Western Corridor transportation study

Confirmed elements

18 February 2005

TRANSIT NEW ZEALAND ARARAU AOTEAROA

greater WELLINGTON REGIONAL COUNCIL

Confirmed elements

Prepared for

Greater Wellington Regional Council

and Transit New Zealand

Prepared by

Maunsell Limited
10th Floor, KPMG Centre, 135 Victoria Street, PO Box 27 277, Wellington, New Zealand
T +64 4 382 2999 F +64 4 382 2998 www.maunsell.com

In association with

Boffa Miskell Limited & Environmental Management Services Limited

18 February 2005

MAUNSELL | AECOM

Contents

Executive summary

This report documents the elements identified for the Western Corridor Transportation Study and identifies the rationale behind the selection of elements for further consideration. The initial list of project elements was identified from the following sources

- consultation
- peer review workshop
- Technical Steering Group workshop
- Review of relevant previous reports.

Two groups of elements have been selected for further review. The following table identifies the elements that will be assessed and costed.

	Elements to be considered
Element No.	Description
	RAIL IMPROVEMENTS
RT1	Double track north/south junction. Double track the existing single track section between Pukerua Bay and Paekakariki
RT2	Double track MacKays to Raumati. Double track the existing single track section between MacKays Crossing and Raumati
RT3	Double track Raumati to Paraparaumu. Double track the existing single track section between Raumati and Paraparaumu
RE1	Extension of commuter network. Electrification of Waikanae section (starting north of existing Paraparaumu station)
RS1	New rail station at Lindale
RS2	New rail station at Raumati, located between Poplar Avenue and Leinster Road
RS12	Improved cycle storage at stations
RM2	Management of rail priorities: freight secondary to commuter trains
RM6	Free carriage of bicycles
RM7	Passenger real time information
	HIGHWAY IMPROVEMENTS
HT1	Transmission Gully 4 lane for the full length
HT4	Transmission Gully 2 lane for the full length
HT7	Transmission Gully 4 lane for the full length. Includes the removal of temporary improvements at Mana
HC1	Coastal Upgrade + 2 lanes (Motorway). Over Transmission Gully

	Elements to be considered
Element No.	Description
	length
HC2	Coastal upgrade +2 lanes through Mana. Over Transmission Gully length
HC4	Coastal Upgrade - expressway concept. Over Transmission Gully length
HC5	Intersection and Bottleneck Upgrades. Involves small scale physical works at the following locations; Whitford Brown Avenue, Mana, Paekakariki, Pukerua Bay, Paraparaumu, Otaihanga Road, Waikanae
HC6	Northern SH1 Upgrade + 2 lanes (Motorway). From MacKays Crossing to Peka Peka
HC7	Northern SH1 Upgrade + 2 lanes (Expressway) . From MacKays Crossing to Peka Peka
HC8	Southern SH1 Upgrade + 2 lanes (Motorway). From Ngauranga Gorge to south of Linden
HP1	Parallel local road to SH1 from Johnsonville to Pukerua Bay
HP2	Parallel local road to SH1 from Fishermans Table to Poplar Avenue
HP3	Western Link Road. Runs from Poplar Avenue to Peka Peka. Is a parallel local road to SH1
HE3	Grays Road
HE5	New route Pauatahanui to Taupo Swamp
	TRAVEL DEMAND MANAGEMENT
TR1	Car pooling / sharing
TR2	Marketing and promotion. Multi modal access guides
TR3	Travel Planning
TR4	ITS/ ATMS
TR6	Transmission Gully toll
TR10	Incident management
TA1	Cycle routes
TA2	Walkway routes

The elements in the following table will be modelled in the WTSM and if they are observed to provide sufficient benefits for the corridor they will be assessed.

