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# George Massey Tunnel Replac Project

Analysis and Comments  
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Analysis: George Massey Tunnel Replacement Project

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# NICHOLAS WONG CONSULTING

Analysis: George Massey Tunnel Replacement Project

## **Introduction**

The opinions contained herein are solely those of the Author and in no way represent any other individual, body of individuals, association, or organization. This paper regards the provincially proposed bridge to be built along the Highway 99 corridor with the intention of replacing the George Massey Tunnel (GMT). The intention of this document is to summarize incongruences in its justification, to demonstrate that removing the GMT would be unwise, and to present evidence indicating that the George Massey Tunnel Replacement Project (GMTRP)'s goal of replacing the GMT with a bridge is neither an effective nor economically sound solution to the traffic bottleneck through the highway 99 corridor.

# NICHOLAS WONG CONSULTING

Analysis: George Massey Tunnel Replacement Project

## **Executive Summary**

The GMTRP has been plagued by contradictory or absent information. In such an environment, it is impossible to form an educated opinion of the project. To explore the systematic nature of the political deception surrounding the bridge proposal, three broad areas were explored: traffic, seismic safety standards, and budgetary concerns. The conclusion being that removing the GMT is unnecessary and a poor economic choice to alleviate traffic congestion or to address any of the stated project goals. The only advantage to removing the GMT is to allow larger ships up the Fraser River indicating that the tolled crossing is designed as a subsidy for the export industry.

The purported primary justification for the GMTRP was the reduction of traffic congestion. However, the 2.1:1 cost-benefit ratio reported in the GMTRP Business Case relies on grossly exaggerated traffic figures that are directly contradicted in the GMTRP Traffic Data Overview. The GMTRP team also fails to provide any citations or justification for the estimated reduction in wait time that the bridge will allegedly bring while, at the same time, soundly ignoring the comments and concerns of Mayors in the surrounding communities and 3 regional transportation plans calling for a transit solution and the twinning of the GMT. The MOTI and the BC Liberal Party's fail to address the viability of any solution to congestion besides more infrastructure.

The BC Liberal Party and the GMTRP advocates have been quick to point out that the GMT is not up to modern seismic standards despite undergoing a seismic retrofit. This stance directly contradicts statements made by the BC Ministry of Transportation and Highways. Research indicates that the reason the GMT is below modern standards is that the BC Liberal Party in 2006 prevented the second phase of the seismic retrofit from moving ahead despite indications that its completion would meet national seismic safety standards for \$20 million or 1.1% the cost of the bridge. The reasoning behind the decision was attributed to plans to remove the tunnel in less than 20 years. This is in spite of the fact that, as of 2006, the BC government's official stance was to twin the bridge for \$700 million following the gateway project.

The final point of analysis is in regards to the price of the proposed bridge in relation to the stated alternatives. When the public was presented with the five options for the GMTRP none of the options were fully articulated and none had information regarding cost. This is evident in the Phase II consultation summary in which it is reported that respondents found the \$3.5 billion bridge option to be the most cost effective despite it being at least 5 times as expensive as a submerged tunnel alternative. While numerous examples of comparable marine span solutions with constructions costs as low as 6.3% the cost of the proposed bridge can be provided, the GMTRP maintains that its bridge will be of a comparable price to a submerged tunnel. It is important to note that whether or not this is true, removing the GMT is not an economically justifiable position.

# NICHOLAS WONG CONSULTING

Analysis: George Massey Tunnel Replacement Project

## History

When the 629-metre-long George Massey Tunnel opened in 1959, it was considered an engineering marvel. Originally called the Deas Island Tunnel, it was the first project in North America to use immersed tube technology. Six concrete segments, each measuring 344 feet long and weighing 18,500 tons, were constructed on a dry dock on the shore of the Fraser River, then sealed and floated to the site where they were sunk into place, secured together and readied for use. About 1,500 people worked on the original tunnel, which cost approximately \$29 million to complete. Queen Elizabeth opened the then state-of-the-art tunnel to overwhelming support. The tunnel was opened with a toll of 25 cents per car, which eventually increased to one dollar. Tolls were removed in 1964 when the majority of the tunnel's construction costs had been repaid. George Massey himself paid the last toll. Beginning in 1981, counter-flow measures were introduced, using a reversible lane system, which continues to operate today, to increase traffic flow during peak traffic periods. Seismic upgrades were made in 2006, including installation of an advanced warning system.<sup>1</sup>

Since the George Massey Tunnel Replacement Project (GMTRP) bridge was first announced in 2013, the public has been left wanting for information. The decision to replace the GMT with a \$3.5 billion bridge was made without a budget, without information about tolling or funding, without a business plan, without any contextual traffic analyses, and even without information regarding the size or scale of the project. All major public infrastructure projects should be based on detailed and public documentation and meticulous analysis; this has not been the case. Multiple Freedom of Information Act requests to the Premier's office and the Ministry of Transportation and Infrastructure (MOTI) have turned up no technical reports, no business case, no cost analysis, and no information to support the decision. All responses were synonymous to the standard reply "Although a thorough search was conducted, no records were located in response to your request"<sup>2</sup>. Despite an utter lack of information, British Columbians were given promissory commencement and completion dates by Premier Christy Clark. Details released in December, 2015, indicate that it will be the largest bridge in British Columbia, it will have a budget of \$3.5 billion, and that it will be tolled. The GMT replacement bridge will be 65% longer and 26.3% taller than the \$3.3 billion Port Mann Bridge project<sup>3</sup>.

