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TO:	**CHAIR AND MEMBERS CIVIC WORKS COMMITTEE MEETING ON FEBRUARY 2, 2016**
FROM:	**JOHN BRAAM, P. ENG. MANAGING DIRECTOR, ENVIRONMENTAL & ENGINEERING SERVICES AND CITY ENGINEER**
SUBJECT:	**FIELD MARSHAL WOLSELEY BRIDGE (QUEBEC STREET) PEDESTRIAN SAFETY**

RECOMMENDATION

That on the recommendation of the Managing Director, Environmental & Engineering Services and City Engineer, the Field Marshal Wolseley Bridge **BE MODIFIED** to incorporate a multi-use path identified herein as Alternative 3A in order to increase safety for both pedestrians and cyclists at an estimated construction cost of $375,000.

PREVIOUS REPORTS PERTINENT TO THIS MATTER

- Civic Works Committee – July 20, 2015 – Quebec Street Bridge – Pedestrian Safety

2015 – 19 STRATEGIC PLAN

The following report supports the Strategic Plan through the strategic focus area of *Building a Sustainable City* by improving mobility and safety for cyclists and pedestrians.

BACKGROUND

Purpose

The purpose of this report is to respond to Council direction received July 28, 2015 requesting a review of options available for creating a protected bicycle lane along the Field Marshal Wolseley Bridge in order to increase safety for both pedestrians and cyclists.

Background

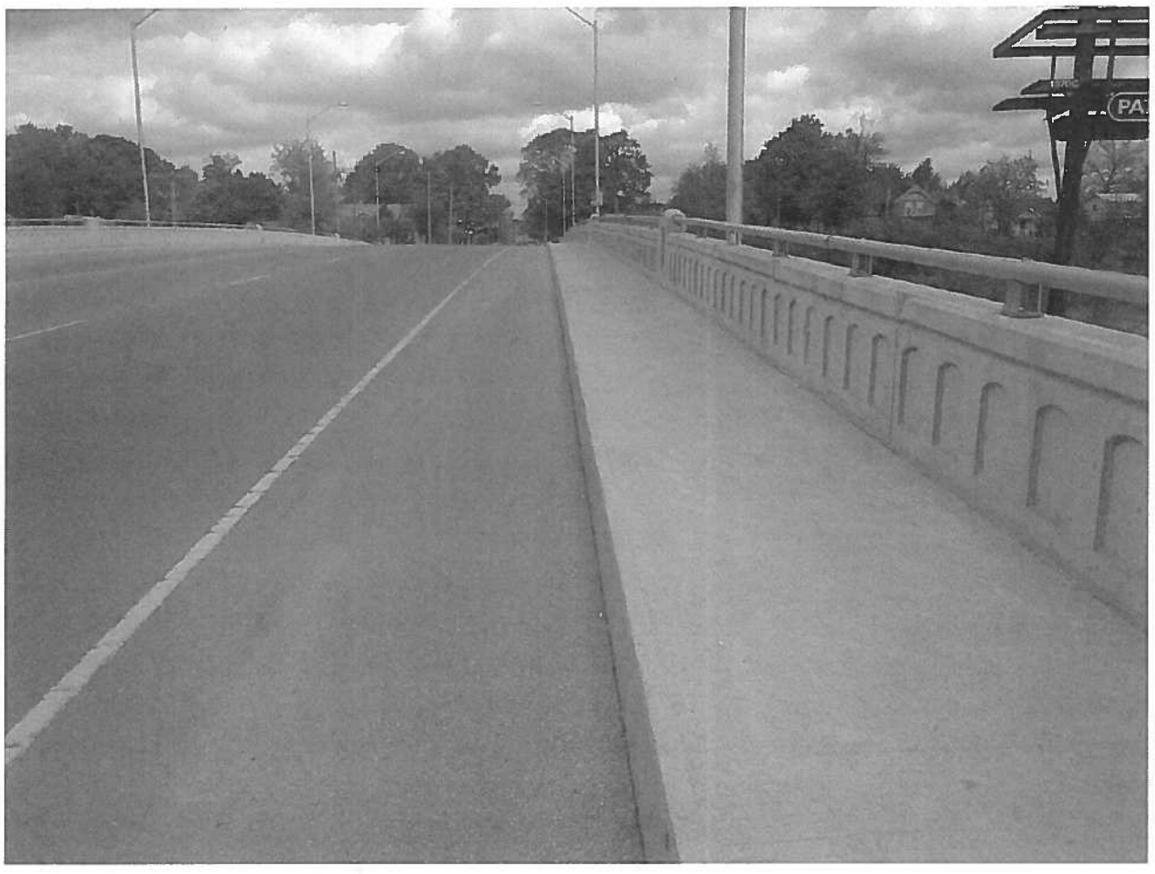
The Thames Valley District School Board has identified plans to close Lorne Avenue Public School on the south side of the Canadian Pacific Railway (CPR) west of Quebec Street in June of 2016. This closure will require students to travel to Bishop Townsend Public School beginning in September 2016. Bishop Townsend Public School is located on the north side of the railway just north of Mornington Avenue. This change will require students living on the south side of the Canadian Pacific Railway to travel over the Field Marshal Wolseley Bridge each day on their way to and from school.

