

**Report to
Rapport au:**

**Transportation Committee / Comité des transports
September 7, 2016 / 7 septembre 2016**

**and Council / et au Conseil
September 14, 2016 / 14 septembre 2016**

**Submitted on August 25, 2016
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**Submitted by
Soumis par:
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**Ward: RIDEAU-VANIER (12) RIDEAU-
ROCKCLIFFE (13)**

File Number: ACS2016-PIE-PGM-0125

SUBJECT: Downtown Ottawa (Truck) Tunnel Feasibility Study

**OBJET: Étude de faisabilité sur l'aménagement d'un tunnel (pour camions)
dans le centre ville d'Ottawa**

REPORT RECOMMENDATIONS

That Transportation Committee recommend Council:

- 1. Receive the Downtown Ottawa (Truck) Tunnel Feasibility Study; and**
- 2. Delegate the authority to the Mayor to contact the Federal and Provincial Governments, on behalf of City Council, to discuss next steps relating to the planning and implementation of a Downtown Ottawa Tunnel, as described in this report.**

RECOMMANDATIONS DU RAPPORT

Que le Comité des transports recommande au Conseil :

- 1. de prendre connaissance de l'étude de faisabilité sur l'aménagement d'un tunnel (pour camions) dans le centre-ville d'Ottawa;**
- 2. de déléguer au maire le pouvoir de communiquer avec les gouvernements fédéral et provincial, au nom du Conseil municipal, pour discuter des prochaines étapes de la planification et de l'aménagement d'un tunnel au centre-ville d'Ottawa, comme le décrit le présent rapport.**

EXECUTIVE SUMMARY

Assumption and Analysis

Following the termination of the joint National Capital Commission-Ontario-Quebec Environmental Assessment Study for the Future Interprovincial Crossings, in mid-2014 staff were directed to commence a study to look at the feasibility of constructing a truck tunnel under downtown Ottawa between the Macdonald-Cartier Bridge and Highway 417. The tunnel option is intended to divert heavy truck traffic that currently travels on the surface of Ottawa's downtown streets and through the communities of Lowertown and Sandy Hill. The \$750,000 truck tunnel feasibility study was funded jointly by the City and the Province of Ontario.

The purpose of the study was to determine if it is technically feasible to construct a truck tunnel under downtown Ottawa and if so what would be the magnitude of cost to construct such a facility and where the tunnel portals and alignment could be located. The study findings indicated that a tunnel for mixed traffic (both cars and trucks) can be justified, there being insufficient demand for a truck-only tunnel.

Based on separate traffic studies, it is estimated that 20,000 to 25,000 vehicles could be diverted per day including approximately 1,700 trucks. Approximately 900 trucks per day would continue to use King Edward Avenue to make local stops downtown.

Several corridor options were investigated and the most feasible tunnel corridor is one that is between a portal at the north end of King Edward Avenue with the main tunnel extending in a cross-town direction going southeast beneath Lowertown and Sandy Hill to a south portal near the Vanier Parkway and Coventry Road intersection on the east side of the Rideau River. This twin bore tunnel of two lanes in each direction would be approximately 3.4 kilometres long and cost in the order of \$2 billion to construct.

Financial Implications

The cost estimate for construction of the most feasible tunnel alignment option is \$1.7 to \$2.0 billion (2015 Canadian dollars). Funding is not included in the City's affordable capital funding envelope, nor in the City's operating/maintenance budget forecast.

There are no direct financial implications associated with Council receiving the report, or with the City contacting the Province of Ontario and the Federal Government to discuss next steps.

Public Consultation/Input

There was no public input component during the feasibility study. However, the release of the study three weeks in advance of the Transportation Committee meeting will provide an opportunity for public review.

RÉSUMÉ

Hypothèses et analyse

Au terme d'une étude d'évaluation environnementale sur les futures liaisons interprovinciales, menée conjointement par la Commission de la capitale nationale, l'Ontario et le Québec vers le milieu de 2014, le personnel a été appelé à étudier la possibilité d'aménager un tunnel pour camions dans le centre-ville d'Ottawa, entre le pont Macdonald-Cartier et l'autoroute 417. Le tunnel éventuel aurait pour but de rediriger les camions lourds qui traversent actuellement les rues du centre-ville ainsi que les secteurs de la Basse-Ville et de la Côte-de-Sable. L'étude de faisabilité du tunnel pour camions, qui a coûté 750 000 \$, a été financée à la fois par la Ville et la province de l'Ontario.

L'objectif de l'étude était de déterminer s'il est faisable, sur le plan technique, d'aménager un tunnel pour camions dans le centre-ville d'Ottawa ainsi que, le cas échéant, combien coûterait ce tunnel, où il pourrait déboucher et par où il pourrait passer. L'étude a révélé que l'aménagement d'un tunnel à circulation mixte (voitures et camions) pourrait être justifié, mais que la demande n'est pas suffisante pour exiger l'aménagement d'un tunnel réservé exclusivement aux camions.

À la lumière des diverses études effectuées sur la circulation, on estime que 20 000 à 25 000 véhicules pourraient être déviés par jour, dont environ 1 700 camions. Environ 900 camions par jour continueraient à circuler sur l'avenue King Edward afin d'effectuer des arrêts au centre-ville.

Plusieurs modèles de tunnel ont été envisagés; le plus réaliste d'entre eux partirait de l'extrémité nord de l'avenue King Edward et le tunnel principal s'étendrait en direction sud-est sous la Basse-Ville et la Côte-de-Sable pour déboucher au sud, près de l'intersection de la promenade Vanier et du chemin Coventry, du côté est de la rivière Rideau. Ce tunnel double à deux voies dans les deux directions ferait environ 3,4 kilomètres de longueur et coûterait autour de deux milliards de dollars à construire.

Répercussions financières

L'estimation des coûts des travaux liés au tracé du tunnel le plus réaliste s'élève de 1,7 à 2,0 milliards (dollars canadiens de 2015). Le financement n'est pas compris dans l'enveloppe de financement abordable des immobilisations de la Ville, ni dans les prévisions budgétaires de fonctionnement ou d'entretien.

