



## **Greater Wellington Regional Council**

2013 WTSM Update

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### **Technical Note 10: WTSM and WPTM Sensitivity Testing**

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August 2015

# Greater Wellington Regional Council

## 2013 WTSM Update

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### Technical Note

### Quality Assurance Statement

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## 1. Introduction

Following the validation of the Wellington Transport Strategy Model (WTSM) and Wellington Public Transport Model (WPTM) as part of the 2013 update, a number of sensitivity tests have been run to establish whether the overall sensitivity of both models to changes in travel cost assumptions and network level-of-service are reasonable.

For WTSM, the tests were the same that were applied during the 2001 development of the model and for the 2006 and 2011 updates, which therefore enables checking of the consistency of the model response. The tests carried out were:

- Test 1 – +20% changes in all Public Transport fares;
- Test 2 – +20% changes in all PT in-vehicle times;
- Test 3 – +20% changes for all PT frequencies;
- Test 4 – +20% car operating costs (fuel cost); and
- Test 5 – +20% car in-vehicle times.

For information and for consistency with the 2011 update, we have also tested a 100% increase in Wellington CBD parking charges.

For WPTM, the tests carried out were the same as those applied during the 2011 development of the model, again enabling ensuring consistency in the model response. These are documented in 'TN22 WPTM Sensitivity Testing' from the 2011 development of the model. The tests carried out were:

- Test 1 – Public transport fares: +20% changes in all PT fares;
- Test 2 – Car operating costs or fuel costs: +20%;
- Test 3 – New Park-and-Ride site at Ava Station;
- Test 4 – Equal behavioural weights;
- Test 5 – Route 3 frequency +25%;
- Test 6 – Route 3 converted to Bus Rapid Transit (BRT), no mode preference
- Test 7 – Route 3 converted to BRT with mode preference

For WPTM, all runs except Test 3 were using the whole transport modelling system including WTSM. As a result total PT demand was allowed to vary in response to the input changes. Only Test 3 was run in WPTM only as WTSM does not use parking capacity as an input to the PT assignment or mode choice model.

## 2. WTSM Sensitivity Tests Results

The table below details the elasticity results/model responses for the WTSM tests. Results from the 2001 development of the model and the previous 2011 update are also shown for comparison, along with a range of expected values from a number of international sources, such as the UK Passenger Demand Forecasting Handbook (PDFH), the NZTA EEM (Economic Evaluation Manual) or the Project Evaluation Manual (PEM) that preceded the EEM.

		2013 Model	2011 Model	2001 Model	Comparative Values
PT Fares +20%	ε PT Trips	<b>-0.22</b>	-0.21	-0.2	International range: -0.1 to -0.6 (PDFH* short and medium distance urban rail: -0.3 to -0.6). EEM -0.2 to -0.3 in the short term, up to 0.6 in the long term
	ε Pass.km	<b>-0.39</b>	-0.38	-0.29	
PT In-Vehicle Time +20%	ε PT Trips	<b>-0.22</b>	-0.21	-0.2	PDFH rail: -0.2 to -0.8 (inferred). EEM 0.25 during peak period, 0.5 off peak.
	ε Pass.km	<b>-0.41</b>	-0.40	-0.39	
PT Frequency +20%	ε PT Trips	<b>-0.12</b>	0.11	0.1	Transfund patronage funding work: +0.2 to +0.7. PDFH rail: +0.15 to +0.6 (inferred)
	ε Pass.km	<b>-0.19</b>	0.19	0.16	
Car VOC +20% (Fuel Increase)	ε Car Trips	<b>-0.07</b>	-0.07	-0.05	Typical international fuel price elasticities: -0.1 to -0.3.
	ε veh.km	<b>-0.40</b>	-0.40	-0.26	
Car Journey Time +20%	ε Car Trips	<b>-0.08</b>	-0.07	-0.07	Transfund PEM: -0.2 to -0.25.
	ε veh.km	<b>-0.31</b>	-0.29	-0.28	
CBD Parking Charge +100%	Car Trips	<b>-1.0%</b>	-0.9%	-0.6%	
	CBD Car Trips	<b>-5.1%</b>	-5.1%	-4.0%	

**Table 1: WTSM Sensitivity Tests**

For all sensitivity tests the results are in line with expectations drawn from local and international evidence, and consistent with previous versions of the model. The results for the parking charge increase also seem to be of a reasonable magnitude.