## Problem Definition

The primary issue regarding the GMTRP proposal is the lack of reliable information being presented to the public for consideration. Proponents of the bridge have cited strong public support for their solution. However, that support, if it exists, exists without information regarding the cost of the bridge in relation to alternatives, any scientific support, or any sources or citations

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<sup>1</sup> George Massey Tunnel Replacement Project Phase 1 Consultation Discussion Guide, British Columbia Ministry of Transportation and Infrastructure (November/December, 2012)

<sup>2</sup>

<sup>3</sup> Comparison between Wikipedia: Port Mann Bridge ([https://en.wikipedia.org/wiki/Port\\_Mann\\_Bridge](https://en.wikipedia.org/wiki/Port_Mann_Bridge)) and CBC News article (<http://www.cbc.ca/news/canada/british-columbia/massey-tunnel-replacement-bridge-1.3367368>)

# NICHOLAS WONG CONSULTING

## Analysis: George Massey Tunnel Replacement Project

for the figures being used as a justification. Therefore, before equitable consideration can be given to the project, it is important to establish a baseline of veracity for the justifications of the GMTRP and considered and analyze countervailing information.

The problem of traffic through the south arm crossing of the Fraser River exists, but, in its current form, the GMTRP is presenting a solution taken in isolation of the larger transportation network and without consideration to any regional transportation planning. This must be remedied. The BC Liberal Party's stance on the justification for the project is the alleviation of traffic through the Highway 99 Corridor and the Alex Fraser Bridge and the GMT not being up to modern seismic safety standards. There is a lack of evidence to support this stance. The \$3.5 billion proposed bridge is neither the most effective manner to address these concerns nor is it the most cost effective. Moreover, there is no justification for the removal of the GMT except to support port activities in the south arm of the Fraser River.

# NICHOLAS WONG CONSULTING

Analysis: George Massey Tunnel Replacement Project

## Analysis

The following section will focus on the justifications and facts presented by the proponents of the bridge and will highlight those areas where the justification is insufficient, major concerns regarding the project as a whole, and those areas where the justification can be shown to be misleading or deliberately false.

### 1) Traffic and Transit Misinformation

Public support for the bridge largely hinges on traffic and congestion concerns. The GMTRP team consistently emphasizes the way in which their bridge will alleviate the bottleneck. Minister of Transportation and Infrastructure, Todd Stone, has stated that “this will be the largest bridge ever built in B.C. When completed, it will address what is now the worst traffic bottleneck in the province”.<sup>4</sup>

In order to legitimize the traffic concern in their 2.1:1 cost-benefit ratio, the GMTRP business case cites an estimated future annual traffic growth of 0.65%. However, their own reports indicate that traffic volume through the GMT has fallen at a rate of -0.36% per annum since 2003<sup>5</sup>. Figures from Translink indicate a far more drastic reduction of -7.5% through the GMT from 2004-2008, an annual traffic growth rate of -1.88%. The GMTRP business case claims that an annual growth rate of 0.65% is “consistent with historical trends as well as projections in Translink’s Regional Transportation Model”<sup>6</sup>. This statement was directly contradicted in the GMTRP Traffic Overview, released in November, 2015, which indicates an annual growth in average daily traffic of -0.36%<sup>7</sup>. The Ministry of Transportation and Infrastructure (MOTI) has directly contradicted itself in two documents released less than a month apart. The drop in traffic rates may be attributed to a 4% increase in average automobile capacity or a 6.67% increase in transit ridership through the corridor from 2008 to 2011<sup>8</sup>. At the very least, this represents a gross exaggeration and the dissemination of deliberate misinformation in the service of advancing the case for the removal of the tunnel and building a bridge. When considered in conjunction with the GMTRP business case’s lack of citation or justification for their figures on the estimated reduction of wait times in section 3.1.1 of the report, one must conclude that they are, with malicious intent, deliberately fabricating statistics to forward their agenda or the entirety of the GMTRP team is both negligent and incompetent<sup>9</sup>. In either case, they cannot be trusted to make reasonable decisions as they regard the GMTRP and certainly not the removal of the GMT.