Le fait pour le Conseil de prendre connaissance du présent rapport et de communiquer avec le gouvernement de l'Ontario ou le gouvernement fédéral en vue de discuter des prochaines étapes n'entraîne aucune répercussion financière directe.

Consultation publique et commentaires

Aucune consultation publique n'a été menée dans le cadre de l'étude de faisabilité. Toutefois, la publication de l'étude, trois semaines avant la réunion du Comité des transports, donnera au public l'occasion d'examiner le projet.

BACKGROUND

In the east end of Ottawa's downtown, the communities of Lowertown and Sandy Hill, together with the adjacent University of Ottawa, are substantially affected by the volume of traffic traveling between the Macdonald-Cartier Bridge and Highway 417. In this

corridor along King Edward Avenue, Rideau Street, Waller Street and Nicholas Street, truck traffic in particular has, for decades, negatively affected the liveability and safety of local residents and visitors to the National Capital Region. Noise and air pollution, dangers due to the speed and volume of cars and trucks, and the aesthetics of having a major truck route through the downtown of Canada's capital are all longstanding issues of concern.

The 2013 Transportation Master Plan (TMP) includes the following direction:

Action 7-17: Reducing impacts in the Central Area

As discussed in Section 7.2, the volume of truck traffic passing through Ottawa's downtown to and from the Macdonald-Cartier Bridge has substantial negative impacts on local neighbourhoods and businesses. The City will work with other governments and the private sector to explore ways that through truck traffic in the central area, particularly on King Edward Avenue, can be reduced while ensuring the safe and efficient movement of goods. This may include efforts to develop a tunnel solution for connecting the Macdonald-Cartier Bridge with Highway 417, or other measures.

The TMP also mentions how this concern with downtown traffic relates to bridge crossings of the Ottawa River:

Interprovincial bridges

The Ottawa River is spanned by five roadway bridges under Federal jurisdiction. This plan projects a substantial increase in total peak hour travel demand across these bridges by 2031, and despite higher levels of transit ridership one or more new river crossing(s) will be warranted by that time. A primary consideration in the planning of a new crossing is its effectiveness as a truck route, because restrictions on existing bridges have concentrated trucks on King Edward Avenue and the Macdonald-Cartier Bridge, leading to industry inefficiencies and negative community and environmental impacts along King Edward Avenue and elsewhere in the Central Area.

Policies in the Official Plan (Section 2.3.1 and Section 3.6.6) also reference seeking a new interprovincial corridor to accommodate trucks in lieu of use of King Edward Avenue.

In recent past, an Environmental Assessment (EA) Study for the Future Interprovincial Crossings in the National Capital Region was undertaken but not fully completed as the Province of Ontario withdrew from the study in mid-2013. That multi-million dollar EA study had been funded by the National Capital Commission (NCC) and the Québec and

Ontario Governments with both the Cities of Ottawa and Gatineau as non-funding participants. Kettle Island was identified in the EA as the technically preferred location for an interprovincial bridge crossing between Ottawa and Gatineau. This new crossing would have provided an alternative truck route to the Macdonald-Cartier Bridge and King Edward Avenue corridor, including provisions for transit lanes as well as cycling and sidewalk facilities.

With the termination of the EA study, the major issue of truck traffic on King Edward Avenue remained unresolved. During the public consultation for the 2013 update to the Transportation Master Plan, public and councillor concern was expressed with this lack of movement towards a solution to this longstanding problem of the excessive number of heavy trucks in the King Edward Avenue corridor. Subsequently, in 2014, the City of Ottawa and the Ontario Ministry of Transportation formally agreed to co-fund this current feasibility study on a potential downtown Ottawa truck tunnel.

DISCUSSION

The purpose of conducting the feasibility study was to answer the two primary questions of: 1) is it technically feasible to construct a truck tunnel under downtown Ottawa; and 2) if so what is the order of magnitude of cost for tunnel construction? Related key issues that would be dealt with included an analysis of the truck travel demand for through usage (would use a tunnel) versus local usage (stays on surface with a local stop), and evaluation of where the tunnel corridor and its portals could feasibly be located. The feasibility study is not an environmental assessment study which would be a more comprehensive exercise and one which would require a public and First Nation and Métis consultation component. The study is primarily a technical exercise and it has not involved public input in its preparation. Finally the feasibility study was focused only on the downtown east area and it did not look at potential truck or other motor vehicle river crossings elsewhere in the city. A copy of the feasibility study is attached as a separate document ([Feasibility Study document.](#))

The following are the main findings of the feasibility study:

Volume of Truck Traffic

The Roadside Truck Survey (2007) and the Interprovincial Crossing EA Truck Analysis Report (2013) were reviewed and there was reconfirmation of acceptance of the general findings that about 65 per cent of truck traffic, approximately 1,700 trucks per day, is through-traffic and 35 per cent, approximately 900 per day, are local, making stops in

the downtown. Furthermore, the total through truck volumes, are too small to be sufficient to justify an investment in a truck-only tunnel.

Data was collected in November and December of 2014 on traffic volumes (all vehicle types) that traveled between the Macdonald-Cartier Bridge and Highway 417. Based on that information, it is estimated that the total number of vehicles that could be diverted to a tunnel could range from 20,000 to 25,000 vehicles/day.

The study also undertook a review of 24 similar tunnel projects in locations in Canada, the United States, Europe, the Middle East and New Zealand. Many of these were constructed to bypass urban environments and are general-use roadways with heavy motor vehicles being 5 per cent to 10 per cent of total traffic. None of the tunnels are limited to truck traffic only. Considering the relatively high cost to construct such tunnels, it would not make economic sense to have single-use tunnels.

The City's feasibility study concluded that a mixed-use vehicle tunnel would be well used.