### 3. WPTM Sensitivity Tests Results

This section summarises the results from the WPTM sensitivity testing and compares them with 2011 results and generally accepted values when applicable.

One difference between the 2011 and 2013 versions of the models is that during the very last stages of the 2011 WPTM development, it was decided to 'fix' demand from the Wairarapa and not apply WTSM growth to it. The reason for this was that applying WTSM factors to observed demand from the Wairarapa resulted in unreliable trends. Given the relatively low numbers from this part of the region, it was decided to keep future demand as observed. This has been kept the same in the 2013 version of WPTM. The non-finalised version of WPTM used for sensitivity testing in 2011 did not yet have fixed demand however, which results in some slight differences when comparing both models.

#### 3.1 Test 1 – PT Fare Increase

The demand from the WTSM Test 1 with PT fares increased by 20% was passed onto WPTM, in which flag-fall fare and per-crossing fares were then increased by the same amount.

Table 2 shows a summary of results per mode (bus and rail only) and time period, for both the 2013 and 2011 models for comparison.

	WPTM 2013 – AM		WPTM 2013 – IP		WPTM 2011 – AM		WPTM 2011 – IP	
	Boardings	Pax-km	Boards	Pax-km	Boardings	Pax-km	Boards	Pax-km
Rail	-6%	-6%	-9%	-7%	-8%	-11%	-10%	-12%
Bus	-8%	-7%	-9%	-7%	-8%	-7%	-8%	-7%
Total	-7%	-6%	-9%	-7%	-8%	-10%	-9%	-9%

**Table 2: WPTM Sensitivity Test 1 – Change in Patronage**

As expected, the total PT demand decreases as it is driven by WTSM. Results are identical in both versions of WPTM for bus, and are similar for rail, the difference being caused by trips from/to the Wairarapa not being fixed in the 2011 model.

The resulting elasticity for both models is shown in Table 3 below, along with standard elasticities from other sources.

	WPTM Boarding		WPTM Trips		Wallis (2004) <sup>1</sup>	TRL (2004) <sup>2</sup>
	WPTM 2013	WPTM 2011	WPTM 2013	WPTM 2011		
AM	-0.42	-0.44	-0.24	-0.32	-0.2 to -0.5 in the short run	-0.4 short run to -1.0 long run
IP	-0.51	-0.49	-0.29	-0.26		

**Table 3: WPTM Sensitivity Test 1 – Demand Elasticity**

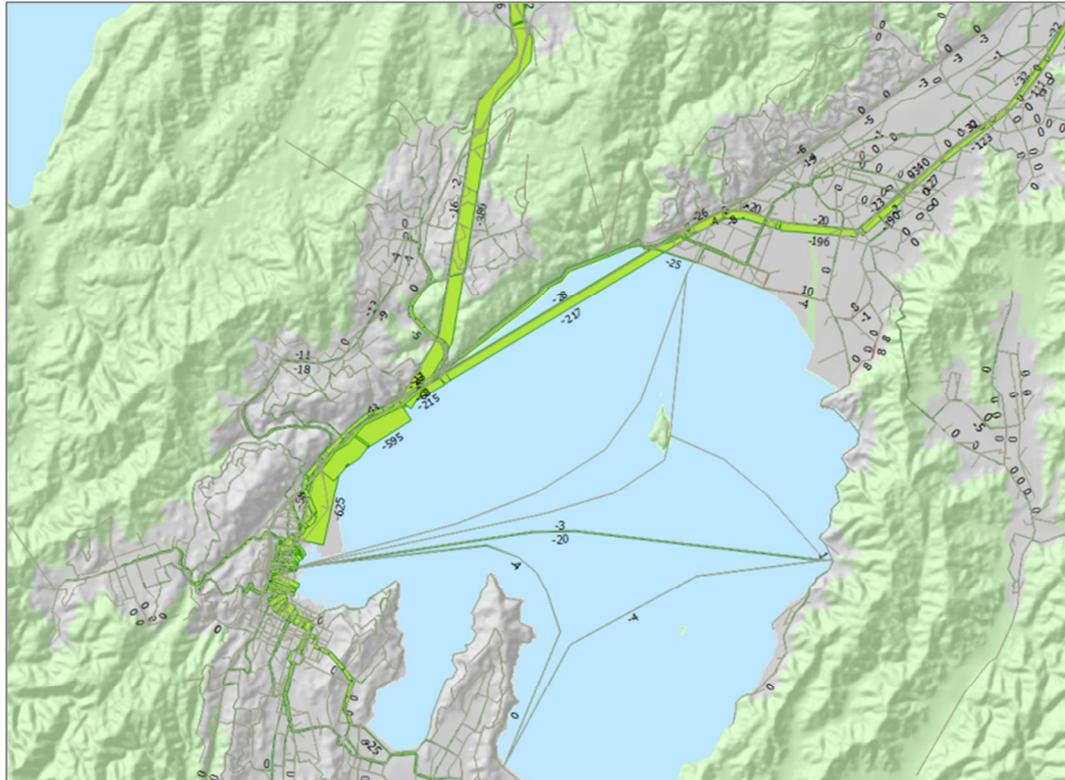
Elasticity results indicate that the response of the 2013 WPTM is similar to the original 2011 version and within the range of generally accepted demand elasticity to PT fare.