	Elements to be considered where modelling supports
Element No.	Description
	RAIL IMPROVEMENTS
RS3	New rail station at Aotea
RS4	New rail station at Glenside
RS5	New rail station at Newlands
RS6	New rail station at MacKays
RS7	Removal of station at Muri / Pukerua Bay
RS8	Removal of station at Redwood / Takapu
RS9	Park and ride capacity improvements.
RS10	A bus rail interchange at Lindale
RS11	A bus rail interchange at Porirua
	HIGHWAY IMPROVEMENTS
HT2	Transmission Gully 4 lane for the southern section only (Linden to SH58)
HT3	Transmission Gully 4 lane for the south section, 2 lane for the north section
HT5	Transmission Gully 2 lane reversible flow
HT6	Transmission Gully 4 lane for the northern section (SH58 to MacKays Crossing)
HE1	Paekakariki Hill Road
HE2	Akatarawa Road
HE4	SH58
HE6	Petone- Grenada Link
HE8	Belmont- Porirua Link
	TRAVEL DEMAND MANAGEMENT
TP1	Parking Charges
TR5	HOV lanes. From Johnsonville south

1. Introduction

This report documents the elements identified for the Western Corridor Transportation Study and identifies the rationale behind the selection of elements for further consideration. The initial list of project elements was identified from the following sources

- consultation
- peer review workshop
- Technical Steering Group workshop
- Review of relevant previous reports.

The WCTS is a strategic study and consequently the elements will be defined at a strategic level. For instance this study will not specifically address the intersection treatment at Paekakariki in isolation. It will however consider the appropriate standard of highway through this area (eg rural highway, expressway, motorway etc.) and in this fashion the intersection treatment will be defined. The level of detail of particular elements in this study will be sufficient to allow robust comparisons between the elements. The projects identified in the Corridor Plan resulting from this study will then be investigated at a greater level of detail in further studies and the specific details for any particular element will be clearly determined.

2. Standards of improvements

The standard of the elements has been developed around affordability, safety and recognised standards. It is very important to provide a degree of consistency between the various element standards so that comparisons can be made between elements. The general philosophy has been to identify existing standards and apply them if they have not been determined to be significantly inadequate. (eg Steyne Avenue rail crossing would be replaced with a similar level crossing). Where elements are directly competing similar standards will be applied (eg curve radii on TGM will be consistent with curve radii on any coastal route)

The standards adopted are

Rail improvements

Track Geometry	Maximum gradients not to exceed existing
	Existing minimum curve radii to be matched or bettered
Station Build Quality	Petone Station Rebuild

Highway improvements

Standards	Speed	Geometry		Intersections
		Desirable minimum radii	Absolute minimum radii	
Expressway	80/100	900	500	Grade separated major intersections, only left turns permitted for minor intersections and accesses, Key intersection movements to be ramped
Motorway	100	1600	900	All intersections grade separated and all movements ramped

Note TGM has vertical gradients up to 8% and minimum curve radii of 550m

Current curves on SH1 include Newlands curve (200m radius), Tawa Interchange curves (325m radii), South Mungavin Curves (400m radii)

Local road improvements

The standard of local road improvements will be matched to the existing standards except in the following cases

- where the current standard is clearly inadequate
- Grays Rd (for any comparison between Coastal and TG routes).

Base case

The base case is the current network plus currently committed construction projects of:

- Lindale Grade Separation
- MacKays Crossing Grade Separation
- Mana/Plimmerton Improvements
- Inner City Bypass (Stage 2).

All assessments will be made for the projected medium growth traffic volumes in 2016. Sensitivity testing will be used to consider variations to this growth.

The philosophy of the base case is based around nil change from existing. This philosophy will be applied where the base case has not been explicitly stated (e.g. it will be assumed the vehicle fleet and its emission standards will be similar to existing).

3. Identified elements

The initial list of elements was identified from:

- consultation
- peer review workshop
- Technical Steering Group workshop
- review of relevant previous reports.

Elements were grouped together into similar categories and an initial analysis was carried out to identify the most promising elements within each category. This analysis considered the following questions

1. is the element likely to meet the Target Minimum Performance Levels
2. is the element affordable
3. will the element maintain or improve safety levels
4. are there elements with less effect on the triple bottom line (economic, environmental, social) that provide similar benefits
5. is the element a grander version of a competing element and therefore should only be considered if the less grand element looks promising

The process of element selection and refinement is likely to be iterative. Where further analysis indicates that some of the elements not taken forward from the initial analysis may have benefits these elements will be considered at a later stage.

