CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF SEPTEMBER 16, 2015

Item 13, Report No. 11, of the Finance, Administration and Audit Committee, which was adopted without amendment by the Council of the City of Vaughan on September 16, 2015.

13 BUDGET AMENDMENT
KING VAUGHAN ROAD BRIDGE REMEDIAL OPTIONS
FROM KIPLING AVENUE TO HIGHWAY 27
WARD 1

The Finance, Administration and Audit Committee recommends approval of the recommendation contained in the following report of the Commissioner of Public Works, the Director of Transportation Services, Parks and Forestry Operations, and the Director of Capital Delivery and Asset Management, dated September 8, 2015:

Recommendation

The Commissioner of Public Works, the Director of Transportation Services, Parks and Forestry Operations, and the Director of Capital Delivery and Asset Management, in consultation with the Director of Financial Planning and Analytics recommend:

1. That Council approve the installation of a temporary pre-manufactured bridge over the Humber River on King Vaughan Road, between Kipling Avenue and Highway 27, to address the identified safety concerns with the existing bridge's guide rails system;

2. That the City's 2015 Capital Budget be amended to include a new capital project for the design, supply and installation of the temporary pre-manufactured bridge, at an amount of $527,000, with funding from the Gas Tax Reserve;

3. That the Commissioner of Public Works be provided the delegated authority to award a contract for the design, supply, and installation of the temporary pre-manufactured bridge, notwithstanding the City's Consolidated Purchasing Policy; and

4. That the inclusion of this matter on the Finance Administration and Audit Committee and Council agendas with respect to amending the capital budget, identified as Budget Amendment King Vaughan Road Bridge Remedial Options from Kipling Avenue to Highway 27, is deemed sufficient notice pursuant to Section 2(1)(c) of By-Law 394-2002, as amended.

Contribution to Sustainability

This report contributes to the goals and objectives within *Green Directions Vaughan*, the City's Community Sustainability and Environmental Master Plan, specifically:

Goal 3: To ensure that Vaughan is a city that is easy to get around with a low environmental impact.

Objective 3.2 "To develop and sustain a network of roads that supports efficient and accessible public and private transit".

Economic Impact

It is anticipated that there will be an impact of $527,000 to the City's Gas Tax Reserve as a result of this capital project. This includes costs relating to the design, supply and installation of the temporary pre-manufactured bridge, as well as contingencies and applicable taxes. The works identified under this capital project are eligible for Gas Tax Funding, as confirmed with the Association of Municipalities Ontario (AMO). As of Q2-15 Reporting, there is sufficient balance in the Gas Tax Reserve to complete the works identified in this capital project.

…/2

The total cost for this project, including contingency allowance, and applicable taxes is calculated as follows:

ESTIMATED COSTS	
Project Costs (Attachment No. 2, Option 6)	450,000.00
Contingency Allowance (15%)	67,500.00
Sub-Total	**517,500.00**
H.S.T. (1.76%) Not Recoverable	9,108.00
Total	**526,608.00**
Administration Recovery (3%) *(Note 1)*	N/A
Net Total Cost	**526,608.00**

ROUNDED **$ 527,000.00**

Note 1: 3% Administration Recovery is not charged as the project is fully funded from Gas Tax Reserve

The project is considered unfamiliar with low complexity and a mostly defined scope with some uncertainty. Therefore, in accordance with the Contingency Matrix (identified in Appendix 1 of the Capital Project Financial Administration and Reporting Policy), a contingency allowance of 15% has been identified as an appropriate amount to address any unforeseen work in completing the scope of this project. Upon completion of the project, any residual funds will be returned to the Gas Tax Reserve.

Communications Plan

In accordance with the City's notice by-law and due to the time sensitive nature of this project, notice of this amendment to the City's budget is being given by the inclusion of this item on the agendas for the Finance, Administration and Audit Committee and Council, which is posted on the City's Website.

Staff will continue to keep residents in the area informed as to the status of the project.

Purpose

The purpose of this report is to seek Council approval to amend the City's 2015 Capital Budget to add a new capital project for the design, supply, and installation of a temporary pre-manufactured bridge over the Humber River on King Vaughan Road, between Kipling Avenue and Highway 27, to address the identified safety concerns with the bridge's guide rail system so that the road can be reopened.