<sup>1</sup> Wallis, Ian. *Review of Passenger Transport Demand Elasticities*. Transfund, 2004.

<sup>2</sup> TRL. *The Demand for Public Transit: A Practical Guide*. Transportation Research Laboratory, 2004.

More detailed results from both 2011 and 2013 versions of WPTM are included in Appendix A.

Figure 1 below shows the general decrease in patronage on the public transport network.



**Figure 1: Test 1 – Change in PT Volumes, AM Peak**

### 3.2 Test 2 – Car Fuel Cost Increase

The demand from the WTSM Test 4 with car vehicle operating costs increased by 20% was passed on to WPTM, in which vehicle operating costs for park-and-ride and kiss-and-ride access were increased by the same amount.

Table 4 shows a summary of results per mode (bus and rail only) and time period, for both the 2013 and 2011 models for comparison.

	WPTM 2013 - AM		WPTM 2013 - IP		WPTM 2011 - AM		WPTM 2011 - IP	
	Boardings	Pax-km	Boards	Pax-km	Boardings	Pax-km	Boards	Pax-km
Rail	4%	6%	5%	9%	2%	0%	0%	3%
Bus	5%	4%	8%	4%	4%	7%	7%	4%
Total	4%	4%	6%	6%	3%	2%	2%	4%

**Table 4: WPTM Sensitivity Test 2 – Change in Patronage**

In this test, patronage increases for all modes and time periods. However the difference between the 2011 and 2013 models is more pronounced, especially for rail. This is again due to the response from the Wairarapa in the 2011 model, which in contrast to the rest of the region showed a decrease in trips. This was noted during the model development:

*“Excluding the Wairarapa services, all routes show increases in patronage due to public transport becoming more attractive relative to driving. The apparent drop in patronage on the Hutt Valley rail line is misleading as this is all due to fewer passengers from the Wairarapa i.e. the drop in demand is highest at the Rimutaka Hill tunnel. The negative difference becomes smaller moving from Upper Hutt to Petone but the loss in trips from the Wairarapa still means that the test case demand is lower than the base case through this corridor.”*

Two volume difference plots are included in Appendix A which highlights this issue, showing the impact of Test 2 with and without the response from the Wairarapa in the 2011 model. As noted previously, demand from the Wairarapa is now fixed, which is why this issue doesn’t occur in the 2013 version of WPTM.

This also translates in the elasticity calculation shown below, which are similar but not exactly the same for both versions of WPTM. However, comparison with generally accepted values shows that the model is responding appropriately.

	WPTM 2013	WPTM 2011	Wallis (2014) <sup>3</sup>	Litman (2011) <sup>4</sup>
AM	0.25	0.18	0.15	0.05-0.15 short term, 0.2-0.4 long term
IP	0.13	0.14		

**Table 5: WPTM Sensitivity Test 2 – Demand Elasticity**

More detailed results are included in Appendix A.

### 3.3 Test 3 – New Park-and-Ride Site at Ava Station

Test 3 consists of adding a 400 space car park at Ava station on the Hutt Valley line. Although car park constraint is not explicitly modelled in WPTM, the capacity acts as a proxy for attractiveness. This test was run in WPTM only, meaning that the total demand is constant but some redistribution can occur across modes, access modes, and station choice.