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<sup>4</sup> BC Government News Release (December 16, 2015) <https://news.gov.bc.ca/releases/2015TRAN0181-002105>

<sup>5</sup> George Massey Tunnel Replacement Project: Traffic Data Overview (November, 2015)

<sup>6</sup> George Massey Tunnel Replacement Project: Business Case (October, 2015)

<sup>7</sup> George Massey Tunnel Replacement Project: Traffic Data Overview (November, 2015)

<sup>8</sup> 2011 Metro Vancouver Screenline Survey Summary Report (August 2013)

<sup>9</sup> George Massey Tunnel Replacement Project: Business Case (October, 2015)

# NICHOLAS WONG CONSULTING

## Analysis: George Massey Tunnel Replacement Project

Gross overestimates of traffic are a minor issue in the justification of the project. The GMTRP completely ignores regional traffic strategies and the concerns of the Mayors of Vancouver and Richmond who believe that “building bigger bridges fails to address long-term solutions for congestion”<sup>10</sup>. There have been multiple comprehensive plans in the past to address regional traffic issues, the Provincial Transit Plan, the Mayors’ Council Transit Plan, and the Gateway project. Each addressed the GMT congestion issue, yet the proposals of each have been forgotten.

The GMTRP ignores the traffic alternatives set out in the 2008 “Provincial Transit Plan” put forth by the governing BC Liberals under Gordon Campbell and then-Minister of Transportation and Infrastructure, Kevin Falcon. The RapidBus BC program was designed to alleviate traffic through the Highway 99 corridor by offering express service through the GMT through to Surrey and White Rock<sup>11</sup>. Even the then-CEO of Translink, Tom Prendergast, stated that the project would result in significant increases in transit ridership through highway 99<sup>12</sup>. Massive upgrades and major bus lanes along highway 99 were constructed to that end; these expensive modifications are being grossly underutilized by the current administration. The Mayors’ Council Transit Plan emphasized again the need for a transit solution rather than expanding automotive dependency. A transit solution is supported by former six term Vancouver City Councillor and transportation and land use expert, Gordon Price. Comparatively, Mr. Price claims that Downtown Vancouver Traffic had, in 2010, fallen to 1965 levels. The transportation expert believes that this is proof that offering alternatives to automobiles is a superior solution to rising congestion and represents a movement away from a car dependent culture<sup>13</sup>. The aforementioned programs and opinions are evidence that a transit solution is a viable option to the reduction of congestion through the GMT.

The Gateway Project, despite being a highway and roads project, pushed for development within a comprehensive regional plan. Bob Wilds, director of the Greater Vancouver Gateway Council, understood that “once [highway] 99 is tied into the new truck route [South Fraser Perimeter Road]... that will encourage more traffic to and from Vancouver and we’ll need a bigger bridge at Oak Street or Knight Street or both”<sup>14</sup>. Alleviating the bottleneck at the GMT will only serve to increase overall wait times for commuters into Vancouver as the Oak and Knight Street bridges become overburdened. The Gateway Council went even further than this and advocated for the expansion of the GMT, not its removal. The GMT expansion project had a total proposed

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10 CBC: Massey Tunnel Replacement not a Solution for Traffic Congestion Says Mayors (December 16, 2015) <http://www.cbc.ca/news/canada/british-columbia/massey-tunnel-bridge-vancouver-mayors-1.3369058>

11 Vancity Buzz: The \$14 Billion Transit Plan the BC Liberals Conveniently Forgot (March 19, 2015) <http://www.vancitybuzz.com/2015/03/14-billion-transit-plan-b-c-liberals-conveniently-forgot/>

12 BC Ministry of Transportation News Release (Dec 11, 2008) [https://archive.news.gov.bc.ca/releases/news\\_releases\\_2005-2009/2008TRAN0097-001880.htm](https://archive.news.gov.bc.ca/releases/news_releases_2005-2009/2008TRAN0097-001880.htm)

13 The Georgia Straight: New Bridge Ordered as Massey Tunnel Traffic Drops Sharply (September 25, 2013) <http://www.straight.com/news/429166/new-bridge-ordered-massey-tunnel-traffic-drops-sharply>

14 Vancouver Sun: All Roads Lead to More Debate (February 4, 2006) [http://www.canada.com/story\\_print.html?id=0199b01a-066f-4c3a-84fd-f3d3c22df318&sponsor=](http://www.canada.com/story_print.html?id=0199b01a-066f-4c3a-84fd-f3d3c22df318&sponsor=)

# NICHOLAS WONG CONSULTING

Analysis: George Massey Tunnel Replacement Project

budget of \$700 million and included an additional submerged tube and an extension of the HOV lanes from Westminster Highway to King George Boulevard<sup>15</sup>. One has no choice but to take this as an endorsement from the Gateway Council for a submerged tunnel option to address congestion through the GMT at a fraction (20%) of the projected cost of the proposed GMTRP super bridge.

In making their case, the GMTRP has presented contradictory evidence as fact to support their position, they have ignored three previous comprehensive regional transportation plans, and they have abandoned a reasonable and actionable transit alternative after investing millions of dollars into highway upgrades that will all have to be removed with the construction of a bridge. At this point, at the very least, the public ought to have lost all faith in the integrity and intentions of this project. By the end of this report, the arguments presented will have further demonstrated the illegitimate and illogical nature of the GMTRP, a provincial initiative put forward by Christy Clark's BC Liberal Party.