Background - Analysis and Options

King Vaughan Road Bridge was built in 1920 and has reached the end of its useful life.

The King Vaughan Road Bridge in Lot 35, Concession VIII, (Bridge No. 014401), is located on King Vaughan Road over the Humber River, approximately 1.0km west of Kipling Avenue, as shown in Attachment No.1.

The existing bridge was constructed in 1920 and is a 13.7m single span filled concrete arch bridge with a concrete deck and surface treated wearing surface. The bridge provides a roadway

width of 3.7m and accommodates a single lane for two-way vehicular traffic. Approximately 650 vehicles use the bridge daily.

Regulations under the Highway Traffic Act (Section 123(2)) and the Bridges Act (Section 2) requires the City to ensure that the bridges are kept safe and in good repair. This requirement is completed through the performance of regular biennial structure inspections in accordance with the Ontario Structure Inspection Manual. Under these regulations, municipalities are responsible for passing load limit by-laws, as required.

Based on the most recent load limit inspection of the structure, completed by AECOM in August 2013, a by-law was passed to limit the load on the bridge to 5 tonnes. The current by-law will expire on December 31, 2015.

The replacement of King Vaughan Road Bridge is scheduled for 2019.

A class environmental assessment is currently being undertaken to determine the feasibility of widening the King Vaughan Road Bridge from a single lane to two lanes. The City has retained Amec Foster Wheeler Environment & Infrastructure for the class environmental assessment study and preliminary design for the bridge replacement through RFP15-070. It is anticipated that the environmental assessment will be completed in late 2016. Recommendations on new bridge structure, alignment and additional property requirements will be identified within this assignment.

Following the preliminary design, it is anticipated that the detailed design phase, including property acquisitions and regulatory approvals (i.e. Toronto and Region Conservation Authority (TRCA), Ministry of Natural Resources (MNR), Department of Fisheries and Oceans (DFO), etc.), will be completed in 2018. During 2015's budget process, the new bridge construction was recognized by Council for 2016. However, given the environmental planning requirements, the new bridge construction has been deferred to 2019 as part of the 2016 budget process.

King Vaughan Road was closed on Thursday August 6th to address a safety concern with the existing bridge's guide rail system identified through routine maintenance and inspection.

On August 6, King Vaughan Road was closed, from Kipling Avenue to Highway 27, to address a safety concern with the guide rail system on the south side of the bridge, identified through routine maintenance and inspection. In the interest of public safety, the bridge was closed through the Commissioner of Public Works' delegated authority for an emergency structural inspection to be completed by an independent bridge inspector.

A traffic control plan was devised and mobilized and a detour route was established. A communications plan was implemented to ensure residents in the surrounding area and other key stakeholders were notified of the closure.

On Friday August 7th, an independent bridge inspector conducted an assessment of the bridge and it was recommended that the bridge remain closed until the safety concern was addressed.

Following the closure of the bridge, Staff retained the services of Amec Foster Wheeler Environment & Infrastructure to undertake an emergency structural inspection. This inspection was completed on Friday, August 7th and compared to previous inspections completed in 2010, 2012, 2013 and 2014. It was determined that the structural integrity of the bridge has not changed over the past five years.

However, the inspection did identify concerns with the existing guide rail system on the south side of the bridge. It was identified that the guide rail system on the south side of the bridge has deteriorated due to the severity of the past two winters since the last inspection in 2013. This presents a safety concern to drivers, pedestrians and cyclists traversing the bridge and it was recommended that the bridge remain closed until the safety concern was addressed.

Since the replacement of the bridge is not scheduled until 2019, several options were evaluated to address the existing safety concern with the bridge's guide rail system in the interim.

As noted, a capital project for the replacement of the bridge is scheduled for 2019, which cannot be expedited due to environmental planning requirements. As a result, several options were evaluated to address the existing safety concern with the bridge's guide rail system in the interim.

Each of the options identified were evaluated based on four considerations; more specifically, the associated cost, risk, impact on the road network and impact on the public of each option. The advantages and disadvantages of each option are provided in more detail in Attachment No. 2. The options evaluated include:

Option 1: Keep the bridge closed to all drivers, pedestrians, and cyclists.