Tunnel Cross Sections

Options of a two-lane, a three-lane, and a four-lane tunnel were reviewed. The four-lane option is most suitable for safety and operational reasons, these include: a) two lanes in each direction allows cars to pass trucks that are moving slower as they go up the grade to exit the tunnel; and b) the need for a shoulder emergency pullover space when there is just one travel lane in each direction requires almost the equivalent in space as is needed for an additional full travel-lane; the marginal cost to build the tunnel somewhat wider for four lanes versus two lanes would be merited. In addition, the two-lane tunnel did not provide adequate capacity or operating characteristics (slow trucks would slow all traffic). The three-lane tunnel solved some of these issues but added operational concerns about the use of a reversible lane and the potential safety concerns, particularly at the portals and ramps.

The initial design preference would be for a dual tunnel configuration, that is, two parallel two-lane tunnels, with a number of emergency crossovers for people to safely exit via the adjacent tunnel and several crossovers to allow emergency vehicles to move between tunnels to respond to an incident.

Corridor Options

Consideration of the following issues was undertaken as part of an analysis of potential corridor alignments:

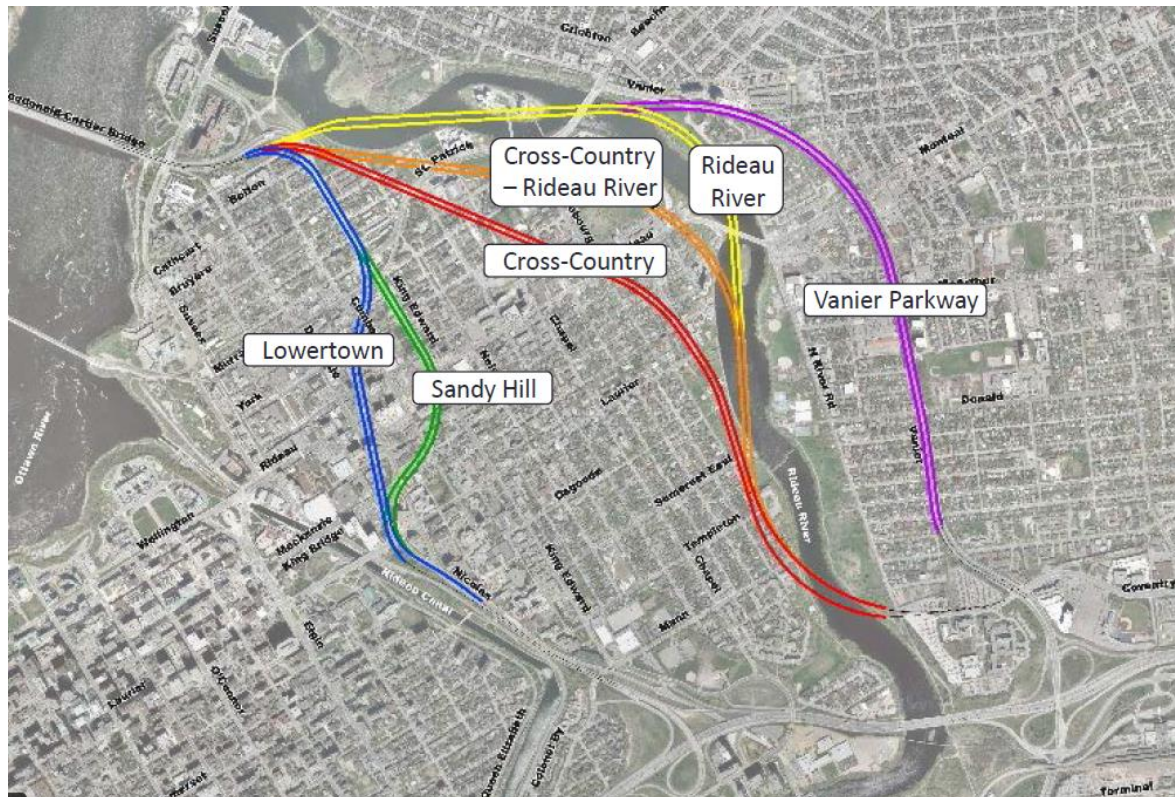
1. Proximity to the Confederation Line Light Rail Transit (LRT) tunnel, the Lowertown Interceptor Outfall Sewer and the Combined Sewage Storage Tunnel (CSST);
2. Interface with Highway 417 interchange to permit a smooth flow of vehicle movements;
3. Adequate transition (grades/curves) to and from the south end of the Macdonald-Cartier Bridge;
4. Depths of current and future building foundations;
5. Geotechnical considerations – bedrock types, surface overburden and groundwater;
6. Utility information – storm and sanitary (major and minor), water, gas, telecommunications, hydro, etc.; and
7. Tunnel requirements – sizing, grades, ventilation, emergency exits and control centre.

Several corridor options were initially examined. A number of these initial candidate corridors had conflicts or major problems with one or more of these above issues (particularly the critical issues 1, 2 and 3) and they were dropped from further review. Those four problematic potential corridors were: Dalhousie Street (grade issues at the Macdonald-Cartier Bridge approach), Cumberland Street (location of the CSST), Nelson Street and King Edward Avenue in their full lengths south to Mann Avenue (both have problems of linking to Highway 417). Document 1, Initial Corridor Alignments, illustrates these alignments.

The short-listed remaining corridors consisted of variations grouped into: 1) two tunnel options connecting the north end of King Edward Avenue to the Nicholas Street interchange, which would either swing west to the north of Laurier Avenue (Lowertown) or south of Laurier Avenue (Sandy Hill); 2) one long tunnel option connecting the north end of King Edward Avenue to Vanier Parkway north of Coventry Road, primarily running under the Rideau River and Vanier Parkway; and 3) three options of mid-length tunnels connecting from the north-end of King Edward Avenue to a portal on a new west

leg of the Vanier Parkway/Coventry Road intersection (just north of the Vanier interchange, near the Royal Canadian Mounted Police (RCMP) headquarters and the baseball stadium). These three routes include a fairly direct cross-country or cross-town route, a route that crosses under the east of Lowertown and the Rideau River, and a route that primarily follows under the Rideau River. The six alternative alignments, shown in Figure 1, were carried forward and reviewed against a set of evaluation criteria.