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<sup>15</sup> Vancouver Sun: All Roads Lead to More Debate (February 4, 2006)  
[http://www.canada.com/story\\_print.html?id=0199b01a-066f-4c3a-84fd-f3d3c22df318&sponsor=](http://www.canada.com/story_print.html?id=0199b01a-066f-4c3a-84fd-f3d3c22df318&sponsor=)

# NICHOLAS WONG CONSULTING

Analysis: George Massey Tunnel Replacement Project

## 2) Seismic Safety Standards and the Underlying Deceit

The MOTI, the premier, and her government's media relations department have stated on numerous occasions that one of the shortcomings of the George Massey Tunnel is that it does not meet modern seismic regulations<sup>16</sup>. This statement directly contradicts statements made by the BC Ministry of Transportation and Highways under the BC Liberal Party that the seismic upgrades would “ensure the tunnel is earthquake-ready, should “The Big One” hit”<sup>17</sup>. This section is devoted to demonstrating that the only reason the GMT is below modern seismic standards is the negligence of the provincial government and the MOTI. It shall further demonstrate that the BC Liberal Party was planning to remove the GMT as early as 2006. The existence of concrete designs to remove the tunnel and the absence of any information regarding the decision making process for the GMTRP indicate that the entire consultation process was illegitimate, that no alternative to the removal of the GMT was sincerely considered, and that starting construction on the largest bridge in BC less than 4 years after announcing the project has nothing to do with the seismic safety standards of the GMT.

The GMT “was originally built in to the seismic standards of the 1950’s, and has been upgraded at several points during its history. In 2006, the connections between the [t]unnel’s sections were strengthened, improving the [t]unnel’s ability to avoid a sudden failure in the event of a major earthquake”<sup>18</sup>. The seismic retrofit was planned in 2001 by Buckland-Taylor Consultants (now COWI Bridge). They were retained by the MOTI to perform the Seismic Safety Retrofit as well as an upgrade to the existing pumping and emergency power system. The upgrade as well as Phase I (the structural component) of the retrofit were completed in 2006 at a total cost of \$19.5 million<sup>19</sup>. As Phase I was completed, the MOTI decided not to move forward with the second phase of the seismic retrofit citing plans to replace the tunnel “with a new crossing in the next 20 years”<sup>20</sup> (2026). Phase I completed the structural component of the retrofit in which steel reinforcements were used to combine the six precast sections into a single unit. This was done to reduce seismic variance along its longitudinal axis<sup>21</sup>. The planned and cancelled Phase II of the seismic safety retrofit was intended to address geotechnical issues regarding the riverbed surrounding the GMT and would have reduced potential heaving of the GMT during an earthquake from its current 1.5m to >0.2m, well within an acceptable range. The structure’s potential lateral movement would also have been reduced from 2m down to 0.1m<sup>22</sup>. These represent a movement reduction of 86.7% and 95% respectively. Phase II was slated to cost \$20 million and would bring the total cost of the seismic safety retrofit to just below \$40 million in

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16 GMTRP website – Why a bridge? <https://engage.gov.bc.ca/masseytunnel/faq/#4>

17 Trucknews: Massey Tunnel to be Quake Resistant (July, 2001)  
<http://www.trucknews.com/features/massey-tunnel-to-be-quake-resistant/>

18 GMTRP Business Case (October, 2015)  
<https://engage.gov.bc.ca/masseytunnel/files/2015/12/Business-Case-Oct-2015.pdf>

19 COWI Website: George Massey Tunnel Seismic Safety Retrofit <http://www.cowi-na.com/menu/projects/bridge/bridges-by-type/other-types-of-structures/Pages/George-Massey-Tunnel.aspx>

20 COWI Website: George Massey Tunnel Seismic Safety Retrofit <http://www.cowi-na.com/menu/projects/bridge/bridges-by-type/other-types-of-structures/Pages/George-Massey-Tunnel.aspx>

21 UBC Department of Earth, Ocean, and Atmospheric Sciences Material (April, 2009)  
[https://www.eoas.ubc.ca/courses/eosc547/lecture-material/March17\\_Presentations.pdf](https://www.eoas.ubc.ca/courses/eosc547/lecture-material/March17_Presentations.pdf)

# NICHOLAS WONG CONSULTING

## Analysis: George Massey Tunnel Replacement Project

total<sup>23</sup>. The completion of the seismic retrofit would have brought the GMT up to modern seismic standards as laid out in by Canada's National Research Council which states that buildings in the vicinity of the Cascadia subduction zone must be able to withstand a M 7.0 earthquake from 50km away<sup>24</sup>. Lecture materials from the UBC department of earth, ocean, and atmospheric sciences indicate that the GMT, had the retrofit been completed, would have been able to withstand a M 8.2 subduction earthquake, well above national standards for the region<sup>25</sup>. For an additional \$20 million, the GMT could be brought to modern seismic standard. Each lane would cost \$5 million to maintain if the tunnel were not removed. Each bridge lane will cost \$350 million. At that price differential it is the height of folly to remove the tunnel.