Each project element is identified and described in the table below. The rationale for selection of elements for modeling and specialist asssement is also provided. In some cases the table indicates that assessment will occur if supported by the modeling. This means that the element will be subject to full assessment if the modeling of the element in the Wellington Transport Strategy Model demonstrates that there are overall transportation benefits to the corridor.

Similarly “No unless RT3” means that the element will not be assessed unless the evaluation of, in this case, RT3 shows that the project is likely to have worthwhile potential.

Element No.	Description	To be costed and assessed	Rationale
	Rail (R)		
	Track improvements (T)		
RT1	Double track north/south junction. Double track the existing single track section between Pukerua Bay and Paekakariki	Yes	Initial operational analysis suggest that the single track section between North and South Junctions does not provide the primary constraint to operation of more frequent suburban peak hour train services. There is however a significant amount of concern about the affect that this section has on system reliability, on time performance and the ability to recover from out of course running.
RT2	Double track MacKays to Raumati. Double track the existing single track section between MacKays Crossing and Raumati	Yes	This section of track represents the primary constraint to the introduction of more frequent peak hour suburban rail services to Paraparaumu. The length of double track required will be determined as part of an operational analysis. It is possible that double track may be required for the full distance between Mackays Crossing and Paraparaumu.
RT3	Double track Raumati to Paraparaumu. Double track the existing single track section between Raumati and Paraparaumu	Yes	This section may need to be duplicated as part of the provision of more frequent services to Paraparaumu. It may also require duplication if services are extended to Waikanae, depending on the frequency of service applied.
RT4	Double track Paraparaumu to Waikanae. Double track the existing single track section between Paraparaumu and Waikanae	No unless RT3	The need for duplication of this section of track only comes into play if suburban services are extended to Waikanae and service frequency requirements are better than 15 minutes. This element will be examined in more detail as part of the operations assessment however it would be unlikely that this

Element No.	Description	To be costed and assessed	Rationale
			level of service frequency will be required from Waikanae within the study period.
RT5	Double track Waikanae to Otaki. Double track the existing single track section between Waikanae and Otaki	No unless RT4	The population of Otaki does not support a frequent service necessitating double tracking to Otaki.
RT6	Double track Otaki to Auckland. Double track the existing single track sections between Otaki and Auckland.	No unless RT5	This is outside the scope of this corridor study
RT7	Passing loops at various location	No	Passing loops would need to be in the order of 10km length to allow express trains to overtake services stopping at each station. Given the lack of room in the corridor and the topography the cost of such a passing loop would be very expensive. Capacity can be provided better with double tracking single sections and increasing the length of train sets.
RT8	3rd track. A dedicated freight track.	No unless RT7	Only one freight train is scheduled through the AM peak. Its speed is similar to the commuter train speeds through the corridor. Most metropolitan services place a curfew on freight services during peak hours when maximum track capacity is reached rather than construct an additional freight track
RT9	4th track.	No unless RT8	A fourth track is unnecessary
RT10	Rail track improvements to increase speed. Carry out grade easing.	No	Time gains will only be in the order of seconds that will have no material effect on the desirability of the service. Construction costs will be very expensive for little if any gain. The current use of additional locomotives for freight trains over the Pukerua Bay hill section mitigate the worst of the grade effects.

Element No.	Description	To be costed and assessed	Rationale
RT11	Rail track improvements to increase speed. Carry out curve easing.	No	Time gains will only be in the order of seconds that will have no material effect on the desirability of the service. Construction costs will be very expensive for little if any gain
RT12	Rail track improvements to increase speed. Remove height restrictions.	No	Commuting capacity can be provided by increasing the length of trains rather than needing to double deck. No height increases are necessary for commuter trains. Height restrictions for containers have recently been eased by lowering the floor of the tunnels on the Paekakariki coast section. Any such further work should be completed in line with a national strategy and outside the scope of this study
RT13	Rail track improvements to increase speed. Remove weight restrictions.	No	Weight restrictions have not been identified as an issue
RT14	Improve structure gauge for freight tunnels / veranda	No	Commuting capacity can be provided by increasing the length of trains rather than needing to double deck. No height increases are necessary for commuter trains. Height restrictions for containers have recently been eased by lowering the floor of the tunnels on the Paekakariki coast section. Any such further work should be completed in line with a national strategy and outside the scope of this study
RT15	Improve signalling	No	The current signalling can handle 24 trains per hour per trackwith an acceptable level of reliability which exceeds the expected number of services. Improved signalling will be provided as necessary with any track upgrades
RT16	New stabling north of Waikanae	Yes	Stabling further north may avoid the need to double track certain sections