Figure 1 – Six Alternative Corridor Options



It should be noted that at the start of the feasibility study the defined study area did not extend to review potential routing options to the east of the Rideau River. As the study progressed possible eastern route alternatives came to be viewed as candidate alignments deemed worthy of continued study as the traffic analysis indicated that there is a strong preference for travel to/from the east end of Ottawa.

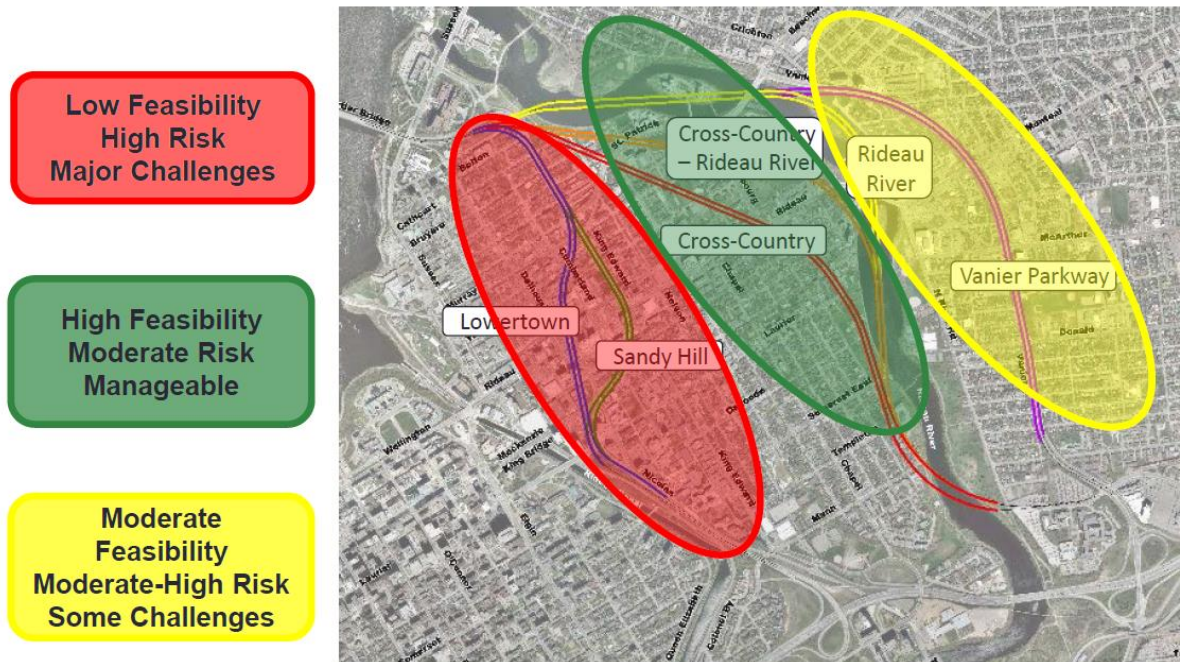
Evaluation Criteria

A set of 15 evaluation criteria were used to highlight positive or negative effects for the six tunnel alternative corridors. Document 2, Evaluation Criteria and Analysis, details the criteria and how the alternatives ranked as to feasibility: low (high risk, major

challenges), moderate (moderate-high risk, some challenges) and high (moderate risk, manageable). Figure 2 illustrates the results of the evaluation.

FIGURE 2 – SUMMARY OF EVALUATION CRITERIA ANALYSIS

Summary of Evaluation



Proposed Corridor

The cross-town option is the most feasible alternative (Figure 3). This corridor is approximately 3.4 kilometres long and would consist of a twin-bore tunnel each carrying two lanes of traffic. The route from the south portal, crossing RCMP site lands, would transition to a roundabout at the Vanier Parkway and Coventry Road intersection to permit traffic flow into the existing roadway to access Highway 417 (Figure 4). Noise mitigation would be required for housing at the northwest corner of the Coventry/Vanier intersection. This alignment across RCMP lands is conceptual in nature and does not entail any agreement by the potentially affected Federal landowner. The route from the north portal has been revised to show an alignment that avoids tunneling under a portion of the vacant property owned by the State of Qatar on the north side of Boteler Street (Figure 5). Tunnel ventilation (exhaust) is expected to occur at the portals.

