BC’s Massey Tunnel:

- Current physical condition??
- Remaining use-able life??
- Costs to maintain annually 2019-2069??

➢ BC Govt & Metro Vancouver transparency needed!!
Massey Tunnel- Information needed:

1) What is remaining use-able tunnel life estimate based upon??

- Reports from competent, qualified engineering/construction company(s)?? Or

- Un-supported govt memorandums/ word of mouth from BC govt staffers??

2) If based on written reports, what are the titles and dates of these report(s)??

3) Names of company(s) that produced these reports??
4) Is current tunnel lifespan estimate based on an assumption or projection that **major refurbishments of the tunnel would be required** during this period?? If Yes,

5) What is the nature of the required refurbishments??

6) **Estimated costs** of Tunnel refurbishments during 2020 to 2070??

7) Schedule?? IE: year(s) refurbishments would have to occur??

8) When refurbishments are being conducted, would availability of tunnel and or one or more tunnel's lanes be reduced??

9) If Yes- details??...
Requested Motion:

• Require that a letter is sent from the task force (and or MV GVRD Board) to BC's Minister of Transportation and Infrastructure requesting that:

  ➢ A comprehensive structural assessment of the Massey Tunnel is conducted by a qualified engineering and construction firm with an objective of establishing:

  1) The likely remaining use-able life of the tunnel;

  2) If major refurbishments are required 2020- 2070- the nature of required refurbishments;

  3) **Estimated costs** of such refurbishments;

  4) A refurbishments schedule 2020- 2070:

  5) The likely remaining use-able lifespan of the tunnel **without** major refurbishments;

  6) Structural assessment report(s) should be made public!!
George Massey Crossing Project

Phase 2: Crossing Options
Task Force Meeting #2
July 24, 2019
Phase 1
• Confirm principles, goals and objectives

Meeting 1
• Confirm long-list of options and evaluation framework

Meeting 2
• Confirm short-list of options

Meeting 3
• Select leading preferred option

Meeting 4
• Endorse final solution to recommend to Metro Vancouver Board

Purpose: Short-list Potential Options
Discussion Topics

1. Multi-modal needs assessment
2. Existing tunnel condition
3. Structure feasibility and impacts
4. Travel demand modelling
5. Preliminary shortlist discussion
Evaluation Process Recap: Long-list

- Travel demand modelling
- Tunnel condition assessment
- Multi-modal needs
- Structure feasibility and impact assessment
- Sensitivity analysis

FOCUS ON TRANSIT AND ACTIVE TRANSPORTATION

Short-list
Multi-modal Needs Assessment

• Transit assumptions:
  – Commitment to transit growth; including dedicated lanes
  – Transit service in curb lane

• Multi-use path (MUP) assumptions:
  – 2 single-direction paths
  – 4 m width desired; 3.5 m acceptable
Existing Tunnel Condition

- Seismic strength est. 1-in-275 event; lifeline std. is 1-in-2475-year.
- Can be seismically retrofitted to 1-in-475 but requires full closure to complete.
- Requires further lighting, electrical, and drainage improvements and improved Fire and Life Safety (FLS).
- Otherwise structurally sound.
- Does not meet minimum lane width standards for 4 vehicle lanes.
- Vertical clearances are substandard.
- Can be used for multi-use path; requires separate ventilation from traffic.

Conclusion: consider for local traffic, transit and/or MUPs only (with seismic and FLS upgrades) or leave for utilities only (no upgrade).
Range of Structural Options

- Bored tunnel
- Immersed tube tunnel (ITT)
- Bridge
- Re-use existing tunnel in combination with above
# Structure Feasibility and Impacts: Specifications

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Service Life Design</td>
<td>New: 100-150 years&lt;br&gt;Retrofit: assume 50 years or less</td>
</tr>
<tr>
<td>Seismic Resilience</td>
<td>New: 1-in-2475 yr (lifeline structure)&lt;br&gt;Retrofit: upgrade to 1-in-475 yr</td>
</tr>
<tr>
<td>Maximum Grade</td>
<td>5%</td>
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<tr>
<td>Road Geometry</td>
<td>Highway: BC MOTI standards&lt;br&gt;Bridge: BC MOTI standards&lt;br&gt;Tunnels: Meet FLS standards</td>
</tr>
<tr>
<td>Maximum Tunnel Width (interior)</td>
<td>Bore: 16 m inside diameter&lt;br&gt;Immersed Tube (ITT): 40-42 m</td>
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</tbody>
</table>
## Structure Feasibility and Impacts: Specifications

<table>
<thead>
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</table>
| Minimum Separation Between Tunnels         | New ITT: 10-25 m  
Existing: 25 m  
Bore: 26 m (1.5 diameter)               |
| Ventilation in Tunnels                     | Uni-directional traffic                                                       |
| Fire and Life Safety                       | Design for all “Ages and Abilities”                                           |
| In-stream Construction Season (if required)| July to mid-February  
(to accommodate fish migration)                                                  |
| Geographic extent                          | Steveston to Hwy 17A interchanges                                             |
Preliminary Analysis: Bored Tunnel Configuration