Option 1 is not recommended due to the significant impact on the road network and on the public.

Option 2: Open the bridge in its current state.

Option 2 is not recommended due to the bridge inspector's recommendation that the bridge should remain closed until the safety concern with the guide rail is addressed.

Option 3: Partially open the bridge to pedestrians and cyclists in its current state and keep the bridge closed for drivers.

Option 3 is not recommended due to the significant impact on the road network and the impact on the public, as well as the additional risk associated with the bridge being opened for pedestrians and cyclists with the guide rail remaining in its current state.

Option 4: Open the bridge with a Jersey Barrier on the south side of the bridge.

Option 4 is not recommended as it is not a viable option due to the reduced lane width that results from the installation of a Jersey Barrier. The installation of the Jersey Barrier will reduce the road width below acceptable standards for vehicular use.

Option 5: Remove and replace guide rails on the existing bridge.

Although Option 5 is viable, it is not recommended due to the unrecoverable costs associated with the installation of the guide rails.

Option 6: Install an elevated pre-manufactured bridge on top of the existing bridge structure.

Option 6 is recommended, as it best addresses the City's needs at this time.

Through the evaluation of options, it was determined that Option 6, the installation of an elevated temporary pre-manufactured bridge on top of the existing bridge structure is the preferable option to address the safety concern with the bridge's guide rail system.

Option 6 provides a comprehensive solution to the safety concern with the bridge's guide rail system. Option 6 addresses all potential safety concerns and potential liabilities regarding both guide rails. Unlike the unrecoverable costs associated with Option 5, this option has a salvage value, as well as the potential for a future application in other capital projects. For example, there may be additional cost savings resulting from the use of the pre-manufactured bridge during the replacement of the King Vaughan Road Bridge in 2019.

It is anticipated the pre-manufactured bridge will be installed by year end, 2015.

Staff will work with TRCA to expedite the permit approval process to ensure the timely installation of the bridge and the associated reopening of the road. Staff will also consult with the Regional Municipality of York and other stakeholders and keep them apprised of the status of the project. It is anticipated the installation of the pre-manufactured bridge will be completed by year end, 2015.

Given this timeline and the desire to have the capital project completed by winter, Staff are requesting that the Commissioner of Public Works be provided the delegated authority to award a contract for the design, supply, and installation of the temporary pre-manufactured bridge, notwithstanding the City's Consolidated Purchasing Policy, in order to expedite the process.

Relationship to Vaughan Vision 2020/Strategic Plan

The recommendations contained in this report support the following objectives of Vaughan Vision 2020:

Service Excellence

- Demonstrate Excellence in Service Delivery
- Promote Community Safety, Health and Wellness

Regional Implications

The extended bridge closure will result in traffic diversion onto Regional Municipality of York roadways. As a result, Staff will be communicating the abovementioned project timelines with the Region and will keep them apprised of the status of the project, as previously stated.

Conclusion

In order to address the identified safety concerns with King Vaughan Road Bridge's guide rail system, this report has recommended an amendment to the City's 2015 Capital Budget to include the design, supply, and installation of a temporary pre-manufactured bridge.

Attachments

1. King Vaughan Road Bridge – Location Map
2. King Vaughan Road Bridge Remedial Options Analysis

Report prepared by:

Adam Payler, Business Analyst, Ext. 6173
Joerg Hettmann, Manager of Forestry, Ext. 6139
Vince Musacchio, Manager of Infrastructure Programming, Ext. 8311

(A copy of the attachments referred to in the foregoing have been forwarded to each Member of Council and a copy thereof is also on file in the office of the City Clerk.)