Existing Conditions

The Field Marshal Wolseley Bridge is located on Quebec Street mid-way between Oxford Street & Dundas Street permitting pedestrians, cyclist and vehicles to travel over the CPR line uninterrupted. The average daily vehicular traffic on the bridge is 13,000 vehicles. The bridge was originally constructed in 1964 to accommodate four lanes of traffic (two northbound & two southbound) and two adjacent sidewalks.

The bridge was rehabilitated in 2010. The rehabilitation project included structural changes to improve the road for vulnerable users such as cyclists and pedestrians. With Quebec Street defined as a primary bike route under the Bicycle Master Plan, the roadway and the bridge was converted to include cycle lanes from Mornington Avenue through to near Dundas Street. As a result, the current bridge was reduced from four to three lanes of traffic (two northbound and one southbound) and two wider than standard cycle lanes (1.8 m) were added. The east sidewalk was widened by 0.35 m and street lighting was upgraded.

Below is a photo of the current bridge bicycle lane and sidewalk typical of both sides of the bridge.



DISCUSSION

Upon receiving Council direction, a consultant review was undertaken and five alternatives were developed that would improve the bicycle lane buffer over the Field Marshal Wolseley Bridge. See Appendix 'A' for details of the alternatives.

Alternative 1A and 1B – Curbing Fastened to Asphalt

Alternative 1A and 1B proposes the installation of different styles of low preformed curbs (precast concrete curbing and rubber speed bumps) mounted to the bridge surface asphalt along the edge of the existing bike lane. The installation would also include flexible delineators. These alternatives are the least expensive, but they have the highest long term associated maintenance costs as the surface mounting will result in the precast elements being prone to shifting, lifting and damage due to snow clearing operations. The curbing between the general purpose lanes and the bicycle lane would make snow clearing and debris cleaning of the bike lanes challenging. The bike lane areas would be prone to snow collection during the winter months and would require snow removal. The estimated construction cost for Alternatives 1A and 1B are both $60,000. The additional annual operating costs for these two alternatives are estimated at $1,900.

Alternative 2 – High Curbing Fastened to Bridge Deck

Alternative 2 is similar to Alternative 1A and 1B, with the significant difference that the proposed curbing is 300 mm high cast in place concrete dowelled into the existing concrete deck. While there is a related increase in cost, this alternative presents a longer term, more durable solution than the surface mounted curbing proposed in Alternative 1A and 1B. Issues relating to snow clearing and cleaning of the bike lanes between the existing raised sidewalk and the new curbing would be the same as Alternative 1A and 1B. The estimated construction cost for Alternative 2 is $100,000. The additional operating costs for this alternative is estimated at $1,700.

