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Western Corridor Implementation Plan Report of the Technical Group

10 April 2000

Executive Summary

(1) The Do Minimum network : another Paremata Bridge, safety improvements and McKays Crossing

(2) The medium level of public transport upgrade (PT1)

(3) Transmission Gully is an appropriate part of the plan to be operated as a toll road

(4) It is appropriate to pursue Transmission Gully at the earliest time that legislation and funding will allow to meet the broader objectives of the Regional Land Transport Strategy

(5) Capacity improvements on the existing highway are also appropriate, but their form and design should recognise the timing of Transmission Gully

(6) Improvements to public transport on the corridor will necessitate improvements to bus-rail interchange and pedestrian connections at Wellington station

(7) The construction of Transmission Gully will require improvements to the road network in the vicinity of Paraparaumu, Ngauranga Gorge, Ngauranga to Aotea Quay and improved connections to the Hutt Valley

(8) The appropriate authorities will need to consider carefully the future of the existing State Highway when Transmission Gully is built if the full environmental benefits of building Transmission Gully are to be realised and the use of Transmission Gully is to be optimised.

The precise form of capacity improvements on the existing highway cannot be determined as it is beyond the level of this strategic analysis. If Transmission Gully is to be completed by 2006 then capacity improvements on the existing highway may not be appropriate. The level of uncertainty of the timing of Transmission Gully means that it is prudent to plan for the construction of capacity improvements on the existing highway.

1. Introduction

The "Western Corridor : Otaki to Ngauranga Merge" section of the Regional Land Transport Strategy 1999-2004 recognises the urgent need to develop a Western Corridor Implementation Plan that includes both road and rail, and identifies the optimum packages for the corridor. This report summarises the analysis of this implementation plan and reports on the conclusions arising from the analysis.

2. Vision

The Regional Land Transport Strategy establishes the need for network balance. There is a need to balance the provision of upstream road capacity with downstream road capacity and there must be a balance between road capacity and passenger transport capacity. Without this balance network performance will be sup-optimal and transport investment decisions will not be efficient.

The Regional Land Transport Strategy identifies the following needs and issues on the corridor.

- Peak period road congestion during weekdays and at weekends
- Inadequate peak and off peak frequency levels of passenger rail in the Kapiti area
- Increasing demands for access along the corridor because of population growth on the Kapiti Coast and insufficient alternative accessways
- Lack of direct access to the rail corridors for significant populations
- Concern about community severance at Mana, Plimmerton and Pukerua Bay
- High accident rates along State Highway 1
- Increases in freight movement
- Increases in journeys associated with recreation and travel
- Increases in forestry freight movement; and
- Poor quality facilities for bus and rail users

The analytical work behind the Regional Land Transport Strategy and work undertaken by Transit New Zealand shows that the corridor plan for the next 20 years needs to include the following elements if network balance and the above needs and issues are to be addressed

- An upgrade to the passenger rail system
- New Paremata Bridge
- Improvements to the existing State Highway
- Construction of Transmission Gully

Work by Transit New Zealand has shown that an upgrade of the coastal section of the existing State Highway is not a realistic proposition.

The purpose of this report is to recommend the most appropriate set of projects from the above list and to determine broadly the sequencing of one element relative to another.

3. Options

The options that have been considered in this plan are:

Passenger Transport

Do Minimum PTO – the rail network remains unchanged

PT1
Doubling of peak and off peak frequency in Kapiti, Waikanae electrification, new station at Raumati, refurbished Paraparaumu station, improved interchange at Wellington Station, associated carpark improvements at stations

PT2
All of PT1 plus new station at Lindale, Aotea and Glenside; Porirua East, Plimmerton and Wellington CBD LRTs; refurbishment of remaining station and carpark improvements at stations

Road Improvements

Do Minimum Rd0
Paremata Bridge replacement/duplication, safety improvements, McKays Crossing grade separation. Options that have Transmission Gully early have the old bridge decommissioned when Transmission Gully is opened. Before Transmission Gully is opened both bridges are used to support the clearways options.

The four road options below RdA to RdD all include the projects from the Do Minimum road option (Rd0).

RdA
Northbound PM peak clearway only to Steyne Ave in 2001, no Pukerua Bay bypass, Transmission Gully in 2006 with peak toll of $2 and offpeak toll $1 and 2.6 c/l regional petrol tax. The northbound clearway can be abandoned on the opening of Transmission Gully.

RdB
Full peak clearways option in Mana and Plimmerton in 2001 as in the Notice of Requirement, Pukerua Bay bypass, Transmission Gully in 2016 with peak toll $2 and offpeak toll $1 and 2.6 c/l regional petrol tax

RdC
No improvements in Mana and Plimmerton, no Pukerua Bay bypass, Transmission Gully in 2006 with peak toll $2 and offpeak toll $1 and 2.6 c/l regional petrol tax

RdD
Reduced peak clearways option in Mana and Plimmerton in 2001, no Pukerua Bay bypass, Transmission Gully in 2006 with peak toll of $2 and offpeak toll of $1 and 2.6 c/l regional petrol tax. The reduced clearways option is a new Transit New Zealand option that provides an additional lane at peak times which is available to buses, high occupancy vehicles and left turning traffic. The clearways south of Goat Point can be abandoned on the opening of Transmission Gully.

