Rise and Report (Items Released from Closed Meeting)

On June 24, 2016 the following was authorized by the Greater Vancouver Regional District Board of Directors to be released to the public:

**George Massey Tunnel Replacement Project – Analysis of Regional Impact**

That the GVRD Board:

a) send a letter to the BC Minister of Transportation and Infrastructure and to the BC Environmental Office conveying:

i. its wish to work with the Province, TransLink and other stakeholders to find mutually acceptable solutions for the issues facing Highway 99 and the George Massey tunnel based on:

- the recognition of the congestion problems affecting the Highway 99 corridor and the need to work with the Province and other stakeholders to find an integrated transportation solution
- the importance of aligning projects designed to increase highway capacity with Metro 2040, the regional growth strategy, with an emphasis on compact, vibrant communities connected by an efficient transit network, an effective goods movement system, and affordable infrastructure
- the need to focus solutions to traffic congestion problems on public transportation investments as well as alternative modes as pedestrians, cycling and HOV lanes
- the negative impact of increases in road capacity on transit ridership and affordability
- the importance of considering traffic congestion impacts elsewhere in the region’s road system caused by enhancements to the Highway 99 corridor
- equitable regional mobility pricing to manage travel demand
- the property impact to Metro Vancouver’s regional park lands and to its utilities infrastructure
- the potential risk and impact to utilities infrastructure and the financial costs associated with replacement or relocation of existing utility services
- protection of the environment and the need and value of pursuing the federal environmental assessment review process

ii. its opposition to the proposed George Massey Tunnel Replacement Project, based on its analysis regarding the direct, indirect, and cumulative regional impacts of the Project, and its ongoing concerns about an inadequate stakeholder input process and insufficient access to background technical analysis;
iii. its request that the Ministry of Transportation and Infrastructure provide commitments, assurances, compensation, monitoring, and other conditions that will be necessary to mitigate the impacts of the George Massey Tunnel Replacement Project on Metro Vancouver assets, infrastructure, and legislated responsibilities, in the event that the project receives approval by the Provincial government;

b) direct staff to forward this correspondence to the Federal Minister of Environment and Climate Change and the Premier of BC communicating the GVRD Board’s analysis, position and concerns.
INTERGOVERNMENT AND FINANCE COMMITTEE RECOMMENDATION
That the GVRD Board:

a) send a letter to the BC Minister of Transportation and Infrastructure and to the BC Environmental Office conveying:
   i. its opposition to the proposed George Massey Tunnel Replacement Project, based on its analysis regarding the direct, indirect, and cumulative regional impacts of the Project, and its ongoing concerns about an inadequate stakeholder input process and insufficient access to background technical analysis;
   ii. its request that the Ministry of Transportation and Infrastructure provide commitments, assurances, compensation, monitoring, and other conditions that will be necessary to mitigate the impacts of the George Massey Tunnel Replacement Project on Metro Vancouver assets, infrastructure, and legislated responsibilities, in the event that the project receives approval by the Provincial government;
   iii. its wish to work with the Province, TransLink and other stakeholders to find mutually acceptable solutions for the issues facing Highway 99 and the George Massey tunnel;

b) direct staff to forward this correspondence to the Federal Minister of Environment and Climate Change and the Premier of BC communicating the GVRD Board’s analysis, position and concerns; and

c) authorize the Corporate Officer to release to the public the report dated June 14, 2016, titled “George Massey Tunnel Replacement Project – Analysis of Regional Impact”.

At its June 17, 2016 meeting, the Intergovernment and Finance Committee considered the attached report titled “George Massey Tunnel Replacement Project – Analysis of Regional Impact”, dated June 14, 2016. The Committee subsequently passed the recommendation as presented above in underline, and requested that staff prepare associated background communications materials to be provided for the Board’s consideration.

The Committee suggested that communications materials be prepared that give consideration to the following:

- the recognition of the congestion problems affecting the Highway 99 corridor and the need to work with the Province and other stakeholders to find an integrated transportation solution
- the importance of aligning projects designed to increase highway capacity with Metro 2040, the regional growth strategy, with an emphasis on compact, vibrant communities connected by an efficient transit network, an effective goods movement system, and affordable infrastructure
- the need to focus solutions to traffic congestion problems on public transportation investments as well as alternative modes as pedestrians, cycling and HOV lanes
- the negative impact of increases in road capacity on transit ridership and affordability
- the importance of considering traffic congestion impacts elsewhere in the region’s road system caused by enhancements to the Highway 99 corridor
- equitable regional mobility pricing to manage travel demand
- the property impact to Metro Vancouver’s regional park lands and to its utilities infrastructure
- the potential risk and impact to utilities infrastructure and the financial costs associated with replacement or relocation of existing utility services
- protection of the environment and the need and value of pursuing the federal environmental assessment review process

Among the comments expressed was the importance of preparing communications materials clearly identifying concerns and potential impacts of the proposed George Massey Tunnel Replacement Project on the region and its communities, and to provide these materials to the public, key decision-makers, and stakeholders. Staff have followed up, and a Communications Brief will be presented to the GVRD Board at its June 24, 2016 meeting.

Attachment:
CLOSED MEETING

To: Intergovernment and Finance Committee

From: Elisa Campbell, Director, Regional Planning & Electoral Area Services
Marcin Pachcinski, Division Manager, Electoral Area & Environment Planning, Policy and Environment Department

Date: June 14, 2016
Meeting Date: June 17, 2016

Subject: George Massey Tunnel Replacement Project – Analysis of Regional Impact

RECOMMENDATION
That the GVRD Board:

a) send a letter to the BC Minister of Transportation and Infrastructure and to the BC Environmental Assessment Office conveying:
   i. its opposition to the proposed George Massey Tunnel Replacement Project, based on its analysis regarding the direct, indirect, and cumulative regional impacts of the Project, and its ongoing concerns about an inadequate stakeholder input process and insufficient access to background technical analysis;
   ii. its request that the Ministry of Transportation and Infrastructure provide commitments, assurances, compensation, monitoring, and other conditions that will be necessary to mitigate the impacts of the George Massey Tunnel Replacement Project on Metro Vancouver assets, infrastructure, and legislated responsibilities, in the event that the project receives approval by the Provincial government;

b) direct staff to forward this correspondence to the Federal Minister of Environment and Climate Change communicating the GVRD Board’s analysis, position and concerns; and

c) authorize the Corporate Officer to release to the public the report dated June 14, 2016, titled “George Massey Tunnel Replacement Project – Analysis of Regional Impact”.

PURPOSE
This report provides the Intergovernment and Finance Committee with an analysis, based on the information available, of the potential impacts of the proposed George Massey Tunnel Replacement Project on Metro Vancouver assets, infrastructure, and legislated responsibilities. This report also provides information on federal and provincial environmental assessment processes, including an update on the status of the application by the Ministry of Transportation and Infrastructure (MOTI) to the BC Environmental Assessment Office.

This matter is being presented at a closed meeting pursuant to Community Charter provision Section 90(1)(d):

90 (1) A part of a meeting may be closed to the public if the subject matter being considered relates to or is one or more of the following:
d) the security of the property of the regional district;

BACKGROUND
At its May 27, 2016 meeting, the GVRD Board considered a report titled “George Massey Tunnel Replacement Project Update”, dated May 25, 2016. The Board subsequently passed the following motion:

a) write a letter in response to the correspondence titled “George Massey Tunnel Replacement Project” dated May 17, 2016 from the Honourable Todd Stone, Minister of Transportation and Infrastructure;

b) direct staff to obtain information on the environmental assessment process from the Canadian Environmental Assessment Agency or other federal authorities in order to recommend an appropriate course of action; and

c) direct staff to report back through the Intergovernment and Finance Committee as soon as possible with an analysis of the George Massey Tunnel Replacement project based on the information available.

This report presents an analysis of potential impacts of the proposed George Massey Tunnel Replacement Project on Greater Vancouver Regional District, Greater Vancouver Water District, and Greater Vancouver Sewerage & Drainage District (collectively known as ‘Metro Vancouver’) assets, infrastructure and legislated responsibilities. This assessment is based on the information available at the time of preparing this report. It also provides information on federal and provincial environmental assessment processes, including an update on the status of MOTI’s application to the BC Environmental Assessment Office. Finally, in response to a Board request for information from the City of Richmond and Corporation of Delta related to the George Massey Tunnel Replacement Project, this report conveys the following attachments:

- Attachment 1: City of Richmond Briefing Paper titled “George Massey Tunnel Replacement – City of Richmond Concerns” dated June 2, 2016.

ANALYSIS OF GEORGE MASSEY TUNNEL REPLACEMENT PROJECT
The BC Ministry of Transportation and Infrastructure is the proponent of the George Massey Tunnel Replacement Project (the Project), which is intended to replace the existing George Massey Tunnel (Tunnel) with a new 10-lane tolled bridge spanning the Fraser River South Arm, Deas Island, and Deas Slough with navigation clearances similar to those at the Alex Fraser Bridge. The Project also entails decommissioning the Tunnel, and modifying Highway 99 between the Bridgeport Road interchange in Richmond to the Highway 91 interchange in Delta. As identified by MOTI, Project goals include reducing congestion and improving travel times and reliability for commuters, transit, commercial vehicles, and tourists; improving safety; providing new travel options for cyclists and pedestrians; and providing capacity for improved transit.

Metro Vancouver has a range of broad interests and concerns related to the Project in terms of its assets, infrastructure and legislated responsibilities. These include regional planning and growth management; air quality and climate change; environment; regional parks; and regional utilities.
While there still exist substantial gaps in design details, impact analysis, and associated technical documentation related to the Project, staff have conducted a high-level assessment of the potential impact of the Project on Metro Vancouver interests. A more detailed assessment is contained in the “George Massey Tunnel Replacement Project: Summary Assessment Table” (see Attachment 3). Metro Vancouver staff will conduct a more thorough assessment of impacts as part of the 60-day public comment period once the BC Environmental Assessment Office (BC EAO) confirms if the Application is reviewable.

A comprehensive review of Metro Vancouver’s interests and the potential anticipated impacts of the Project on Metro Vancouver assets, infrastructure and legislated responsibilities is provided below. This analysis has been prepared based on available but limited information regarding this Project.

**Regional Planning and Growth Management**

The proposed Project will have implications for regional growth management, including land use, transportation, agriculture and human health impacts. With a key focus of the Project on expanding road / highway capacity by the construction of a new bridge, there are many aspects of the proposed Project that appear to be inconsistent with the direction of Metro 2040, the regional growth strategy. While MOTI proposes that the Project design is based on assumptions that the Urban Containment Boundary will not change, and has taken account of municipal plans, experience, both direct and as documented in research related to relevant transportation infrastructure projects indicates that there is a strong likelihood that the Project will have effects on growth management and land use plans. For example, it may result in impacts on the distribution and growth of traffic, in choices about the location of businesses and households, and in overall potentially substantial land use shifts that differ from the regional vision and municipal plans that have been pursued over many decades. The result may be increased pressures for land use conversion, including the conversion of agricultural and industrial land.

The current information is incomplete in many regards, including documentation related to potential land use impacts of new highway interchanges, the transportation effects of the new bridge on the regional transportation system, human health impacts, the impact of decommissioning the Tunnel on irrigation water for agriculture, and others.

**Air Quality and Climate Change**

The proposed Project will result in changes in the levels of emissions of common air pollutants, toxic air pollutants and greenhouse gases. The changes in emission levels may lead to direct impacts in the vicinity of the Project, including exposure to harmful pollutants, as well as impacts in the regional airshed, including smog and reduced visual air quality.

The current analysis of Project-related air quality and greenhouse gas impacts is inadequate. The analysis needs to examine traffic impacts across a broader study area to assess changes in traffic volumes and congestion at other points in the regional transportation system, and the associated changes in emissions and resultant environmental impacts. The analysis also needs to consider a range of future traffic scenarios to improve public confidence and address any criticisms of the selection of optimistic scenarios for the analysis. The MOTI’s Application also indicates that “Air quality comprises one of the ‘steps’ along the pathway of effects of the Project, with human health identified as the ultimate receptor of Project-related effects.” With this statement in mind, and
consideration of the concerns identified with respect to the analysis of air quality impacts, there are consequential concerns about the basis for the analysis of air quality-related health impacts.

**Environment**
Construction of the Project as proposed (including the BC Hydro transmission line relocation) and the decommissioning of the Tunnel may have impacts on land and marine environments with ecological importance, and may directly affect fish and wildlife, and their habitat. The Fraser River estuary is the single most important area of aquatic bird and raptor habitat in British Columbia; Deas Island hosts one of the largest and most significant bat colonies in the Lower Mainland; and the intertidal marshes found in the Fraser River estuary provide critical rearing areas for juvenile salmon.

Potential direct environmental impacts include:
- Changes in fish habitat quality due to acoustic effects, changes in ambient water quality, induced turbidity, riverbed lowering, and local scouring.
- Direct mortality and disturbance to upland birds (e.g., destruction of raptor and passerine nests).
- Habitat loss and direct mortality of terrestrial wildlife during vegetation clearing and grubbing, stripping, and soil excavation.

Potential indirect and cumulative environmental impacts include:
- An increase of impervious surface area and stormwater runoff entering the river which could increase concentrations of nutrients, organics, metals, chlorides, bacteria, and hydrocarbons.
- The reduction of and changes to existing fish and wildlife habitat quality due to acoustic effects, changes to ambient water quality, and the permanent placement of in-stream piers in Deas Slough, piers adjacent to Green Slough, and temporary bridge structures during construction.
- Permanent habitat alteration and loss as well as disturbance to wildlife (mainly birds and bats) due to increased noise levels and increased ambient light environment from vehicle traffic.
- Potential for indirect habitat disturbance through the introduction of invasive species by construction vehicles or equipment.
- Impacts on agricultural lands, which provide habitat and other ecological health values.
- The possibility of additional impacts from additional dredging in the Fraser River following Tunnel decommissioning.

**Regional Parks**
The proposed Project is expected to follow the alignment of the existing Tunnel, bisecting Deas Island Regional Park through the existing MOTI right-of-way. The proposed bridge and the associated BC Hydro transmission relocation project will permanently change the character of the park, have an impact on visitor experience, and create permanent noise, debris and visual impacts. Construction activities from both projects will have negative impacts on park visitors’ experience and will result in vegetation removal, thereby impacting habitat. The potential exists to improve trail connectivity between the sides of Deas Park; however, these potential benefits are diminished by the impact of the proposed 10-lane bridge along with the transmission line towers.
At this stage, insufficient information is known about how the land under the bridge will be designed and used, making it difficult to understand associated impacts on connectivity through the Regional Park.

**Regional Utilities**

The proposed Project affects both the regional water supply system and the regional liquid waste system. In particular, the River Road West Main in Delta, the Lulu Island-Delta Main in Richmond and crossing under the Fraser River into Delta, along with the Brighouse Branch Sewer North, may all be impacted by the Project. New information provided in MOTI’s Environmental Assessment Application indicates that additional highway improvement works are planned for the section of the Project extending north to the Oak Street Bridge in Richmond. Therefore, the potential impacts to the regional water supply and liquid waste systems are greater than previously reported.

Both the Lulu Island-Delta Main and the River Road West Main are critical components of the regional water system supplying residents, businesses and industry south of the Fraser River as well as back-feeding the City of Richmond during an emergency. Loss of either of these mains would have a significant impact on water supply to Richmond and Delta. It is imperative that both mains be adequately monitored and protected throughout all phases of the proposed construction work and that there are no interruptions or reductions in service, especially during the peak summer water demand period. As shown on Attachment 4, given the proposed additional works within the expanded project area, and the configuration of the regional system supplying Richmond and Delta, there would be critical risks to water supply in the event construction of all project components within the Richmond/Delta corridor proceed on a concurrent basis, regardless of the time of year.

MOTI recognizes the importance of Metro Vancouver’s infrastructure, and has committed to working closely with Metro Vancouver staff to ensure the integrity of regional utilities. In their Application, MOTI has indicated that given the current stage of project design, detailed utility relocation requirements have not yet been finalized. Protection and possible relocation of utilities will be the responsibility of the Contractor retained by MOTI to design and build the bridge and highway improvements. Details of works pertaining to utilities will be confirmed during final design.

While Metro Vancouver’s Lulu Island-Delta Main crossing the Fraser River downstream of the Project site is not directly adjacent to the Project works and will not require relocation, this portion of the Main may be affected by tunnel decommissioning. Further modelling of river hydraulics and river bed lowering is required in this regard.