Alternative 3A and 3B – Multi-Use Path

Alternative 3A proposes to extend the existing raised concrete sidewalk to encompass the existing bike lane and serve as a 3.3 m wide multi-use path. It provides long term durability as the sidewalk extension can be fully integrated into the existing bridge deck. This configuration facilitates the winter and summer maintenance of the vulnerable road user area better than the other alternatives. The barrier curb provides an improved buffer adequate for the posted speed limit. Increasing the height of the existing railings would be required to meet Bridge Design Code heights for bicycle safety. The details related to integration of the existing on road bike lanes north and south of the bridge onto the multi-use pathways would be reviewed during detailed design. The estimated construction cost for Alternative 3A is $375,000. The additional annual operating costs for this alternative is estimated at $1,000.

Alternative 3B also proposes to widen the sidewalk into a multi-use path and proposes an additional barrier wall between the new multi-use pathway and the vehicle travel lanes. Details related to increasing the railing height and integration of on-road bike lanes north and south of the bridge would be similar to that completed in Alternative 3A.

While this alternative has the same advantages as Alternative 3A of being fully dowelled into the bridge deck and easier to maintain it adds an additional physical barrier between vehicles and other users. However the barrier wall would reduce the width of the multi-use path. This physical barrier also introduces new safety hazards for motorists related to the end treatments of the barrier wall. The wall would also restrict site lines for traffic exiting the west leg of Salisbury Street, north of the overpass, creating an unsafe condition. The implementation of the barrier wall would also have a significant impact on roadway snow clearing operations and would require the removal / loading of snow. The estimated construction cost for Alternative 3B is the highest at $450,000. The additional operating costs for this alternative is estimated at $1,400.

Recommendation

Based on an assessment of the advantages and disadvantages of the various alternatives, Alternative 3A, as detailed in Appendix B, is recommended. The multi-use path can provide a larger buffered area for all vulnerable road users. The multi-use path best facilitates year-round maintenance of the alternatives.

Other Work Items

Two unrelated bridge items are also currently under consideration for this bridge. In conjunction with the proposed pedestrian/cyclist safety retrofit, City staff have been working with representatives from Wolseley Barracks for the installation of additional military plaques to the existing concrete parapet walls of the bridge. There has also been some movement recorded of the bearing pads on the pier caps underneath the bridge that should also be addressed at this time. These additional items can be included within the same contract and they would be completed prior to the school year beginning in September 2016. The cost of these additional work items of approximately $75,000 will be in addition to the estimated costs noted above.

CONCLUSION

Local school changes will increase the number of vulnerable road users on the Field Marshal Wolseley Bridge. A series of alternatives were assessed to improve pedestrian and cyclist safety across the structure. Alternative 3A, the creation of a raised wide multi-use path on each side of the bridge is the recommended solution to improve safety on the bridge. The creation of wide multi-use pathway creates a larger shared space for pedestrians and cyclists by moving the barrier curb toward the general purpose lanes. The construction cost of this improvement is estimated at $375,000. The additional anticipated annual operating cost associated with the multi-use path implementation is $1,000.

Additional unrelated work items valued at $75,000 would also be addressed in coordination with the multi-use path implementation.

The total construction cost estimate for the work is $450,000 plus engineering costs. Funds for this work would be sourced from the Bridge Upgrades and Cycling Facility Accounts.

Upon Council Approval, the City will engage a consultant, AECOM Canada Ltd., to complete the detailed design necessary to implement Alternative 3A and the additional plaque installations and pier cap maintenance work. Tendering of the construction contract is proposed for early May, with construction to commence in early June. The work is predicted to take approximately 8 to 10 weeks to complete.

Acknowledgements

This report was prepared with assistance from Jane Fullick, C.E.T., Technologist II, Karl Grabowski, P. Eng., Transportation Design Engineer of the Transportation Planning and Design Division.

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RECOMMENDED BY:
JOHN BRAAM, P. ENG. **MANAGING DIRECTOR,** **ENVIRONMENTAL & ENGINEERING SERVICES AND CITY ENGINEER**

Attach: Appendix A – Multi-Use Corridor, Preliminary Options Review
Appendix B – Proposed Bridge Modification

c: G. MacDonald/J. Pucchio, AECOM Canada Ltd.