The above three public transport options and five road options have been analysed using the Wellington strategic transport model. There have been 15 combinations modelled which is the complete number of permutations of public transport and road options.

The Wellington strategic transport model is capable of modelling morning and evening peaks, and interpeak. It has analysed the above options for years 2001, 2006 and 2016.

The model is capable of considering intermodal and peak spreading effects as well as redistribution effects that make up the major components of induced traffic effects but not at a detailed level required for selecting project options, or required for funding requests.

A breakdown of the capital costs of the individual projects are:

Paremata bridge	$4.3 million
Rural section upgrade	$8.7 million
Pukerua Bay bypass	$8.0 million
Mackays Crossing grade separation	$12.3 million
Medium rail upgrade	$14.5 million
Enhanced rail upgrade	$121.6 million
Northbound clearway to Steyne Ave (RdA)	$5 million
Full clearways (NOR)	$14 million
Reduced clearways	$12 million
Transmission Gully (less MacKays crossing)	$233 million

4. Analysis

The following is the results of the technical analysis of the 15 combinations of road and public transport options.

4.1 Economics

The analysis is based on a collection of projects spread over time. Thus the benefits and costs of the package change over time as new projects come on stream. The only way these costs and benefits can be meaningfully compared is to sum the discounted value of the costs and benefits over the life of the package. The discount rate used in this calculation is 10%. This is called the net present value (NPV).

The package includes more than one project and elements that do not normally occur in a conventional cost-benefit analysis such as tolls, petrol tax and fare revenue. This means that the economic evaluation used here cannot be compared with other projects up and down the country. This analysis can only be used to compare the various packages under discussion amongst themselves. In this analysis, the economic efficiency indicator is called a benefits, revenue to cost ratio (BRC).

The summary of the results of each package compared to the Do Minimum road and public transport option are as shown in the Appendix Table 1. Monetary values are in millions of dollars.

The above results show that there is very little difference in the calculated BRC of the packages with road options A, B, C and D or the levels of public transport provision. The differences are within the margin of error of this analysis. It does appear, however, that the packages with the highest level of public transport provision (PT2) or no road improvements in addition to the Do Minimum option (Rd0) are least attractive in BRC terms.

Examination of the net present value of the benefits-cost + revenue show that this is maximised by packages which bring Transmission Gully, although the difference is not large, early and provide the medium level of public transport investment. Packages with no road improvements perform poorly in this area.

These results suggest that some road improvements are required. It is clear that the enhanced public transport option provides large benefits but the cost is high. If the same order of benefits can be produced at lower cost, this option would be attractive.

4.2 Travel Performance

The statistics were calculated for the various packages and are shown in Tables 2 and 3 in the Appendix.

All road improvements induce traffic onto the peak period road network. The major sources of induced traffic in order of decreasing significance are mode change, trip redistribution and trip retiming. Only the addition of the public transport enhancements can counteract this trend. Enhanced public transport investment (PT2) is more effective than the medium level of investment in counteracting induced traffic.

All road improvements have a similar impact on the forecasted 2016 annual cost of congestion by reducing it by about $6 million per annum. The medium level of public transport investment reduces the 2016 annual cost of congestion by a further $2 million per annum whereas the enhanced level makes an impact of about $11 million per annum.

All road improvements have a similar impact on the Kapiti to Wellington CBD peak car journey time. Time savings of about 10 to 13 minutes occur in the 2016 morning peak. The medium level public transport investment reduces the car journey time by a further two minutes whereas the enhanced level of public transport investment reduces car journey time by 4.5 minutes.

Transmission Gully attracts a significant but modest amount of traffic compared to the existing highway during the forecasted traffic peaks. This is a consequence of the existing highway being free and Transmission Gully being tolled. Secondly the existing highway carries a significant amount of local traffic. This result indicates that the construction of Transmission Gully will not significantly improve severance and environmental quality along the existing State Highway on its own. There are a

number of issues that need to be addressed if the use of Transmission Gully is to be optimised. These may include:

(a) physical measures to discourage long distance traffic using the existing highway so that they use Transmission Gully
(b) tolling long distance traffic using the existing route
(c) a mix of the above

4.3 Network Wide Impacts

Examination of the wider network shows the interdependency of this corridor with other parts of the total network. The public transport improvements do not remove bottlenecks in the road network although their severity is lessened. Public transport enhancements increase the demands for good interchange and pedestrian connections at Wellington station as well as public transport improvements through the Wellington CBD.

All the road improvement options on this part of the corridor place greater demands for road improvements to remove bottlenecks on SH1 at Paraparaumu, Ngauranga Gorge, Ngauranga to Aotea off-ramp, the Terrace Tunnel and the inner city east of the Terrace Tunnel. These road improvement options also increase the demand for improved road connections between the western corridor and the Hutt Valley. This is the result of induced traffic generated primarily by mode change, trip redistribution and trip retiming.