The GMTRP business case, finally released in October of 2015, indicates that geotechnical riverbed issues were the cause of the GMT's substandard seismic resistance<sup>26</sup>. As the preceding paragraph indicates, this does not have to be the case. For 1.1% of the cost of the GMTRP bridge, the GMT could have been made seismically sound according to modern standards. Instead of acting in the interest of public safety, the MOTI under the BC Liberal Party cancelled Phase II (the upgrade designed to address geotechnical issues specifically) because of pre-existing plans to remove the GMT in 2006. Given the facts, there are only a few explanations for the events that have unfolded. Either a) The BC Liberal Party was willing to endanger the public by cancelling necessary seismic upgrades on the possibility that a solution for the Highway 99 corridor requiring the removal of the GMT would be proposed, planned, approved by all environmental assessments, approved through public consultation, and constructed within 20 years, or b) The BC Liberal Party knew, back in 2006, that the plan was always to construct a bridge and remove the GMT.

If the first option is true, the government of British Columbia risked closing, due to seismic risk, the Highway 99 corridor in 2026 on the outlandish hope that due process discovers that a bridge is a better option than a tunnel and that it be constructed in less than the 5-10 years of life that the GMTRP business plan states the GMT has before it falls into disrepair<sup>27</sup>. It is important to note that, if the GMT only has 5 years before the peculiarly undefined "significant capital investments<sup>28</sup>" are required, the forecast completion date of the largest bridge in BC (2022) will come two years too late and Lower Mainland residents will be at risk of the GMT failing in some indeterminate fashion. It is also interesting to consider that the GMTRP does not cite the systems at risk of failure beyond the categories of mechanical and electrical. However, the mechanical

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22<sup>□</sup> NAESGAARD et al. 13<sup>th</sup> World Conference on Earthquake Engineering. *Numerical Analyses for the Seismic Safety Retrofit Design of the Immersed-Tube George Massey Tunnel*, No. 112 (August, 2004) [http://www.iitk.ac.in/nicee/wcee/article/13\\_112.pdf](http://www.iitk.ac.in/nicee/wcee/article/13_112.pdf)

23<sup>□</sup> COWI Website: George Massey Tunnel Seismic Safety Retrofit <http://www.cowi-na.com/menu/projects/bridge/bridges-by-type/other-types-of-structures/Pages/George-Massey-Tunnel.aspx>

24<sup>□</sup> NRC - Earthquake Resistance Provisions in the 2010 National Building Code (September, 2011) <http://www.nrc-cnrc.gc.ca/ci-ic/article/v16n3-3>

25<sup>□</sup> UBC Dept EOSC 547 Lecture Material (April, 2009) [https://www.eoas.ubc.ca/courses/eosc547/lecture-material/March17\\_Presentations.pdf](https://www.eoas.ubc.ca/courses/eosc547/lecture-material/March17_Presentations.pdf)

26<sup>□</sup> GMTRP Business Case (October, 2015) <https://engage.gov.bc.ca/masseytunnel/files/2015/12/Business-Case-Oct-2015.pdf>

27<sup>□</sup> GMTRP Business Case (October, 2015)

28<sup>□</sup> GMTRP Business Case (October, 2015)

# NICHOLAS WONG CONSULTING

## Analysis: George Massey Tunnel Replacement Project

pumping system and the emergency electrical systems were recently upgraded in 2006 as part of the Phase I seismic retrofit. Which essential system failures pose a threat to public safety remains an open question.

If the second option is true and the BC Liberal Party knew in 2006 that they were going to remove the GMT, the entire consultation process started in 2012, continuing through 2016, and costing taxpayers millions of dollars will have been a farce from its inception. If the BC Liberal Party already had plans laid for the removal of the GMT, three of the five alternatives presented (those in which the GMT remained intact) were never given proper consideration. If this proves true, it represents concrete evidence that Christy Clark and the BC Liberal Party care nothing for the input of the public or due process, have been systematically misleading the people of British Columbia regarding at least this issue, and have, in many instances, released information that they knew to be patently false (this category includes all consultation documents). As it currently stands, only two of the six project goals (support trade and commerce and support options for pedestrians and cyclists) are addressed by the bridge. In support of this premise, in a letter to Mr. Freer, executive project director for the GMTRP, the Pacific Corridor Enterprise Council commends the GMTRP for “introducing a number of assorted exploratory conceptual draft options for consideration with the objective of isolating those that may be more suitable... to substantially advance the planning process”<sup>29</sup>. A solution to congestion is required and desired by residents of the surrounding areas. However, the public will never be able to offer an educated and considered opinion if the options presented are skewed to elicit a particular response in favour of specific options.