FINANCE, ADMINISTRATION AND AUDIT COMMITTEE SEPTEMBER 8, 2015

BUDGET AMENDMENT
KING VAUGHAN ROAD BRIDGE REMEDIAL OPTIONS
FROM KIPLING AVENUE TO HIGHWAY 27
WARD 1

Recommendation

The Commissioner of Public Works, the Director of Transportation Services, Parks and Forestry Operations, and the Director of Capital Delivery and Asset Management, in consultation with the Director of Financial Planning and Analytics recommend:

1. That Council approve the installation of a temporary pre-manufactured bridge over the Humber River on King Vaughan Road, between Kipling Avenue and Highway 27, to address the identified safety concerns with the existing bridge's guide rails system;

2. That the City's 2015 Capital Budget be amended to include a new capital project for the design, supply and installation of the temporary pre-manufactured bridge, at an amount of $527,000, with funding from the Gas Tax Reserve;

3. That the Commissioner of Public Works be provided the delegated authority to award a contract for the design, supply, and installation of the temporary pre-manufactured bridge, notwithstanding the City's Consolidated Purchasing Policy; and

4. That the inclusion of this matter on the Finance Administration and Audit Committee and Council agendas with respect to amending the capital budget, identified as Budget Amendment King Vaughan Road Bridge Remedial Options from Kipling Avenue to Highway 27, is deemed sufficient notice pursuant to Section 2(1)(c) of By-Law 394-2002, as amended.

Contribution to Sustainability

This report contributes to the goals and objectives within *Green Directions Vaughan*, the City's Community Sustainability and Environmental Master Plan, specifically:

Goal 3: To ensure that Vaughan is a city that is easy to get around with a low environmental impact.

Objective 3.2 "To develop and sustain a network of roads that supports efficient and accessible public and private transit".

Economic Impact

It is anticipated that there will be an impact of $527,000 to the City's Gas Tax Reserve as a result of this capital project. This includes costs relating to the design, supply and installation of the temporary pre-manufactured bridge, as well as contingencies and applicable taxes. The works identified under this capital project are eligible for Gas Tax Funding, as confirmed with the Association of Municipalities Ontario (AMO). As of Q2-15 Reporting, there is sufficient balance in the Gas Tax Reserve to complete the works identified in this capital project.

The total cost for this project, including contingency allowance, and applicable taxes is calculated as follows:

ESTIMATED COSTS	
Project Costs (Attachment No. 2, Option 6)	450,000.00
Contingency Allowance (15%)	67,500.00
Sub-Total	**517,500.00**
H.S.T. (1.76%) Not Recoverable	9,108.00
Total	**526,608.00**
Administration Recovery (3%) *(Note 1)*	N/A
Net Total Cost	**526,608.00**

ROUNDED **$ 527,000.00**

Note 1: 3% Administration Recovery is not charged as the project is fully funded from Gas Tax Reserve

The project is considered unfamiliar with low complexity and a mostly defined scope with some uncertainty. Therefore, in accordance with the Contingency Matrix (identified in Appendix 1 of the Capital Project Financial Administration and Reporting Policy), a contingency allowance of 15% has been identified as an appropriate amount to address any unforeseen work in completing the scope of this project. Upon completion of the project, any residual funds will be returned to the Gas Tax Reserve.

Communications Plan

In accordance with the City's notice by-law and due to the time sensitive nature of this project, notice of this amendment to the City's budget is being given by the inclusion of this item on the agendas for the Finance, Administration and Audit Committee and Council, which is posted on the City's Website.

Staff will continue to keep residents in the area informed as to the status of the project.

Purpose

The purpose of this report is to seek Council approval to amend the City's 2015 Capital Budget to add a new capital project for the design, supply, and installation of a temporary pre-manufactured bridge over the Humber River on King Vaughan Road, between Kipling Avenue and Highway 27, to address the identified safety concerns with the bridge's guide rail system so that the road can be reopened.

Background - Analysis and Options

King Vaughan Road Bridge was built in 1920 and has reached the end of its useful life.

The King Vaughan Road Bridge in Lot 35, Concession VIII, (Bridge No. 014401), is located on King Vaughan Road over the Humber River, approximately 1.0km west of Kipling Avenue, as shown in Attachment No.1.

The existing bridge was constructed in 1920 and is a 13.7m single span filled concrete arch bridge with a concrete deck and surface treated wearing surface. The bridge provides a roadway width of 3.7m and accommodates a single lane for two-way vehicular traffic. Approximately 650 vehicles use the bridge daily.

Regulations under the Highway Traffic Act (Section 123(2)) and the Bridges Act (Section 2) requires the City to ensure that the bridges are kept safe and in good repair. This requirement is

completed through the performance of regular biennial structure inspections in accordance with the Ontario Structure Inspection Manual. Under these regulations, municipalities are responsible for passing load limit by-laws, as required.