4.4 Sensitivity Testings

Two sensitivity tests have been undertaken. Increasing projected population and employment growth rates and reducing the cost of the Transmission Gully project.

A selection of packages have been tested with growth rates from the Kapiti Coast increased by 20 percent and Transmission Gully reduced to a cost of $200 million. These tests are designed to test the sensitivity of the results to changes in the underlying assumptions on the boundary of what could reasonably be expected to occur. The results are provided in the Appendix Table 4.

All options improve considerably in BRC and net present value of benefit-cost + revenue with increased growth rates. Public transport enhancements show large increases in the net present value of benefits-cost + revenue as does the BRC with increased travel growth.

A reduced cost for Transmission Gully improves the BRC and the net present value of benefits – cost + revenue to a greater extent if Transmission Gully is built early.

4.5 Discussion of Options

Peak Period Congestion

From north of Porirua, all road and public transport options reduce the travel time to the Wellington CBD. For example, the journey from Kapiti is about 10 minutes shorter in both 2006 and 2016 at peak times for road options and public transport options reduce this travel time by a further two to 4.5 minutes.

Rail Service to Kapiti

Medium and high public transport investment options increase the peak-hour frequency to Kapiti to 4 per hour (presently 2 per hour) and off-peak to 2 per hour (presently 1 per hour)

Demands for Access

Options in which Transmission Gully is constructed earlier reduce the level of traffic earlier and so facilitate access to the existing highway.

Lack of Direct Access to Rail

Medium public transport investment provides more stations and park and ride facilities than at present and so addresses this issue. Enhanced public transport investment additionally provides light rail access to areas such as Whitby which are presently not served.

Community Severance

When Transmission Gully is built flows on the existing SH1 will drop to around 80% (am Peak 2016) of their present level. The percentage drop in traffic on SH1 is greater when Transmission Gully is first opened. This will have some effect on severance but will not be particularly noticeable by the public unless further measures are introduced to discourage the use of the existing highway by long distance traffic.

Accident Rates on SH1

Transmission Gully will reduce traffic on SH1. As Transmission Gully will be built to a high standard, the overall effect should be to reduce accidents.

Increases in Freight Movement (including forestry)

The impact here depends critically on the extent to which freight traffic is transferred to the Transmission Gully route.

Increase in Recreation Travel

Options RdA RdC andRdD and to a lesser extend RdB, provide additional capacity from 2006. For RdA RdC and RdD this should be more than enough to cater for the leisure peaks which occur on summer weekends; this may not be true of RdB.

Poor Quality Facilities for PT Users

Medium and enhanced public transport investment options address this.

4.6 The Regional Land Transport Strategy Objectives and Network Balance

The various packages are assessed against the objectives of the Regional Land Transport Strategy and the principle of network balance.

Accessibility and Economic Development

All road and public transport options enhance access along the corridor. The options that provide Transmission Gully early deliver a higher standard of access early. Higher levels of public transport investment deliver higher levels of accessibility. Generally, higher levels of accessibility will deliver greater economic activity unless the costs of providing the accessibility are too high. In all cases, the BRC exceeds 1.0 except with the enhanced public transport investment option with no road improvements.

Economic Efficiency and Affordability

All the options are affordable as the Willingness to Pay research has shown if tolling, and petrol tax are available in addition to rates funding. Economic efficiency, as viewed from a National or Regional resource perspective, is promoted by those options with a BRC greater than 1.0.

Safety

All options provide for enhanced safety but options that provide Transmission Gully early provide greater safety benefits over time.

Sustainability

If the environmental impacts of induced traffic are to be avoided and severance effects reduced then the analysis shows that improvement in the passenger transport network on the corridor is required in addition to measures that will discourage the use of the existing State Highway when Transmission Gully is built.

Network Balance

The analysis has shown the need to invest in passenger transport if the balance in peak period road use and passenger transport is to be maintained. Road improvement options will need to be built in conjunction with improvements to the road network in Kapiti, Ngauranga Gorge and south and improved connections to the Hutt Valley.

4.7 Conclusions

A summary of this analysis is shown in the matrix below which is consistent with the approach in identifying the preferred Regional Land Transport Strategy.

	Do Min	Rd0PT1	Rd0PT2	RdAPT0	RdAPT1	RdAPT2	RdBPT0	RdBPT1	RdBPT2	RdCPT0	RdCPT1	RdCPT2	RdDPT0	RdDPT1	RdDPT2
Accessibility Car	0	0	0	++	++	++	+	+	+	++	++	++	++	++	++
Accessibility PT	0	+	++	-	+	++	-	+	++	-	+	++	-	+	++
Economic Development	0	0	0	+	++	+	0	+	0	+	++	+	+	++	+
Safety	0	+	+	+	++	++	0	+	+	+	++	++	+	++	++
Economic Efficiency	0	+	0	++	++	+	+	+	0	++	++	+	++	++	+
Affordability															
• **User**	0	0	0	-	-	-	0	0	0	-	-	-	-	-	-
• **Funding**	0	0	-	-	--	--	0	-	--	-	--	--	-	--	--
• **PT subsidy**	0	+	++	-	0	++	-	0	+	-	0	++	-	0	++
Sustainability															
• **Environment**	0	+	+	--	0	+	--	0	0	--	0	+	--	0	0
• **Fuel**	0	+	+	--	0	+	--	0	0	--	0	+	--	0	0
• **Severance**	0	0	0	+	+	+	-	-	-	+	+	+	+	+	+
Network Balance	0	+	+	--	0	+	--	0	0	--	0	+	--	0	0