The aforementioned scenarios are made considerably worse by the fact that, as of February 2006, the position of the BC Liberal Party was that twinning the tunnel after the completion of the Gateway project was the best solution<sup>30</sup>. The Gateway Council, directed by Bob Wilds, estimated the total cost of expanding the tunnel and surrounding highway infrastructure was only \$700 million, 20% of the proposed expenditure of the GMT<sup>31</sup>. That means that the decision to build a bridge and to remove the tunnel represents a complete reversal of the government's stated position on GMT improvements. Worse than that, it demonstrates a blatant disregard for the democratic process, government accountability, and transparency.

Thus, if the GMT is not up to modern seismic standards it is the fault of the MOTI for cancelling Phase II of the seismic upgrades. The BC Liberal Party is using their failure to maintain the GMT as justification for the GMTRP at a cost per lane ratio of 70:1 in terms of building the bridge or maintaining GMT. Thus, as the seismic safety retrofit was never completed due to plans to remove the bridge by 2026 back in 2006, the GMTRP consultation process and any semblance of taking public consideration into account is farcical.

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<sup>29</sup> Pacific Corridor Enterprise Council letter to Geoff Freer (March 21, 2013)

<sup>30</sup> Vancouver Sun: Twinned Tunnel Part of Victoria's Long-term Plan (February, 2006)  
[http://www.canada.com/story\\_print.html?id=0c3cc174-0094-4fc2-92d7-44e23b60736a&sponsor=](http://www.canada.com/story_print.html?id=0c3cc174-0094-4fc2-92d7-44e23b60736a&sponsor=)

<sup>31</sup> <sup>32</sup> Vancouver Sun: All Roads Lead to More Debate (February, 2006)  
[http://www.canada.com/story\\_print.html?id=0199b01a-066f-4c3a-84fd-f3d3c22df318&sponsor=](http://www.canada.com/story_print.html?id=0199b01a-066f-4c3a-84fd-f3d3c22df318&sponsor=)

# NICHOLAS WONG CONSULTING

## Analysis: George Massey Tunnel Replacement Project

### 3) Pricing and Rationale

One of the unspoken logical requirements for the decision to build a bridge and remove the GMT is that the price of building a bridge was at least comparable to a tunnel option. This is a very difficult position to maintain given the \$3.5 billion budget for the GMTRP's bridge proposal and the lack of information on whether the removal of the GMT is included in the price tag. There are also legitimate concerns regarding the tolling policy in the Lower Mainland and the implications that it will have on the economic viability of the option as well as the overall traffic impacts. Hereafter, these concerns and alternatives will be examined. Given the lack of justification for the removal of the GMT on the grounds of seismic safety standards and relief of traffic congestion, and the significantly and demonstrably lower cost of a tunnel alternative, the motivations for the removal of the GMT in favor of a bridge replacement must be other than the stated project goals.

Considered in the context of other submerged tunnel projects around the world and previous provincial positions and statements, the only conclusion that can be drawn is that the proposed bridge will be almost five times more expensive than the highest quote on a submerged tunnel option (given a 13.82% increase in the Canadian Consumer Price Index 2006-2015 and the \$700 million construction and highway upgrade price estimate from the Gateway Council in 2006, cost projections for a second tube will be \$796.74 million compared to the conservative estimate of the GMTRP at \$3.5 billion)<sup>32,33</sup>. In addition, there is no measurable advantage to removing the GMT for traffic congestion, safety, or any of the alleged project goals defined in the GMTRP project definition report. The special exceptions being to support cyclist access to the crossing (which could be addressed by a submerged tunnel alternative or bridge thus having no impact on the removal of the GMT) and to subsidize the industrial export of US Thermal Coal to Asia via Panamax Supertankers out of Surrey-Fraser Docks (approved by PMV in December, 2015) despite global coal prices falling to half of its 2011 sale price<sup>34</sup>.

What could \$2.8 billion do if it were allocated to programs designed for the residents of the Lower Mainland? That is the differential between the highest estimate for a submerged tunnel expansion (\$700 million)<sup>35</sup> and the GMTRP bridge's budget of \$3.5 billion. This figure is far from the outlier as most comparable projects had much lower construction costs. For example, the Calandtunnel in Rotterdam, 1100m of enclosed submerged tunnel with 6 traffic lanes, was constructed in 2004 for \$220.4 million CAD (€145 million @ 1.52CAD) or 6.3% of the proposed bridge<sup>36</sup>. The Daugava tunnel in Riga, Latvia, 1300m of enclosed submerged tunnel along with 6750m of road construction in the tender design phase, is estimated at \$320.72 million CAD (€211 million @ 1.52 CAD)<sup>37</sup>. The Coatzacoalcos tunnel under construction in Coatzacoalcos, Mexico, is 1500m in length and will cost \$219 million CAD (\$160 million USD

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33 Statistics Canada: Consumer Price Index, historical summary (1996 to 2015)