Based on the most recent load limit inspection of the structure, completed by AECOM in August 2013, a by-law was passed to limit the load on the bridge to 5 tonnes. The current by-law will expire on December 31, 2015.

The replacement of King Vaughan Road Bridge is scheduled for 2019.

A class environmental assessment is currently being undertaken to determine the feasibility of widening the King Vaughan Road Bridge from a single lane to two lanes. The City has retained Amec Foster Wheeler Environment & Infrastructure for the class environmental assessment study and preliminary design for the bridge replacement through RFP15-070. It is anticipated that the environmental assessment will be completed in late 2016. Recommendations on new bridge structure, alignment and additional property requirements will be identified within this assignment.

Following the preliminary design, it is anticipated that the detailed design phase, including property acquisitions and regulatory approvals (i.e. Toronto and Region Conservation Authority (TRCA), Ministry of Natural Resources (MNR), Department of Fisheries and Oceans (DFO), etc.), will be completed in 2018. During 2015's budget process, the new bridge construction was recognized by Council for 2016. However, given the environmental planning requirements, the new bridge construction has been deferred to 2019 as part of the 2016 budget process.

King Vaughan Road was closed on Thursday August 6th to address a safety concern with the existing bridge's guide rail system identified through routine maintenance and inspection.

On August 6, King Vaughan Road was closed, from Kipling Avenue to Highway 27, to address a safety concern with the guide rail system on the south side of the bridge, identified through routine maintenance and inspection. In the interest of public safety, the bridge was closed through the Commissioner of Public Works' delegated authority for an emergency structural inspection to be completed by an independent bridge inspector.

A traffic control plan was devised and mobilized and a detour route was established. A communications plan was implemented to ensure residents in the surrounding area and other key stakeholders were notified of the closure.

On Friday August 7th, an independent bridge inspector conducted an assessment of the bridge and it was recommended that the bridge remain closed until the safety concern was addressed.

Following the closure of the bridge, Staff retained the services of Amec Foster Wheeler Environment & Infrastructure to undertake an emergency structural inspection. This inspection was completed on Friday, August 7th and compared to previous inspections completed in 2010, 2012, 2013 and 2014. It was determined that the structural integrity of the bridge has not changed over the past five years.

However, the inspection did identify concerns with the existing guide rail system on the south side of the bridge. It was identified that the guide rail system on the south side of the bridge has deteriorated due to the severity of the past two winters since the last inspection in 2013. This presents a safety concern to drivers, pedestrians and cyclists traversing the bridge and it was recommended that the bridge remain closed until the safety concern was addressed.

Since the replacement of the bridge is not scheduled until 2019, several options were evaluated to address the existing safety concern with the bridge's guide rail system in the interim.

As noted, a capital project for the replacement of the bridge is scheduled for 2019, which cannot be expedited due to environmental planning requirements. As a result, several options were evaluated to address the existing safety concern with the bridge's guide rail system in the interim.

Each of the options identified were evaluated based on four considerations; more specifically, the associated cost, risk, impact on the road network and impact on the public of each option. The advantages and disadvantages of each option are provided in more detail in Attachment No. 2. The options evaluated include:

Option 1: Keep the bridge closed to all drivers, pedestrians, and cyclists.

Option 1 is not recommended due to the significant impact on the road network and on the public.

Option 2: Open the bridge in its current state.

Option 2 is not recommended due to the bridge inspector's recommendation that the bridge should remain closed until the safety concern with the guide rail is addressed.

Option 3: Partially open the bridge to pedestrians and cyclists in its current state and keep the bridge closed for drivers.

Option 3 is not recommended due to the significant impact on the road network and the impact on the public, as well as the additional risk associated with the bridge being opened for pedestrians and cyclists with the guide rail remaining in its current state.

Option 4: Open the bridge with a Jersey Barrier on the south side of the bridge.

Option 4 is not recommended as it is not a viable option due to the reduced lane width that results from the installation of a Jersey Barrier. The installation of the Jersey Barrier will reduce the road width below acceptable standards for vehicular use.