Taking together the whole analysis in this report there are a number of conclusions that can be drawn. These are:

- Packages with no public transport improvements perform poorly against public transport accessibility, sustainability and network balance criteria
- Packages with enhanced public transport perform poorly against affordability and economic efficiency criteria
- Some public transport investment is necessary to provide public transport accessibility and economic development, economic efficiency, sustainability and network balance benefits
- Road improvements on the corridor are necessary to provide road accessibility, economic development, safety and economic efficiency benefits
- There is little difference between the economic efficiency of building Transmission Gully earlier or later
- Building Transmission Gully early has a small benefit in terms of NPV of benefits-cost + revenue, accessibility, economic development and safety over building it later. The BRC is neutral in terms of building Transmission Gully early or later.

5. Actions Required

The following section identifies the legislative, planning, funding and property issues that are required to progress each of the options.

PT1

Legislative : none
Planning : resource consent for station at Raumati
Funding : Transfund New Zealand and Regional Council funding required
Property : purchase of land at Raumati and Waikanae (carpark)

PT2

Legislative : none
Planning : resource consent for stations at Glenside, Aotea and Lindale
Funding : Transfund New Zealand and Regional Council funding required
Property : purchase of land at Glenside, Aotea and Lindale

Rd0

Legislative : none
Planning : resource consent required for Paremata Bridge
Funding : Transfund New Zealand funding required
Property : none

RdA

Legislative : to enable Transmission Gully (both funding of it and toll road), regional petrol tax in 2006
Planning : designation appeals in Environment Court for Transmission Gully
Funding : tolls, regional petrol tax and Transfund New Zealand funding
Property : land purchase for Transmission Gully alignment

RdB

Legislative : to enable Transmission Gully (both funding of it and toll road, regional petrol tax in distant future (beyond 2016))
Planning : appeals in Environment Court for existing highway and designation appeals in Environment Court for Transmission Gully
Funding : Transfund New Zealand funding for SH1 improvements, tolls, regional petrol tax and Transfund New Zealand funding in the distant future for Transmission Gully
Property : land purchase for SH1 improvements at Mana, Plimmerton and Pukerua Bay; land purchase for Transmission Gully alignment in distant future

RdC

Legislative : to enable Transmission Gully (both funding of it and toll road), regional petrol tax in 2006)
Planning : designation appeals in Environment Court for Transmission Gully
Funding : tolls, regional petrol tax and Transfund New Zealand funding
Property : land purchase for Transmission Gully alignment

RdD

Legislative : to enable Transmission Gully (both funding of it and toll road, regional petrol tax in 2006)

Planning : resource consent required in Plimmerton, for existing highway and designation appeals in Environment Court for Transmission Gully

Funding : Transfund New Zealand funding for SH1 improvements; tolls, regional petrol tax and Transfund New Zealand funding for Transmission Gully in 2006

Property : land purchase for SH1 improvements at Plimmerton; land purchase for Transmission Gully alignment in 2006

6. Recommendations of the Technical Group

The recommendations follow from the conclusions drawn in sections 4.2, 4.3 and 4.7. These conclusions indicate that the Western Corridor Implementation Plan should provide for:

(1) The Do Minimum network : another Paremata Bridge, safety improvements and McKays Crossing

(2) The medium level of public transport upgrade (PT1)

(3) Transmission Gully is an appropriate part of the plan to be operated as a toll road

(4) It is appropriate to pursue Transmission Gully at the earliest time that legislation and funding will allow to meet the broader objectives of the Regional Land Transport Strategy

(5) Capacity improvements on the existing highway are also appropriate, but their form and design should recognise the timing of Transmission Gully

(6) Improvements to public transport on the corridor will necessitate improvements to bus-rail interchange and pedestrian connections at Wellington station

(7) The construction of Transmission Gully will require improvements to the road network in the vicinity of Paraparaumu, Ngauranga Gorge, Ngauranga to Aotea Quay and improved connections to the Hutt Valley

(8) The appropriate authorities will need to consider carefully the future of the existing State Highway when Transmission Gully is built if the full environmental benefits of building Transmission Gully are to be realised and the use of Transmission Gully is to be optimised.

The precise form of capacity improvements on the existing highway cannot be determined as it is beyond the level of this strategic analysis. If Transmission Gully is to be completed by 2006 then capacity improvements on the existing highway may not be appropriate. The level of uncertainty of the timing of Transmission Gully

means that it is prudent to plan for the construction of capacity improvements on the existing highway.