**Relocation of BC Hydro Transmission Line**

As noted in previous sections in this report, BC Hydro is planning to relocate a 230-kilovolt transmission line that currently spans the length of the Tunnel to coincide with the proposed George Massey Tunnel Replacement Project. Although BC Hydro has not yet announced which of three relocation alternatives it will implement, it is continuing to study Alternative 1, an overhead transmission line crossing the Fraser River. Metro Vancouver has both regional utility and regional park assets located in close proximity, and may experience direct and cumulative impacts to these assets. Regional Park ecology, visitor experience, and viewsheds will be impacted and similarly, the construction of the new transmission line may have impacts on the above-noted regional water supply mains.
Fraser River Dredging
The proposed decommissioning of the Tunnel raises the possibility that additional dredging may occur in the Fraser River. While very little information is known about future potential dredging plans, the impact of any increased dredging on the Fraser River estuary, GVWD and GVS&DD marine crossings of the Fraser River, and land uses along the Fraser River could be significant.

FEDERAL AND PROVINCIAL ENVIRONMENTAL REVIEW PROCESSES
BC Environmental Assessment Act
The Project is subject to an environmental review under the B.C. Environmental Assessment Act due both to the area of land disturbed associated with the decommissioning of the Tunnel, and to the length of additional lanes being added to an existing public highway.

The BC EAO established an Advisory Working Group comprised of federal, provincial, local government and First Nations representatives to assist it with the assessment process. Metro Vancouver staff attended two Pre-Application stage working group meetings on January 21 and March 10, 2016. On May 30, 2016, the MOTI submitted its application for an Environmental Assessment Certificate to the BC EAO. As prescribed through the provincial environmental assessment process, the BC EAO has thirty days from the submission of the application to evaluate the application for completeness. Stakeholders, including Metro Vancouver, have fifteen days within this timeframe to provide comments on the completeness of the application. Metro Vancouver staff are preparing comments in this regard, to be submitted to the BC EAO by June 15, 2016.

If the MOTI’s application is deemed to be complete, the BC EAO will make the application available for a 60-day public comment period. This period also represents the start of the 180-day application review period, during which the BC EAO prepares an assessment report for referral to the provincial Ministers with decision-making authority. In this case, the Ministers responsible for the decisions on whether to issue an Environmental Assessment Certificate are the Minister of Environment and the Minister of Community, Sport and Cultural Development.

MOTI’s Application to the BC Environmental Assessment Office
On May 30, 2016, the BC EAO confirmed receipt of an application for an Environmental Assessment Certificate for the George Massey Tunnel Replacement Project (the Application) from the MOTI. The first step of the provincial process to review the Application involves a screening by the Advisory Working Group and by the BC EAO to ensure that the Application meets all Application Information Requirements. The Advisory Working Group, on which Metro Vancouver staff participate, has fifteen days to identify any deficiencies to the BC EAO. The BC EAO then has fifteen days to determine if the Application meets the Requirements, and to provide direction for changes if appropriate. All screening comments about the completeness of the Application must be provided to the BC EAO by Advisory Working Group members (including Metro Vancouver staff) by June 15, 2016.

Canadian Environmental Assessment Act
While the Project does not automatically trigger a federal review under the Canadian Environmental Assessment Act, 2012 (CEAA 2012), it will require issuance of a permit, approval or authorization from Fisheries and Oceans Canada, Environment Canada, Transport Canada, and the Vancouver Fraser Port Authority. As well, in a letter to the federal Minister of Environment and Climate Change dated April 5, 2016, the Metro Vancouver Board requested that the Minister, pursuant to section 14(2) of the
Canadian Environmental Assessment Act, 2012, order a federal environmental assessment of the Project.

Some key features that characterize the environmental review of a project through CEAA 2012 include:

- greater independence between project proponents and reviewers, to ensure that project impacts are assessed in an impartial and objective manner;
- greater rigour of the analytical process;
- longer timeframe (at least 365 days for an environmental assessment conducted by the Agency and at least 24 months for an environmental assessment by a review panel);
- more substantial public / stakeholder input, including the opportunity to comment on the draft environmental assessment report;
- incorporation of broader impacts into assessment, including direct, indirect and cumulative effects;
- mitigation measures identified in the environmental assessment decision statement are incorporated into the design plans and implemented with the project;
- review of projects by a review panel is conducted by members selected on the basis of their knowledge, experience and expertise, who must be free from bias or conflict of interest relative to the project;
- a review panel has the ability to assess whether the environmental impact statement prepared by the proponent is sufficient to proceed to public hearings;

Metro Vancouver Request for Mitigation Conditions and Measures
Recognizing that the BC EAO’s assessment will be referred to the provincial Ministers with decision-making authority, Metro Vancouver staff are also developing a list of issues and impacts, along with commitments, assurances, compensation, monitoring, and other conditions that are necessary to mitigate the impacts of the Project on Metro Vancouver assets, infrastructure and legislated responsibilities if the Project is approved. Initial work in this regard is contained in the “George Massey Tunnel Replacement Project: Summary Assessment Table” (see Attachment 3). This information can be provided by Metro Vancouver to the BC EAO as part of its submission during the 60-day public comment period, or can be conveyed under separate cover.

ALTERNATIVES
1. That the GVRD Board:
   a) send a letter to the BC Minister of Transportation and Infrastructure and to the BC Environmental Office conveying:
      i. its opposition to the proposed George Massey Tunnel Replacement Project, based on its analysis regarding the direct, indirect, and cumulative regional impacts of the Project, and its ongoing concerns about an inadequate stakeholder input process and insufficient access to background technical analysis;
      ii. a request that the Ministry of Transportation and Infrastructure provide commitments, assurances, compensation, monitoring, and other conditions that will be necessary to mitigate the impacts of the George Massey Tunnel Replacement Project on Metro Vancouver assets, infrastructure, and legislated responsibilities, in the event that the project receives approval by the Provincial government;
b) direct staff to forward this correspondence to the Federal Minister of Environment and Climate Change communicating the GVRD Board’s analysis, position and concerns; and
c) authorize the Corporate Officer to release to the public the report dated June 14, 2016, titled “George Massey Tunnel Replacement Project – Analysis of Regional Impact”.

2. That the Intergovernment and Finance Committee receive for information the report dated June 14, 2016, titled “George Massey Tunnel Replacement Project – Regional Impacts and Concerns” and provide alternate direction to staff.

FINANCIAL IMPLICATIONS
If the Board supports alternative one, letters will be sent to the Minister of Transportation of Infrastructure and to the BC Environmental Assessment Office conveying that, should the Project proceed, Metro Vancouver will be seeking commitments, assurances, and compensation from the Province to mitigate the impacts on Metro Vancouver assets, infrastructure and legislated responsibilities. It is anticipated that the new bridge, the accompanying BC Hydro transmission line relocation, and the decommissioning of the existing Tunnel, will have both direct and indirect financial implications for regional water supply and liquid waste utilities infrastructure and service delivery, along with anticipated direct and indirect impacts to the Deas Island Regional Park.

Given the lack of detail available about the Project and the relocation of the BC Hydro transmission line, the specific financial implications for Metro Vancouver as a result of the Project are unknown and difficult to estimate at this time. Metro Vancouver staff will continue to liaise with MOTI and with BC Hydro to protect the interests of Metro Vancouver with respect to its assets and operations.

It should also be noted that significant Metro Vancouver staff time has been dedicated to the George Massey Tunnel Replacement Project. The need for staff time is anticipated to continue at variable intensity until the completion of the George Massey Tunnel Replacement Project, including decommissioning of the Tunnel.

Project Business Case
The business case provided by MOTI for the Project includes an assumption of incremental GDP growth of $13 million / year every year from 2021–2045, but it does not provide important information related to how stated values were arrived at. Similarly, it is unclear how other Project-related benefits were calculated, including the benefit of seismic improvements. The breakdown of project costs is redacted in the original business case from October 2015, so the amount of construction plus contingency is unknown as is the interest during construction and the decommissioning of the tunnel. If contingencies are insufficient, project costs could well exceed the stated amount of $3.5 billion. As well, there is a lack of clarity related to the calculation of the present value of net project costs, including whether there have been any deductions incorporated into the calculation of the net amount.

The business case also does not present analysis of the range of transportation options that were considered by the Province before deciding upon a 10-lane bridge as the preferred alternative for achieving Project goals. For example, no information is available that assesses the investment of $3.5 billion in funding towards the new bridge against other alternatives that would achieve Project goals,
but would better align with *Metro 2040* and enhance the proposed investments included in the TransLink Mayors’ Council 10-Year Vision.

**SUMMARY / CONCLUSION**

At its May 27, 2016 meeting, the GVRD Board considered a report titled “George Massey Tunnel Replacement Project Update”. This report responds to requests from the Board and presents, based on the information available, an analysis of the potential impacts of the proposed George Massey Tunnel Replacement Project on Metro Vancouver assets, infrastructure, and legislated responsibilities. It also provides information on federal and provincial environmental assessment processes, an update on MOTI’s application to the BC Environmental Assessment Office, and conveys information from the City of Richmond and Corporation of Delta related to the George Massey Tunnel Replacement Project.

Metro Vancouver has a range of broad interests and concerns related to the Project in terms of its assets, infrastructure and legislated responsibilities, including regional planning and growth management; air quality and climate change; environment; regional parks; and regional utilities. Although substantial gaps in design details, impact analysis, and associated technical documentation related to the Project still exist, this report provides a high-level staff assessment of the potential impact of both the Project and related proximal works on Metro Vancouver interests. The potential impacts, including direct, indirect and cumulative effects, are considered to be broad and potentially substantial. In all cases, the lack of sufficient access to the full breadth of technical information including financial and business case documentation has made it very difficult to clarify and quantify these impacts in more detail. Moreover, the limited timeframes provided for stakeholder input to specific reports and applications throughout this process have created ongoing difficulties in conducting analysis to the appropriate level of detail.

There continue to be concerns about the direct, indirect, and cumulative regional impacts of the proposed George Massey Tunnel Replacement Project on the integrity and security of Metro Vancouver assets, as well as ongoing concerns about an inadequate stakeholder input process and insufficient access to background technical analysis. Timelines for stakeholder analysis and feedback on MOTI’s Project Definition Report and the Application Information Requirements submitted to the BC EAO have been challenging. As previously noted, the BC EAO has given stakeholders with 15 days to review the Application Information Requirements (2,500+ pages) for completeness. There will be a 60-day public comment period after the BC EAO accepts the application. A potential concern is how meaningful the solicitation of public comment will be on information that is often highly technical or specialized.

Based on the foregoing analysis of the information available on the Project and the potential impact on Metro Vancouver assets, infrastructure, and services, staff recommend that the Board support alternative one and that a letter be sent to the BC Minister of Transportation and Infrastructure and to the Federal Minister of Environment and Climate Change conveying the Board’s opposition to the Project. Further, should the Project be approved, that the Province of British Columbia commit to providing compensation, monitoring, and other conditions that will be necessary to mitigate the impacts of the George Massey Tunnel Replacement Project on Metro Vancouver assets, infrastructure, and legislated responsibilities.
Update on the George Massey Tunnel Replacement Project
Intergovernment and Finance Committee Meeting Date: June 17, 2016
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Attachments and References: (Orbit #18482936):
1. City of Richmond Briefing Paper titled “George Massey Tunnel Replacement – City of Richmond Concerns” dated June 2, 2016
3. George Massey Tunnel Replacement Project: Summary Assessment Table
4. Map: Areas of Potential Impact to Metro Vancouver Utilities
5. Project Definition Report

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George Massey Tunnel Replacement

City of Richmond Concerns

The key areas of concern for the City include:

- **Tunnel Decommissioning & Preference for New/Improved Tunnel**: The removal of the existing tunnel coupled with a new bridge encourages future increased dredging of the Fraser River to enlarge the shipping channel and thus greater industrialization of the river as well as the surrounding area.

- **Highway 99 Widening & Impacts to Agricultural Land/ESAs/RMAs**: Project information indicates a “net positive impact” to agricultural lands but has not been confirmed nor quantified. The widening of Highway 99 to an undisclosed depth on the west side will impact the viability of adjacent existing farm land as well as the City’s designated Environmentally Sensitive Areas and Riparian Management Areas. The project team has indicated they wish to acquire a depth of 36 meters along the highway where Steveston Highway meets Highway 99.

- **Regional Concerns**: It is not clear that a new 10-lane bridge is consistent with the Regional Growth Strategy or the Mayors’ Council Vision for Regional Transportation Investments. Additionally, what are the environmental and other impacts of encouraging increased use of the single occupant motor vehicle instead of investing in public transportation.

- **Funding for the Proposed Bridge**: It remains unclear how the proposed bridge will be funded and what portion of its cost, if any, will be contributed by Port of Vancouver. The details of the project funding model should be shared sooner rather than later in order to ensure the financial planning process for the project is fully transparent.

- **Bridge Toll versus Mobility Pricing**: No information is available on the toll rate or how it will be equitably applied given that the region’s existing and planned tolled facilities will be located solely on bridge crossings linking the region south of the Fraser River. A tolling policy that focuses only on river crossings penalizes an island city like Richmond. Now is an opportune moment to initiate work on a region-wide mobility pricing policy for roads and bridges consistent with the long-term funding strategy for the Mayors’ Council Vision.

- **Potential Congestion at Oak Street Bridge**: The project scope does not include any improvements to the Oak Street-70th Avenue intersection, which is the primary source
of traffic queuing at the Oak Street Bridge, nor at the Knight Street Bridge to where the Oak Street Bridge traffic may eventually divert.

- **Impacts on & Required Improvements to Local Road Network:** The project scope may have potentially significant impacts on the local road network but there are no details as to the scale and cost of needed improvements to these local roads.

- **Sustainable Transportation Options:** The integrated transit stops should be operational on opening day. Pedestrian and cycling facilities should be incorporated in all new structures, including a pathway on both sides of the bridge, with safe and convenient connections to the local network.

- **Origin-Destination Surveys:** The Project Definition Report (PDR) states that approximately 60 per cent of traffic through the Tunnel is destined for or originates from Richmond based on two Bluetooth surveys each for a two-week period in the Fall of 2013 and 2014. Further clarification had been requested by the City on the project team’s survey methodology to arrive at this conclusion.

- **Relocation of BC Hydro Transmission Line:** BC Hydro will need to relocate its existing transmission line that runs underground through the tunnel and has identified an overhead crossing as the technically-leading solution. The City’s preferred options are either an underground crossing of the Fraser River or attached to the new bridge.

- **EA Process:** The expectation of the BCEAO for the City to provide comments on both the Project Description and Key Areas of Study document as well as the dAIR by the specified deadlines within the overlapping review periods is unrealistic.

- **Decision to replace tunnel with bridge:** The City notes the change in direction from upgrading the Tunnel to building a bridge. Until announcing the bridge project in 2012, the publicized intention of the MoTI was to improve and/or expand the Tunnel. Should the project to improve the existing crossing at the Fraser River go ahead, Council’s preference is for an upgraded and/or expanded tunnel instead of a new bridge.

**Missing Technical Information**

Staff have met with the George Massey Tunnel Replacement (GMTR) project team regularly since January 2014 (in more than 70 meetings as noted in MoTI news releases and publications). Although MoTI has indicated that the City has “provided valuable comments that have shaped the project scope” (as noted in the news release distributed in conjunction with Minister Stone’s March 30, 2016 presentation at the Richmond Chamber
of Commerce), there are many areas on which the City is still awaiting a response and/or more detailed information.

Specifically, in addition to the concerns expressed to MoTI through Council resolutions, the City has not received any further information on the following specific technical issues.

- Outstanding data and technical analysis of the existing and forecast traffic volumes for the Highway 99 corridor and ramps, Oak Street, Knight Street and Arthur Laing Bridges and the Steveston Highway and No. 5 Road intersection.

- Traffic modelling results to demonstrate the extent of any traffic diversion to these bridges, whether there is sufficient capacity and to identify any necessary mitigating traffic management measures.

- Extend the project scope to include the assessment of traffic impacts and implementation of the appropriate improvements at Oak Street and 70th Avenue, as well as Highway 99 northbound on-ramps from Sea Island Way and Bridgeport Road.

- Technical analysis to support the PDR statement that “there won’t be additional cars crossing the Oak Street Bridge because of the new bridge”.

- More information on the methodology and data collection for the Bluetooth O-D studies including sample size and its statistical significance of each study.

- Rationale on why Highway 99 is being widened to the west rather than the east, whether the extent on the west can be reduced from what is currently proposed (e.g. 36 m take from the City’s Garden lands) and what options, if any, are available to the City.

- Provide the specific extent of impact of the project on agricultural land as well as the amount and location of land that can be reinstated as agricultural.

- Conduct a safety audit of the Steveston interchange (e.g., northbound to westbound movement and weaving of traffic).