- Depth of tunnel is governed by depth of liquefiable soils (est. 35-50 metres).
- Resulting length is 3-4 km; may extend north of Steveston and south of Hwy 17A; challenging connections required.
- Significant excavation challenge at the interchanges.
- Stacked roadway configuration, max four lanes per bore.
- MUP not feasible with 8-lanes (use existing tunnel or separate new facility).
- Stairs may be required for emergency egress, making FLS for all ages and abilities challenging.
Bored Tunnel: Typical Configuration
Bored Tunnel: Anticipated Profile

TUNNEL PORTAL EXCAVATION

STEVESTON
FRASER RIVER
DEAS SLOUGH
HWY 17A
Preliminary Analysis: ITT Configuration

• Depth of tunnel governed by *Navigation Protection Act*.  
• Resulting length is approx. 1.8 kilometres (similar to existing).  
• Connections to interchanges similar to today, with possible impacts to Deas Island Park and at the north approach.  
• Requires extensive dredging for construction and large graving dock.  
• MUP feasible in 8 lane tunnel only if two tunnels; large footprint.  
• New bridge over Deas Slough; navigation clearance TBD.
ITT: Anticipated Configuration
ITT: Anticipated Profile

EXISTING DIKE PROTECTION AND NEW BRIDGE PIERS IN DEAS SLOUGH ALSO REQUIRED

STEVESTON

RICE MILL RD.

RAIL

FRASER RIVER

RIVER ROAD

DEAS SLOUGH

HWY 17A
Preliminary Analysis: Bridge Configuration

• Height governed by *Navigational Protection Act*; similar to Alex Fraser.
• Length estimated at 3 km.
• Large structures required for ramp connections at Steveston interchange.
• 8 lanes with MUP achievable; weather and elevation challenges for cyclists.
• Noise and visual impacts in Deas Park, Richmond and Delta.
• Light impacts required in Deas Park.
Bridge: Typical Configuration
Bridge: Anticipated Profile

SNOW AND ICE MANAGEMENT SYSTEM ALSO REQUIRED

STEVESTON HWY 17A
FRASER RIVER
DEAS SLOUGH
HWY 17A

2019-07-24 GMC Phase 2 Preliminary Draft for Discussion
Travel Demand Modelling

• Modelled runs:
  4 lane (base case)
  6- and 8-lane (TransLink Regional Transportation Model)

• Model assumptions as per TransLink 10-yr plan
George Massey Crossing RTM AADT Forecast

- 2017: 85,300
- 2035: 93,700 (+17%)
- 2050: 98,200 (+19%)

4-Lane

6-Lane

8-Lane
Lane Alternatives Analysis Summary

• 6-lane generates significant benefits in the off-peak direction on Hwy 99; some peak direction benefits.
• 8-lane **with** transit dedication incentivizes transit use and provides upside future Hwy 99 resilience benefits.
• 8-lane **without** transit dedication generates overall network benefits but limits transit network benefits.

• **Staff Working Group general consensus:** maintain 3 GP lanes in peak direction and incorporate transit dedication in both directions.
Preliminary Short-list: Working Group Recommendation

With Existing Tunnel:

• New 4-lane bridge; keep existing 4-lane tunnel *(drop – below standards)*
• New 4-lane deep bored tunnel; keep existing 4-lane tunnel *(drop – below standards)*
• New 4-lane immersed tube tunnel; keep existing 4-lane tunnel *(drop – below standards)*

• New 6-lane bridge; keep existing tunnel for transit or local traffic *(2 lanes only)*
• New 6-lane deep bored tunnel; keep existing tunnel for transit or local traffic *(2 lanes only)*
• New 6-lane immersed tube tunnel; keep existing tunnel for transit or local traffic *(2 lanes only)*
Preliminary Short-list: Working Group Recommendation

**Without Existing Tunnel:**

- New 6-lane bridge (all GP lanes); with counterflow (drop – transit service limitations)
- New 6-lane deep bored tunnel (all GP lanes); with counterflow (drop – transit service limitations)
- New 6-lane immersed tube tunnel (all GP lanes); with counterflow (drop – transit service limitations)
- New 6-lane bridge (all GP lanes); without counterflow (drop – no opportunity for dedicated transit)
- New 6-lane deep bored tunnel (all GP lanes); without counterflow (drop – no opportunity for dedicated transit)
- New 6-lane immersed tube tunnel (all GP lanes); without counterflow (drop – no opportunity for dedicated transit)
Preliminary Short-list: Working Group Recommendation

Without Existing Tunnel:
- New 7-lane bridge; with counterflow (drop for now, potentially revisit)
- New 7-lane deep bored tunnel; with counterflow (drop – ventilation challenges)
- New 7-lane immersed tube tunnel; with counterflow (drop – ventilation challenges)
- New 8-lane bridge; consider potential with dedicated transit lanes (keep)
- New 8-lane deep bored tunnel; consider potential with dedicated transit lanes (keep; locate MUP elsewhere)
- New 8-lane immersed tube tunnel; consider potential with dedicated transit lanes (keep; locate MUP elsewhere)
Next Steps

• Mayors Council Meeting (25 July)
• Complete meetings with First Nations (in progress)
• Re-confirm Transport Canada navigational requirements
• Conduct shortlist evaluation
Thank You