Appendix 1

Table 1 : Economic Evaluation Based on Annualised AM, Inter and PM Peak Flows

Money Values in $million	Rd0PT0	Rd0PT1	Rd0PT2
NPV Benefits	0	$55.8	$108.7
NPV Costs	0	$60.7	$137.5
NPV tolls + petrol tax	0	0	0
NPV fare revenue	0	$11.7	$26.5
NPV benefits-costs + revenue	0	$6.7	-$2.3
BRC	-	1.11	0.98
	RdAPT0	**RdAPT1**	**RdAPT2**
NPV Benefits	$145.3	$195.0	$245.8
NPV Costs	$162.2	$223.0	$299.0
NPV tolls + petrol tax	$59.9	$62.3	$46.2
NPV fare revenue	-$9.1	0	$30.9
NPV benefits-costs + revenue	$33.9	$34.4	$24.1
BRC	1.21	1.15	1.08
	RdBPT0	**RdBPT1**	**RdBPT2**
NPV Benefits	$84.8	$138.7	$185.8
NPV Costs	$80.4	$142.3	$218.0
NPV tolls + petrol tax	$18.4	$27.3	$24.7
NPV fare revenue	-$2.8	0	$16.5
NPV benefits-costs + revenue	$20.0	$23.7	$9.0
BRC	1.25	1.17	$1.04
	RdCPT0	**RdCPT1**	**RdCPT2**
NPV Benefits	$136.6	$192.0	$243.9
NPV Costs	$159.1	$221.1	$297.4
NPV tolls + petrol tax	$67.6	$67.7	$48.8
NPV fare revenue	-$10.3	0	$32.5
NPV benefits-costs + revenue	$34.8	$38.7	$27.7
BRC	1.22	1.17	1.09
	RdDPT0	**RdDPT1**	**RdDPT2**
NPV Benefits	149.0	200.8	251.6
NPV Costs	167.2	228.0	304.0
NPV tolls + petrol tax	59.9	62.3	30.9
NPV fare revenue	-9.1	0	46.4
NPV benefits-costs + revenue	32.6	35.1	24.9
BRC	1.19	1.15	1.08

Table 2 : AM Peak 2016 Travel Performance

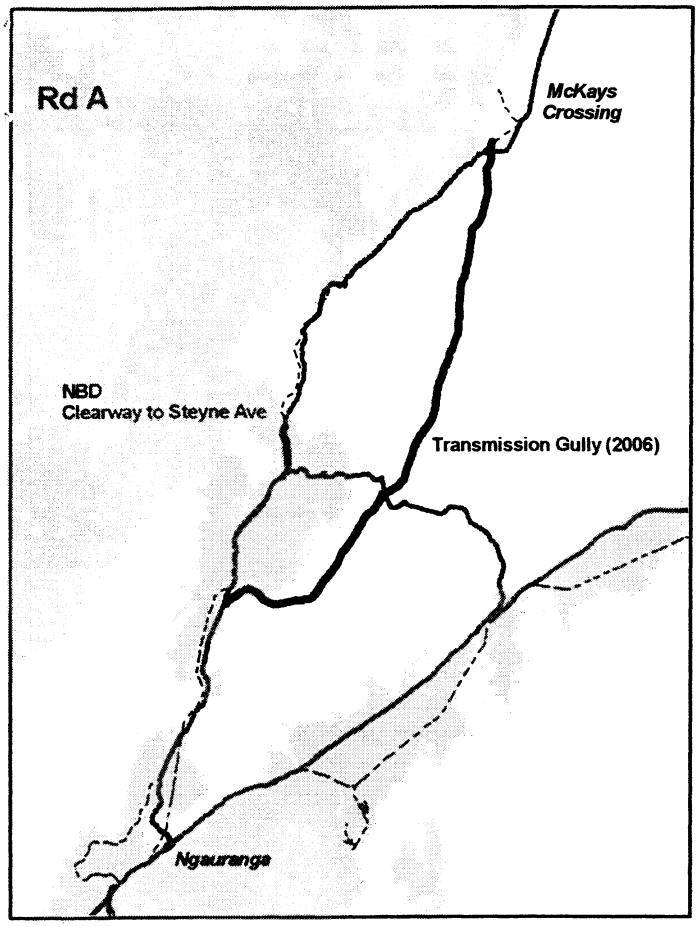
	Forecast 2016 AM Peak SBD Flows (7.00 am – 9.00 am)			Annual Cost of Congestion (millions) 2016	Paraparaumu-Wellington Car travel time (mins) 2016
	Mana Vehicles	TG Vehicles	PT Persons		
Rd0PT0	2621	-	1632	$129	79.3
Rd0PT1	2515	-	1949	$125	75.6
Rd0PT2	2504	-	2010	$116	72.7
RdAPT0	2269	1424	1289	$123	66.5
RdAPT1	2208	1424	1626	$121	64.7
RdAPT2	2137	1246	1700	$112	61.8
RdBPT0	3023	859	1253	$124	69.5
RdBPT1	2860	903	1601	$121	66.8
RdBPT2	2844	698	1660	$113	63.9
RdCPT0	2269	1424	1289	$123	66.5
RdCPT1	2208	1424	1626	$121	64.7
RdCPT2	2137	1246	1700	$112	61.8
RdDPT0	2280	1396	1285	$124	66.3
RdDPT1	2217	1395	1623	$121	64.5
RdDPT2	2148	1235	1698	$112	61.4