- Evidence to confirm net zero or positive impact on agricultural land (provide quantified number and locations to demonstrate) and net zero or positive impact on RMAs and ESAs.

- The Project Qualified Environmental Professional (QEP) should be conducting an evaluation of the current and future Riparian Management Areas (RMA) and Environmentally Sensitive Areas (ESA).
Project Scope

The City had expected the release of BC MoTI's *Project Definition Report* in June 2014 based on initial information from MoTI and discussions with the GMTR staff, however, these documents were not made public until December of 2015. The following summarizes the project scope of the GMTR initiative:

- Replace the Tunnel with a new 10-lane bridge (eight lanes plus two dedicated transit/HOV lanes) in the same corridor. The clear span structure will have a 57 m navigational clearance, similar to the Alex Fraser Bridge.

- Replace the Westminster Highway, Steveston Highway and Highway 17A interchanges with the latter two new interchanges including integrated transit stops within the centre median.

- Widen the Shell Road overpass and replace the Blundell Road, Ladner Trunk Road and 112th Street overpasses.

- Provide continuous dedicated transit/HOV lanes (50 lane-kms) between Highway 91 in Delta and Bridgeport Road in Richmond including a transit only ramp at Bridgeport Road, which will also support potential future rapid transit expansion.

- Provide access and connections for cyclists and pedestrians with a multi-use pathway on the new bridge.

- Provide a new connection to Rice Mill Road.

- Decommission the Tunnel once the new bridge opens.

- The Project will be funded through user tolls with the amount to be determined.

Consultation

- Following the Province’s announcement in September 2012 that the Tunnel would be replaced, the Ministry of Transportation & Infrastructure (MoTI) has undertaken three rounds of public consultation to date:
  - Phase 1 (November-December 2012): Focused on understanding the needs and potential constraints to help develop project scope and design requirements. Based on the feedback, the top three factors to consider in the development of replacement options were: congestion reduction, support
economic growth and inclusion of transportation alternatives, rather than impacts such as support for the Regional Growth Strategy, environmental factors and air quality impacts.

- Phase 2 (March-April 2013): Sought input on draft project scope and goals, five crossing scenarios, and the criteria to evaluate the options. Based on the feedback, the highest support was for a new bridge in the same corridor.

- Phase 3 (December 2015-January 2016): Feedback on the proposed project scope, success measures, funding options, and traffic management during construction.

- City staff first met with GMTR staff in September 2013 and subsequently established regular meetings (typically every two weeks) to discuss technical issues as of January 2014.

- Further detailed information about the project was requested by staff at each of these technical meetings. While GMTR staff had responded with further information, the necessary details are still missing in order for staff and Council to better assess the local impacts of the project.

- The project as defined and the lack of the requested detailed information has led to concerns regarding the justification of the project and its potential negative impacts on the City and the region.

- These requests from the City are summarized in Missing Technical Information on Page 4 and also generally reflected in Council Resolutions summarized on Page 7.

**Environmental Assessment Process**

- The GMTR project is subject to review under the BC *Environmental Assessment Act*. The project is triggered by the tunnel decommissioning and the modification of existing public highway equal or greater than 20 kilometres.

- Pre-Application Stage (December 2015-June/July 2016): Initiated with the release of the Project Definition and Key Areas of Study document and the draft Application Information Requirements (dAIR) that is reviewed by Working Group members. This includes:

  - 31-day (January 15-February 15, 2016) public comment period on the Project Definition and Key Areas of Study including two open houses.
Meetings of the Environmental Assessment Advisory Working Group to provide comments on the Project Definition and Key Areas of Study by February 15, 2016 and the dAIR by February 10, 2016. City staff received an extension of the February 10, 2016 deadline to February 22, 2016.

- Application Review Stage (June/July-November/December 2016): The final AIR must be approved by the BCEAO prior to MoTI submission of an application for an environmental assessment certificate.

- A dAIR Working Group meeting during this stage of the EA process was held on March 10, 2016 that focused on the collective Working Group comments on the dAIR, the responses of MoTI and a discussion of key outstanding issues of Working Group members on the dAIR.

- On May 24, 2016, the City was notified that the AIR has been finalized by the EAO and starting May 31, Working Group members, including the City, will have 30 days to review the Application for completeness.

- Upon submission of the AIR, the BC EAO will undertake a completeness review and a 30-day screening period including an opportunity for further public consultation. This marks the final stage of pre-application.

- Following this 30-day period, the final application will be submitted and include a minimum 45-day public comment period and at least two BC EAO-led open houses.

**Council Resolutions**

To date, Richmond City Council has considered six reports on the GMTR:

- March 11, 2013: Report on the five crossing scenarios identified in Phase 2 consultation. Council resolved to oppose any crossing option that would significantly impact existing farm lands and communities, particularly Scenario 5.

- June 23, 2014: Report on proposed project objectives to be considered by MoTI in the development of a preferred project scope of improvements, which were endorsed by Council.

- July 27, 2015: Status update on project including relocation of the BC Hydro transmission line currently housed in the Tunnel. Council resolved to forward the report to MoTI for consideration in the development of the PDR. Council also resolved to advise BC Hydro that should the Tunnel be decommissioned, the City’s
preferred options for the relocation of the transmission line would be either an underground crossing of the Fraser River or attached to the new bridge.

- October 13, 2015: Report on the impacts of the potential widening of Highway 99 on the west side within Richmond. Council resolved to forward the report to MoTI for consideration in the development of the PDR and advise the Agriculture Land Commission and the Minister of Transportation and Infrastructure of the City’s concerns of the potential impacts on existing established institutions and farming of their backlands.

- January 25, 2016: Report on the PDR issued in December 2015. Council resolved that its preference is for a new or improved tunnel rather than a new bridge. Council also resolved to request an extension for comments on the draft AIR and to refer the topic to Metro Vancouver for comments on the compatibility of the new bridge with the Regional Growth Strategy. Council further resolved to support in principle the objectives of easing traffic congestion, improving transit and cycling connections and replacing aging highway infrastructure to enhance public safety subject to a number of issues being addressed prior to further design.

- February 22, 2016: Report expressed concern with change in direction from upgrading the Tunnel to building a bridge and included nine supporting documents. Council resolved to request that the Province provide copies of all reports and studies that relate to the original plan to twin the Tunnel and/or provide Rapid Bus service that were considered during the period from 2006 to 2008, and if necessary, that the foregoing request be made as an official Freedom of Information request. Although Minister Stone has recently responded in his letter of March 30, 2016 that the above information would be posted on the project website in Spring, a formal FOI request has been sent out from the City to MoTI to ensure that the information being compiled is thorough and complete. Council also resolved to request the Federal Minister of the Environment to refer the George Massey Tunnel Replacement Project to a Canadian Environmental Assessment Review Panel for review under the Environmental Assessment Act. CEEA responded on March 31, 2016 to indicate that this request would be reflected in their advice to the Minister.

Attachment 1 contains each of the full Council resolutions above.

Federal Government Partnership

The PDR states that the Province is working with the federal government to determine potential funding partnerships. Given that a new bridge will be tolled, the BC Minister of
Transportation & Infrastructure has stated that a contribution may either reduce the toll rate or the length of repayment period. This project can be seen as potentially competing for funding with the regional transportation improvements identified by the Mayors’ Council Vision.
<table>
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<th>Council Meeting</th>
<th>Resolution</th>
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City of Richmond Briefing Paper
Attachment 1
June 2, 2016

<table>
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<th>Council Meeting</th>
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| October 13, 2015  | (1) That the staff report titled “Update on George Massey Tunnel Replacement Project – Highway 99 Widening,” dated September 28, 2015, from the Director, Transportation, be forwarded to the Ministry of Transportation and Infrastructure’s George Massey Tunnel Replacement project team for consideration in the development of the Project Definition Report;  

(2) That a letter be sent by Mayor Brodie, on behalf of Council, to the Agriculture Land Commission and the Minister of Transportation and Infrastructure, with copies to all Richmond MLA’s, advising of the City’s concerns with any potential widening of Highway 99 on the west side impacting existing established institutions and farming of their backlands, and reiterating the City’s request for the early provision of the Project Definition Report and financing strategy; and  

(3) That a letter be sent to the Agriculture Land Commission confirming that the City wishes to be fully engaged in any discussions regarding the use of Agricultural Land Reserve lands for the George Massey Tunnel Replacement Project. |
| January 25, 2016  | (1) That the Ministry of Transportation and Infrastructure (MoTI) be advised that while the City supports the objectives of the George Massey Tunnel Replacement Project to ease traffic congestion at the existing tunnel area, improve transit and cycling connections and replace aging highway infrastructure to enhance public safety, as described in their Project Definition Report, the following issues must be addressed by MoTI prior to advancing the project for further design and the procurement process:  

(a) Provision of further details to demonstrate how the overall project will: |
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<td>(2) That the BC Environmental Assessment Office be requested to extend the deadline for comments on the draft Application Information Requirements from February 10, 2016 to March 15, 2016 to provide the City with sufficient time to provide meaningful input.</td>
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<td>(3) That the matter be referred to Metro Vancouver for comments on the compatibility of the new bridge with the Regional Growth Strategy;</td>
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<td>(4) That overall Richmond City Council prefers a new or improved tunnel rather than a new bridge;</td>
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<td>(5) That a letter be sent to the City of Vancouver request that they involve the City of Richmond in the discussions regarding the Oak Street Bridge and 70th Avenue and Oak Street situations following the completion of construction;</td>
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<td>(6) That a letter be sent to Agricultural Land Commission seeking information on the potential encroachment on the farm land; and</td>
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<td>(7) That a copy of the resolution be sent to the Prime Minister, Premier, City of Vancouver, local MPs and local MLAs.</td>
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| February 22, 2016 | (1) That the City of Richmond request that the Provincial Government provide copies of all reports and studies – including but not limited to business plans, feasibility studies, technical studies, seismic studies, and/or environmental impact studies – that relate to the original plan to twin the George Massey Tunnel and/or provide Rapid Bus service that were considered during the period from 2006 to 2008; and that if necessary, that the foregoing request be made as an official Freedom of Information request; |
|                  | (2) That a letter be sent to the Auditor General requesting comments on the process leading up to the decision related to the George Massey Tunnel Replacement Project; and |
|                  | (3) That the City of Richmond send a letter to the Federal Minister of the Environment requesting that the George Massey Tunnel Replacement Project be referred to a Canadian Environmental Assessment Review Panel for review under the Environmental Assessment Act. |
To: Mayor and Council  
From: Engineering Department  
Date: February 26, 2016

George Massey Tunnel Replacement Project

The following report has been reviewed and endorsed by the Chief Administrative Officer.

- **RECOMMENDATIONS:**

  A. THAT a copy of this report be provided to the Minister of Transportation and Infrastructure and all Metro Vancouver Directors.

  B. THAT the Ministry of Transportation and Infrastructure be requested to retain the current timeline for conducting the Project Definition Report review while continuing to receive input from key stakeholders.

- **PURPOSE:**

The purpose of this report is to provide information to Council on the Metro Vancouver staff report that was submitted to the Intergovernment and Finance Committee on the George Massey Tunnel Replacement Project (“Project”).

- **BACKGROUND:**

The Ministry of Transportation and Infrastructure (“Ministry”) is working on replacing the George Massey Tunnel with a new 10 lane bridge and improving Highway 99 between Bridgeport Road and Highway 91. The proposed bridge will provide a dedicated transit/HOV lane and a separated multi-use path for pedestrians and cyclists. The estimated capital cost for the overall project is $3.5 billion.

Consultations have been ongoing since 2012 on the project. Most recently, consultations and public information sessions were held in conjunction with the release of the Project Definition Report in December 2015. As well, the BC Environmental Assessment Office also sought public comments as part of the pre-application Environmental Assessment process up until February 15, 2016.

- **DISCUSSION:**

In response to the release of the Project Definition Report, Metro Vancouver staff provided written comments to the Ministry and subsequently provided a report to the
Intergovernment and Finance Committee on February 17 (Attachment A) requesting an additional two months to evaluate the impacts of the proposed Project on regional planning and growth management; air quality and climate change; environment; regional parks; and, regional utilities. This report was also presented to the Metro Vancouver Board on February 26, 2016.

There are a number of reasons that this project needs to move ahead within the Ministry’s current time frame:

- The Ministry has undertaken numerous detailed studies for the project and has shared the results with key stakeholders including Metro Vancouver staff.
- Consultation with stakeholders has been ongoing over the past three years and to date Metro Vancouver has met with the Ministry more than 20 times. The Corporation of Delta and the City of Richmond have also been consulted with more than 60 times since the project was initiated.
- The submission of the Environmental Assessment Application to the BC Environmental Assessment Office will trigger a further public comment period for a minimum of 45 days. As well, it is anticipated that there will also be at least six months of time for additional discussion and comment between the Ministry and key stakeholders, including Metro Vancouver.
- Metro Vancouver staff reported on the Regional Planning and Transportation impacts in 2014 (Attachment B) to allow the region to respond in a timely and knowledgeable manner upon the release of the Project Definition Report.
- The Province intends to fund the Project through user tolls. As the new bridge may divert traffic to other routes, the Province is committed to receiving feedback to review its current tolling policy. For reference, a recent summary of major bridge traffic volumes is provided in Attachment C, along with toll revenues from the Port Mann and Golden Ears Bridges.
- The existing tunnel is already beyond required vehicular capacity and reaching the end of its useful life. As such, replacement of the tunnel should not be delayed. Some key facts are as follows:
  - Queues can extend from 1.5 to 5 km during the rush hours.
  - The existing tunnel has about 10 years of useful life remaining before major components will need to be completely replaced.
  - The existing tunnel does not meet modern seismic standards.
  - The existing traffic congestion and delays are impacting the air quality on either side of the tunnel and the Project is expected to help reduce greenhouse gas emissions as a result of reduced idling. As well, the new bridge will provide much needed transit, cycling, and pedestrian improvements.

In addition, Delta staff requested clarification from the George Massey Tunnel Replacement Project Team on the comments made by Metro Vancouver to the local...
media following their request for additional time. The Project Team provided Delta staff with a response (Attachment D) summarizing the extent to which Metro Vancouver has been involved in the project consultation process as well as providing clarification on the comments made by Metro Vancouver.

Implications:
Financial Implications – There are no financial implications to Delta.

Community Implications – It is essential to maintain project timelines to ensure the bridge will be delivered on schedule to meet the needs of the community.

• CONCLUSION:

Rather than incurring further delays and costs to this Project, Metro Vancouver should continue to send comments to the Ministry and work collaboratively with the George Massey Tunnel Replacement Project Team to review and address the regional issues within the existing timelines.

Steven Lan, P.Eng.
Director of Engineering

Department submission prepared by: Hugh G Fraser, P.Eng.

This report has been prepared in consultation with the following listed departments.

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<tr>
<th>Concurring Departments</th>
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<td>Human Resources &amp; Corporate Planning</td>
<td>Sean McGill</td>
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• ATTACHMENTS:
  A. Intergovernment and Finance Committee Meeting Report dated January 30, 2016
  B. Transportation Committee Meeting Report dated March 5, 2014
  C. Extract from TransLink 2011 Metro Vancouver Regional Screenline Survey
  D. Memorandum February 29, 2016 George Massey Tunnel Replacement Project
To: Intergovernment and Finance Committee

From: Elisa Campbell, Director, Regional Planning
Marcin Pachcinski, Division Manager, Electoral Area & Environment Planning, Policy and Environment Department

Date: January 30, 2016

Subject: Update on the George Massey Tunnel Replacement Project

RECOMMENDATION
That the GVRD Board send a letter to the Minister of Transportation and Infrastructure requesting that an additional two months be granted to review the Project Definition Report for the George Massey Tunnel Replacement Project and to assess the impacts of the proposed Project on Metro Vancouver infrastructure and services.

PURPOSE
This report provides the Intergovernment and Finance Committee with an update on the George Massey Tunnel Replacement Project, including the recent release of the Project Definition Report and the environmental assessment review process that the George Massey Tunnel Replacement Project will undergo and proposes that more time be requested to properly review the report.

BACKGROUND
On December 16, 2015, the Ministry of Transportation and Infrastructure released its Project Definition Report for the George Massey Tunnel Replacement Project (Attachment 1), and requested that comments on the Project Definition Report be submitted by January 28, 2016. On December 16, 2015, the BC Environmental Assessment Office determined that the George Massey Tunnel Replacement Project is subject to provincial environmental assessment review, and requires an environmental assessment certificate prior to proceeding. The Environmental Assessment Office has requested that comments on the draft Application Information Requirements be submitted by February 10, 2016.