Results from both versions of WPTM are show in Table 6.

<sup>3</sup> Wallis, Ian. *Review of Passenger Transport Demand Elasticities*. Transfund, 2004.

<sup>4</sup> Litman, Todd. *Transportation Elasticities - How Prices and Other Factors Affect Travel Behaviour*. Victoria Transport Policy Institute, 2011.

	2011				2013			
	P&R	K&R	Walk	ALL	P&R	K&R	Walk	ALL
Bus: all Lower Hutt stops	0	0	-4	-4	0	0	-5	-5
Rail: Petone	-19	-3	-1	-22	-20	-4	0	-24
<b>Rail: Ava</b>	<b>43</b>	<b>8</b>	<b>-2</b>	<b>49</b>	<b>44</b>	<b>9</b>	<b>-3</b>	<b>50</b>
Rail: Woburn	-1	0	0	-1	-1	0	-1	-2
Rail: Waterloo	-7	0	0	-7	-6	-1	0	-7
Rail: Epuni	-4	0	0	-4	-3	0	0	-3
Rail: Western Hutt	0	-2	0	-2	0	-2	0	-2
Rail: Melling	-6	-2	0	-8	-6	-2	0	-8
<b>RAIL: all stations</b>	<b>6</b>	<b>1</b>	<b>-3</b>	<b>4</b>	<b>8</b>	<b>0</b>	<b>0</b>	<b>8</b>
<b>Bus and Rail</b>	<b>6</b>	<b>1</b>	<b>-8</b>	<b>0</b>	<b>8</b>	<b>0</b>	<b>-9</b>	<b>-1</b>

Table 6: WPTM Sensitivity Test 3 – Demand Elasticity

As can be observed, results are very similar for both models and appear reasonable, with the main change being an increase in park-and-ride trips and to a lesser extent kiss-and-ride trips to Ava. These trips have mostly been abstracted from people parking at other stations, with only a few trips having switched from bus/walk access.

Figure 2 below shows the boardings along this section of the Hutt Valley line per station and per type, both in the base scenario and in Test 3.

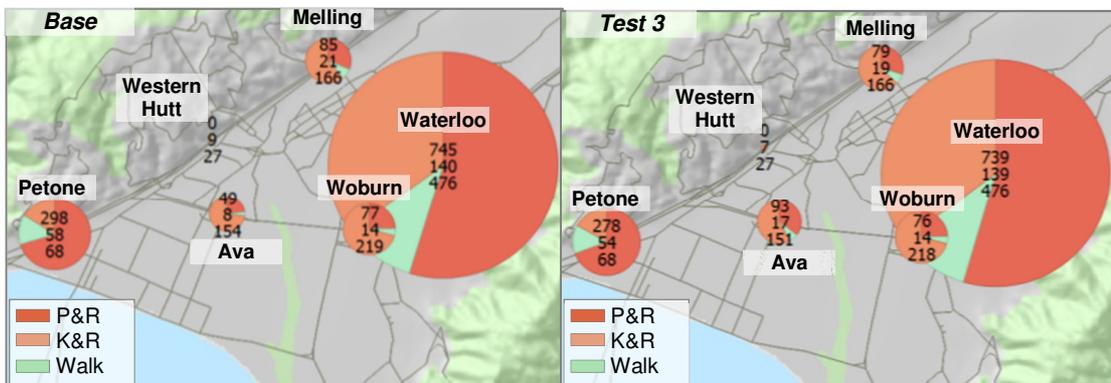


Figure 2: Test 3 – Rail Boardings per Access Mode – AM Peak

Results from the 2011 model are shown in Appendix A for comparison.

### 3.4 Test 4 – Equal behavioural weights

Test 4 consists of removing any modal preference by setting all mode specific parameters equal to those of bus.

In WTSM, this was achieved by setting the in-vehicle time weighting (@msc) equal to 1 for all modes. In WPTM, in-vehicle time weighting (@ivt), line boarding time (@lbt) and effective headway calculation (@hdwy) for all modes were set equal to bus parameters.

Table 7 shows a summary of results per mode (bus and rail only) and time period, for both the 2013 and 2011 models for comparison. The removal of behavioural weights does not

have any significant impact in terms of total demand (as estimated in WTSM) but leads to a switch from rail to bus in WPTM, with both the 2011 and 2013 versions presenting a similar response.