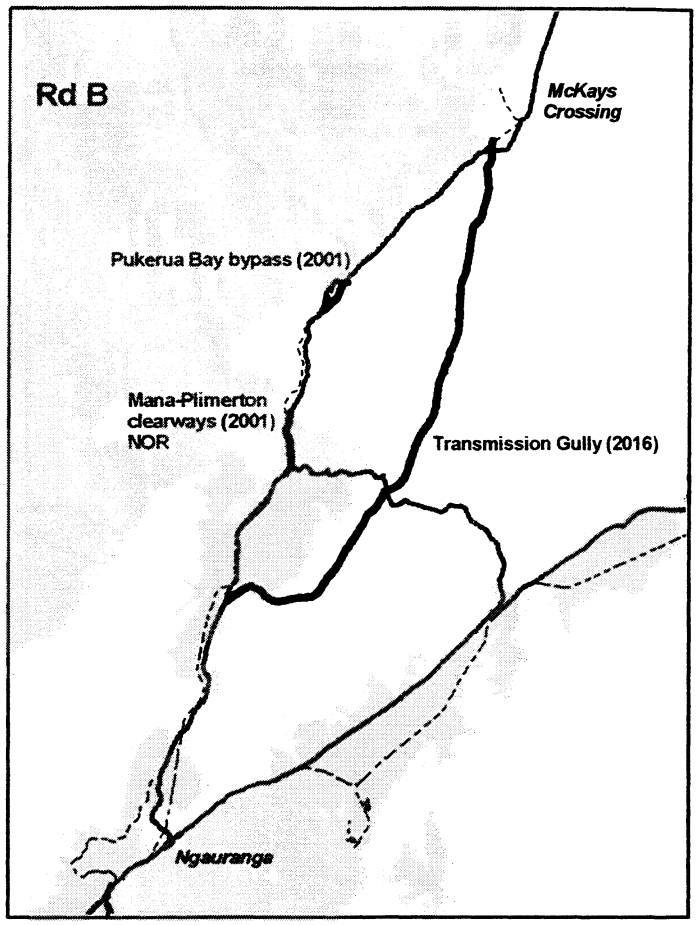
Table 3 : PM Peak 2016 Travel Performance

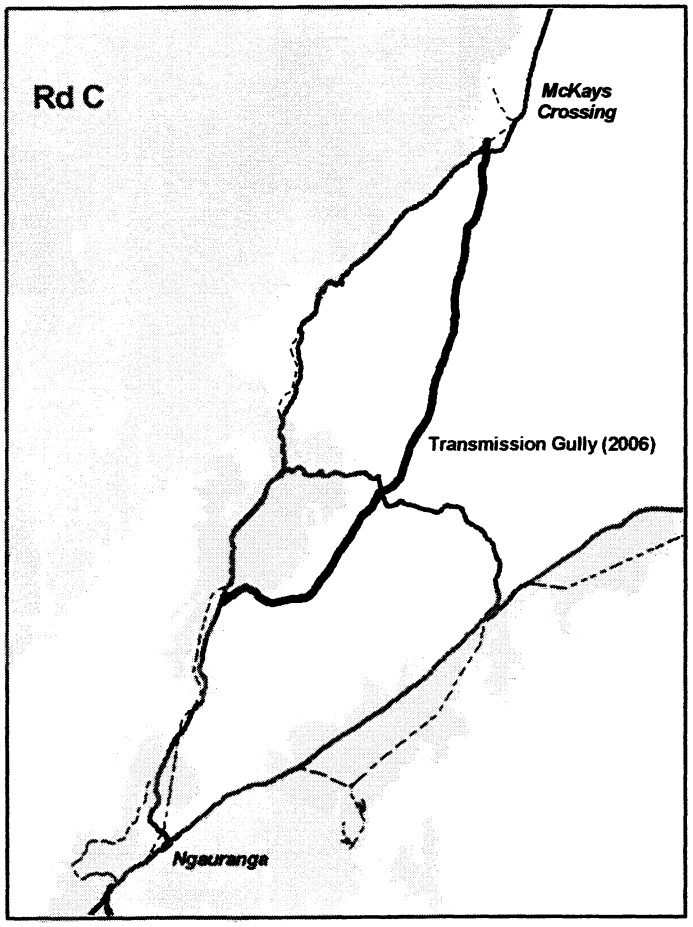
	Forecast 2016 PM Peak NBD Flows (4.00 pm – 6.00 pm)			Annual Cost of Congestion (millions) 2016	Wellington - Paraparaumu Car travel time (mins) 2016
	Mana Vehicles	TG Vehicles	PT Persons		
Rd0PT0	2710	-	1629	$129	68.3
Rd0PT1	2607	-	1949	$125	64.7
Rd0PT2	2602	-	2000	$116	62.1
RdAPT0	2365	1758	1236	$123	57.7
RdAPT1	2285	1708	1621	$121	56.4
RdAPT2	2398	1322	1723	$112	54.7
RdBPT0	3180	1342	1222	$124	60.3
RdBPT1	3034	1307	1564	$121	57.6
RdBPT2	3031	1055	1628	$113	55.1
RdCPT0	2365	1758	1236	$123	57.7
RdCPT1	2285	1708	1621	$121	56.4
RdCPT2	2398	1322	1723	$112	54.4
RdDPT0	2377	1723	1232	$124	57.5
RdDPT1	2296	1674	1618	$121	56.2
RdDPT2	2410	1210	1721	$112	54.3