This staff report provides the Intergovernment and Finance Committee with a short description of both the Project Definition Report and the environmental assessment review process, briefly outlines Metro Vancouver’s broad interests as they relate to the George Massey Tunnel Replacement Project, and requests that additional time be granted to conduct a more detailed assessment of impacts of the proposed Project on Metro Vancouver services and infrastructure.

GEORGE MASSEY TUNNEL REPLACEMENT PROJECT
Project Definition Report
The Project Definition Report outlines the Ministry of Transportation and Infrastructure’s proposal to construct a 10-lane tolled bridge (eight motorized vehicle lanes plus two dedicated transit/high-occupancy vehicle lanes) to replace the existing George Massey Tunnel. The George Massey Tunnel Replacement Project as described also entails improvements to Highway 99 from Bridgeport Road in Richmond to Highway 91 in Delta, including dedicated transit/high-occupancy lanes, on- and off-
ramps, and interchanges. A multi-use cycling and pedestrian pathway will be included in the bridge design. The existing George Massey Tunnel will be decommissioned once the new bridge opens to traffic. The estimated capital cost of the George Massey Tunnel Replacement Project is $3.5 billion.

The Ministry of Transportation and Infrastructure has sought public comments on its Project Definition Report in support of making final decisions. The deadline for comments on the Project Definition Report was January 28, 2016. Given the compressed timeline for making submissions, Metro Vancouver staff provided comments to the Ministry of Transportation and Infrastructure to meet the January 28, 2016, deadline. A copy of these comments is provided to the Intergovernment and Finance Committee for information (Attachment 2). These comments have not been reviewed or endorsed by the Metro Vancouver Board.

**Provincial Environmental Assessment Review**

Under Section 10 of the *Environmental Assessment Act*, the Environmental Assessment Office may determine that an environmental assessment certificate is required for a project, and that the proponent may not proceed with the project without an assessment, where “a reviewable project may have a significant adverse environmental, economic, social, heritage or health effect, taking into account practical means of preventing or reducing to an acceptable level any potential adverse effects of the project.”

On December 16, 2015, the Environmental Assessment Office determined that the George Massey Tunnel Replacement Project is subject to the provincial environmental assessment review process and requires an environmental assessment certificate prior to proceeding. The determination was based on the Ministry of Transportation and Infrastructure’s Project Description and Key Areas of Study (Attachment 3).

The Project Description and Key Areas of Study includes *valued components*. The Environmental Assessment Office’s User Guide (June 2015) describes valued components as follows:

> Valued components provide the foundation of environmental assessments in BC. Valued components are aspects of the natural and human environment that have scientific, ecological, economic, social, cultural, archaeological, historical or other importance. Examples of valued components included in environmental assessments are fish and fish habitat, water quality, species at risk, communities and infrastructure, archaeological resources, and noise. The valued components selected for a proposed project guide the focus of the environmental assessment.
For the George Massey Tunnel Replacement Project, the Ministry of Transportation and Infrastructure has identified the following valued components:

- River hydraulics and morphology
- Sediment quality and water quality
- Underwater noise
- Fish and fish habitat
- Marine mammals
- Vegetation
- Amphibians
- Terrestrial wildlife
- Land and Water Use
  - Marine use
  - Land use
  - Agricultural use
- Visual quality
- Air quality
- Atmospheric noise
- Human health
- Heritage resources

The Environmental Assessment Office has established an advisory working group of federal, provincial, local government and Aboriginal Group representatives to assist the Environmental Assessment Office with the assessment process. Metro Vancouver staff are participating in the process as part of the working group (Attachment 4). In the current pre-application phase of the environmental assessment review process, the focus of input from working group members is to ensure that the application contains the necessary information to allow the Environmental Assessment Office to undertake its assessment and make recommendations to the Ministers making the decision. This effort includes, for example, determining whether all applicable valued components have been identified. Metro Vancouver staff attended the first meeting of a stakeholder Working Group on January 21, 2016, to discuss the Project Description and Key Areas of Study.

The Environmental Assessment Office has requested comments on the draft Application Information Requirements by February 10, 2016. In order to meet this deadline, Metro Vancouver staff have submitted comments to the Environmental Assessment Office, focusing on the completeness of the environmental assessment application materials, including valued components. These comments have not been reviewed or endorsed by the Metro Vancouver Board.

**Proposed BC Hydro Transmission Line Relocation**

The existing Tunnel will be decommissioned once the new bridge opens to traffic. The decommissioning of the Tunnel will require BC Hydro to relocate a 230 kilovolt transmission line which currently spans the length of the Tunnel. The transmission line connects to overhead cable on either side of the Tunnel, with single pole configuration running adjacent to Highway 99. The transmission line must be relocated from the Tunnel and on both sides of the crossing to allow for construction of the new bridge and prior to the decommissioning of the Tunnel. BC Hydro staff began consulting with Metro Vancouver staff about this issue in 2015. In fall 2015, BC Hydro undertook public consultation on conceptual designs for three alternatives:

- An overhead transmission line crossing the Fraser River supported by towers;
- An underground transmission line running under the Fraser River; and
- A transmission line located on the new bridge.

The BC Hydro Board is anticipated to select a preferred alternative in early 2016. Metro Vancouver staff will continue to engage with BC Hydro and will keep the Intergovernment and Finance Committee and other committees apprised of new information.
Metro Vancouver’s Interests

Metro Vancouver’s broad interests around the George Massey Tunnel Replacement Project are related to:

- **Regional Planning and Growth Management** – The proposed bridge will have implications for regional growth management, including related effects on the distribution and growth of traffic across the Fraser River, as well as localized effects on communities, industrial development, population and employment growth distribution, and agricultural lands. Metro Vancouver staff convened an agency/municipal/industry meeting on February 5, 2016, to discuss these issues, and to identify and prioritize further analysis to be undertaken either by Metro Vancouver in conjunction with other interested partners including the proponent, or as part of the Environmental Assessment process. Staff received updates from municipalities, health authorities, consultants and the Province as to how potential land use implications are being assessed and addressed. Possible research needs were identified, and staff will continue to work with agency representatives to advance these efforts.

- **Air Quality and Climate Change** – The proposed bridge will result in changes in the levels of emissions of common air pollutants, toxic air pollutants and greenhouse gases. The changes in emission levels may lead to impacts in the vicinity of the George Massey Tunnel Replacement Project, including exposure to harmful pollutants, as well as impacts in the regional airshed such as smog and reduced visual air quality.

- **Environment** – The proposed bridge may have impacts on land and marine environments with ecological importance. These environments include agricultural lands that serve not only a food-production role, but also provide habitat and other ecological health values. Plans to divert Green Slough underneath the future bridge are of particular interest. Consideration of how to reduce, mitigate, and compensate for impacts will be an important part of the environmental assessment review process.

- **Regional Parks** – The new bridge is expected to follow the alignment of the Tunnel, bisecting Deas Island Regional Park through the existing Ministry of Transportation and Infrastructure right-of-way. Ongoing discussions between Regional Park Staff and the Ministry of Transportation and Infrastructure have focused on noise, debris and visual impacts of the proposed new bridge and the associated BC Hydro project, post construction ecological and trail connectivity through the Ministry of Transportation and Infrastructure right-of-way, habitat impacts and restoration opportunities, and trail connectivity from the bridge to the Deas Island Regional Park and broader regional greenway network including the Experience the Fraser Canyon to Coast Trail. The Ministry of Transportation and Infrastructure has indicated they will not require access through the Deas Island Regional Park for construction but may request limited post-construction access for maintenance purposes.

- **Regional Utilities** – Water Services staff have identified that the River Road West Main in Delta and the Lulu Island-Delta Main crossing under the Fraser River, between Richmond and Delta, may be affected by the George Massey Tunnel Replacement Project. The River Road West Main may need protection from ground improvements or changes in loads imparted by
both Ministry of Transportation and Infrastructure bridge work and by BC Hydro tower installation. The Ministry of Transportation and Infrastructure is also relocating Green Slough to return the slough back to its original pre-Tunnel alignment. Depending on the final channel alignment, the River Road West Main may require relocation. The specific impacts and costs are difficult to predict at this early stage of project definition. The Ministry of Transportation and Infrastructure is reviewing options for removing sections of the Tunnel from the Fraser River once it is decommissioned. Tunnel removal will alter the river hydraulics, which may result in scour at the Lulu Island-Delta Main crossing. This effect has been demonstrated in modelling undertaken by the Ministry of Transportation and Infrastructure’s river hydraulics consultant. Any future dredging of the Fraser River channel to facilitate the movement of larger vessels, following decommissioning of the Tunnel, could have significant implications to Metro Vancouver water and sewer infrastructure within the Fraser River.

Detailed comments will be provided by staff at various points in the process. Staff will continue to provide information to and seek direction as relevant from the Intergovernment and Finance Committee, the Utilities Committee, the Climate Action Committee, the Regional Parks Committee, and the Regional Planning Committee as the George Massey Tunnel Replacement Project proceeds.

PROJECT TIMELINE AND KEY PROCESS DATES

The information in this section of the report provides a timeline for the George Massey Tunnel Replacement Project, as well as key dates in the consultative and approval processes.

**September 2012** The Government of BC announces its intention to seek a replacement for the George Massey Tunnel.

**September 2013** The Government of BC announces a new bridge is the preferred alternative for the replacement of the George Massey Tunnel.

**September 2013 – November 2015** The Ministry of Transportation and Infrastructure undertakes traffic studies, technical and financial analysis, geotechnical investigations, and consultation to support development of its Project Definition Report.

**December 15, 2015** The Ministry of Transportation and Infrastructure submits its Project Description and Key Areas of Study to the Environmental Assessment Office to determine if the George Massey Tunnel Replacement Project requires a review under the *Environmental Assessment Act*.

**December 16, 2015** The Environmental Assessment Office issues an order under Section 10 of the *Environmental Assessment Act*, determining the George Massey Tunnel Replacement Project requires an environmental assessment review.

**December 16, 2015** The Ministry of Transportation and Infrastructure releases its Project Definition Report and seeks public comments.

**January 7, 2016** The Environmental Assessment Office issues an order under Section 11 of the *Environmental Assessment Act*, setting out the requirements for the first
public comment period (beginning January 15, 2016) on the Project Description and Key Areas of Study document.

**January 15, 2016**

The Environmental Assessment Office starts a public comment period on the Project Description and Key Areas of Study. Comments at this stage will be used to inform the development of the application information requirements.

**January 21, 2016**

The Environmental Assessment Office hosts the first Working Group meeting with stakeholders (including Metro Vancouver staff) to discuss the Project Description and Key Areas of Study.

**January 28, 2016**

Deadline for public comments on the Project Definition Report to Ministry of Transportation and Infrastructure.

**February 10, 2016**

Deadline for Working Group (including Metro Vancouver) comments on the Ministry of Transportation and Infrastructure's draft Application Information Requirements submission to the Environmental Assessment Office.

**February 15, 2016**

Deadline for public comments on the Project Description and Key Areas of Study to the Environmental Assessment Office.

**Early & mid-2016**

Environmental Assessment Review Process, including Working Group meetings with stakeholders (involving Metro Vancouver staff) and a public comment period during the application review stage. Metro Vancouver will have a formal opportunity to comment during the application review stage (date to be determined).

**2017 – 2022**

Construction of new bridge

> **2022**

Bridge opens to traffic

> **2022**

George Massey Tunnel decommissioned
ALTERNATIVES
1. That the GVRD Board send a letter to the Minister of Transportation and Infrastructure requesting that an additional two months be granted to review the Project Definition Report for the George Massey Tunnel Replacement Project and to assess the impacts of the proposed Project on Metro Vancouver infrastructure and services.
2. That the Intergovernment and Finance Committee receive for information the report titled “Update on the George Massey Tunnel Replacement Project”, dated January 30, 2016, and provide alternate direction to staff.

FINANCIAL IMPLICATIONS
The George Massey Tunnel Replacement Project, including the accompanying BC Hydro transmission line relocation and decommissioning of the existing Tunnel, may have financial implications for water utilities and the Deas Island Regional Park. If the GVRD Board supports Alternative 1, a letter will be sent to the Minister of Transportation and Infrastructure requesting that an additional two months be granted to undertake a more detailed review of the George Massey Tunnel Replacement Project Definition Report and the potential impacts on Metro Vancouver infrastructure and services.

Given the lack of detail in the current Project Definition Report, the specific implications for Metro Vancouver as a result of the new bridge and BC Hydro infrastructure are unknown and difficult to estimate at this time. Metro Vancouver staff will continue to liaise with the Ministry of Transportation and Infrastructure and with Port Metro Vancouver to protect the interests of Metro Vancouver with respect to its assets and operations.

It should also be noted that significant Metro Vancouver staff time has been dedicated to the George Massey Tunnel Replacement Project. The need for staff time is anticipated to continue at variable intensity until the completion of the George Massey Tunnel Replacement Project, including decommissioning of the Tunnel.

SUMMARY / CONCLUSION
This report provides the Intergovernment and Finance Committee with an update on the George Massey Tunnel Replacement Project and responds to the Committee’s request to report on the costs and implications of the George Massey Tunnel Replacement Project on Metro Vancouver infrastructure.

The George Massey Tunnel Replacement Project, outlined in the Ministry of Transportation and Infrastructure’s Project Definition Report released December 16, 2015, proposes to replace the George Massey Tunnel with a new 10-lane bridge, replace the Westminster Highway, Steveston Highway and Highway 17A interchanges, and widen Highway 99 to accommodate dedicated transit/HOV lanes between Bridgeport Road in Richmond and Highway 91 in Delta.

On December 16, 2015, the BC Environmental Assessment Office determined that the George Massey Tunnel Replacement Project is subject to the provincial environmental assessment review process, and requires an environmental assessment certificate prior to proceeding. The determination was based on the Ministry of Transportation and Infrastructure’s Project Description and Key Areas of Study. The George Massey Tunnel Replacement Project is in the pre-application stage of the
provincial environmental assessment review process. Metro Vancouver staff are participating in a stakeholder Working Group organized by the Environmental Assessment Office.

Metro Vancouver's broad interests around the George Massey Tunnel Replacement Project are related to regional growth management and planning, air quality and climate change, environment, regional parks, and regional utilities. Deas Island Regional Park, the River Road West Main, and the Lulu Island-Delta Water Main have been identified as Metro Vancouver assets being potentially impacted by the George Massey Tunnel Replacement Project.

This report contains timelines for the George Massey Tunnel Replacement Project and known key dates in consultative and approval processes. Staff will continue to provide information to and seek direction as relevant from the Intergovernment and Finance Committee.

The Ministry of Transportation and Infrastructure requested that comments on the Project Definition Report be received by January 28, 2016. Similarly, the Environmental Assessment Office requested that comments from stakeholders on the draft Application Information Requirements be received by February 10, 2016. Given these compressed schedules, and in order to meet the deadlines, Metro Vancouver staff submitted comments, and have provided them to the Intergovernment and Finance Committee for information. These comments have not been reviewed or endorsed by the Metro Vancouver Board. Staff recommend Alternative 1, that the GVRD Board send a letter to the Minister of Transportation and Infrastructure requesting that an additional two months be provided for Metro Vancouver Board review and assessment.

Attachments (Orbit #17222716):
1. Project Definition Report
2. Staff comments on Project Definition Report
3. Project Description and Key Areas of Study
4. Environmental Assessment Process
5. Staff comments on draft Application Information Requirements
6. Proposed Bridge Rendering and Metro Vancouver Assets

17186328
To: Transportation Committee

From: Ray Kan, Senior Regional Planner
Planning, Policy and Environment Department

Date: March 5, 2014  Meeting Date: March 12, 2014

Subject: Preliminary Regional Analysis of the New Delta-Richmond Bridge and Existing George Massey Tunnel

RECOMMENDATION
That the Transportation Committee receive for information the report dated March 5, 2014, titled “Preliminary Regional Analysis of the New Delta-Richmond Bridge and Existing George Massey Tunnel”.

PURPOSE
This report provides an update on the George Massey Tunnel Replacement Project and the preliminary results of an analysis undertaken by TransLink for Metro Vancouver.

BACKGROUND
Staff presented a progress update on the regional analysis of the new Delta-Richmond Bridge to the Transportation Committee at its meeting on December 3, 2013. At the time, TransLink, as requested by the GVRD Board in October, was still conducting the technical analysis and could only share the broad assumptions and methodology. TransLink has now completed a preliminary analysis of the new bridge. The results are discussed in this report.

DISCUSSION

Project Context
The George Massey Tunnel Replacement Project is one of the final pieces of the Provincial Gateway Program. It is important to monitor the development of this project and the potential effects of adding vehicular capacity on the implementation of Metro Vancouver 2040: Shaping Our Region (Metro 2040). This will allow the region to respond in a timely and knowledgeable manner when the Province releases the Project Definition Report in the spring of 2014.