Element No.	Description	To be costed and assessed	Rationale
RT17	Rail corridor along Transmission Gully route	No	The grades are too steep for rail operations without extensive tunnelling.
RT18	Porirua to Hutt valley route	No	The grades are too steep for rail operations without extensive tunnelling. A 2004 trial bus operation failed to establish an underlying demand and was discontinued.
RT19	Johnsonville line connection to NIMT at Tawa	No	The Johnsonville line used to be the NIMT until the tunnels under Newlands were completed. Given that existing Northern Trunk Route through the Tawa tunnels is double track and does not present a capacity issue for the Western Corridor there is little reason to consider reconnecting the Johnsonville line. There is no benefit to reconnect this track back to the NIMT. The Johnsonville line is single track, has steep gradients and the alignment meanders and would therefore be little use for the trains on the western corridor (NIMT)
RT20	Kapiti Coast route. To run from Raumati to Waikanae	No	The current bus services in the area are marginal. The cost of the construction of the line including bridging the Waikanae River would far exceed any benefit
RT21	Akatarawa Rail	No	The grades are too steep for rail operations without extensive tunnelling. The Hutt rail corridor does not have any significant excess capacity. There is no significant desire for rail services along this corridor
RT22	Johnsonville Line Improvements	No	The Johnsonville Line is not part of this study. Changes in patronage on the Johnsonville Line have very little effect on the Western Corridor
	Electrification extensions (E)		

Element No.	Description	To be costed and assessed	Rationale
RE1	Extension of commuter network. Electrification of Waikanae section (starting north of existing Paraparaumu station)	Yes	Currently Waikanae commuters transfer to the train at Paraparaumu. Electrification will allow connections at Waikanae and Lindale and will also reduce traffic on the highway. Electrification will make rail travel more attractive for commuters in Waikanae.
RE2	Extension of commuter network. Electrification of Otaki section	No Unless RE1	The population of Otaki does not support a frequent service necessitating electrification to Otaki
	Station improvements (S)		
RS1	New rail station at Lindale	Yes	A Lindale station will reduce load on the Paraparaumu station and carpark and make rail travel for commuters near Lindale more attractive
RS2	New rail station at Raumati, located between Poplar Avenue and Leinster Road	Yes	A Raumati Station will reduce load on the Paraparaumu Station and make rail travel for commuters in Raumati more attractive.
RS3	New rail station at Aotea	If modelling supports	Will increase journey times for trains to the north. Would only be appropriate where local development created a demand.
RS4	New rail station at Glenside	If modelling supports	Will increase journey times for trains to the north. Would only be appropriate where local development created a demand.
RS5	New rail station at Newlands	If modelling supports	RLTS investigations in 1997 showed the station could attract many people but the cost of the underground station would be very expensive and operationally difficult in a network that is otherwise comprised of above ground stations
RS6	New rail station at MacKays	If modelling supports	The current road project will make access easier with the grade separation. There appears to be sufficient area to develop a park and ride facility