Figure 3 – Most (High) Feasible Alternative – Crosstown

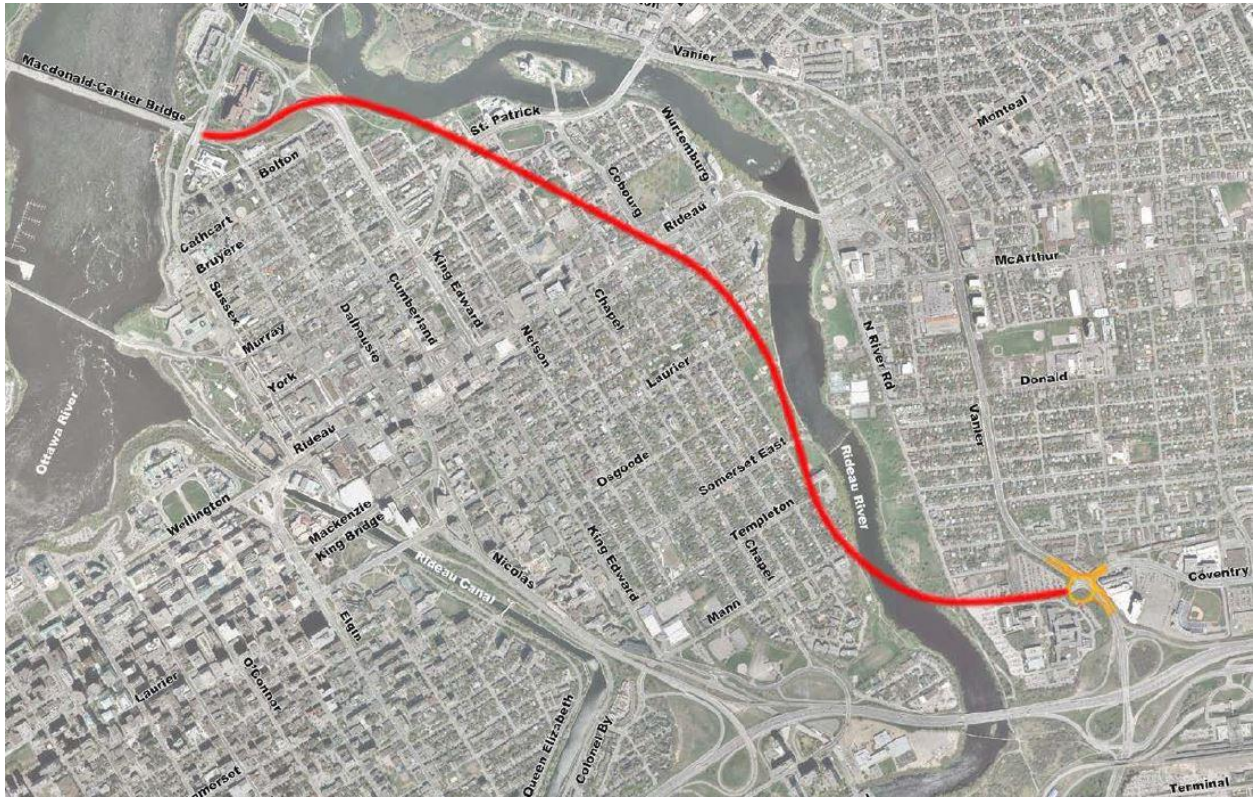


Figure 4 – South portal and proposed roundabout

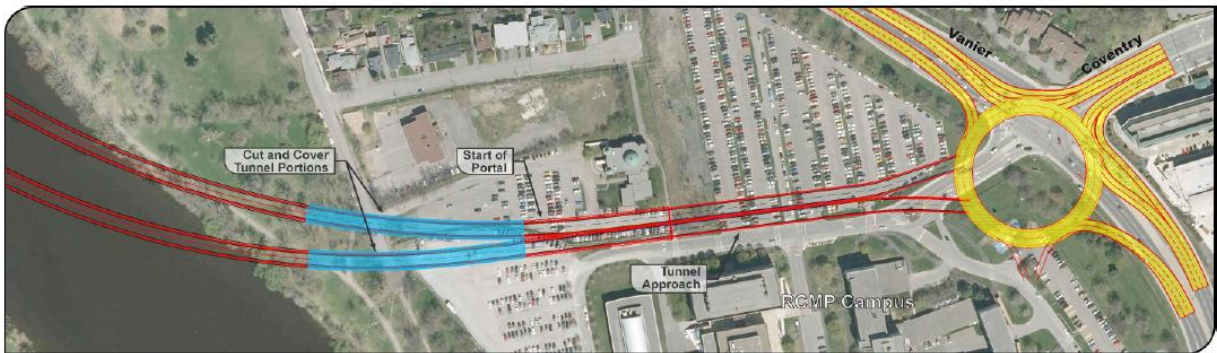
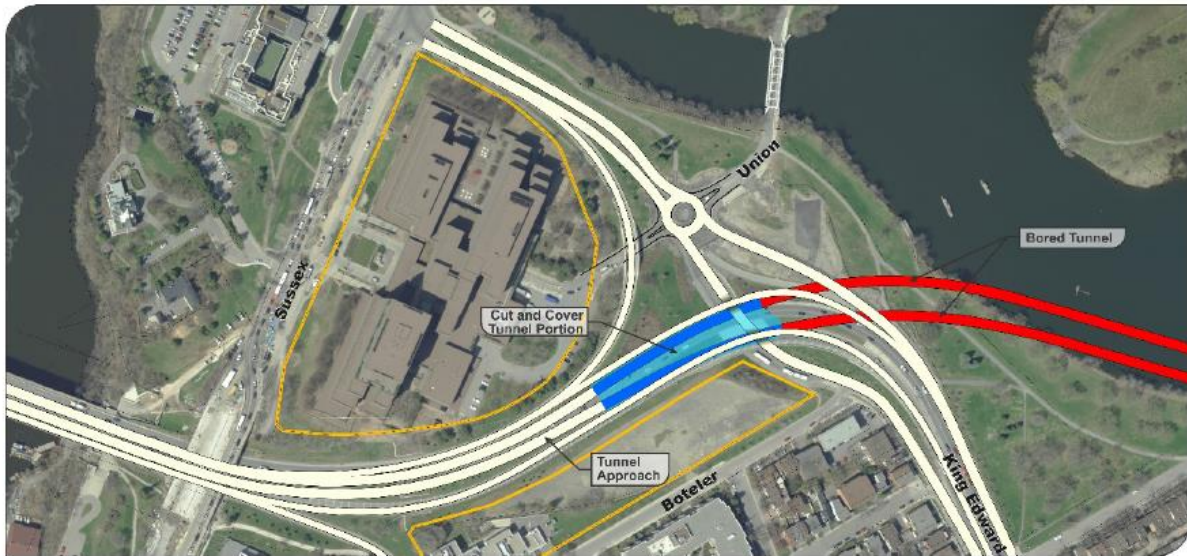


Figure 5 – North portal and King Edward Avenue



The high feasible alternative of the cross-town route is a longer length tunnel than the least feasible alternatives (Lowertown and Sandy Hill) connecting King Edward Avenue to Nicholas Street. Overall, while the shorter routes are attractive at first glance, they present some significant challenges. Some of these challenges will be expensive to mitigate, eroding any potential cost savings from the shorter route and others will be very technically challenging or pose long term risks to the City. Document 3 sets out the many challenges with the Lowertown and Sandy Hill alternatives – making these alternatives the least feasible and least attractive.