In September 2013, the Premier of British Columbia announced a preferred solution to replace the George Massey Tunnel with a new bridge on the same corridor. At its meeting on October 25, 2013, the GVRD Board approved the following resolution (excerpted):

“a) request the Minister of Transportation and Infrastructure to demonstrate how the project scope, design, and performance of the proposed bridge to replace the George Massey Tunnel takes into careful consideration the effects on the implementation of the Regional Growth Strategy, Integrated Air Quality and Greenhouse Gas Management Plan, and Regional Transportation Strategy, and that measures be included to support, and not detract from, regional objectives.”
b) request the TransLink Board provide Metro Vancouver with technical analysis and commentary on the potential transportation and emissions implications of expanding transportation capacity on the George Massey Tunnel corridor and effects with proximate Fraser River watercrossings, including tolling and non-tolling scenarios, and the degree of consistency and support the proposed bridge would have on the Regional Growth Strategy, Integrated Air Quality and Greenhouse Gas Management Plan, the Regional Transportation Strategy, and Regional Goods Movement Strategy.

c) direct staff to investigate in relation to the George Massey Tunnel replacement project the following:
  i. the business plan;
  ii. the role of the port; and
  iii. the balance of phase 2 of the Gateway Program;
  iv. the potential for an LRT.

The Board’s request to TransLink is consistent with TransLink’s requirement, under the South Coast British Columbia Transportation Authority Act, to:

“review, and advise the Greater Vancouver Regional District, the municipalities and the government regarding the implications to the regional transportation system of (iii) major development proposals and provincial highway infrastructure plans in the transportation service region” (SCBCTA, Section 4(1)(f)).”

In January 2014, staff met with the provincial George Massey Tunnel Replacement team. At this meeting, the provincial project team advised staff of the following:

- A Project Definition Report will be released for consultation in the spring, and will contain details such as the number of lanes on the new bridge.
- A formal environmental assessment process will be undertaken after a project description is submitted to the provincial environmental assessment office.
- The geographic scope of the project extends along the Highway 99 corridor from the Canadian/U.S. border to Bridgeport Road in Richmond. Modifications and upgrades to highway interchanges are within scope.
- All financing options are on the table.
- Geotechnical fieldwork is underway to examine soil conditions.
- Computer modeling analysis is underway on alternative lane capacity and arrangements.
- The project team has initiated dialogue with TransLink on potential bus service improvements along the corridor.

The provincial team and Metro Vancouver staff will schedule a follow-up meeting in early spring.
TransLink’s Preliminary Analysis

The Ministry of Transportation and Infrastructure will release a Project Definition Report in the spring to articulate the precise scope, benefits, and costs of the project. For Metro Vancouver to be in a position to respond in a timely and knowledgeable manner, it is important that an independent analysis of this project be undertaken. TransLink has provided Metro Vancouver with a memorandum reporting out on the preliminary analysis of the new Delta-Richmond bridge and the implications for the corridor and the regional network (Attachment 1).

The scope of the analysis and major assumptions are shown below:

| Scope of TransLink Analysis                                  | • Transportation impacts of the new bridge on travel behavior (traffic diversion, modal shift, etc.)
|                                                             | • Growth impacts of the new bridge on population and job distribution
| Analysis Years                                              | • Base Year: 2011
|                                                             | • Future Year: 2045
| Analysis Time Period                                        | • AM peak hour (approximately 7:30AM-8:30AM)
| Demographics and Population/Employment Distribution         | • Base assumptions prepared by Metro Vancouver for infrastructure planning
|                                                             | • Sensitivity test prepared by Coriolis
| Tunnel/Bridge Lane Capacity                                 | • George Massey Tunnel: 3 lanes northbound in the AM peak hour; 1 lane southbound
|                                                             | • New Bridge: 3 general purpose lanes in each direction; 1 HOV/transit lane in each direction (total of 8 lanes)
| Toll                                                        | • Consistent with rates assumed for the Golden Ears Bridge and Port Mann Bridge.
| Transit Supply                                              | • Base Year 2011: 39 buses/hour
|                                                             | • Future Year: 48 buses/hour

The primary tool used by TransLink is the Regional Travel Demand Model, which is a computer model calibrated to 2011 conditions and used for forecasting purposes up to the year 2045. The model has been the primary tool used to evaluate transportation projects for over the past three decades. It must be cautioned that forecasts from any computer model will contain uncertainty and potential errors. When reviewing these model outputs, it is generally more useful to assess the relative change compared to baseline conditions rather than the precision of any one number.

Transportation Effects on the Highway 99/Fraser River Crossing Corridor

Three common transportation performance measures used in evaluating transportation projects are congestion, mode share, and vehicle kilometres travelled (VKT). Congestion and mode share are measured at the tunnel/bridge section only. VKT is aggregated from all road links that feed traffic to the tunnel/bridge in both directions – Highway 99 is the largest component of the corridor. Additional information can be found in the attached document.
An indicator of congestion is the ratio between volume (demand) and capacity (supply). A ratio above 1 generally means there is more traffic than the roadway can handle efficiently, resulting in slow moving traffic and long queues.

With no new capacity, 2-way congestion continues to rise in the tunnel due to growth in population, employment, and economic activity.

A new bridge in 2045 experiences reduced congestion, but the demand approaches capacity. The addition of tolls helps to manage the growth in demand and prolong the capacity of the bridge beyond 2045.

Transit mode share declines over time, whether the tunnel remains or a new untolled bridge is built. With the tunnel, travel speed deteriorates for buses, which makes transit a less desirable choice. Transit mode share falls to 9 percent in 2045.

With an untolled bridge, the expanded capacity allows for more people to drive and take transit, but transit mode share remains stuck at 9 percent in 2045.

When tolls are added to the bridge, a transit mode share of 12 percent is achieved due entirely to a decline in people driving or carpooling.

Vehicle kilometres travelled (VKT) is a proxy for greenhouse gas emissions.

VKT in the corridor will be higher with a new bridge (no tolls) as compared to the tunnel in 2045. This is because more traffic is drawn to the expanded capacity.

The addition of tolls on the new bridge will help to moderate the growth in VKT in the corridor by nearly 25 percent.
Auto and Truck Patterns on Other Fraser River Crossings

TransLink’s analysis also provides a preliminary view of the implications for auto and truck traffic on other water crossings. In 2045, relative to the existing tunnel, a new 8-lane tolled bridge could potentially draw down some auto traffic on the Alex Fraser Bridge, Pattullo Bridge, and Port Mann Bridge and contribute to an increase in traffic on the Oak Street Bridge and Queensborough Bridge. Truck traffic could decrease on the Alex Fraser Bridge and Queensborough Bridge, and increase on the Oak Street Bridge. As noted in the attachment, TransLink is reviewing the “truck component” of the Regional Travel Demand Model to ensure truck traffic is fully captured.

Growth Distribution Effects (Land Use)

TransLink commissioned Coriolis to study the potential redistribution of growth in 2045 as a result of the new bridge, as well as changes in access and travel time. In terms of population, Coriolis notes that about 1% of single family and townhouse growth may shift from West Richmond and Steveston to South Delta and South Surrey (on the order of 4,000 people).

In terms of employment, Coriolis notes that South Delta and South Surrey may receive a slightly higher share of population-serving employment at the expense of West Richmond and Steveston. In the short term, the pace of light industrial development may occur faster in Richmond and Delta and parts of South Surrey. This growth may come at the expense of South Burnaby and North Surrey. Over the long-term to 2045, with the constraint on industrial lands, there is no significant difference in the total amount of light industrial employment at these locations.

TransLink re-evaluated the transportation effects using Coriolis’ population and employment analysis and found only nominal differences for traffic levels across the new bridge.

It should be noted that the scope of the Coriolis analysis did not account for potential increases in marine-based goods movement. The removal of the tunnel may remove a marine bottleneck and allow for more ship traffic along the Fraser River to Fraser Surrey Docks. This element could represent a material shift in the region’s capacity to move goods. Further, the direct impact on the land acquired or expropriated for the new bridge, approaches, and associated works are out of the scope of the TransLink analysis. Further investigation is warranted on these issues.

Moreover, changes in accessibility may put development pressures on the Agricultural Land Reserve and the Metro 2040 Urban Containment Boundary. Any relaxation of these policies would render the current analysis obsolete.

Other Effects

TransLink also tested an expanded regional transit system, including improved bus frequencies on the Highway 99 corridor. Generally, along the Highway 99 corridor, there are slightly fewer auto trips and slightly more transit trips. Further investigation is warranted on the optimal level of transit service on this corridor given an expanded facility, and the associated costs and benefits.

ALTERNATIVES

This is an information report. No alternatives are presented.
FINANCIAL AND REGIONAL GROWTH STRATEGY IMPLICATIONS

Due to the implications of expanding the capacity of the current watercrossing between Delta and Richmond on the implementation of Metro 2040: Shaping Our Region, it is important for Metro Vancouver to play an ongoing role in assessing the broad dynamics of the options and the potential effects on travel patterns and land use.

SUMMARY / CONCLUSION

The preliminary analysis undertaken by TransLink, as requested by the Metro Vancouver Board, provides a common base from which the Transportation Committee can continue to monitor and query the development of the bridge proposal. This work demonstrates that TransLink and Metro Vancouver are cooperating on issues of regional significance. The region benefits greatly from the mutual sharing of technical information and the exchange of evidence-based policy dialogues.

While still preliminary, the analysis is already improving the collective understanding about the regional transportation system and the Highway 99 corridor. For instance, three major observations can be made for the 2045 morning rush hour study period:

- An 8-lane untolled bridge appears to provide measurable travel time benefits for travelers and sufficient capacity for the projected demand to 2045, but the demand on the bridge does approach capacity in 2045.
- An 8-lane tolled bridge appears to manage the growth in auto traffic demand and may actually prolong the useful capacity of the bridge beyond 2045.
- A new 8-lane bridge appears to have only minor effects on the redistribution of population and employment growth (assuming the Agricultural Lane Reserve and Urban Containment Boundary remain vigilantly protected).

Staff will continue to bring forward updates to this analysis and the analysis of the forthcoming Project Definition Report to be released by the Province in spring 2014. In particular, some outstanding questions that remain to be answered, including those posed by the GVRD Board, and will require additional investigation are:

1. The incremental benefits and costs of lane capacity above and beyond 8 lanes.
2. The effects on truck trips along Highway 99 and in relation to the other watercrossings.
3. The effects on morning and afternoon rush hour traffic through Richmond and Vancouver.
4. The effects on marine-based goods movement and the associated industrial development and employment growth distribution within the region.
5. The direct land impacts (regional parks and agricultural lands) of the bridge, approaches, interchanges, and other works.
6. The direct air emissions impacts of increased vehicular traffic on the Highway 99 corridor.
7. Opportunities for improved transit service on the Highway 99 corridor.

Staff will continue to work with TransLink on better understanding the role and effects of the new bridge, and to better answer the broader questions about implications to land use, air emissions, and goods movement.
Attachment:
‘George Massey Tunnel Replacement: Impacts on Regional Transportation Demand’ – Memo dated February 25, 2014 from TransLink addressed to Ms. Elisa Campbell, Director of Regional and Strategic Planning, Metro Vancouver.
February 25th, 2014

Ms. Elisa Campbell
Director, Regional and Strategic Planning
Planning, Policy and Environment
Metro Vancouver
4330 Kingsway, Burnaby, BC
V5H 4G8

Dear Ms. Campbell,

Re: George Massey Tunnel Replacement: Impacts on Regional Transportation Demand

Attached is a technical memo that provides preliminary modeling analysis on the potential effects of the replacement of the George Massey Tunnel on the regional network. TransLink has recently updated our regional modeling network assumptions to support the development of the new long-range Regional Transportation Strategy, which includes the examination of different future investment and management alternatives. TransLink conducted a number of illustrative model runs using the Regional Travel Demand Model. These consider how the additional capacity of a tunnel replacement and resultant changes in the network may affect travel behaviour and how they may impact the distribution of population and jobs over the long term. The exact scope of the new bridge has not yet been confirmed but general expectations and early indications are that the bridge will have more lanes than the existing tunnel.

Preliminary Observations for 2045 Forecasts
The figures here and in the attached report are order-of-magnitude illustrations and are appropriate for relative comparisons between model scenarios. They should not be interpreted as precise predictions of future traffic or passenger volumes, especially on specific road sections or transit route segments. The results are for the AM peak hour only. The technical memo provides some more details around the following observations:

Vehicle Kilometres Travelled
- A new tolled crossing (with 8-lanes) may experience about 5% more demand and traffic crossing the bridge, but decreases in congestion levels at the bridge, compared to the existing untolled crossing in 2045.
• A new untolled crossing (with 8 lanes) may experience in excess of 40% more demand and traffic crossing the bridge, decreases in current congestion levels at the bridge, relative to the existing untolled tunnel.

Mode Choice
• A new tolled crossing (with 8 lanes) in 2045 may result in similar transit mode share (12%) as in 2011, whereas both an untolled 8-lane crossing new crossing and an untolled existing tunnel, may result in a 25% reductions in transit mode share (9%).

Travel Times
• A new tolled crossing (with 8 lanes) in 2045 may result in a trip time between 8th Ave in Surrey and the Oak Street Bridge decreasing by about 10% (3 minutes) relative to 2011, whereas both a new untolled crossing and the existing untolled tunnel may result in trips increasing by about 10% (3 minutes) relative to 2011.

The preceding observations and findings assume that current regional and local land use policies, and protection of the Agricultural Land Reserve remain.

Land Use Implications
Assuming current provincial, regional and local land use policies remain:
• The changes in transportation accessibility for land uses in the corridor are likely to shift some residential and employment growth patterns relative to the Metro Vancouver’s current MGS projections, including:
  o Shifs in the growth of single family residential units to South Surrey and South Delta from West Richmond and Steveston;
  o More rapid development in light industrial land uses in Richmond, Delta and South Surrey, shifting from South Burnaby and North Surrey.
• These land use changes may shift travel demand but because of the resulting redistribution of employment trips, this factor does not appear to affect crossing volumes or mode share.
• Changes in accessibility may put additional development pressure on Agricultural Land Reserve and Urban Containment Boundaries.

The attached technical memo delves into the methodology, sensitivity tests and results in more detail. Please feel free to contact me with any questions.

Best regards,

Tamim Raad
Director, Strategic Planning and Policy, TransLink

CC Bob Paddon, EVP, Strategic Planning & Public Affairs, TransLink
BRIEFING MEMO

DATE: February 25, 2014
FROM: Strategic Planning and Policy
SUBJECT: George Massey Tunnel Replacement: Preliminary Modelling of Potential Impacts

PURPOSE
To provide a preliminary assessment of the potential impacts of replacing the George Massey Tunnel on the regional transportation system.

BACKGROUND
The Province of BC has announced its intent to replace the George Massey Tunnel with a new bridge. The exact scope of the new bridge has not yet been confirmed but general expectations and early indications are that the bridge will have more lanes than the existing tunnel. TransLink has undertaken an analysis to understand how the additional capacity and resultant changes in the network would affect travel behaviour; and how they may impact the distribution of population and jobs over the long term. In order to gain some initial understanding of these potential impacts, TransLink staff conducted a number of illustrative model runs using the Regional Travel Demand Model. The purpose of this memo is to document the preliminary results of these simulations.

DISCUSSION
Methodology
The analysis relies on TransLink's latest regional transportation model, also used to develop TransLink's Regional Transportation Strategy (RTS). The Provincial team working on this project is also applying the same model for its own analysis. The model, calibrated for 2011 conditions, reflects the current system of 682 regional transportation zones. The future model runs were completed for horizon year 2045. This preliminary evaluation focuses only on AM peak hour (7:30 to 8:30 am) conditions; however these results come from full 24-hour model assignments. The AM peak conditions appear to be representative of peak volumes for the crossing, although the PM peak in the outbound direction lasts longer and could lead to longer queuing.

Scope of Modelling Work
The analysis consists of comparing the following five model scenarios:
- Base Case (run 1) which reflects the transportation network, land use and Massey tunnel conditions as they existed in 2011. The current tunnel configuration consists of a 4-lane cross section, operating as a counter-flow system in the peak hours with three general
purpose lanes in the peak direction and one general purpose lane in the off-peak direction. This 2011 scenario serves as a benchmark against which conditions of future scenarios are compared.

- *Keeping the current tunnel* in the year 2045, *with tolls (run2) and without tolls (run3).*
- *A new bridge* in the current location in the year 2045, *with tolls (run 4) and without tolls (run 5).* These scenarios assumed an 8-lane cross section on the bridge span, including three general purpose lanes and one HOV/transit lane in each direction.