Element No.	Description	To be costed and assessed	Rationale
RS7	Removal of station at Muri / Pukerua Bay	If modelling supports	Removal of stations will decrease travel time for trains to the north
RS8	Removal of station at Redwood / Takapu	If modelling supports	Removal of stations will decrease travel time for trains to the north
RS9	Park and ride capacity improvements.	If modelling supports	Will make rail travel more attractive
RS10	A bus rail interchange at Lindale	If modelling supports	Lindale has sufficient area to provide a transportation hub for the Kapiti Coast
RS11	A bus rail interchange at Porirua	If modelling supports	Will make passenger transport more attractive
RS12	Improved cycle storage at stations	Yes	Will make rail travel more attractive
	Units (U)		
RU1	Additional Units	If modelling supports	Currently the average unit length is 5 carriages, platforms are able to accommodate 8 carriages. Purchase of additional units would provide increased capacity. The recent government announcement on unit upgrades obviates the need to consider such an element in this study
	Management (M)		
RM1	Improved rail frequency on existing infrastructure	No	The frequency of the rail movements has already been optimised for the current infrastructure
RM2	Management of rail priorities: freight secondary to commuter trains	Yes	Only one freight train is scheduled through the AM peak. Its speed is similar to the commuter train speeds through the corridor. Most metropolitan services place a curfew on freight

Element No.	Description	To be costed and assessed	Rationale
			services during peak hours when maximum track capacity is reached rather than construct an additional freight track. This will be included if necessary
RM3	Fare levels and structures: integrated ticketing / fare structures	If modelling supports	Will make passenger transport more attractive
RM4	Freight rail diversion through Wairarapa	No	The Hutt rail corridor does not have any significant excess capacity at peak hours. The travel time through the Wairarapa is likely to match or exceed any alternative delay avoiding a peak hour freight curfew near Paraparaumu. The additional fuel and maintenance costs running through the Wairarapa will not provide a disbenefit
RM5	Integrated scheduling	If modelling supports	There is already a high degree of timetable co-ordination between bus and train in this corridor but not all trains have a connecting bus service, which effectively reduces travel time choice for people in affected areas. Increasing bus frequency in these areas could have a similar affect to increasing train frequencies for these people but not have the potentially high infrastructure costs sometimes associated with rail infrastructure options related to increasing train frequencies
RM6	Free carriage of bicycles	Yes	Will make rail travel more attractive where capacity is available
RM7	Passenger real time information	Yes	Will make passenger transport more attractive
	Light Rail (L)		
	Track (T)		
	The idea of converting low patronage railway lines to light rail (tram) operation is not new, with the Port Melbourne and St.Kilda lines		

Element No.	Description	To be costed and assessed	Rationale
	in Melbourne having been converted in this manner. The advantages flow from: • the use of smaller units of rollingstock that are less expensive to purchase than trains • lower maintenance costs for track resulting from lower axle loadings • lower operating costs • faster service due to reduced stop dwell times and better acceleration rates • more frequent service due to smaller rollingstock units. However there is a significant cost associated with the conversion. Traction wiring needs to be changed, rails may need reprofiling, platform heights need to be altered, level crossing and signalling systems need modification A significant issue to be overcome is the fact that the track is currently at 1064mm gauge. Most light rail systems are built to 1435mm gauge (including Australia) but 1000mm gauge is also popular, particularly in older cities where streets are narrow (tram bodies are generally narrow). To increase the Wellington gauge to 1435mm would involve a complete relay of the track because the sleepers (ties) will not be long enough for the wider track gauge. Another barrier to altering gauge is the fact that the Northern Trunk is the main link between Wellington and Auckland and is used by diesel hauled passenger and freight trains. Even if the gauge issues are resolved then there would be considerable safety concerns associated with mixing light rail vehicles with heavy freight trains. Note also that the issues associated with the single track sections will need to still be resolved and in fact may be more pressing as the density of tram operation would most likely to be higher Similarly converting bus services to light rail require high demand often evidenced by full buses at high frequencies. Currently the existing bus services have the capacity to meet the demand. Furthermore, it would be necessary to agree on a single route for the trams whereas the buses cover a variety of origins and destinations. The conclusion is that there is insufficient patronage to justify a tram operation.		
LT1	Services from Plimmerton on existing track	No	No advantage over conventional rail and more expensive. Mixing light rail vehicles and heavy rail vehicles on one track will pose safety issues

