

# Western Corridor transportation study

## Report to RLTC

12 August 2005



## Report to Regional Land Transport Committee

### 1. Introduction

This report provides information for the Regional Land Transport Committee for a workshop on 18 August 2005.

In the workshop on 15 June 2005 the RLTC requested the Western Corridor Transportation Study team provide information on the cost and risks associated with the competing elements of the Coastal Route and Transmission Gully (TG) and to establish how TG could be funded .

These matters amongst others are discussed below.

### 2. Costs and risks of Transmission Gully and the Coastal Route

#### Costs

The cost estimates of Transmission Gully and the Coastal route have been compared against other projects on a lane kilometre basis in the following table. The originally estimated costs per lane-kilometre for TGM and the Coastal Route are similar

Project	Length of lane-kilometres	Expected cost	Cost per lane-kilometre
Coastal Route	67km	\$700M <sup>Note 1</sup>	\$10.4M/km
Transmission Gully	108km	\$1,090M <sup>Note 1</sup>	\$10.1M/km
Western Sydney Orbital	160km	\$2,230M	\$13.9M/km
M5 Extension – Sydney	40km	\$794M	\$19.9M/km
Eastern Distributor – Sydney	27km	\$700M	\$25.5M/km

Note 1. Based on Maunsell revised estimates

The table shows that the cost rate of the Australian projects is in the order of 40-100% higher than the estimates for the Wellington projects. While some of the additional costs can be attributed to the method of procurement, the value of the projects are of a similar order to complete TGM or the Coastal Route. If the projects on the Western Corridor require construction resourcing from Australia then these rates could be encountered.

Recently Transit New Zealand has arranged a peer review of the cost estimates of TGM and the Coastal Route. As a result of the discussions Maunsell has revised the cost estimates. The final expected cost estimate comparison is shown in the following table. The differences between the estimates relate largely to differences in scope and extent of mitigation.

<b>Element</b>	<b>Maunsell original expected cost estimate</b>	<b>Peer review expected cost estimate</b>	<b>Maunsell revised expected cost estimate</b>
Coastal Route	\$610M	\$890M	\$700M
Transmission Gully Motorway	\$1,001M	\$1,170	\$1,090M

**Risks**

The initial risk assessment identified that the risk associated with the Coastal Route and TGM were extremely high and very high respectively. Further risk assessment has resulted in changes to the original Coastal Route option with an increased likelihood of obtaining consent.

The revised option is based on reclamation rather than elevated structures and includes greater mitigation. The use of reclamation greatly reduces the potential for traffic delays during construction and geotechnical slope stability risks related to excavation into unstable rock material as well.

The resulting key risk comparison between the routes is provided in the following table.

<b>Key Differentiating Issues</b>	<b>Coastal Route</b>	<b>Transmission Gully Motorway</b>
Project fails to be consented	Higher risk	Lower risk
Scale of project results in increased cost	Lower risk	Higher risk
Geotechnical conditions increase cost	Lower risk	Higher risk
Project can not be funded	Lower risk	Higher risk
Project design/scope changes results in increased costs	Higher risk	Lower risk
Industry resourcing results in increased costs	Lower risk	Higher risk

Pursuing designation and resource consents for the Coastal Route would determine the scope of the key risk of the Coastal Route. The level of mitigation measures required to consent a Coastal Route could then be able to be costed with greater certainty.

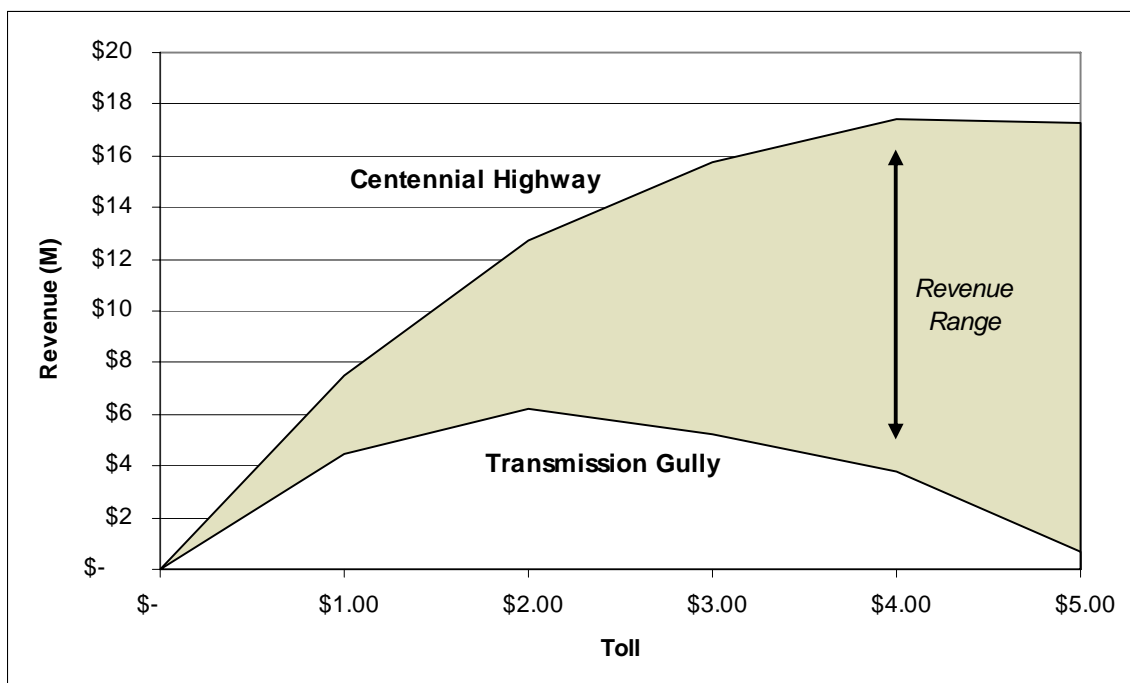
If consents can be obtained for the entire Coastal route, this would allow the capacity improvements to be staged to match the available funding sources and priorities at the time.