Two additional model runs were also performed as sensitivity testing to identify the impacts of different land use and background transportation network assumptions, as discussed later in this memo. The following table shows the specific modelling input assumptions applied to the five scenarios tested.

**Summary of Key Modelling Assumptions (Year 2045, AM Peak Hour):**

<table>
<thead>
<tr>
<th>Land Use Assumptions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The land use data for all scenarios come from the Metropolitan Growth Scenario (MGS) forecasts of employment and population for the year 2045 as provided by Metro Vancouver.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Road Network Assumptions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>The 2045 road network modelled in this analysis is the same as the Year 2045 RTS Base Case road network, which includes about 10,500 lane-kilometers within the GVRD. This represents an increase of about 10% over the 2011 road network. Most of the additional lane-kilometers are assumed to occur in Surrey, White Rock, Richmond and Delta, and to a lesser extent in the Tri-cities and Langley. Pattullo Bridge is assumed to be a rehabilitated 3-lane bridge.</td>
</tr>
</tbody>
</table>

Apart from the 8-lane bridge section itself, assumption about potential related improvements in the corridor had to be made in order to conduct the analysis (the Province has not announced a concept); the following changes were used:

- HOV lanes extending between the King George Boulevard interchange and the Oak Street Bridge
- Highway 99 corridor consisting of two general purpose lanes in each direction between the US Border and the Oak Street Bridge
- An additional general purpose lane extending in each direction between the SFPR interchange and the Westminster Highway interchange
- Highway 99 interchange ramps were modified at SFPR, H17A, Steveston, and Sea Island Way
- Highway 17A NB narrowed down to 1 lane from Deltaport Way to Ladner Truck Rd
- Improved Bridgeport and South Delta P&R connectivity
Summary of Key Modelling Assumptions (Year 2045, AM Peak Hour):

Transit Network Assumptions:

The modelling work assumes the Year 2045 RTS Base Case transit network which does not include any significant upgrades or expansion of transit service. The RTS 2045 Base Case includes about 24,000 daily bus kilometers and 4,000 daily train kilometers (SkyTrain and Canada Line) within the GVRD. This represents an increase of about 16% and 51% respectively relative to 2011. The additional train kilometers are mostly due to implementation of the Evergreen Line. Most of the additional bus kilometers are assumed to occur in Surrey, White Rock, Tri-cities, Richmond and Delta.

Within the Massey corridor, and the working assumption is that transit service would increase from 39 buses/hour under 2011 conditions to 48 buses/hour in the 2045 base case (+24%).

Tolling Assumptions:

The tolling scenarios, for either a tunnel or a bridge, assume that the Port Mann and Golden Ears Bridges remain tolled in 2045 but that a rehabilitated 3-lane Pattullo Bridge, included in TransLink's current Base Plan, would not be tolled facility. The tolled tunnel and bridge alternatives assume tolls consistent with those for the Port Mann and Golden Ears Bridges.

Preliminary Modelling Results

The following tables summarize the key general network and corridor-specific model outputs for the five scenarios tested. All statistics are for the 2045 AM Peak hour. The Network results reflect Origin-Destination demand (matrix data) while the Corridor results reflect actual volumes on specific road sections or transit route segments (assignment data).

Total vehicle demand from south of the Fraser river splits as follows:

<table>
<thead>
<tr>
<th>Demand</th>
<th>From south of the Fraser river</th>
<th>Crosses to north of the Fraser river</th>
<th>Remains on the south side of river</th>
<th>To destinations east of Langley</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUTO</td>
<td>227,600 trips</td>
<td>21,600 (10%)</td>
<td>201,800 (88%)</td>
<td>4,200 (2%)</td>
</tr>
<tr>
<td>TRUCKS</td>
<td>8,600 trips</td>
<td>1,960 (23%)</td>
<td>5,970 (69%)</td>
<td>670 (8%)</td>
</tr>
</tbody>
</table>

The truck component of TransLink’s regional model is currently under review and in the process of being upgraded to improve all aspects of truck traffic. The regional figures reflect the observed volumes. Figures 1 and 2 illustrate the distribution of trips originating south of the Fraser River for Auto and Trucks respectively.
Figure 1. Distribution of Auto Demand – 2045 AM Peak Hr

Crosses to the north: 21,600 (10%)
Travels east: 4,200 (2%)
Remains in the south: 201,800 (88%)

Total Auto demand from south of Fraser: 227,600 trips

Figure 2. Distribution of Truck Demand – 2045 AM Peak Hr

Crosses to the north: 1,960 (23%)
Travels east: 670 (8%)
Remains in the south: 5,970 (69%)

Total Truck demand from south of Fraser: 8,600 trips
### REGIONAL NETWORK Results - Tunnel and Bridge Options.

<table>
<thead>
<tr>
<th>Key REGIONAL NETWORK Indicators</th>
<th>Year 2011</th>
<th>Year 2045</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Base Case - Tunnel</td>
<td>Future - 4-Lane Tunnel, MGS Land Use</td>
</tr>
<tr>
<td></td>
<td>WITHOUT Toll</td>
<td>WITHOUT Toll</td>
</tr>
<tr>
<td>Total Regional Person-Trips</td>
<td>434,300</td>
<td>619,800 (43%)</td>
</tr>
<tr>
<td>- by AUTO</td>
<td>434,300</td>
<td>619,800 (43%)</td>
</tr>
<tr>
<td>- by TRANSIT</td>
<td>91,300</td>
<td>146,500 (60%)</td>
</tr>
<tr>
<td>Modal Split (Auto/Transit)</td>
<td>3,712,700</td>
<td>5,263,700 (42%)</td>
</tr>
<tr>
<td>Vehicle Km Travelled (veh-km)</td>
<td>83 / 17</td>
<td>81 / 19 (-2% / -12%)</td>
</tr>
<tr>
<td>% of Auto Links V/C &gt;1:</td>
<td>13%</td>
<td>20% (46%)</td>
</tr>
<tr>
<td>2-way Volumes at N-S Crossings:</td>
<td>32,700</td>
<td>40,300 (23%)</td>
</tr>
<tr>
<td>Traffic</td>
<td>2,300 (35%)</td>
<td>2,300 (35%)</td>
</tr>
<tr>
<td>Transit Trips</td>
<td>1,700</td>
<td>2,300 (35%)</td>
</tr>
</tbody>
</table>

* This is the total 2-way volumes at relevant water crossings across the Fraser River that could reasonably be used to get from south of the Fraser into Richmond and the Burrard Peninsula. Traffic volumes include the Massey Tunnel, Alex Fraser, Pattullo and Port Mann bridges; transit trips are limited to the Massey Tunnel, Alex Fraser and Port Mann bridges.

### MASSEY CORRIDOR Results - Tunnel and Bridge Options.

<table>
<thead>
<tr>
<th>Key MASSEY CORRIDOR Indicators</th>
<th>Year 2011</th>
<th>Year 2045</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Base Case - Tunnel</td>
<td>Future - 4-Lane Tunnel, MGS Land Use</td>
</tr>
<tr>
<td></td>
<td>WITHOUT Toll</td>
<td>WITHOUT Toll</td>
</tr>
<tr>
<td>2-way Person-Trips at Massey crossing - by AUTO</td>
<td>8,200</td>
<td>9,100 (11%)</td>
</tr>
<tr>
<td>- by TRANSIT</td>
<td>1,150</td>
<td>840 (-27%)</td>
</tr>
<tr>
<td>Modal Split (Auto/Transit)</td>
<td>88 / 12</td>
<td>91 / 9 (3% / -25%)</td>
</tr>
<tr>
<td>Total 2-way Traffic Volume at Massey crossing:</td>
<td>7,040</td>
<td>7,870 (12%)</td>
</tr>
<tr>
<td>VKT (veh-km)</td>
<td>223,200</td>
<td>260,800 (17%)</td>
</tr>
<tr>
<td>V/C Ratio (2-way weighted avg.)</td>
<td>1.26</td>
<td>1.41 (12%)</td>
</tr>
<tr>
<td>V/C Ratio (inbound peak)</td>
<td>1.27</td>
<td>1.41 (11%)</td>
</tr>
<tr>
<td>Avg. Speed (km/hr)</td>
<td>29</td>
<td>22 (-26%)</td>
</tr>
<tr>
<td>AUTO travel performance: 8 Ave to Oak St Bridge:</td>
<td>35</td>
<td>38 (9%)</td>
</tr>
<tr>
<td>Time (min)</td>
<td>68</td>
<td>61 (-9%)</td>
</tr>
</tbody>
</table>

Figure 3 (passenger vehicles) and Figure 4 (trucks) on the following page compare the 2045 forecasts for a new 8-lane, tolled crossing compared to the current 4-lane tunnel without tolls.
Figure 3. Difference in Auto trips 8-lane bridge (toll) vs. 4-lane tunnel (untoll) – 2045 AM Peak Hr

Figure 4. Difference in Truck trips 8-lane bridge (toll) vs. 4-lane tunnel (untoll) – 2045 AM Peak Hr
Sensitivity Tests
In addition to the five base model runs, this analysis tested the sensitivity of the system to alternative land use assumptions and background network and service conditions. The objective of these tests is to provide a high level assessment of the potential transportation impacts.

**Sensitivity Test 1: Alternative Land Use - Methodology and Assumptions**
TransLink commissioned Coriolis Consulting Corp, to develop a set of 2045 land use forecasts which illustrate the potential land use impacts of a new 8-lane bridge replacing the Massey tunnel. Coriolis developed these land use forecasts in coordination with TransLink staff and reviewed the findings with Metro Vancouver staff. The future land use was assigned to each transportation zone based on the following observations from the assessment.

The bridge and associated road works could impact the distribution of population and households, due to increased accessibility, as follows:
- About 1% of the suburban population growth that will be accommodated in single family and townhouse development (about 4,400 people) would likely shift from West Richmond and Steveston to South Delta (Ladner and Tsawwassen) and South Surrey.
- There may also be a small shift in population growth from high density nodes (e.g. Yaletown, Lonsdale, Metrotown) to South Delta and South Surrey, but this shift would be small and therefore is not modeled.

The bridge and associated road works could impact the distribution of employment, due to increased accessibility, as follows:
- South Delta and South Surrey would likely receive a slightly higher shares of population-serving employment there (e.g. retail and service employment) and corresponding less in West Richmond and Steveston.
- The pace of light industrial development would likely occur faster in Richmond, Delta (e.g. Tilbury, Tsawwassen First Nation), and parts of South Surrey in the short term and correspondingly slower in South Burnaby and North Surrey. However, the industrial land supply in these areas (and the entire region) is likely to be constrained by 2045, resulting in no significant differences in the total amount of light industrial employment at these locations. ¹

¹ The removal of the tunnel could open up the south arm of the Fraser to deep draught (or higher capacity) vessels. However, Port Metro Vancouver has indicated that the ability to dredge this arm of the Fraser to facilitate deeper or more fully loaded vessels is limited by width of the river. Therefore the Consultant did not assume that these higher capacity vessels would not be going upstream and therefore do not impact employment distribution. Subsequent to the analysis by Coriolis, Metro Vancouver indicated that the potential to open up the south arm of the Fraser River to access Fraser Surrey Docks, either for short-sea shipping or expanded container throughput, could represent a material shift in the region’s ability to move goods, which may impact employment distribution- this potential effect was not included in the sensitivity test.
This set of land use forecasts was run through the model for the future bridge, with and without toll, in order to examine how changes in land use may impact travel demand and travel patterns.

**Results**
The following table summarizes the differences between applying the base and the alternative land use scenarios form Coriolis in the case of a bridge in 2045.

### REGIONAL NETWORK Results 2045 - Difference between CORIOLIS Base and Alternative Land Use

<table>
<thead>
<tr>
<th>Key REGIONAL NETWORK Indicators</th>
<th>Future - 8-Lane Bridge, Coriolis Alternative - Base Land Use</th>
<th>Bridge WITHOUT Toll</th>
<th>Bridge WITH Toll</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Regional Person-Trips</td>
<td></td>
<td>2,900</td>
<td>3,000</td>
</tr>
<tr>
<td>by AUTO</td>
<td></td>
<td>0</td>
<td>-100</td>
</tr>
<tr>
<td>by TRANSIT</td>
<td></td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Transit Mode Share (%)</td>
<td></td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Vehicle Km Travelled (veh-km)</td>
<td></td>
<td>600</td>
<td>1,400</td>
</tr>
<tr>
<td>% of Auto Links V/C&gt;1</td>
<td></td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2-way Volumes at N-S Crossings:</td>
<td>Traffic</td>
<td>100</td>
<td>200</td>
</tr>
<tr>
<td>Traffic</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Transit Trips</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

### MASSEY CORRIDOR Results 2045 - Difference between CORIOLIS Base and Alternative Land Use

<table>
<thead>
<tr>
<th>Key MASSEY CORRIDOR Indicators</th>
<th>Future - 8-Lane Bridge, Coriolis Alternative - Base Land Use</th>
<th>Bridge WITHOUT Toll</th>
<th>Bridge WITH Toll</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-way Person-Trips at Massey crossing - by AUTO</td>
<td></td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>by TRANSIT</td>
<td></td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Transit Mode Share (%)</td>
<td></td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Total 2-way Traffic Volume at Massey crossing:</td>
<td>VKT (veh-km)</td>
<td>1,200</td>
<td>2,200</td>
</tr>
<tr>
<td>V/C Ratio</td>
<td></td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Avg. Speed (km/hr)</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Sensitivity Test 2: Alternative Transportation Network- Network Assumptions**

As part of the Regional Transportation Strategy planning process, TransLink developed a number of alternative future transportation network scenarios. These scenarios reflect different levels of investment in the regional transportation network and demand management measures. For the purpose of this sensitivity test, TransLink assumed RTS Alternative 3 regional network background conditions. In terms of network infrastructure and services, RTS Alternative 3 assumes a major expansion of transit, cycling and walking:

- Rapid Transit expansion on key corridors
- Transit priority on high capacity, congested transit corridors
- Expanded Frequent Transit Network and extended supportive transit network to new areas
- Significant investment in cycling and walking
- Minor incremental road expansion
- New, tolled Patullo Bridge
Alternative 3 assumes that general increases in bus service would result in much higher frequency of bus service on most routes within the Massey corridor. This level of planning has not yet occurred, but for working purposes an expansion allocation of 90 buses/hour compared to 39 buses/hour in 2011 was used for modelling.

Results
The following table summarizes the differences between RTS Alternative 3 and RTS Base Case with a new 8-lane tolled bridge in 2045.

**REGIONAL NETWORK 2045 - Difference Alt. 3 - Base Network with Tolled Bridge**

<table>
<thead>
<tr>
<th>Key REGIONAL NETWORK Indicators</th>
<th>Future 8-Lane Tolled Bridge with RTS ALT3 - RTS Base Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Regional Person-Trips</td>
<td>-11,200</td>
</tr>
<tr>
<td>- by AUTO</td>
<td>13,700</td>
</tr>
<tr>
<td>- by TRANSIT</td>
<td>9%</td>
</tr>
<tr>
<td>Transit Mode Share (%)</td>
<td>9%</td>
</tr>
<tr>
<td>Vehicle Km Travelled (veh-km)</td>
<td>-83,800</td>
</tr>
<tr>
<td>% of Auto Links V/C &gt;1:</td>
<td>0%</td>
</tr>
<tr>
<td>2-way Volumes at N-S Crossings: Traffic</td>
<td>-300</td>
</tr>
<tr>
<td></td>
<td>500</td>
</tr>
</tbody>
</table>

**MASSEY CORRIDOR 2045 - Difference Alt. 3 - Base Network with Tolled Bridge**

<table>
<thead>
<tr>
<th>Key MASSEY CORRIDOR Indicators</th>
<th>Future 8-Lane Tolled Bridge with RTS ALT3 - RTS Base Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-way Person-Trips at Massey crossing - by AUTO</td>
<td>-100</td>
</tr>
<tr>
<td>- by TRANSIT</td>
<td>120</td>
</tr>
<tr>
<td>Transit Mode Share (%)</td>
<td>8%</td>
</tr>
<tr>
<td>Total 2-way Traffic Volume at Massey crossing:</td>
<td>-130</td>
</tr>
<tr>
<td>VKT (veh-km)</td>
<td>-4,900</td>
</tr>
<tr>
<td>V/C Ratio</td>
<td>-1%</td>
</tr>
<tr>
<td>Avg. Speed (km/hr)</td>
<td>4</td>
</tr>
</tbody>
</table>

Summary of Preliminary Observations
In interpreting the model outputs, it is important to keep in mind that they are intended to provide a high level approximation of what transportation behaviour may be like in the future given the current set of land use and network assumptions. The figures are order-of-magnitude illustrations and are appropriate for relative comparisons between scenarios. They should not be interpreted as precise predictions of future traffic or passenger volumes, especially on specific road sections or transit route segments. As noted earlier, the modelled results are for the AM peak hour only.