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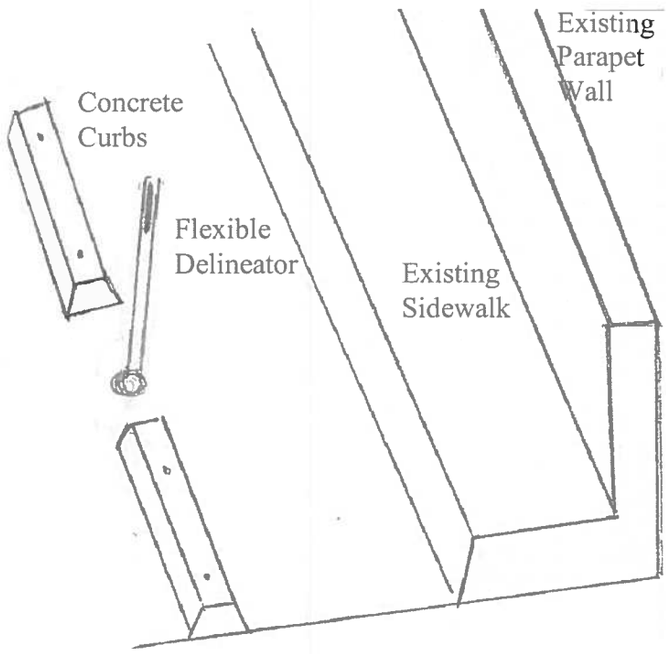
APPENDIX A

Field Marshal Wolseley Bridge – Multi Use Corridor - Preliminary Options Review

Alternative 1A

Low Curb with Delineator Posts



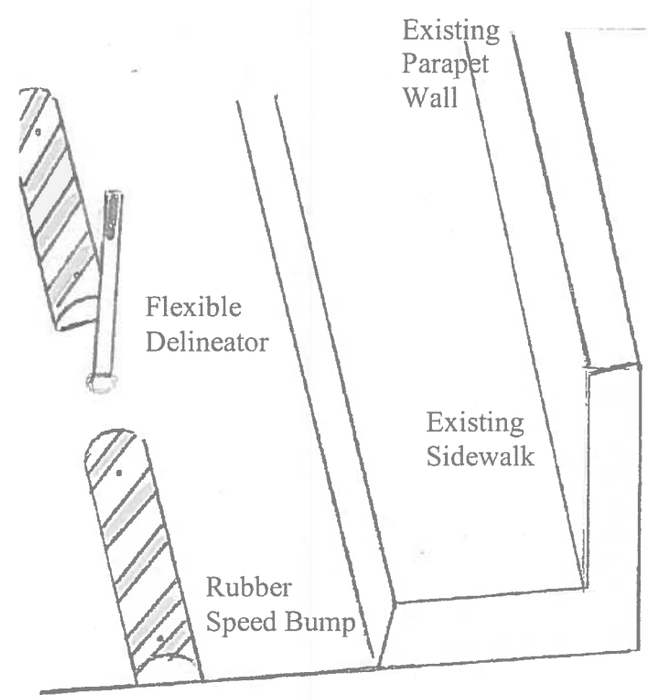
Description:
- Precast concrete curbs (130 mm height)
- Curb placed directly on asphalt and anchored to asphalt for lateral support
- 600 mm gaps between curbs units to permit drainage and for delineators
- Flexible delineator posts 1.4 m high

Advantages:
- Low cost option and quick installation
- Easy transition at the approaches
- Flexible delineators, paint and reflectors will provide high visibility of corridor
- Curbs provide protection for minor impacts

Disadvantages:
- Multi-level bicycle/sidewalk platform
- Low level of vehicle buffer
- Introduces complications to general operations (snow storage would accumulation from lanes)
- Likely requires annual/biannual maintenance