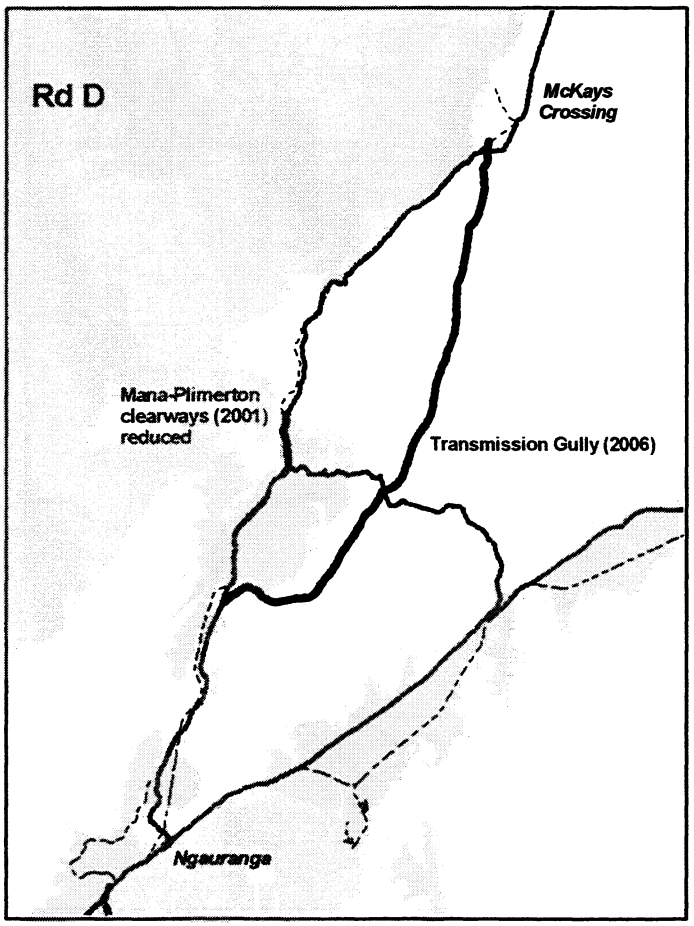
Table 4 : Sensitivity Analysis

	Growth Rate Increased by 20%		Transmission Gully $200 million	
	NPV (benefits-costs + revenue) (millions)	BRC	NPV (benefits-costs + revenue)	BRC
RdAPT0	$97.1	1.63	$52.5	1.40
RdBPT0	$58.3	1.77	$27.2	1.40
RdBPT1	$103.2	1.72	$30.9	1.24
RdBPT2	$124.3	1.58	$16.2	1.08
RdCPT0	$96.1	1.63	$53.4	1.40
RdDPT0	$89.7	1.54	$55.2	1.38