Summary of Current Conditions (Base Case 2011):
- The tunnel shows high levels of congestion and a demand that significantly exceeding capacity, with a volume-to-capacity (v/c) ratio > 1.3 leading to queuing on the approaches to the tunnel.
- The tunnel’s two way traffic volume is approximately 7,000 vehicles/hour. This represents 22% of total Fraser River crossings (as defined in the previous Network Regional table).
Transit mode share at the tunnel (12%) is lower than the network average (17%).

Summary of System Wide Conditions 2045 (all base scenarios):

- At the regional level, there would be over 45% more trips (all modes) compared to 2011.
- The future regional network level travel demand is expected to be similar for all five base model crossing scenarios with only marginal variations.
- The model forecasts the total number of daily regional trips will be about 766,000; total regional transit demand will be about 146,000 trips.
- The regional transit mode share should thus be stable (at about 19% across all scenarios).

George Massey Corridor Level 2045

- Background growth in population and employment alone should result in 11% more person-vehicle trips and 12% more traffic volume through the tunnel in 2045, compared to today.
- Without any changes to the existing tunnel,
  - Congestion would increase, with a volume-to-capacity ratio of over 1.4
  - Transit mode share on the corridor would drop from 12% in 2011 to 9% in 2045.

At the corridor level, the model shows potentially significant differences in transportation behaviour for the four future crossing scenarios. Comparing an 8-lane bridge to a 4-lane untolled tunnel in 2045:

- A new 8-lane bridge without tolls would have:
  - 40% more traffic;
  - A v/c ratio improvement from 1.4 to 0.95 for the 2-way weighted average and to 1.14 for the inbound peak direction;
  - An increase in total two-way transit trips of 73%, but, due to higher vehicle travel, no change in transit mode share (stable at 9%).

- If tolled, a new 8-lane bridge in 2045 could potentially have:
  - 4% more traffic than the existing tunnel;
  - Lower congestion levels than untolled (a v/c ratio of 0.76 for the 2-way weighted average and 0.91 for the inbound peak direction);
  - An increase in total two-way transit trips of 67%, and an increase in transit mode share from 9% to 12% due to the lower number of vehicle trips in this scenario. These volumes and mode shares appear reasonable given the Year 2045 RTS Base Case does not assume significant levels of transit investment.
Alternative Land Use Sensitivity Test
At the regional level, the alternative land use tested generates marginal impacts on network level travel demand in 2045; slightly less vehicles trips (0.5% fewer) and about the same number of transit trips. Regional transit mode share forecasts remain stable.

At the corridor level, this alternative land use forecast does not generate statistically more traffic for the new bridge (or the north-south crossings collectively) compared to the Base Case land use. This is likely due to the fact that most of the changes of population relocation are accompanied by similar reallocations of employment.

In 2045, within the corridor, the alternative land use scenario is expected to have similar trends in transportation behaviour as the other bridge crossing scenarios with base land use.

Alternative Transportation Network Sensitivity Test
As described previously, the alternative background transportation network assumptions tested include transit expansion (RTS Alternative 3). At the regional level, this scenario forecasts higher transit trips and transit mode share in 2045 compared to Base Case scenario. The variation in mode share is expected to be slightly less noticeable at the corridor level but it would increase from 19% to 21% region-wide for the AM peak hour.

At the corridor level, the alternative transportation network tested resulted in marginally lower vehicle traffic at the Massey crossing in 2045. Similarly, this reduction in vehicle traffic would translate directly into more transit ridership, though the increase however remains small. The stability of the forecast is likely due to the fact that the transit, cycling and road upgrades envisioned for this corridor do not significantly alter the relative attractiveness of the different modes.

In 2045, within the corridor, the alternative background transportation network scenario is expected to have similar trends in transportation behaviour as the other bridge crossing scenarios with base case transportation network.

This 2045 transportation network sensitivity test includes completion of a practical, comfortable and safe cycling network. These facilities, along with convenient crossing on a new bridge, would provide better options for people to bicycle, likely resulting in large percentage increases. However, the land use and travel patterns around the bridge mean the number of absolute trips that would be conducive for shifting to cycling is unlikely to be large enough to alter the preliminary vehicle and transit travel demand forecasts previously discussed.
**Source: TransLink 2011 Metro Vancouver Regional Screenline Survey**

<table>
<thead>
<tr>
<th>Crossing</th>
<th>Daily Traffic Volumes (2011)*</th>
<th>Estimated Annual Trips (Daily x 365 days)</th>
<th>Estimated Annual Weekday Trips (Daily x260 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthur Laing Bridge</td>
<td>79,000</td>
<td>28,835,000</td>
<td>20,540,000</td>
</tr>
<tr>
<td>Oak Street Bridge</td>
<td>88,000</td>
<td>32,120,000</td>
<td>22,880,000</td>
</tr>
<tr>
<td>Knight Street Bridge</td>
<td>96,000</td>
<td>35,040,000</td>
<td>24,960,000</td>
</tr>
<tr>
<td>George Massey Tunnel</td>
<td>89,000</td>
<td>32,485,000</td>
<td>23,140,000</td>
</tr>
<tr>
<td>Queensborough Bridge</td>
<td>88,000</td>
<td>32,120,000</td>
<td>22,880,000</td>
</tr>
<tr>
<td>Alex Fraser Bridge</td>
<td>117,000</td>
<td>42,705,000</td>
<td>30,420,000</td>
</tr>
<tr>
<td>Pattullo Bridge</td>
<td>68,000</td>
<td>24,820,000</td>
<td>17,680,000</td>
</tr>
<tr>
<td>Port Mann Bridge</td>
<td>112,000</td>
<td>40,880,000</td>
<td>29,120,000</td>
</tr>
<tr>
<td>Pitt River Bridge</td>
<td>79,000</td>
<td>28,835,000</td>
<td>20,540,000</td>
</tr>
<tr>
<td>Golden Ears Bridge</td>
<td>30,000</td>
<td>10,950,000</td>
<td>7,800,000</td>
</tr>
<tr>
<td>Lion's Gate Bridge</td>
<td>63,000</td>
<td>22,995,000</td>
<td>16,380,000</td>
</tr>
<tr>
<td>Iron Workers Memorial Bridge</td>
<td>127,000</td>
<td>46,355,000</td>
<td>33,020,000</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>1,036,000</strong></td>
<td><strong>378,140,000</strong></td>
<td><strong>269,360,000</strong></td>
</tr>
</tbody>
</table>

*Daily traffic volumes are based on an average fall weekday in 2011.*

<table>
<thead>
<tr>
<th>Crossing</th>
<th>Actual Toll Revenue</th>
<th>Year</th>
<th>Document Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Port Mann Bridge</td>
<td>$122 Million</td>
<td>2014</td>
<td>Transportation Investment Corporation 2014/2015 Annual Service Plan Report</td>
</tr>
<tr>
<td>Golden Ears Bridge</td>
<td>$41.6 Million</td>
<td>2014</td>
<td>TransLink 2014 Year-End Financial and Performance Report Appendix A</td>
</tr>
</tbody>
</table>
MEMORANDUM

To: Mayor Lois E. Jackson
From: Steven Lan, P.Eng., Director of Engineering
Date: February 29, 2016
Subject: George Massey Tunnel Replacement Project: Comments made by Metro Vancouver in relation to their request for additional review time of the Project Definition Report

File No.: 5220-30/GMTR
CC: George V. Harvie, Chief Administrative Officer

Provided below is additional information from the George Massey Tunnel Project Team in response to the recent Metro Vancouver staff report on the project.

1. Delay Request

   • Ministry staff have met with Metro Vancouver more than 20 times over the past three years.
   • Metro Vancouver staff participate in the technical working group for the Project's environmental assessment review.
   • Metro Vancouver staff have already provided written comments on the PDR and the Environmental Assessment Project Definition and Key Areas of Study document.
   • The Project Team has met with Delta and Richmond staff more than 60 times each in the past three years and both municipalities have also sent comments.
   • Once the EA application is submitted, there will be another 45 to 60 day public comment period and at least six more months of time for discussion and comment from Metro Vancouver staff and directors.

2. Federal Environmental Review

   • Currently there is no federal trigger for the environmental review.
   • Changing federal legislation will take some time.
3. Other Items

**Building more roadway lanes encourages more car trips, most of which are made in single-occupant vehicles, ultimately leading to more congestion.**

- The Project includes measures to promote transit, carpooling, cycling and walking and to help manage growth in vehicle demand over time.
- With or without the new bridge to replace the George Massey Tunnel, traffic on Highway 99 will continue to grow as more people move to Richmond and Delta and more jobs are created.
- Building an 8-lane bridge will result in congestion on opening day.

*Investment in the George Massey Tunnel Replacement Project means that the Province no longer supports the Regional Growth Strategy (RGS).*

The RGS calls for measures to reduce greenhouse gases, use land efficiently, build an efficient transportation system and a stable economy, protect natural areas, develop complete communities that support walking and transit, and support sustainable transportation choices. All of these were considered in developing the project scope. For example:

- The Project is expected to help reduce greenhouse gas emissions as a result of reduced congestion-related idling.
- Municipal population and employment targets and existing land use designations were used as the basis for traffic forecasting.
- The Project will reduce congestion, improve travel time and reliability, improve transit service, provide new alternatives for cycling and walking, provide safe alternatives for slower moving traffic, and accommodate future rapid transit. Most of these would not be possible if the Tunnel is not replaced.
- Additionally, the Project provides the opportunity to return Green Slough to its original alignment and reconnect portions of Deas Island Regional Park that are currently bisected by Highway 99.

*Most people were unaware of planning for the Project before the Premier announced plans to proceed.*
• There have been three phases of public consultation in 2012, 2013, and 2015/16.
• More than 1,000 people participated in each of the three phases of consultation, including 550 people at the Delta open house a few weeks ago.
• Participation levels during this Project’s consultation have far exceeded many other recent consultations in this region and hundreds of meetings have been held with First Nations, regional and local government staff, and interested stakeholders.
• The Province’s EA communication plan notes that more than 90 presentations have been made to date, in addition to hundreds of meetings with government and agency staff.

**Port Metro Vancouver is driving the Project**

• The new bridge will have the same vertical clearance as the Alex Fraser Bridge.
• There are no plans to dredge the river to a deeper depth once the Tunnel is removed.
• All current proposals for expansion on the Fraser River can be accommodated with the Tunnel in place.

*The Project will take away much needed funding ($4 billion) that should be spent on carbon mitigation, especially in transport for the province.*

• The Project will be tolled, ensuring that construction can begin now without taking away from funding for other important initiatives like health care, education, rapid transit and other transportation projects.
• The Province has committed to funding the province’s share of the Broadway Line extension and the Surrey-Langley Rapid Transit lines.

*The Tunnel should be left for use as a mass transit rail and as a means to prevent proposed LNG and coal expansion on the South Fraser.*

• The new bridge will be built to accommodate future rail-based transit, and in the meantime will support improved Rapid Bus service, with dedicated transit lanes, dedicated transit ramps to
connect to Bridgeport SkyTrain Station and integrated transit stops at Steveston Highway and Highway 17A.

- Currently proposed coal and LNG developments can proceed without removing the Tunnel; in fact, LNG vessels have shallower draft requirements than the container vessels using the Fraser River today.

The Project will negatively impact farmland in Delta and Richmond, compromising regional food security and putting pressure to remove land from the Agricultural Land Reserve.

- The Province has committed to no net loss of agricultural land and is working with farmers to achieve a net gain in quality farmland in Delta and in Richmond.
- Like the South Fraser Perimeter Road, this Project also offers potential agricultural benefits like improved cross-highway access and travel time reliability for getting perishables to market.
- The Project Team is working with the Delta Farmers' Institute, the Richmond Farmers' Institute and individual farmers.
- The Agricultural Land Reserve is protected by provincial legislation.

The Project will result in more idling or about the same for vehicles at the other bottlenecks resulting from the construction as well as increased traffic encouraged by the bridge.

- The Project is expected to reduce congestion related idling – both as compared with today and to a future without a new bridge. This will contribute to reduced greenhouse gas emissions.
- Bridge tolls will serve to help manage growth in traffic over time.