Alternative 1B

Speed Bump with Delineator Posts



Description:
- Prefabricated rubber speed bumps (58 mm height)
- Speed bumps placed directly on asphalt and anchored into asphalt for lateral support
- 600 mm gaps between curbs units to permit drainage and for delineators
- Flexible delineator posts 1.4 m high

Advantages:
- Least cost option and quick installation
- Easy transition at the approaches
- Flexible delineators, paint and reflectors will provide high visibility of corridor
- Curbs provide protection for very minor curb impacts

Disadvantages:
- Multi-level bicycle/sidewalk platform
- Lowest level of buffer considered
- Introduces complications to general operations (snow storage would accumulation from lanes)
- Likely requires maintenance biannually

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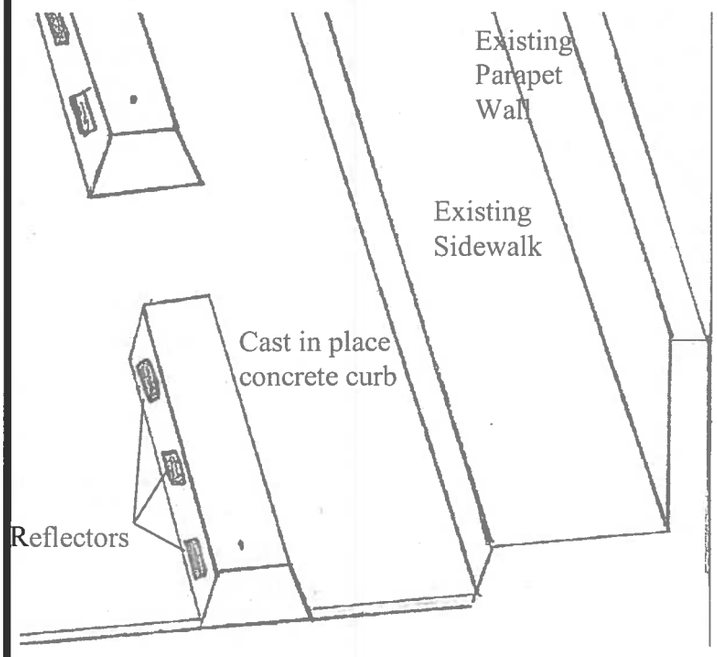
Alternative 2

High Cast-in-Place Curbs with Reflectors



Description:

- Cast in place curbs (350 high) recessed 50 mm into asphalt
- Curbs anchored into deck for lateral support
- 100 mm gaps between to permit drainage
- Reflectors or paint placed for visibility

Advantages:

- Medium cost option
- Easy transition at the approaches
- Paint and reflectors will provide high visibility of corridor
- Curbs provide protection for minor to moderate curb impacts

Disadvantages:

- Multi-level bike/sidewalk platform
- Improved buffer as compared to the low curb option
- Increased construction schedule
- Introduces complications to general operations (snow clearing on sidewalk; default location for snow storage from lanes; potentially increases challenges with snow clearing on road)
- Likely requires maintenance biannually

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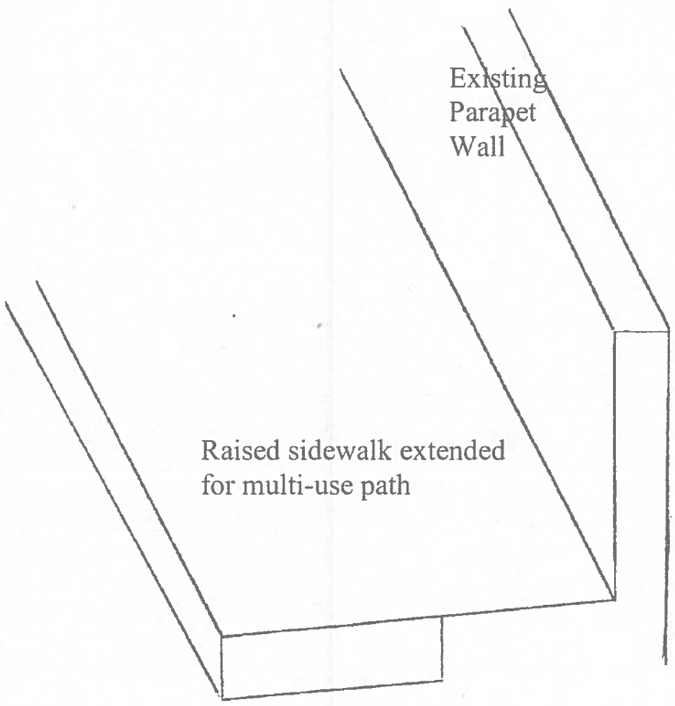
Alternative 3A