Dangerous Goods Considerations

The transport of dangerous goods, such as petroleum products and toxic gases/chemicals, in a potential tunnel under downtown Ottawa is not considered appropriate given the populated urban areas which the tunnel would pass under, and the significant challenges of managing an incident in the enclosed and relatively inaccessible confines of a tunnel. The review of 24 comparison tunnels found that, in almost all cases, dangerous goods were prohibited in the tunnels. Where dangerous goods passage did occur, several mitigation and safety measures were implemented ranging from complicated monitoring equipment to time restrictions (e.g. travel in middle of night only). In addition managing dangerous goods events on surface streets (while potentially disruptive to local traffic, residents and businesses) is substantially easier as access is less restricted, existing training of emergency services personnel is in place and existing resources can be used.

Cost estimate

The magnitude of cost estimate for construction of the most feasible tunnel alignment option would be in the range of \$1.7 to \$2.0 billion (2015 Canadian dollars). This estimate includes costing for construction, property, engineering, project management and contingency. The contingency is in the order of 35 per cent (low range) to 55 per cent (high range) in recognition of the conceptual nature of the feasibility study and the desktop only design exercise (e.g. on-site bore hole drilling and other such works have not been undertaken within the scope of this study). A higher than typical contingency range was used to recognize the highly conceptual nature of the design effort, the uniqueness of the project, the high degree of uncertainty in the ground conditions along the route, and a desire to achieve a higher degree of cost certainty. This higher contingency adds approximately \$100 million to the estimated cost. A cost estimate was only prepared for the most feasible alternative alignment.

Ownership and Tolling

The study briefly presents a range of potential tunnel ownership options including: 1) a Provincial crown agency; 2) private ownership, e.g. Highway 407 in the greater Toronto area; 3) public ownership; and 4) a tunnel authority. The study also sets out a general overview of the tolling issues that would be relevant to a potential tunnel, starting with a decision-making framework as to work steps for analysis when assessing tolling and pricing projects. Construction, ownership and tolls are all interconnected in the implementation process and would be subject to the need for significant study should there be a decision to advance further with any tunnel proposal.

Financial Context

This project and the cost for its planning (Environmental Assessment Study), design, procurement, and implementation are not included in the City's affordable capital funding envelope, nor in the City's operating/maintenance budget forecast.

RURAL IMPLICATIONS

The recommendations of this report do not have direct impact on rural residents, lands, services or businesses.

CONSULTATION

This feasibility study included consultation with technical staff from the City, the Ontario Ministry of Transportation, the Ministère des Transports du Québec and the National

Capital Commission. Those staff members were part of a Technical Consultation Group that was established and met five times during the course of work on this study. No public consultation was undertaken as part of this feasibility study. If this project were to proceed to the next phase, there would be a comprehensive consultation program with local residents, community associations, Business Improvement Areas, First Nations and other organizations as part of an environmental assessment study.

COMMENTS BY THE WARD COUNCILLORS

Councillor Fleury provided the follow comments:

“Interprovincial trucks travelling between Ottawa and Gatineau have been a long-standing concern for our downtown communities. It has had negative impacts in our community for too long. We want to resolve this issue and not just push it on to another community. I believe that the truck tunnel is the most viable solution for this issue. This tunnel would be beneficial for our city as a whole because it would minimize traffic on the surface, thereby making our streets safer and lessening the effects of traffic pollution. It would also allow for tremendous opportunities for economic development along Rideau Street.

In order to build this tunnel, we would need financial support from the provincial and federal levels of government. We have had ongoing discussion with both levels of government and are optimistic in their leadership for our capital city. It is time to continue this dialogue and establish a clear workplan for this important infrastructure project. We believe that it is the responsibility of the provincial Ministry of Transportation to lead in resolving this important missing link in infrastructure (the 400 highway connection to the interprovincial crossing). The next step, which is highlighted in this feasibility report, is to begin an Environment Assessment on the proposed corridor.”

Councillor Nussbaum provided the following comments:

“Removing trucks from our downtown streets is an important priority for our city. However, any proposed solution must avoid simply transferring the burden from one community to another.

I supported the previous Council’s decision to conduct the tunnel feasibility study because I was opposed to the flawed interprovincial bridge study that was rightly halted by the Province of Ontario in 2013. One of the problems with that process was its failure to adequately consider the impacts of a new bridge on neighbouring communities.

Unfortunately, the option recommended in this tunnel feasibility study suffers from the same problem. Specifically, the study did not adequately consider options to mitigate the impact on the neighbouring community at the point where the tunnel would connect with Highway 417. The proposed at-grade traffic circle would have tens of thousands of additional vehicles including thousands of trucks arriving daily within 25 metres of residential homes.

The consultant missed an opportunity to propose a less intrusive junction between the tunnel and Highway 417 that could have reduced the burden of additional heavy traffic on Overbrook residents. Fortunately, there is still time and opportunity to correct this flaw. It will be critical to ensure that any further work on this tunnel option addresses community concerns and mitigates the impact of the traffic circle. More detailed plans should provide options for reconfiguring the junction between the tunnel and the 417, such as constructing it underground, positioning it further away from residential neighbourhoods, or building a direct connection between the tunnel and the highway.

A second problem with the study, which can also be corrected, is the assumption that the tunnel would only remove two thirds of truck traffic from the King Edward, Rideau, Waller and Nicholas corridor. This isn't enough – we need to do more to ensure that only trucks that are delivering to a downtown address use downtown roads. This should not include other truck movements within the Capital – for example, a truck moving from St. Laurent Shopping Centre in Ottawa to les Promenades in Gatineau. The requirement for a downtown truck ban is clear in the City of Ottawa Official Plan – the King Edward truck route is supposed to be removed from the identified truck route system once a new truck corridor is established. Unless the City is diligent about that ban, the estimated \$2 billion investment in the tunnel would be wasted because it would only reduce, but not eliminate, such truck movements in the downtown corridor. Without a robust ban, the downtown core would be burdened with the same number of trucks we are trying to eliminate today in a matter of only 50 years.

A tunnel connecting the Macdonald-Cartier Bridge to Highway 417 has the potential to finally rid the city and downtown residents of the scourge of 2,600 daily trucks. A tunnel would also relieve pressure on the Vanier Parkway and other local roads. However, in order to be successful, a tunnel cannot transfer the burden of truck traffic to Overbrook, nor should it only partially solve the problem from which other communities are already suffering.