Option 5: Remove and replace guide rails on the existing bridge.

Although Option 5 is viable, it is not recommended due to the unrecoverable costs associated with the installation of the guide rails.

Option 6: Install an elevated pre-manufactured bridge on top of the existing bridge structure.

Option 6 is recommended, as it best addresses the City's needs at this time.

Through the evaluation of options, it was determined that Option 6, the installation of an elevated temporary pre-manufactured bridge on top of the existing bridge structure is the preferable option to address the safety concern with the bridge's guide rail system.

Option 6 provides a comprehensive solution to the safety concern with the bridge's guide rail system. Option 6 addresses all potential safety concerns and potential liabilities regarding both guide rails. Unlike the unrecoverable costs associated with Option 5, this option has a salvage value, as well as the potential for a future application in other capital projects. For example, there

may be additional cost savings resulting from the use of the pre-manufactured bridge during the replacement of the King Vaughan Road Bridge in 2019.

It is anticipated the pre-manufactured bridge will be installed by year end, 2015.

Staff will work with TRCA to expedite the permit approval process to ensure the timely installation of the bridge and the associated reopening of the road. Staff will also consult with the Regional Municipality of York and other stakeholders and keep them apprised of the status of the project. It is anticipated the installation of the pre-manufactured bridge will be completed by year end, 2015.

Given this timeline and the desire to have the capital project completed by winter, Staff are requesting that the Commissioner of Public Works be provided the delegated authority to award a contract for the design, supply, and installation of the temporary pre-manufactured bridge, notwithstanding the City's Consolidated Purchasing Policy, in order to expedite the process.

Relationship to Vaughan Vision 2020/Strategic Plan

The recommendations contained in this report support the following objectives of Vaughan Vision 2020:

Service Excellence

- Demonstrate Excellence in Service Delivery
- Promote Community Safety, Health and Wellness

Regional Implications

The extended bridge closure will result in traffic diversion onto Regional Municipality of York roadways. As a result, Staff will be communicating the abovementioned project timelines with the Region and will keep them apprised of the status of the project, as previously stated.

Conclusion

In order to address the identified safety concerns with King Vaughan Road Bridge's guide rail system, this report has recommended an amendment to the City's 2015 Capital Budget to include the design, supply, and installation of a temporary pre-manufactured bridge.

Attachments

1. King Vaughan Road Bridge – Location Map
2. King Vaughan Road Bridge Remedial Options Analysis

Report prepared by:

Adam Payler, Business Analyst, Ext. 6173
Joerg Hettmann, Manager of Forestry, Ext. 6139
Vince Musacchio, Manager of Infrastructure Programming, Ext. 8311

Respectfully submitted,

Paul Jankowski,
Commissioner of Public Works

Zoran Postic,
Director of Transportation Services, Parks and Forestry Operations

Jack Graziosi,
Director of Capital Delivery and Asset Management

ATTACHMENT No. 1

KING VAUGHAN ROAD BRIDGE
BRIDGE No. 014401

LOCATION: Part of Lot 35, Concession 8

LEGEND

SUBJECT BRIDGE

Note: Aerial photography acquired in spring, 2014

N

NOT TO SCALE

LOCATION: F:\Common\ENG\ATTACHMENTS\ENGINEERING_SERVICES\ATTACHMENTS\KING_VAUGHAN_ROAD_BRIDGE.MXD

CITY OF VAUGHAN - CAPITAL DELIVERY & ASSET MANAGEMENT

DRAFTSPERSON: B.R

ATTACHMENT No. 2

King Vaughan Road Bridge Remedial Options Analysis

Option 1: Keep the bridge closed to all drivers, pedestrians and cyclists.

Advantages of Option 1	Disadvantages of Option 1
• May be implemented immediately • Minimal operating cost of $4,000 for fencing at both entrances to the bridge • Public safety concerns limited • City's potential liability limited	• Impact on the road network (approximately 650 vehicles per day) • 4 years until bridge replacement is scheduled to be complete • Public may be frustrated with the City's inaction and the length of time the bridge will be closed • Public that live on King Vaughan Road may become accustomed to living on essentially a dead-end for 4 years, which may make the transition to reopen the bridge difficult for them • Public that live around King Vaughan Road that farm on either side of the bridge may be significantly disadvantaged • School bus schedules will be negatively affected • Potential safety issue for vehicles (especially larger vehicles) attempting to turnaround at the dead-end in situations where they missed the road closure signage • Potential safety issue for pedestrians and cyclists avoiding the barriers and traversing the bridge • Possible impact on EMS response times due to the detour

Option 2: Open the bridge in its current state.