Western Corridor Options

Railway lines
State Highways
Urban area

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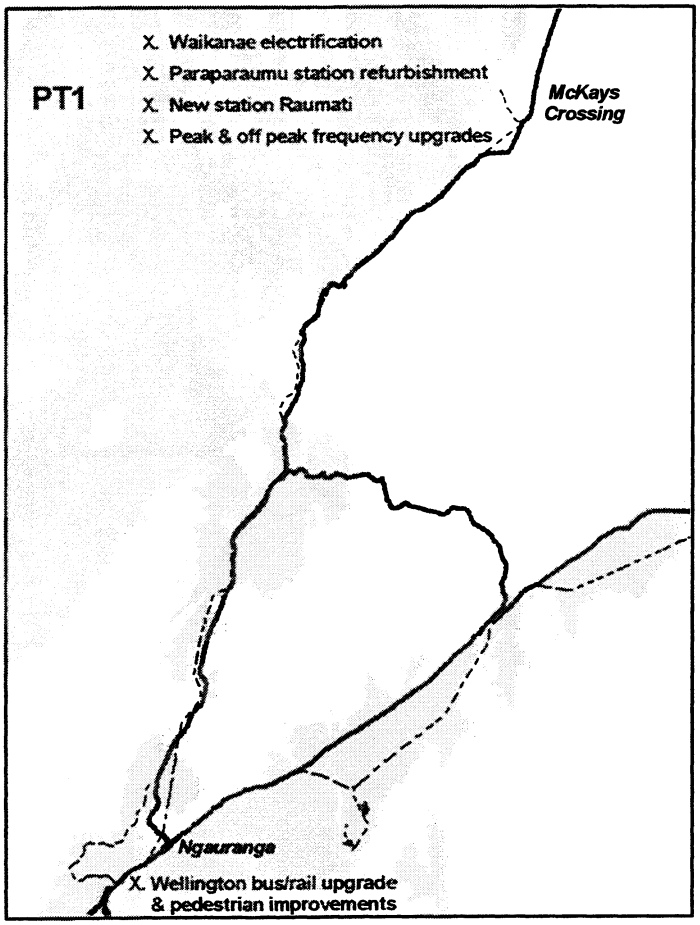
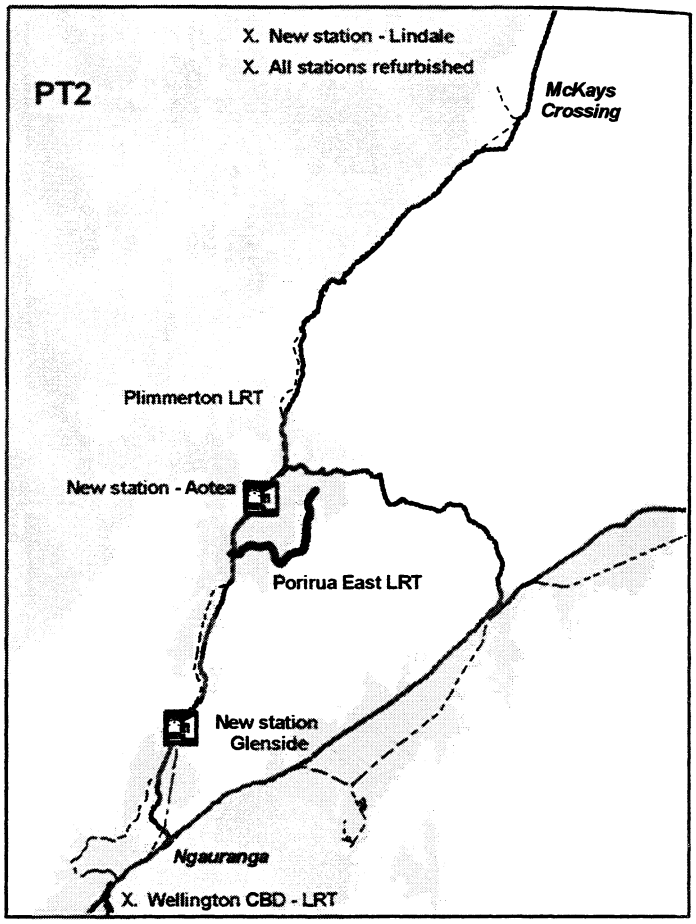
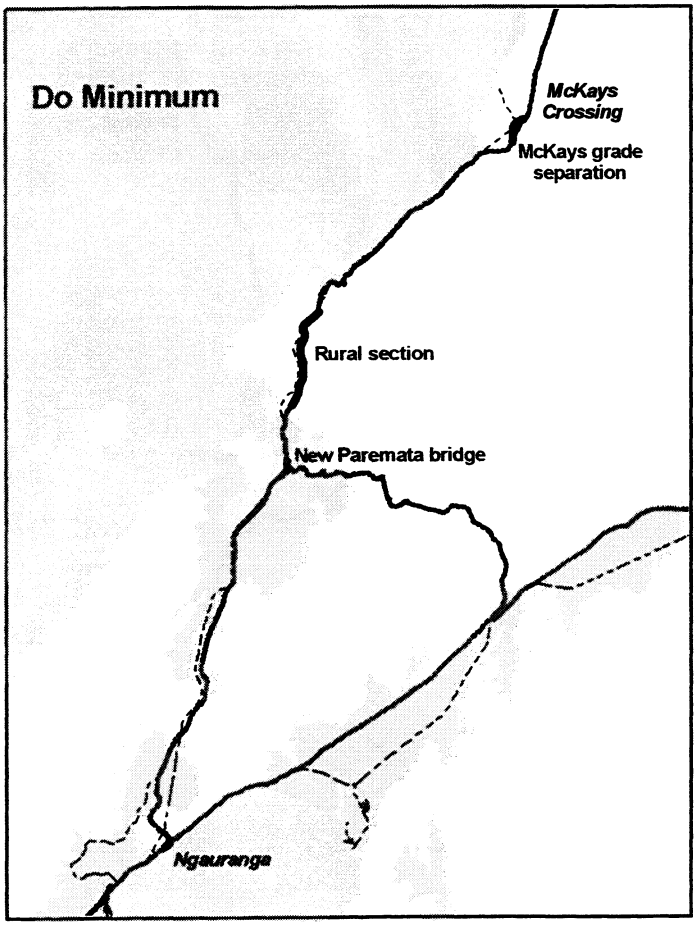
Map created March/28/2000







Western Corridor Options

------ *Railway lines*
——— *State Highways*
Urban area

N

Map created March/28/2000