Multi-Use Path with Parapet Wall Modification



Description:

- Raised cast in place concrete in the bicycle lane to combine the sidewalk and bicycle lane into a multi-use path surface
- Modified / raised parapet wall railing to accommodate bicycles (1.37 m high)
- Sidewalk and existing wall constructed to a full structural standard
- Option to mount flexible delineators along the curb edge of the extended sidewalks as an added safety feature

Advantages:

- Single level bike/sidewalk platform both buffered by curb
- Sidewalk extensions can be fully integrated into the existing bridge deck to provide long term durability
- Configuration provides significant safety improvement
- Reduced operational difficulties with snow clearing on sidewalk and roadway
- Low maintenance

Disadvantages:

- Longer construction schedule than Alternatives 1A, 1B and 2
- Higher cost than Alternatives 1A, 1B and 2
- Modified appearance of parapet wall railings
- Reduced snow storage on road

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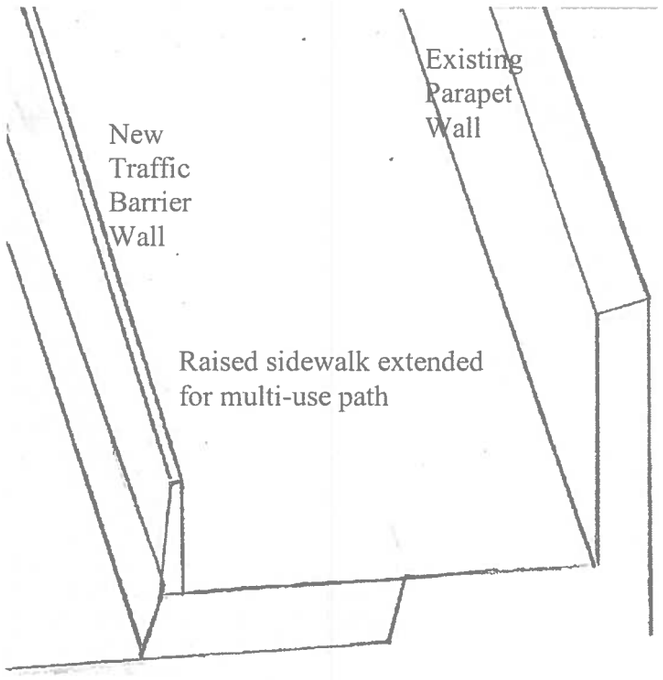
Alternative 3B

Multi-Use Path with Traffic Barrier System and Parapet Wall Modification



Description:

- Raised cast in place concrete in the bicycle lane to combine the sidewalk and bicycle lane into a multi-use path surface
- Install 825 mm high crash rated traffic barrier along curb edge
- Modified / raised parapet wall railings to accommodate bicycles (1.37 m high)
- Sidewalk and barrier constructed to a full structural standard

Advantages:

- Single level bike/sidewalk platform both buffered by curb
- Configuration provides greatest pedestrian safety
- Reduced operational difficulties with snow clearing on sidewalk and roadway
- Low maintenance

Disadvantages:

- Longest construction schedule
- Highest cost option
- New traffic barrier would taper down at the ends of the bridge, however the barrier ends would not be ideal from a roadway safety perspective
- Modified appearance of existing parapet walls due to raising pedestrian railing.
- Reduced snow storage on road

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APPENDIX B
PROPOSED BRIDGE MODIFICATION