It will be important to correct the shortcomings of the tunnel feasibility study in whatever steps are taken next to ensure that all residents of our city benefit from – and can

celebrate – the long-awaited removal of interprovincial truck traffic from our downtown core.”

LEGAL IMPLICATIONS

There are no legal impediments to implementing the recommendations as outlined in this report.

RISK MANAGEMENT IMPLICATIONS

There are no risks associated with the approval of this report.

FINANCIAL IMPLICATIONS

The cost estimate for construction of the most feasible tunnel alignment option is \$1.7 to \$2.0 billion (2015 Canadian dollars). Funding is not included in the City’s affordable capital funding envelope, nor in the City’s operating/maintenance budget forecast.

However, there are no direct financial implications associated with Council receiving the report, or with the City contacting the Province of Ontario and the Federal Government to discuss next steps.

ACCESSIBILITY IMPACTS

There are no impacts to current accessibility conditions based on this report.

ENVIRONMENTAL IMPLICATIONS

There are no environmental implications to receipt and acceptance of this feasibility study.

TERM OF COUNCIL PRIORITIES

Among the Term of Council Priorities is Transportation and Mobility – TM4 Improve safety for all road users, which has as one of its specific strategic initiatives the completion of the Downtown Ottawa Truck Tunnel Feasibility Study. Additionally this study is supportive of the Term of Council Priority TM2 – Provide and promote infrastructure to support safe mobility choices

SUPPORTING DOCUMENTATION

Document 1 Initial Corridor Alignments

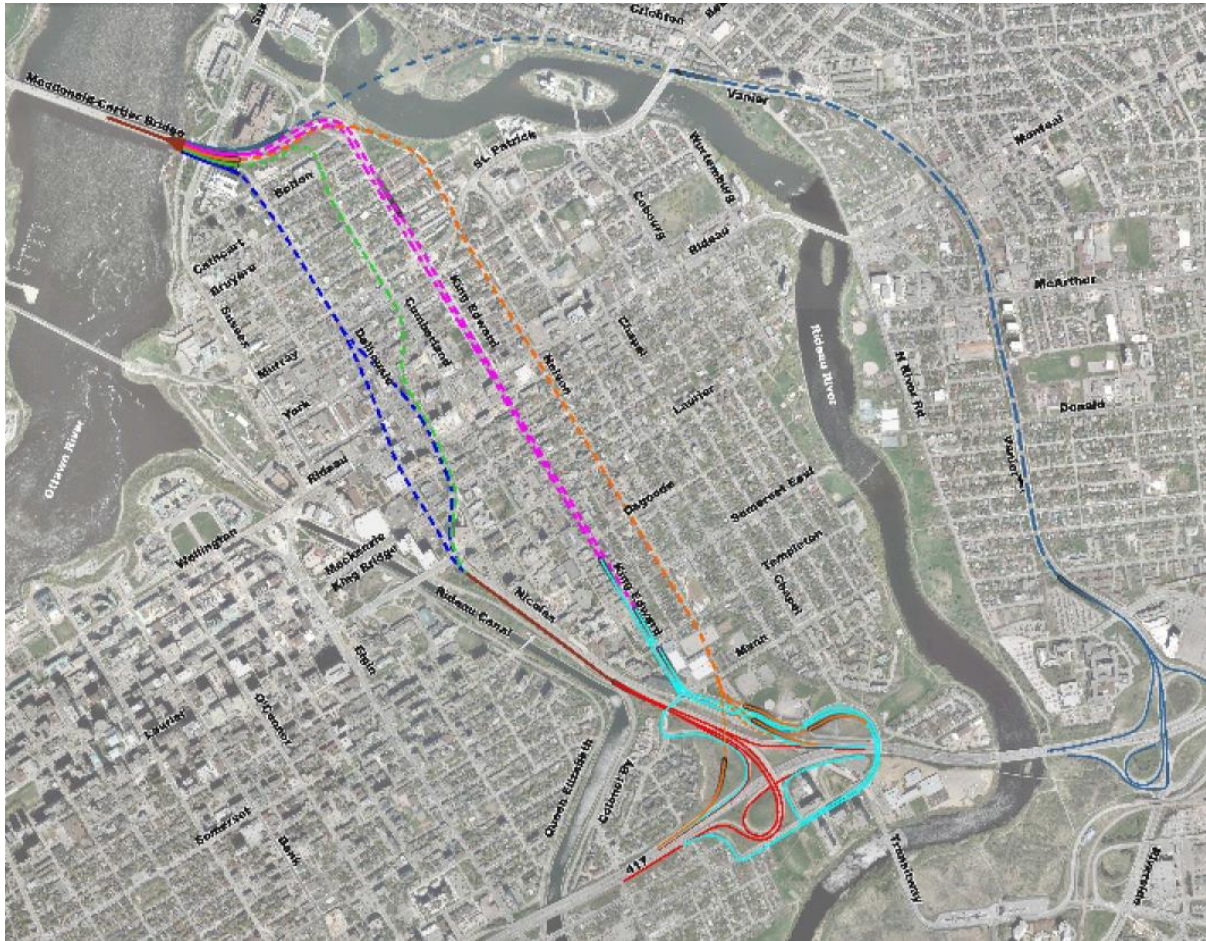
Document 2 Evaluation Criteria and Analysis

Document 3 Lowertown and Sandy Hill Alternatives

DISPOSITION

That Transportation Committee recommend that Council receive the Downtown Ottawa (Truck) Tunnel Feasibility Study, and, that the Mayor communicate with officials at the Province of Ontario and the Federal Government of Canada to discuss next steps towards planning and implementing a tunnel link between Highway 417 and the Macdonald-Cartier Bridge.