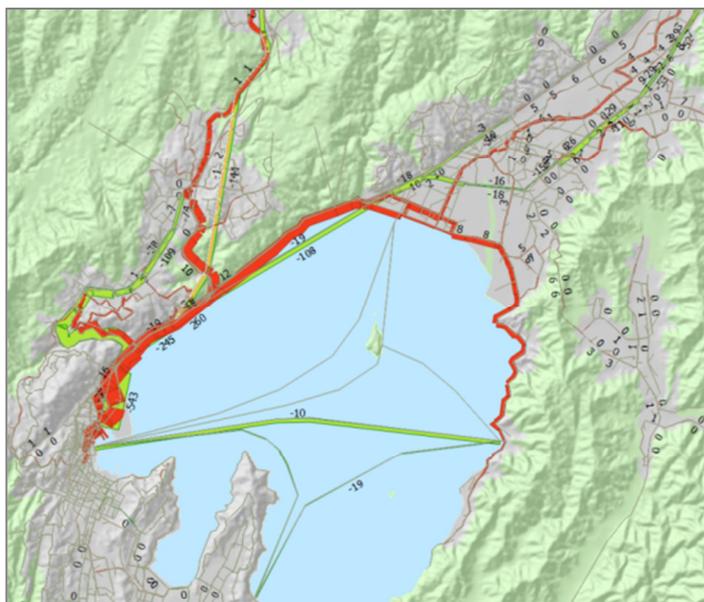
	WPTM 2013 - AM		WPTM 2013 - IP		WPTM 2011 - AM		WPTM 2011 - IP	
	Boardings	Pax-km	Boards	Pax-km	Boardings	Pax-km	Boards	Pax-km
Rail	-6%	-3%	-22%	-17%	-6%	-3%	-20%	-14%
Bus	5%	12%	5%	13%	5%	11%	6%	14%
Total	0%	0%	0%	1%	0%	0%	1%	1%

**Table 7: WPTM Sensitivity Test 4 – Change in Patronage**

Table 8 below shows the results for rail boardings per line. As in 2011, during the morning peak the most impacted line is the Johnsonville line where there is more competition between the bus and rail modes. The Hutt Valley and Kapiti lines are less impacted, showing the more significant time advantage presented by rail in these corridors. During the Inter peak, the Hutt Valley shows the largest decrease as less congestion on SH2 makes using bus a viable alternative, however the numbers are much lower than in the morning peak.

Line	WPTM 2013		WPTM 2011	
	AM	IP	AM	IP
Johnsonville	-26%	-21%	-24%	-15%
Hutt Valley / Melling / Wairarapa	-4%	-41%	-5%	-34%
Kapiti / Capital Connection	-3%	-8%	-3%	-13%

**Table 8: WPTM Sensitivity Test 4 – Change in Rail Boardings by Line**



**Figure 3: Test 4 – Change in PT Volumes, AM Peak**

The figure for 2011 is included in Appendix A for comparison, along with more detailed results for both models.

### 3.5 Test 5 – Bus Route 3 Frequency Improvement

In this test, the frequency of all Route 3 services was increased by 25% in both WTSM and WPTM.

This results in a 13% increase in patronage on Route 3 (14% in the 2011 model) and reduced boardings on alternative routes, but negligible changes overall for bus demand. Table 9 below shows the calculated elasticities with respect to frequency for Route 3, along with results from the 2011 model and the typical accepted range.

	WPTM 2013	WPTM 2011	Wallis (2004)
AM	0.54	0.61	0.2 to 0.5
IP	0.57	0.30	

**Table 9: WPTM Sensitivity Test 5 – Route 3 Patronage Elasticity**

The 2013 elasticities are slightly above the accepted range, but the following note was made for the 2011 WPTM sensitivity testing which holds true for this version as well:

*“As documented in TCRP (2004) it is important to note the substantial variations in reported ridership responses to bus frequency changes given the widely varying circumstances attending individual bus route and system headway changes. Some of these variables include:*

- *The pre-existing level of transit service;*
- *The geographic, demographic and socio-economic environment; and*
- *The time period of day or week of the service.*

*Another complicating factor is that some ridership changes in response to frequency changes reflect primarily diversion of riders from one route to another (route choice), rather than diversion from one mode to another (mode choice, such as between auto and transit).*

*Given some of the considerations above, the elasticities calculated for the model appear reasonable.”*

Figure 4 shows the changes in bus volumes along Route 3 and alternative corridors.