### 3. Transmission Gully funding options

Transmission Gully has an expected cost differential between \$300-400M. there are three ways to fund this difference locally. Tolls could be charged on the route, rates could be collected and a further regional petrol tax could be applied. Future options could also include road pricing if it is ever legislated.

#### Tolls

The modelling of the effects of tolls indicate that the annual toll revenue could range between \$6M and \$17M per annum as shown in the attached graph. The Centennial Highway plot shows what could be achievable if both TG and Centennial Highway were tolled. (Explain how Centennial Highway could be tolled) The greyed area between the plots indicates toll possibilities as vehicles are deterred from using the Coastal Route (eg reducing posted speed limits).



Without any speed reductions on the coastal route the maximum toll revenue for TG would be in the order of \$6M per annum. Reducing the speed limit to 50kph on the existing route from Mana to MacKays Crossing could discourage use of the coastal route apart from the direct users such as Pukerua Bay residents. In such circumstances it could be possible to raise a net \$10M per annum toll after costs. This toll revenue could service a \$115M debt at 8% interest over 35 years. It is noted that there would be some risks associated with reliance on the potential toll revenue.

The small return in relation to the capital cost of TGM makes it unattractive to private investment. If private investment funded the \$115M they would have an 11% stake in the project and little control over the road or the parallel coastal route making it a high risk investment. Currently there are plenty of

other opportunities internationally that would be more favourable to private investment.

### Rates

The shortfall in funding could also be provided by local rates. The following table provides one rating model based on benefits to road users, regional economy and local impacts. This model would increase average annual rates for 35 years by \$49 in Upper Hutt and up to \$727 in Porirua.

	Weighting	Kapiti	Porirua	Wellington	Lower Hutt	Upper Hutt
Road users by origin	50%	37%	33%	23%	6%	2%
Existence, regional economy, tourism, national strategic	20%	9%	9%	56%	19%	7%
Local strategic	10%	20%	60%		20%	
Avoided noise and pollution, accessibility, severance, congestion	20%	20%	80%			
TLA Share		26%	40%	22%	9%	3%
Repayments over 35 years at 8%						
Annual Repayments	\$400M loan	\$8,971,906	\$13,779,815	\$7,700,097	\$2,984,528	\$884,961
	\$300M loan	\$6,728,929	\$10,334,861	\$5,775,073	\$2,238,396	\$663,721
Average house rateable value (RV)		\$212,430	\$269,054	\$380,189	\$251,226	\$215,344
Annual rate increase per household	\$400M loan	\$375	\$727	\$94	\$69	\$49
	\$300M loan	\$281	\$545	\$70	\$52	\$37
Annual rate increase per \$100,000 RV	\$400M loan	\$177	\$270	\$25	\$28	\$23
	\$300M loan	\$132	\$203	\$18	\$21	\$17

An alternative approach would be to determine that the difference between TGM and the coastal route only provides benefits to Porirua and that the local contribution should be met solely by Porirua. This would increase the above figures for Porirua by a factor of 2.5 and the other areas would have a nil increase.

The figures for a \$300 million loan would be applicable if used in combination with tolls.

### Additional regional petrol tax or road pricing

Funding the price difference through a further regional petrol tax or road pricing will be a cost to households in the region in a similar manner to a rates increase. If the revenue collection is targeted to users of the corridor then the split of the costs to households would be in line with the top row of the above table.