Element No.	Description	To be costed and assessed	Rationale
LT2	Whitby light rail	No	Current bus operation just viable. There is insufficient patronage to justify a light rail operation
LT3	Paraparaumu Beach light rail.	No	Current bus operation just viable. There is insufficient patronage to justify a light rail operation
LT4	Sky rail	No	No areas on the corridor have sufficient demand and have such restricted width to make elevated rail appropriate
LT5	Paekakariki - Lindale tram	No	Current bus operation just viable. There is insufficient patronage to justify a light rail operation
	Highway (H)		
	Transmission Gully (T)		
HT1	Transmission Gully 4 lane for the full length	Yes	This option has been designed and costed previously
HT2	Transmission Gully 4 lane for the southern section only (Linden to SH58)	If modelling supports	
HT3	Transmission Gully 4 lane for the south section, 2 lane for the north section	If modelling supports	
HT4	Transmission Gully 2 lane for the full length	Yes	This option will provide the lowest cost version of TG. The current geometry of TG includes 550m and 750m radii and steep grades. This option along with HT1 effectively brackets a range of two and three lane variants of TG
HT5	Transmission Gully 2 lane reversible flow	If modelling supports	Allows for a lower cost TG and still provide best peak hour capacity

Element No.	Description	To be costed and assessed	Rationale
HT6	Transmission Gully 4 lane for the northern section (SH58 to MacKays Crossing)	If modelling supports	
HT7	Transmission Gully 4 lane for the full length. Includes the removal of temporary improvements at Mana	Yes	The reduction in traffic on the coast route due to the implementation of TG is likely to make this option indiscernible from HT1. A two lane road through Mana will meet the remnant demand
	Coastal Upgrade (C)		
HC1	Coastal Upgrade + 2 lanes (Motorway). Over Transmission Gully length	Yes	To provide a motorway route along the coast to a standard above the TG option with larger radii and grades better matching the requirements of the Geometric Design Manual
HC2	Coastal upgrade +2 lanes through Mana. Over Transmission Gully length	Yes	Similar to HC4 excepting that no improvement is made through Mana
HC3	Coastal Upgrade - + 1 lane tidal flow. Over Transmission Gully length	No unless only narrow corridor available	
HC4	Coastal Upgrade - expressway concept. Over Transmission Gully length	Yes	To provide a very near equivalent standard to the TG option
HC5	Intersection and Bottleneck Upgrades. Involves small scale physical works at the following locations; Whitford Brown Avenue, Mana, Paekakariki, Pukerua Bay, Paraparaumu, Otaihanga Road, Waikanae	Yes	To relieve known congestion points but not to provide full two lane capacity

Element No.	Description	To be costed and assessed	Rationale
HC6	Northern SH1 Upgrade + 2 lanes (Motorway). From MacKays Crossing to Peka Peka	Yes	To upgrade SH1 north of MacKays Crossing to a four lane motorway standard
HC7	Northern SH1 Upgrade + 2 lanes (Expressway). From MacKays Crossing to Peka Peka	Yes	To upgrade SH1 north of MacKays Crossing to a four lane expressway
HC8	Southern SH1 Upgrade + 2 lanes (Motorway). From Ngauranga Gorge to south of Linden	Yes	To increase the number of lanes on the existing motorway section
	Parallel local road to SH1 (P)		
HP1	Parallel local road to SH1 from Johnsonville to Pukerua Bay	Yes	To provide an alternative access and better connect communities divided by the State highway traffic volumes
HP2	Parallel local road to SH1 from Fishermans Table to Poplar Avenue	Yes	To provide an alternative access and better connect communities divided by the State highway traffic volumes
HP3	Western Link Road. Runs from Poplar Avenue to Peka Peka. Is a parallel local road to SH1	Yes	To provide an alternative access and better connect communities divided by the State highway traffic volumes
HP4	Western Link Road as a bypass	No	
	East West linkage upgrades (E)		
HE1	Paekakariki Hill Road	If modelling supports	
HE2	Akatarawa Road	If modelling supports	