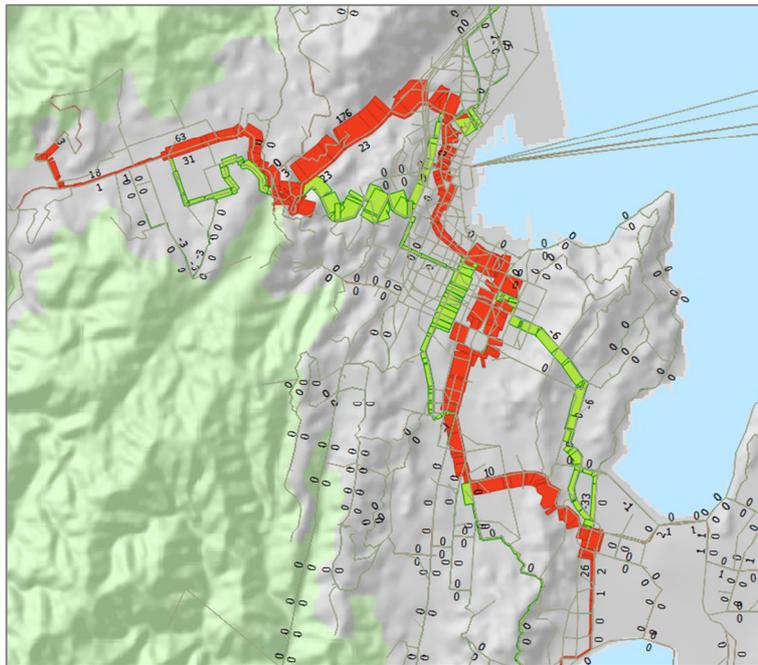


The figure for 2011 is included in Appendix A for comparison, along with more detailed results for both models.

### 3.7 Test 7 – Bus Route 3 BRT Conversion, with IVT Change

This test includes the increase in frequency and transit speed from the two previous tests, but adds a reduction in the in-vehicle time weighting for Route 3 services, to reflect its conversion to BRT. This was achieved by applying an in-vehicle time factor of 0.92 for BRT (@msc in WTSM, @ivt in WPTM).

Figure 6 below shows the resulting change in volumes along Route 3 and alternative corridors. Again the changes are similar to the two previous tests but more pronounced with a 43% increase in patronage on Route 3, showing the cumulative impact of reduced wait time, transit time, and improved transit time perception.



**Figure 6: Test 7 – Change in PT Volumes, AM Peak**

The figure for 2011 is included in Appendix A for comparison, along with more detailed results for both models.

## 4. Conclusion

A range of sensitivity tests have been applied to WTSM, WPTM, and the system as a whole, to demonstrate that both models responds appropriately to changes in assumptions (PT fares, fuel costs, perception factors, etc.) and network levels of service (waiting time, in-vehicle time, parking supply, etc.).

This was done by comparing the 2013 updated model to the previous 2011 versions, and comparing the calculated elasticities against generally accepted values when applicable.

Results show that both models behave as expected and in a sound manner, providing confidence that they will respond appropriately to the range of varying assumptions and changes in network supply to be potentially analysed in forecasting and project analysis.

## Appendix A

### WPTM Detailed Results

DRAFT

## Test 1 – PT Fare Increase

### 2011 WPTM

	Boards						Passenger km ('000s)					
	AM			IP			AM			IP		
	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff
Rail – P&R	4830	4510	-7%	230	210	-8%						
Rail – K&R	1020	950	-7%	40	40	-9%						
Rail - Walk	6800	6200	-9%	980	880	-10%						
Rail - ALL	12640	11660	-8%	1250	1130	-10%	290	258	-11%	22	20	-12%
Bus	17520	16190	-8%	5810	5340	-8%	108	100	-7%	37	34	-7%
Ferry	190	160	-14%	20	10	-27%	2	2	-14%	0	0	-27%
Total	30360	28010	-8%	7080	6480	-9%	400	360	-10%	60	54	-9%