### **Effect on the regional economy**

Constructing TGM in a reliability style package is estimated to provide a boost to the regional GDP of \$58M per year during construction and \$34M per year from transport savings following implementation. This would be significantly offset by the cost of debt repayments of \$34M per year for 35 years for the \$400M additional cost.

The positive impact on regional GDP of the construction expenditure occurs because most of it is externally provided additional spending in the local economy and does not come at the expense of other regional economic activity. If the entire cost had to be funded locally on a pay as you go basis from offsetting household expenditure cuts within the region the net impact of the construction expenditure on regional GDP would be negative because the typical mix of household expenditure generates stronger multiplier effects than an equivalent expenditure on construction.

In comparison, if the coastal route reliability style package is constructed the regional GDP would be increased by \$45M per year during construction and \$34 M per year from transport savings following implementation. There would be no debt repayments offsetting these benefits.

## **4. Sensitivity of route choice**

Sensitivity testing has been undertaken on the likely effects on transport of significantly higher energy costs. This shows a mode shift to passenger transport. The TG based package is expected to result in higher energy consumption and CO2 emissions than the Coastal based package due to the steeper topography and increased number of trips generated.

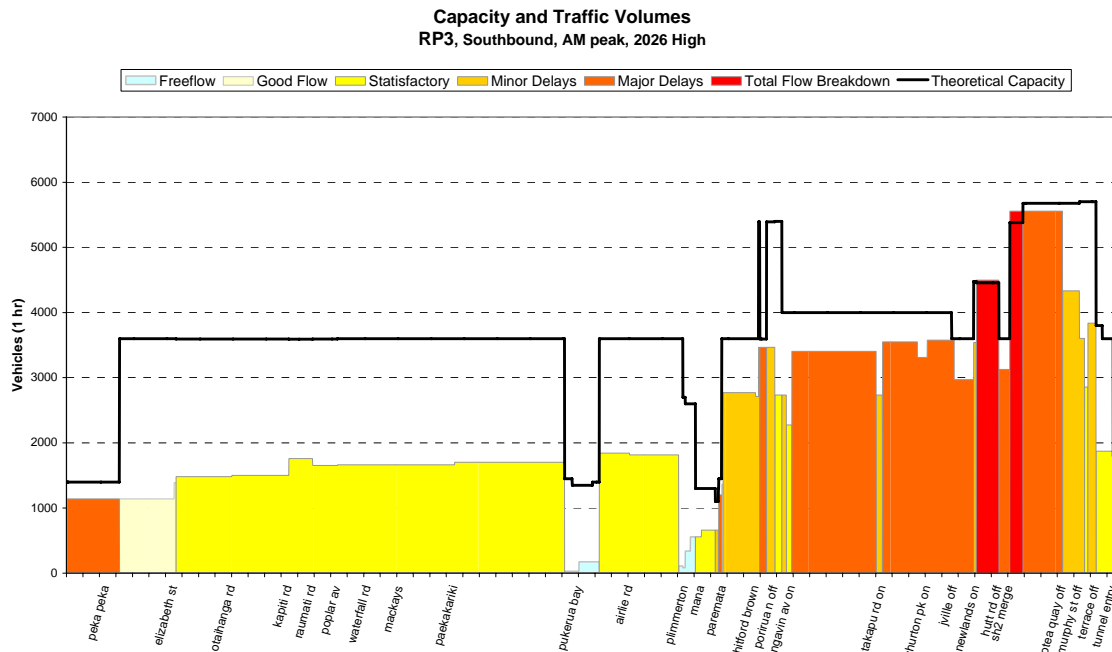
Alternative population and migration scenarios have also been tested. The model takes into account the ageing of the population and resulting changes in transport needs. The current expected projections indicate that there is a real prospect of zero population growth in 30 years, however the Wellington Regional Strategy aims to achieve higher rates of growth.

The two packages will have different effects on land use pressures and opportunities. In particular the TGM based package is likely to result in pressure for urban development of the Pauatahanui/Judgeford area and will continue to promote the high rate of growth in Kapiti. The Coastal based package however will integrate more effectively with travel demand management measures and provide better opportunities for high density development around transport nodes and integration of rail and road transport.

Discussions have been held with the Wellington Regional Strategy Project Executive Group regarding implications of packages for the Strategy which is currently undertaking public consultation. The Strategy is seeking to ensure that quality regional form and systems are achieved involving good design, good accessibility, strong sense of community and strong sense of personal safety.

Initial indications are that the choice of coastal or TG based packages is not seen as critical to achieving these outcomes.

The Coastal Route is based on providing reliability through a four lane median divided road. A four lane road has sufficient capacity to meet the projected traffic volumes for the high growth scenario in 2026 as shown in the following table. There is little risk that further capacity would be required in the foreseeable future.