Element No.	Description	To be costed and assessed	Rationale
HE3	Grays Road	Yes	To provide improved access to SH1, particularly with any coastal options
HE4	SH58	If modelling supports	
HE5	New route Pauatahanui to Taupo Swamp	Yes	To provide improved access to SH1, particularly with any coastal options
HE6	Petone- Grenada Link	If modelling supports	
HE7	Waikanae to Totara Park	No	Akatarawa Road option covers this option
HE8	Belmont- Porirua Link	If modelling supports	
	Management (M)		
HM1	Bus lanes and bus priority	No	
HM3	New bus services / schedules	No	There are no current restrictions to bus services and schedules
HM4	Bus fare levels and structure	No	There are no current restrictions to operator changes to fare levels
HM5	Super routes for trucks	No	This would need to be considered nationally
HM6	Slow vehicle lane	No	Technology and modernisation is likely to improve slow vehicle speeds
	Travel demand management (T)		
	Parking constraint policy (P)		

Element No.	Description	To be costed and assessed	Rationale
TP1	Parking Charges	If modelling supports	Limiting the attractiveness of private vehicle journeys will reduce peak hour flows
TP2	Parking Supply on the fringe of the CBD	No	There are no current restrictions to the provision of parking around the CBD.
TP3	Restricted parking in CBD	No	TP1 in effect models the effect of parking restrictions
	Road private and PT (R)		
TR1	Car pooling / sharing	Yes	Will reduce traffic flows
TR2	Marketing and promotion. Multi modal access guides	Yes	Will reduce traffic flows
TR3	Travel Planning	Yes	Will reduce traffic flows
TR4	ITS/ ATMS	Yes	Will reduce delays arising from incidents and inform drivers
TR5	HOV lanes. From Johnsonville south	If modelling supports	HOV lanes will be modelled in the most congested part of the corridor. Further HOV options will be modelled as appropriate during refinement of any preferred packages
TR6	Transmission Gully toll	Yes	Initial work indicates the potential toll revenue will be small in relation to the construction cost
TR7	Additional lane toll / HOV	No unless TR5	To utilise additional capacity in HOV lanes
TR8	Strategic assessment of congestion charging	No	This is a national issue
TR9	Weekly vehicle mileage rationing	No	Publicly unacceptable and very difficult to administer
TR10	Incident management	Yes	Refer TR4

Element No.	Description	To be costed and assessed	Rationale
TR11	Grade separation rail crossings	No	Current crossings on side roads are generally suitable. Changes to these crossings are not corridor issues
TR12	Buses to replace rail	No	The current rail corridor delivers 28% of morning commuters through the most congested part of the corridor. Recent Government announcements indicate a strong desire to maintain the rail function. The existing Ganz Mavag units would still be there as a commercial proposition in 2016 and so the existing rail service forms part of the base case. The Business Case demonstrates that rail is superior to bus. Removal of the train service will add to road congestion and be a disbenefit from the base case
TR13	PT to Hutt Valley	No	A 2004 trial bus operation between Porirua and the Hutt Valley failed to establish an underlying demand and was discontinued. The model indicates that demand for trips from Kapiti to the Hutt Valley is 20% of those from Porirua to the Hutt Valley and therefore a bus service from Kapiti to the Hutt Valley is also likely to be unsuccessful.
TR14	Express buses Kapiti- Wellington	No	This service is currently provided
TR15	Road freight by rail	No	Individual projects are already available under the ATR funding. The volume of parcel deliveries is increasing which are generally provided by road transport
	Active Modes (A)		
TA1	Cycle routes	Yes	
TA2	Walkway routes	Yes	

Element No.	Description	To be costed and assessed	Rationale
TA3	Walkway routes, separate from shared paths	No	Small volumes do not merit separation. Shared path around Oriental bay appears to work reasonably for recreational cyclists and pedestrians
TA4	Bridleways	No	Very small amount of horse traffic
	Land use (L)		
TL1	Urban growth policy	No	Sensitivity testing will be completed on Wellington Regional Strategy scenarios
TL2	Employment locations	No	Sensitivity testing will be completed on Wellington Regional Strategy scenarios
TL3	High density residential at PT nodes	No	Sensitivity testing will be completed on Wellington Regional Strategy scenarios