Document 1 – Initial Corridor Alignments Tunnel Corridor Options



Document 2 – Evaluation Criteria and Analysis

Terms Describing		Feasibility Constraint	Definition
Negative Effects	Positive Effects		
None / No / Negligible Low	Good / Best High	Minimal	The impact is judged to be either completely non-existent, has the least impact, or is of a magnitude small enough that it has little effect, or is of limited benefit compared to all the alternatives. Few mitigation measures are required.
Some Medium/ Moderate	Reasonable Medium/ Moderate	Minor	The impact exists and is of relatively low magnitude, but enough to have a measurable effect or contribution. Some mitigation measures may be required.
Significant High	Limited / None / No or Least Low	Major	The impact exists and has a moderate to relatively large effect, or has the most impact when compared to all other alternatives. A high degree of mitigation measures are required.

EVALUATION CRITERIA	TUNNEL ALTERNATIVES					
	Lowertown	Sandy Hill	Cross-Country	Cross-Country / Rideau River	Rideau River	Vanier Parkway
1. Accommodation of Surface Vehicles	No differentiation					
2. Vehicle Traffic Operation of South Portals	Green	Green	Yellow	Yellow	Yellow	Red
3. LRT and CSST	Red	Red	Yellow	Yellow	Yellow	Yellow
4. Major Underground Utilities Conflicts	No differentiation					
5. Surface Effects on Route	Green	Green	Yellow	Yellow	Red	Yellow
6. Surface Effects, Urban Landscape – South Portals	Red	Red	Green	Green	Green	Yellow
7. Subsurface Risks	Red	Red	Yellow	Yellow	Red	Yellow
8. Impact on Properties (Surface / Subsurface)	Yellow	Yellow	Yellow	Yellow	Green	Green
9. Deep Foundations / Bridge Foundations	Red	Red	Green	Green	Yellow	Yellow
10. Development Precluded to Tunnel	Red	Red	Green	Green	Green	Green
11. Availability of Construction Staging Areas	Red	Red	Yellow	Yellow	Yellow	Yellow
12. Comparative Construction Costs – Length	Green	Green	Yellow	Yellow	Yellow	Yellow
13. Comparative Costs – Utility Relocation			Yellow	Yellow	Yellow	Yellow
14. Comparative Costs – Operation / Maintenance			Yellow	Yellow	Yellow	Yellow
15. Safety and Emergency Management	Red	Red	Yellow	Yellow	Yellow	Yellow

Document 3 – Lowertown and Sand Hill Alternatives - Evaluated as Least Feasible

The six tunnel alternatives were evaluated using 15 evaluation criteria, scored on a three category scale as indicated in Document 2.

The Lowertown and Sandy Hill alternatives scored well on several categories:

- The routes are the shortest, and likely the least expensive.
- South portal along Nicholas Street ties in well with local road network, although the Ministry of Transportation is concerned about the operation of the Nicholas Street interchange.
- As these routes are the shortest their costs are likely to be somewhat (but not necessarily proportionately) lower, including both capital and operating costs. Such a costing however does not include the risks associated with these technically challenging routes and expensive mitigation (where and if possible).

In other categories these routes did not score well:

#3 – Conflict with other City infrastructure

There are substantial conflicts with the Confederation Line LRT tunnel and the CSST tunnel, which would not only introduce project risk, but occur in an area of very challenging ground conditions. There is a known rock valley in the area, similar to the one under Rideau Street in front of the Rideau Centre, which is filled with glacial tills, sands and weak clays. Construction in this area would be difficult and would require temporary support measures and monitoring to protect the other tunnels.

The Technical Consultation Group for the tunnel feasibility study recommended as desirable to have a 5-metre minimum buffer separation distance between any proposed vehicular tunnel and the LRT tunnel, CSST, etc. This separation cannot be achieved for these routes, increasing risk and cost of implementation.

#6 – Surface Effects, Urban Landscape – South Portal

The south portal emerges near the University of Ottawa in two separate portal structures south of Laurier Avenue immediately adjacent to Colonel By Drive and the

Rideau Canal (a UNESCO World Heritage Site). The southbound exit would need to be constructed west of Nicholas Street, in the green space between Nicholas Street and Colonel By Drive. Developing a connection that maintains the existing character of the area will be challenging as there will be little space for landscaping. The second portal would need to be placed in the centre of Nicholas Street, just north of the pedestrian underpass, at the University of Ottawa and Campus LRT station, which connects to the Corkstown Bridge. This would require significant lane shifts for at-grade traffic to negotiate around the portal structure.

Additionally the south portal would create significant noise issues immediately adjacent to both the Canal and the edge of the University, which are far less pronounced at the Vanier portal given the setback of development at that location.

#7 – Subsurface Risks

Geotechnical risks are substantially higher for the Nicholas Street portal. As noted above the ground conditions are very poor in this area, requiring expensive and challenging construction. There is known poor rock quality and mixed face conditions at the south end of the alignment, high groundwater inflows in buried valley/faulted bedrock, and, a need to limit groundwater drawdown as there are heavy buildings on clay nearby. The more consistent ground conditions at the Vanier portal are more manageable.

#9 – Deep Foundations / Bridge Foundations Potentially Affected

The tunnels would need to pass under larger buildings with deeper foundations. This adds to the complexity of the work and the risk of settlement of tall buildings. There are no apparent routes in this area that would avoid these deep foundations.

#10 – Development Precluded to Tunnel

The tunnels are likely to preclude some development regardless of alignment to preserve the integrity of the tunnel. Development potential is higher along these routes.

#11 – Availability of Construction Staging Areas

The highly constrained portal sites provide little to no opportunity for staging areas. Both portals are in built-up areas. The Vanier portal provides better opportunities to develop the space needed for construction laydown and staging.

#15 – Safety and Emergency Management

Safety and emergency management scores slightly lower as well. The more sinuous alignment increases the potential for incidents the highly constrained portal areas present challenges to mount emergency operations in the event of an incident, particularly at the south portal. If emergency vehicles block Nicholas Street to access the south ends of the tunnels they effectively block the alternate route to keep traffic moving while the incident is managed.

Overall, while the shorter routes are attractive at first glance, they present some significant challenges. Some of these challenges will be expensive to mitigate, eroding any potential cost savings from the shorter route, and others will be very technically challenging or pose long term risks to the City.