### Technical recommendation

The Coastal route is the technically preferred solution for the Central Section on balance. The Coastal Route is not preferred on all matters; it has a high risk associated with obtaining consent and would have greater potential for traffic disruption during construction. Revising the Coastal Route to a reclamation option would reduce the potential traffic disruption effects and is expected to have a greater likelihood of consent approval. The Coastal Route is preferred for the following key reasons:

- a. achieves a better outcome towards key objectives of the NZTS, RLTS and the LTMA
- b. lower cost
- c. higher project efficiency
- d. can be staged to suit available funds
- e. benefits are accrued as each stage is completed
- f. better utilisation of existing infrastructure

These reasons are discussed in more detail below.

#### a. Achieves a better outcome towards key objectives of the NZTS, RLTS and the LTMA

The Coastal Route has a higher planning balance sheet score than TGM. The key packages for comparing the effects of a Transmission Gully and the Coastal Route are the versions of the Reliability Package that include these elements.

In the planning balance sheet weightings that include the RLTC objective of economic efficiency and affordability the Coastal Route scores higher directly. When compared to the base score of 5 the Coastal Route scores 20-30% higher than TGM.

Objective weighting	Reliability Package	
	Coastal Route	Transmission Gully
RLTC	6.2	5.9
Transport Action Group	6.3	6.1
Public weighting (from Stage 2 consultation)	6.4	6.2

The Land Transport New Zealand weighting does not include the economic efficiency and affordability objective and considers efficiency separately. The LTNZ scores are 6.4 and 6.5 for the Coastal Route and TGM packages respectively. Considering a value for money approach on the change in PBS score from the base score of 5.0 indicates that the Coastal Route provides better value for money.

**b. Lower cost**

The expected cost for the Coastal Route is lower than TGM in all estimates. The final scope and mitigation measures of the Coastal Route would only be known following a consent process. At this point the cost estimate for the Coastal Route could be determined with greater certainty and would likely have a lower risk contingency than TGM.

**c. Higher project efficiency**

The Coastal Route package delivers similar regional benefits for less cost and has a 60% higher project efficiency than the TGM package.

Reliability Package	Annual Regional Benefits	Expected Costs	Relative Efficiency
Coastal Route	\$50M	\$1,640M	1.2
Transmission Gully	\$52M	\$2,030M	1.0



When the Coastal Route is compared directly against TGM as elements the Coastal Route has a 40% greater efficiency as shown in the following table.

Element comparison	Annual Regional Benefits	Expected Costs	Relative Efficiency
Coastal Route	\$16.6M	\$700M	1.4
Transmission Gully	\$18.7M	\$1,090M	1.0

The peer review estimates identify that the Coastal Route has a 15% greater efficiency.

**d. Can be staged to suit available funds**

The Coastal Route has much greater staging potential than TGM to suit the available funding. Staging on TGM is largely limited to breaking it into two sections either side of SH58. Staging on the Coastal Route can include individual intersection improvements and variable lengths of highway to suit available budgets.

**e. Benefits can be accrued as each stage is completed**

Removing one bottleneck on SH1 will provide some benefits while improving the whole route will provide greater benefits. We have modelled a number of runs to identify the effect of each element in the Coastal Route upgrade. In one series each element was run in isolation without any other Coastal Route elements and in the second series the Coastal Route elements were modelled without one element. The results identify a number of key points

- The full Coastal Route scheme provide more benefits than the sum of the individual elements
- Similarly, the full Coastal Route scheme in a corridor package provides more benefits than the scheme in isolation
- Individual elements provide more benefits depending on which order they are implemented (ie Centennial Highway ranges from \$0.8M-\$2.6M as it goes from first project to last project in the Coastal Route)

The results are shown in the following table.

Elements in Coastal Route	Individual element benefits as <u>first</u> project	Total benefits less single element	Individual element benefits as <u>last</u> project
MacKays – Centennial Highway	\$0.5M	\$9.0M	\$1.8M
Centennial Highway	\$0.8M	\$8.2M	\$2.6M
Pukerua Bay Bypass/ Airlie Rd	\$0.7M	\$8.0M	\$2.8M
Mana Bypass	\$4.4M	\$4.4M	\$6.4M
Sum of individual elements	\$6.5M		
Full scheme	\$10.8M		
Full scheme in reliability package	\$16.6M		

**f. Better use of existing infrastructure**

Over the last fifteen years the Regional Land Transport Strategy has been to construct TGM.

Because of the inability to fund TGM, a number of upgrades to SH1 have been required to address safety and congestion issues.

Further interim improvements along the existing SH1 will be required irrespective of the route selected. With a strategy to build the Coastal Route improvements on SH1 would increase certainty that the strategy would be implemented, with a strategy to build TG improvements on SH1 could decrease certainty.