<http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/econ46a-eng.htm>

34 Vancouver Sun, G Hoekstra: Port Approves Changes that will See Coal Ships Loaded on Fraser River (December, 2015)

[http://www.vancouversun.com/technology/port+approves+changes+that+will+coal+ships+loaded+fraser+river/11558372/story.html?\\_\\_lsa=9bb2-c353](http://www.vancouversun.com/technology/port+approves+changes+that+will+coal+ships+loaded+fraser+river/11558372/story.html?__lsa=9bb2-c353)

35 Vancouver Sun: All Roads Lead to More Debate (February, 2006)

[http://www.canada.com/story\\_print.html?id=0199b01a-066f-4c3a-84fd-f3d3c22df318&sponsor](http://www.canada.com/story_print.html?id=0199b01a-066f-4c3a-84fd-f3d3c22df318&sponsor)

36 Tunnel Engineering Consultants: Calandtunnel <http://tec-tunnel.com/projects/calandtunnel/>

37 Tunnel Engineering Consultants: Daugva <http://tec-tunnel.com/projects/daugava/>

# NICHOLAS WONG CONSULTING

## Analysis: George Massey Tunnel Replacement Project

@ 1.37 CAD)<sup>38</sup>. Each project uses submerged tunnel technology to provide water crossings that are longer than the Highway 99 span across the Fraser River and each one is deeper than river bed.

The most impressive comparison, however, is the Busan-Koje link in Busan, South Korea. According to the project description, “the Busan-Koje Link Project will provide an 8.2 km highway link between the southern city of Busan and the island of Koje in South Korea. The overall link comprises two major cable stayed bridges, with main spans of 230 m and 475 m respectively, and a 3.4 km long immersed concrete tunnel, located in a water depth of up to 40m<sup>39</sup>”. The total cost of the project: \$1.5 billion CAD (\$1.1 billion USD @ 1.37 CAD)<sup>40</sup>. The existence of an economically viable submerged tunnel alternative to the GMTRP is without question. This completely contradicts the assessment of the GMTRP’s Evaluation of Options published in March, 2014 which states that a bridge option is, in terms of capital construction costs, comparable to maintaining the tunnel and expanding capacity by submerging another tube (conveniently indicated, without any actual supporting facts or figures, by both being classified in the \$\$ category)<sup>41</sup>. As a tunnel alternative represents such an astronomical capital cost savings to the GMTRP (between 80% and 93.7% savings as compared to \$3.5 billion) it becomes ever more conspicuous that, from the Phase II public consultation in the Spring of 2013 (seven months before Christy Clark first announces that the GMT will be replaced by a bridge) to the present, the cost of maintaining the GMT and expanding capacity with a submerged tube is represented as comparable to the \$3.5 billion bridge. This is beyond the scale of potential error and can only be construed as a deliberate attempt by the BC Liberal Party to mislead the public and withhold vital information that would have a profound impact on public opinion surrounding the project as a whole.

At \$20 million to complete Phase II of the seismic safety retrofit, why is the GMT being removed? When the GMTRP was announced in 2013, PMV CEO Robin Silvester stated that he supported the bridge because “it could reopen the river to deeper draft vessels” while refusing to say if the port would cover any of the cost<sup>42</sup>. The first issue with this statement is that the largest ships that have ever utilized the river are currently navigating its waters. There is no golden age of deep draft shipping in the south arm of the Fraser to “reopen” The second issue is that this statement directly contradicts the one made by PMV Chief Financial Officer, Allan Baydala, in which he claims that the removal of the GMT “will not have a significant impact on the size of ships... using the Fraser River”<sup>43</sup>. This statement is in response to public concerns that the GMT is being removed to, as Mr. Silvester has openly stated, allow larger ships to access the Fraser River. Taken in the context of statements made by Surrey Fraser Docks CEO, Jeff Scott,

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38 Tunnel Engineering Consultants: Coatzacoalcos <http://tec-tunnel.com/projects/coatzacoalcos/>

39 Tunnel Engineering Consultants: Busan-Koje Link <http://tec-tunnel.com/projects/busan-koje-link/>

40 Tunnel Engineering Consultants: Busan-Koje Link <http://tec-tunnel.com/projects/busan-koje-link/>

41 MMK Consulting Inc.: GMTRP Evaluation of Crossing Scenarios (March, 2014)  
[https://engage.gov.bc.ca/masseytunnel/files/2015/06/GMT-2014-March\\_Evaluation-of-Crossing-Scenarios.pdf](https://engage.gov.bc.ca/masseytunnel/files/2015/06/GMT-2014-March_Evaluation-of-Crossing-Scenarios.pdf)

42 Vancouver Sun, K Pemberton: Fraser Port Facility Pushes for Deeper Dredging if Bridge Replaces Massey Tunnel (October, 2013)  
[http://www.vancouversun.com/technology/Fraser+port+facility+pushes+deeper+dredging+bridge+replace+Massey+Tunnel/9044885/story.html?\\_\\_lsa=9bb2-c353](http://www.vancouversun.com/technology/Fraser+port+facility+pushes+deeper+dredging+bridge+replace+Massey+Tunnel/9044885/story.html?__lsa=9bb2-c353)