Advantages of Option 2	Disadvantages of Option 2
• May be implemented immediately • No impact on the road network • No additional capital or operating costs • Public may be satisfied with prompt reopening of the bridge	• Safety hazard for the public • Risks associated with neglecting the safety hazard identified (i.e. potential liability for the City) • Public may be concerned due to the state of the south guide rail with respect to safety • Potential that the north guide rail may also fail • Potential increase in accidents due to the narrowing of the travel surface • Negative public perception for doing nothing after the bridge was closed this

	long and an obvious hazard exists • Large vehicles, such as school buses and EMS, may not be able to use the bridge due to the narrowed road surface • Pedestrians, such as children, may be at increased risk to trip or get stuck in the open gap along the south guide rail

Option 3: Partially open the bridge in its current state for pedestrians and cyclists and keep the bridge closed for drivers.

Advantages of Option 3	Disadvantages of Option 3
• May be implemented within a week • Minimal operating cost of $2,500 to enhance safety for pedestrians and cyclists on the bridge • Public safety concerns is reduced • City's potential liability reduced • Public frustration over the closure of the bridge may be slightly reduced due to continued pedestrians and cyclists access	• Impact on the road network (approximately 650 vehicles per day) • 4 years until bridge replacement is scheduled to be complete • Public may be frustrated with the City's inaction and the length of time the bridge will be closed • Public that live on King Vaughan Road may become accustomed to living on essentially a dead-end for 4 years, which may make the transition to reopen the bridge difficult for them • Public that live around King Vaughan Road that farm on either side of the bridge may be significantly disadvantaged • School bus schedules will be negatively affected • Potential safety issue for vehicles (especially larger vehicles) attempting to turnaround at the dead-end in situations where they missed the road closure signage • While public safety concerns and the City's potential liability is negligible with respect to vehicles, some public safety concerns and potential liability exists for pedestrians and cyclists, albeit minimal • Possible impact on EMS response times due to the detour • Number of pedestrians and cyclists that use the bridge is estimated to be minimal

Option 4: Open the bridge with a Jersey Barrier on the south side of the bridge.

Advantages of Option 4	Disadvantages of Option 4
• May be implemented within a week • Capital costs associated with the Jersey Barrier is relatively low (i.e. $15,000) • Public safety concerns reduced • City's potential liability reduced	• Installation of the Jersey Barrier will reduce the road width below acceptable standards for vehicular use and is resultantly not a viable option • Disadvantages will be similar to Option 1

Option 5: Remove and replace guide rails on the existing bridge.

Advantages of Option 5	Disadvantages of Option 5
• A comprehensive solution to the problem • Addresses all potential safety concerns and potential liabilities regarding the guide rail system	• Timeline for implementation (estimated 3 months) • Capital costs associated with two permanent guide rails is significant (i.e. $200,000) • Capital costs associated with the two permanent guide rails is unrecoverable • Both guide rails will be replaced, along with the entire bridge, in 4 years • No guarantee the problem with the guide rail will not occur again prior to the replacement of the bridge in 4 years

Option 6: Install an elevated pre-manufactured bridge on top of the existing bridge structure.

Advantages of Option 6	Disadvantages of Option 6
• A comprehensive solution to the problem • Addresses all potential safety concerns and potential liabilities regarding both guide rails • The pre-manufactured bridge may serve as inventory for emergency response or temporary access for other bridge repair projects and new developments • When construction will be occurring for the replacement of the bridge in 4 years, the pre-manufactured bridge may be used rather than purchasing or constructing a temporary bridge or closing the road • The pre-manufactured bridge may be sold by the City at a later date and the City may recoup some of the costs	• Timeline for implementation (estimated 3-4 months) • Capital costs associated with the pre-construction bridge is significant (i.e. $450,000)