Steven Lam, P.Eng., Director of Engineering

LF/II
<table>
<thead>
<tr>
<th>Metro Vancouver Function</th>
<th>Issue or Impact</th>
<th>Actions Required of the Proponent to Address Issue or Impact (i.e. Commitments, Assurances, Compensation, Monitoring, Mitigation)</th>
</tr>
</thead>
</table>
| Regional Planning and Growth Management – Land Use | • No information is provided on how the project may impact industrial lands and industry in the region.  
• Regarding potential induced land use impacts of the project, although there are no land use re-designation changes directly associated with the project, there will be increased pressures for land use conversion. Consultant work completed to date that assesses the potential land use impacts of the project assumes the existing policy framework as laid out by Official Community Plans, the Regional Growth Strategy and the Agricultural Land Reserve. Assuming that the Urban Containment Boundary and Agricultural Land Reserve will not change is an important baseline, but it is also important to acknowledge that the new infrastructure will increase speculative pressure to expand the Urban Containment Boundary and to convert agricultural lands. | • Address how the proposed project may impact industrial lands and industry in the region.  
• Acknowledge and assess how the proposed project will increase speculative pressure to expand the Urban Containment Boundary and to convert agricultural lands. |
| Regional Planning and Growth Management – Transportation | • Incomplete information about the transportation effects of the new bridge on the regional transportation system.  
• Comparative information is missing on the baseline and forecast indicators in the Local Assessment Area, the adjacent watercrossings, and the Regional Assessment Area for personal vehicles and goods movement vehicles:  
  o Queue lengths on adjacent watercrossings,  
  o Mode share,  
  o Crash frequencies,  
  o Fuel consumption,  
  o Total greenhouse gas emissions (emissions from travel + congestion),  
  o Vehicle Kilometres Travelled, and  
  o Vehicle Hours Travelled | • Provide requested information, appropriate mitigation measures, residual effects and significance, cumulative effects and significance, and follow-up strategy. |
<table>
<thead>
<tr>
<th>George Massey Tunnel Replacement Project</th>
<th>Summary Assessment Table of Issues and Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Regional Planning and Growth Management – Agriculture</strong></td>
<td><strong>Regional Planning and Growth Management – Agriculture</strong></td>
</tr>
<tr>
<td>• Inadequate documentation of mitigation measures, residual effects and their significance, cumulative effects and their significance, and follow-up strategy to fully address the identified traffic issues.</td>
<td>• Potential effects of decommissioning the tunnel must consider multiple variables (climate change, sea level rise) and the likely scenario of river dredging on the salinity levels of irrigation water for agriculture during the growing season over the long term (10+ years) due to the high risk of loss of farm viability for one or more farms.</td>
</tr>
<tr>
<td>• The lack of a comprehensive assessment of the potential effects on the quality of irrigation water from the Fraser River from climate change and future scenarios of dredging when the tunnel decommissioned, raises questions as to how high salinity water quality issues can be fully mitigated.</td>
<td>• Consider the time of year of construction impacts to minimize effects during the growing season or physical degradation on soil quality.</td>
</tr>
<tr>
<td><strong>Regional Planning and Growth Management – Human Health</strong></td>
<td><strong>Regional Planning and Growth Management – Human Health</strong></td>
</tr>
<tr>
<td>• The proponent committed to conducting a Health Impact Assessment and the Application Information Requirements require the proponent to include the HIA’s methodology, conclusions and recommendations as part of the Application. The methodology section in the Application does not provide Metro Vancouver reviewers with sufficient confidence in the conclusions. The proponent has not provided the actual HIA report for review.</td>
<td>• Assess and implement mitigative measures to reduce potential health impacts.</td>
</tr>
<tr>
<td>• Monitor and evaluate the Health Impact Assessment’s health issues of interest at several stages post construction.</td>
<td>• Provide a modelling plan to Metro Vancouver to facilitate a complete review of the application.</td>
</tr>
<tr>
<td><strong>Air Quality and Climate Change – Project-Related Air Quality Impacts</strong></td>
<td><strong>Air Quality and Climate Change – Project-Related Air Quality Impacts</strong></td>
</tr>
<tr>
<td>• The Metro Vancouver Integrated Air Quality and Greenhouse Gas Management Plan is linked to the Regional Growth Strategy in that planning for compact urban areas and complete communities, including transit-oriented development, will reduce transportation emissions and protect air quality in the region. To align with the Plan and its goals for air quality and climate change, major projects in the region should support the goals and guidelines outlined in the Plan.</td>
<td>• Incorporate appropriately completed traffic analysis into the subsequent air quality, climate change and health effects assessments. This analysis needs to examine traffic impacts across a broader study area to assess changes in traffic volumes and</td>
</tr>
</tbody>
</table>
### George Massey Tunnel Replacement Project
**Summary Assessment Table of Issues and Impacts**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The proponent has not provided sufficient information to adequately characterize air emissions or assess/mitigate air quality issues and impacts in the following key areas:</td>
</tr>
<tr>
<td>o</td>
<td>Incomplete information on the inputs used in air quality modelling to support the conclusion of &quot;No Project-related residual or cumulative effects on air quality&quot;. This includes the absence of a modelling plan that complies with the BC Air Quality Dispersion Modelling Guideline, as well as incomplete information on the effects of the new bridge on transportation and traffic (i.e. traffic volume and distance travelled), such that emissions can be appropriately characterized. Without the technical details that must be included in a modelling plan, staff does not have the necessary information required to fully assess the Air Quality Study.</td>
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<td>o</td>
<td>Lack of comprehensive assessment of secondary formation of air pollutants, such as ground level ozone and secondary fine particulate matter within the Regional Assessment Area. The reduction of ground level ozone has been a focus of Metro Vancouver’s air quality program for decades, as articulated in regional air quality management plans in 1994, 2005 and 2011, as well as the Regional Ground Level Ozone Strategy adopted by the GVRD Board in 2014.</td>
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<td>o</td>
<td>Comments in the Regional Planning section on the completeness of the traffic modelling for the project application indicate that there is incomplete information for Vehicle Kilometres Traveled and Vehicle Hours Travelled, amongst other parameters. This information is crucial to the completion of the air quality, climate change and health effects assessments in the application. Without adequate information to review the traffic assessment, these assessments can also not be adequately reviewed.</td>
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<td>congestion at other points in the regional transportation system, and the associated changes in emissions and resultant environmental impacts. The analysis also needs to consider a range of future traffic scenarios to improve public confidence and address any criticisms of the selection of optimistic scenarios for the analysis.</td>
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<td>Include as part of the modelling plan an approach and methodology to conduct photochemical modelling in order to assess the impacts of the project on regional ground level ozone formation, over a broader study area and under a number of project-related traffic scenarios as noted above.</td>
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<td>Commit to contributing to additional ambient air quality monitoring stations, both fixed and mobile, to assess impacts of the project on an ongoing basis. The proponent should consult with air quality authorities in the region to determine the parameters to be monitored, the method of reporting, and the location of the stations.</td>
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| Air Quality and Climate Change – Construction Phase Air Quality and Health Impacts | • For the construction phase, there is no modelling provided of construction-related air quality and human health impacts. Instead, the proponent indicates that the Air Quality & Dust Control Management Plan (not yet developed) will include best management practices that will mitigate air quality impacts (and associated health impacts) from construction, although no evidence of the efficacy of the best management practices has been provided.  
• Project information provided by the proponent states that “Air quality comprises one of the ‘steps’ along the pathway of effects of the Project, with human health identified as the ultimate receptor of Project-related effects.” This raises consequential concerns about the basis for the analysis of air quality-related health impacts.  
• Prepare the Air Quality & Dust Control Management Plan in advance of project initiation, and provide it for review and comment by relevant air quality regulatory and other agencies. The management plan must include provisions for baseline air quality and dustfall monitoring prior to initiation of construction, during construction, and once construction is complete. The results of this monitoring program must be regularly reported to relevant air quality regulatory and oversight agencies. |
| Air Quality and Climate Change – Greenhouse Gases and Climate Impacts | • Information provided by the proponent describes greenhouse gas emissions in the context of “the Project alignment” comparatively in 2011 and 2031 (with and without the Project). Greenhouse gas reductions are attributed to both engine technology improvements and congestion relief. It is not appropriate to examine greenhouse gas emission changes within a geographic scope as limited as “the Project alignment”. The assessment not only fails to consider greenhouse gas emissions in the broader regional context, but also fails to assess changes in greenhouse gas emissions due to either induced traffic as a result of the project, or changes in traffic volumes (and congestion and emissions) in other parts of the regional transportation system.  
• Examine potential greenhouse gas emissions impacts associated with the Project over a regional scope and with a range of scenarios to comply with regional greenhouse gas emissions reductions targets. |
| Environment and Regional Parks – Habitat, Wildlife and Fish | • Information provided by the proponent does not identify that Deas Island hosts one of the largest and most significant bat colonies in the Lower Mainland. This colony will be affected by noise and construction activities during the breeding season and will be permanently impacted by increased lighting and noise from the bridge.  
  
• The tunnel removal and bridge construction has the potential to affect fish and wildlife and their habitat at Deas Island Regional Park in the water connected to it temporarily in several ways:  
  
  o Increase turbidity and potential decrease in ambient water quality in the water connected to Deas Island due to sedimentation during clearing and grubbing, and installation of temporary barging facilities.  
  
  o The possibility of accidental spills of toxic or hazardous materials into the water connected to Deas Island.  
  
  o Temporary re-suspension of existing contaminants into the water column.  
  
  o Physical injury or direct mortality to fish from noise during ground improvements and during tunnel decommissioning.  
  
  o Dredging, tug and barge operations and removal of rip rap have the potential to disturb to fish and mammals.  
  
  o Changes in fish habitat quality due to acoustic effects, changes in ambient water quality, induced turbidity, riverbed lowering, and local scouring.  
  
  o Auditory physical injury (impact pile driving) and/or behavioural disturbance (vibratory pile driving and in-river operation of construction vessels) on marine mammals (seals & sea lions) from increased underwater noise.  
  
  o Temporary changes to the ability of on marine mammals to feed on migrating fish stocks that may in turn be affected from changes in ambient water quality from induced turbidity, and re-mobilization of sediment contaminants. | • Adhere to provincial and federal laws, best management practices, and timing windows to avoid temporary and permanent disturbance to the Deas Island Regional Park Bat Colony.  
  
• Continue to work with Metro Vancouver (including but not limited to technical working groups) during the design and construction phases to minimize or eliminate impacts to Deas Island Regional Park and its environs.  
  
• Avoid sensitive ecosystems in Deas Island Regional Park  
  
• Commit to no net loss of habitat and collaborative work with regional agencies to determine compensation, mitigation, and monitoring requirements.  
  
• Work with Metro Vancouver to offset negative impacts on fish and wildlife and their habitat on Deas Island Regional Park by conducting revegetation and restoration of areas within the Project alignment, including under the new bridge to improve ecological conditions.  
  
• Work with Metro Vancouver to offset negative impacts on fish and wildlife and their habitat on Deas Island Regional Park and Deas Slough by conducting revegetation and restoration of areas within the Project alignment, including under the new bridge to improve ecological conditions. |
| o | Habitat loss and direct mortality of terrestrial wildlife that move between Deas Island Regional Park and adjacent forests, during vegetation clearing and grubbing, stripping, and soil excavation. |
| o | Habitat alteration due to sensory disturbance from noise, dust, and presence and movement of construction crews and equipment. |
| o | Direct mortality and disturbance to upland birds that move between Deas Island Regional Park and adjacent forests (e.g., destruction of raptor and passerine nests). |
| o | Temporary disturbance of vegetation. |
| o | Construction of temporary bridges on either side of the existing Deas Slough Bridge, including temporary piers in Deas Slough, will result in vegetation removal and habitat impacts. |

- The bridge may affect the fish and wildlife and their habitat Deas Island Regional Park and the water connected to it permanently in several ways, including:

  - An increase of impervious surface area and stormwater runoff entering the river could increase in concentrations of nutrients, organics, metals, chlorides, bacteria, and hydrocarbons in the water connected to Deas Island.
  - Physical injury or direct mortality to fish due to auditory injuries from pulsed noise (i.e., impact pile driving) and auditory physical injury to marine mammals.
  - The reduction of and changes to habitat used by existing fish and wildlife that move in and out of Deas Island Regional Park, due to changes in quality due to acoustic effects, changes to ambient water quality, and the permanent placement of in-stream piers.
  - Permanent habitat alteration and loss as well as disturbance to wildlife (mainly birds and bats) due to increased noise levels and increased ambient light environment from vehicle traffic.
  - Species at Risk in the park which are potentially affected by the new bridge include: Barn Swallow, Barn Owl, Great

| • | Adhere to provincial and federal laws, best management practices, and timing windows to avoid temporary and permanent disturbance to fish and wildlife and their habitat. |

| • | Prepare the Invasive Species Management Plan in advance of project initiation, and provide it for review and comment by relevant agencies, including Metro Vancouver’s Regional Planning Advisory Committee – Regional Invasive Species Task Force. |

| • | Commit to ongoing monitoring and control of invasive species along Highway 99. |
| Regional Parks – Park Land and Visitor Experience | Blue Heron, Trowbridge’s Shrew, Olympic Shrew, Pacific Water Shrew, and Southern Red-back Vole.  
- The permanent destruction of raptor and passerine nests (barn swallow nesting area under the Deas Slough Bridge and bald eagle nest in BC hydro right-of-way) which are used by birds that actively use the park for feeding and resting.  
- Increased vehicle collisions with avian wildlife.  
- The proponent committed to developing an Invasive Species Management Plan, but the plan is not included in the application. |  
| Regional Utilities – Water and Liquid Waste | Deas Island Regional Park and its recreational values are directly and significantly impacted by the proposed project. In particular, noise, debris, shading and visual effects from the bridge will impact visitor experience.  
- Construction access through Deas Island Regional Park is not desirable from a park visitor perspective, and existing park infrastructure is inadequate to support this type of use.  
- Access through the Regional Park will likely be required for long-term maintenance of the Ministry’s bridge. Pursuant to Metro Vancouver Regional Parks Bylaw No. 1177, 2012, all commercial access through or on Metro Vancouver Regional Parks must undergo a permitting process. Park roads and trails may require upgrades to support access. Some roads and trails may not be suitable due to adjacent sensitive habitat.  
- The proposed Project involves construction of temporary and permanent works both crossing, and in close proximity to, several existing Metro Vancouver water mains, (Lulu Island-Delta Main and River Road West Main) at multiple locations. Both of these mains are critical for water supply to the City of Richmond and Corporation of Delta. |  
|  | - Provide visual modeling and description of the viewshed under the bridge.  
- Continue to work with Metro Vancouver staff to secure the required permits for construction and maintenance access through the park.  
- Confirm the nature of access required post construction and complete an impact assessment that includes the area and park assets.  
- Continue to work with Metro Vancouver during the design and construction phases to minimize or eliminate impacts and potential risks to regional utility infrastructure. |
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<th>At this phase of the project development, the design details and construction schedule have not been established. However, water supply to Richmond and Delta would be significantly impacted if construction activity were to damage either main during summer peak demand period. The impact of damaging both mains concurrently would be critical at any time of the year. These same comments would apply to any proposed relocation of these regional water facilities. Construction must be therefore carefully planned and phased to ensure risks are minimized and water supply is maintained.</th>
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<td></td>
<td>MOTI indicates that the mitigation of impacts to the Lulu Island-Delta and River Road West Mains for land-based construction will be a Contractor responsibility.</td>
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<td>On land, Lulu Island-Delta Main will be impacted by two separate overpass and highway construction activities in north Richmond: the first is dedicated transit lanes starting south of the Bridgeport Road interchange and terminating at Van Horne Way. The second is at Shell Road where new overpass will be constructed.</td>
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<td>Multiple construction activities such as ground improvement, foundations, structures, temporary bridges, highway crossings and the realignment of Green Slough are expected adjacent to the River Road West Main in Delta on the south shore of Deas Slough.</td>
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<td>Greater Vancouver Sewerage &amp; Drainage District Brighouse Branch Sewer lies within the footprint of the dedicated transit lanes crossing Bridgeport Road.</td>
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<td>Metro Vancouver will require access to its infrastructure both during and following construction.</td>
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<td>Commit to bearing all associated costs for protection and/or relocation of regional utilities.</td>
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<td>Require project contractors to protect Metro Vancouver infrastructure and specify that risks, responsibilities, costs, methods of protection and schedule must be borne by the Contractor.</td>
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<td>Comply with all Metro Vancouver requirements, including any crossing and proximal work approvals and related submissions pertaining to design and construction of temporary and permanent works.</td>
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<td>Commit not to undertake GVWD utility relocations (if required) during peak summer water demand period.</td>
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<td>Commit to not undertake proximal work adjacent to River Road West Main at Deas Slough and Lulu Island-Delta Main in north Richmond concurrently at any time of the year.</td>
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<td>Provide details of support structures for the temporary bridge over Deas Slough, the south approach to the Massey Bridge, the southbound River Road off-ramp, and the Shell Road Overpass and dedicated transit lanes in north Richmond to assess the potential impact to Metro Vancouver utility infrastructure.</td>
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### George Massey Tunnel Replacement Project
#### Summary Assessment Table of Issues and Impacts

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<tr>
<th>Tunnel Decommissioning:</th>
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<tr>
<td><strong>Lulu Island-Delta Main</strong> crosses the Fraser River between Richmond and Delta buried in a shallow trench under the river bed and may be impacted by Fraser River bed lowering caused by tunnel removal. This bed lowering may impact the existing scour protection and undermine the pipe.</td>
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<td><strong>For the Lulu Island-Delta Main Fraser River Crossing, MOTI proposes a mitigation plan to monitor the pipe during, and following, tunnel removal and to add scour protection as required.</strong></td>
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### Finance – Costs and Business Plan

| No sensitivity analysis on construction costs or project benefits is provided (only discount rate and traffic growth rates). |
| The breakdown of project costs is redacted. Therefore, the amount of construction plus contingency is unknown, as is the interest during construction and the tunnel decommissioning cost (which does not appear to include a contingency.) Contingencies may be insufficient and therefore project costs could well exceed $3.5B. |
| Construction costs are among the most important components of the business case analysis, as they could easily be higher and because they occur most closely to the present (as opposed to benefits which occur over the period to 2045). The present value of cost overruns will be relatively high. |

| Provide Metro Vancouver with unimpeded access to its utility infrastructure for operation and maintenance activities both during and after construction of the Project. |
| Improve upon the monitoring and mitigation plan for the Lulu Island-Delta Main Fraser River Crossing in a preventative and proactive manner. There are periods where no in-river construction is permitted due to environmental and other permitting restrictions, or is limited due to high river flows. Metro Vancouver has concerns with the reactive approach proposed by MOTI in its submission to the provincial Environmental Assessment Office. |
| Extend hydraulic modelling of the Fraser River beyond 210 days from the date of tunnel removal in order to fully assess the impact of downstream scour and bed lowering on the Lulu Island-Delta Main. |

<p>| Provide a sensitivity analysis on construction costs and project benefits. |
| Provide project cost details, including contingency details. |
| Provide 2003 report used to calculate the incremental GDP growth of $13M/year every year from 2021-2045. |
| Provide complete information on cash flows related to the project, including timing of expenditures. |
| Provide information on how the benefit of seismic improvements was calculated. |</p>
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<th>Issue</th>
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<td>• Insufficient information is provided on how the assumption of</td>
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<td>incremental GDP growth of $13M/year every year from 2021-2045 is</td>
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<td>arrived at, as that information is drawn from another report from</td>
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<td>2003, which was not part of the application materials submitted.</td>
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<td>Information on how the results from the 2003 report were used to</td>
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<td>arrive at the stated values of GDP growth is not provided and</td>
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<td>therefore Metro Vancouver staff are unable to provide comments on</td>
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<td>this assumption. This assumption is critical as the project only</td>
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<td>becomes a clear winner when assumed incremental GDP effects are</td>
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<td>included. Also, it is not clear whether the incremental GDP is in</td>
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<td>real dollars or nominal dollars.</td>
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<td>• Incomplete information is provided on cash flows related to</td>
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<td>the project. Therefore, it is not possible to verify calculations</td>
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<td>of net present value because the information only includes the</td>
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<td>total for the project cost and not the timing of expenditures.</td>
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<td>• Unclear how benefit of seismic improvements was calculated.</td>
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<td>• The business case only compares with status quo. It is quite</td>
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<td>possible that the Province could gain greater net benefits from</td>
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<td>another project.</td>
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George Massey Tunnel Replacement Project:
Areas of Potential Impact to Metro Vancouver Utilities

Legend
- **MV Water Main**
- **MV Sewer Main**
- **George Massey Tunnel Replacement Project Scope**