43 PMV Statement, A. Baydala: George Massey Tunnel replacement  
<http://www.portmetrovancover.com/about-us/topics-of-interest/george-massey-tunnel-replacement/>

# NICHOLAS WONG CONSULTING

## Analysis: George Massey Tunnel Replacement Project

indicating that coal will be loaded directly onto Panamax Supertankers in the Fraser rather than being barged to Texada Island<sup>44</sup> and that WesPac has recently been given a license to export LNG from a Tilbury Terminal<sup>45</sup>, Mr. Baydala's statement is difficult to believe. This is particularly true given the lack of historical accounts of LNG export from the south arm of the Fraser. It is interesting to note that the decision to increase LNG export capacity in the Fraser River coincides with the Tsawwassen First Nation's rejection of a proposed LNG Terminal on the grounds of the detrimental environmental effects of LNG export and, in particular, extraction<sup>46</sup>. A contributing factor to their decision may be the falling global price of LNG which has collapsed to 31.3% of its peak value in 2014<sup>47</sup>. It is a fair assessment to identify that PMV has contradicted itself, deceived the residents of its jurisdiction, and acted in a manner that is consistent with preparations for a massive influx of export activity in the south arm of the Fraser River. Given this mobilization of resources to the areas immediately upriver from the GMT and PMV's history of identifying the GMT as an impediment to export accessibility, it is not uncharitable to believe that the primary benefactor of the GMTRP will be PMV.

Nowhere is it more evident that the GMTRP was engineered from the outset with a particular agenda in mind than on the price point. Essential facts were ignored, the public was given false information, and PMV contradicts itself on the size and draft of ships that will be utilizing the south arm of the Fraser River following the removal of GMT. There is no excuse for this level of misinformation. Misdirection of this magnitude is tantamount to manipulation.

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44<sup>1</sup> Vancouver Sun, K Pemberton: Fraser Port Facility Pushes for Deeper Dredging if Bridge Replaces Massey Tunnel (October, 2013)

[http://www.vancouversun.com/technology/Fraser+port+facility+pushes+deeper+dredging+bridge+replace+s+Massey+Tunnel/9044885/story.html?\\_\\_lsa=9bb2-c353](http://www.vancouversun.com/technology/Fraser+port+facility+pushes+deeper+dredging+bridge+replace+s+Massey+Tunnel/9044885/story.html?__lsa=9bb2-c353)

45<sup>1</sup> Delta Optimist, D. Stout: Tilbury LNG Facility is Looking at further Expansion (June, 2015)

<http://www.delta-optimist.com/opinion/tilbury-lng-facility-is-looking-at-further-expansion-1.1980935>

46<sup>1</sup> Vancouver Sun: Tsawwassen First Nation Rejects Proposed LNG Facility (December, 2015)

[http://www.vancouversun.com/tsawwassen+first+nation+rejects+proposed+facility/11594929/story.html?\\_\\_lsa=9bb2-c353](http://www.vancouversun.com/tsawwassen+first+nation+rejects+proposed+facility/11594929/story.html?__lsa=9bb2-c353)

47<sup>1</sup> Trading Economics: Natural Gas (1990-2016) <http://www.tradingeconomics.com/commodity/natural-gas>

# NICHOLAS WONG CONSULTING

Analysis: George Massey Tunnel Replacement Project

## Conclusion

One must consider the facts as they present themselves in coming to an educated conclusion. The GMTRP has made that impossible if only their documentation is taken into account. Here are the inescapable conclusions. The BC Liberal Party cancelled the second phase of the GMT seismic safety retrofit despite the cost being 1.1% of the cost of the bridge. Even though they could have brought the GMT up to modern seismic safety standards they elected to use their mismanagement of the tunnel as justification for its removal. The GMTRP documents and consultation reports wrongfully assert that the cost of maintaining the tunnel and doubling its capacity with a submerged tunnel alternative (Option 4b in the consultation reports) is comparable to the bridge proposal when it is not even in the same order of magnitude when comparing price (actually 80%-93.7% less than the bridge). In manufacturing their justification for the bridge, the GMTRP provided traffic figures that contradict themselves, ignored several regional transportation plans, and they have abandoned a transit alternative despite having spent millions of dollars on highway upgrades to support it. In order to support an agenda in which the GMT is removed, the residents of the Lower Mainland have been deceived, ignored, and overruled. I welcome any and all counter arguments to this position that are supported by principled facts and figures. What comes next is up to you. Although, as a final note, if a government were entertaining the possibility of maintaining the George Massey Tunnel even while increasing capacity and if that government had not come to a decision before ever announcing the plan to the public, it might make sense not to call the project the George Massey Tunnel **Replacement** Project.