to avoid the subject section of Bruce Road 20 and Highway 9.
Snowmobile Trail Network	Y	Y	Y	Y	Y	It is presumed that, since there is not a trail network connected to the river crossing, pedestrian traffic would primarily be local. A two-lane bridge would provide for added safety.
Pedestrian Use	Y	Limited	Y	Y	Limited	

RECOMMENDED REPLACEMENT ALTERNATIVE
REPLACEMENT WITH A TWO-LANE STRUCTURE
- MINIMAL COST DIFFERENTIAL, BETTER ALIGNED WITH THE ROAD DESIGN STANDARDS, SAFETY and VERSATILITY OF USE -