### 2013 WPTM

	Boards						Passenger km ('000s)					
	AM			IP			AM			IP		
	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff
Rail – P&R	4840	4580	-5%	140	130	-7%						
Rail – K&R	1180	1130	-4%	50	40	-4%						
Rail - Walk	6780	6330	-7%	1010	910	-10%						
Rail - ALL	12800	12040	-6%	1200	1090	-9%	300	282	-6%	21	20	-7%
Bus	17860	16370	-8%	5870	5360	-9%	105	98	-7%	38	35	-7%
Ferry	210	180	-13%	10	5	-43%	3	2	-12%	0	0	-44%
Total	30870	28600	-7%	7080	6450	-9%	408	383	-6%	59	55	-7%

## Test 2 – Car Fuel Cost Increase

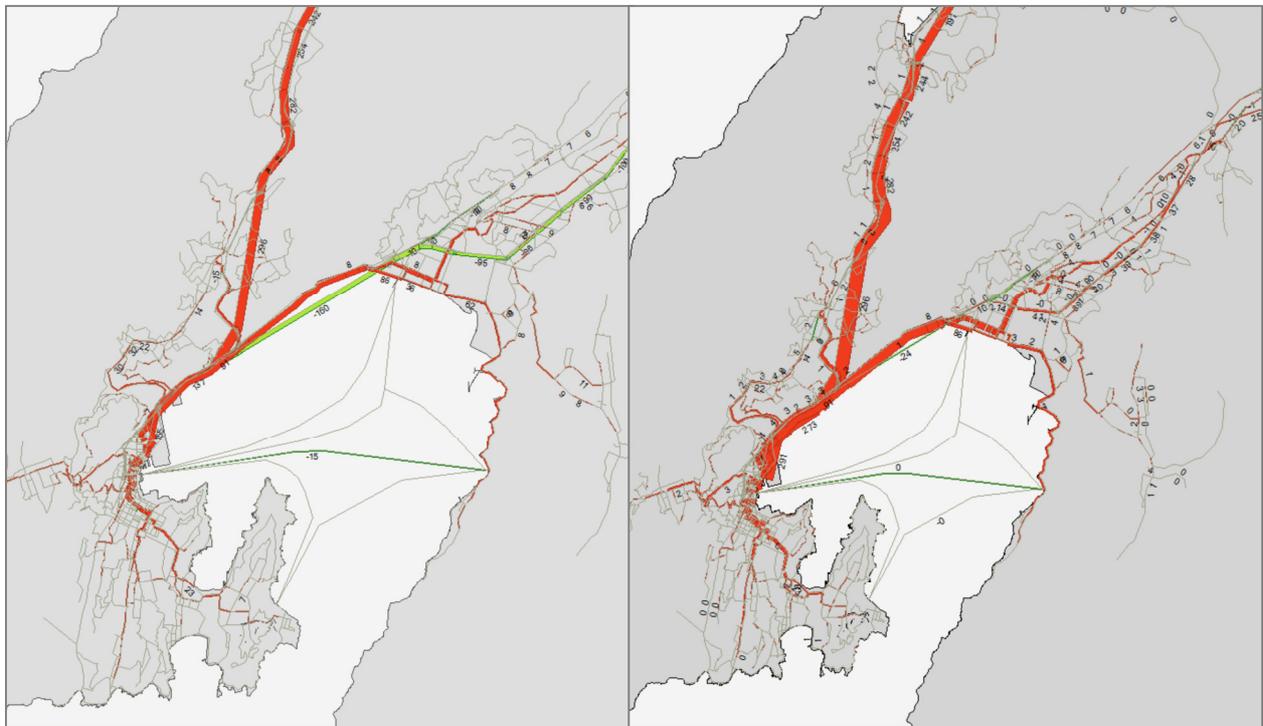
### 2011 WPTM

	Boards						Passenger km ('000s)					
	AM			IP			AM			IP		
	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff
Rail – P&R	4830	4980	3%	230	240	3%						
Rail – K&R	1020	1040	2%	40	40	5%						
Rail - Walk	6800	6820	0%	980	1010	3%						
Rail - ALL	12640	12840	2%	1250	1290	3%	290	289	0%	22	23	3%
Bus	17520	18290	4%	5810	5990	3%	108	116	7%	37	38	4%
Ferry	190	180	-8%	20	20	6%	2	2	-7%	0	0	5%
Total	30360	31310	3%	7080	7300	3%	400	407	2%	60	62	4%

**2013 WPTM**

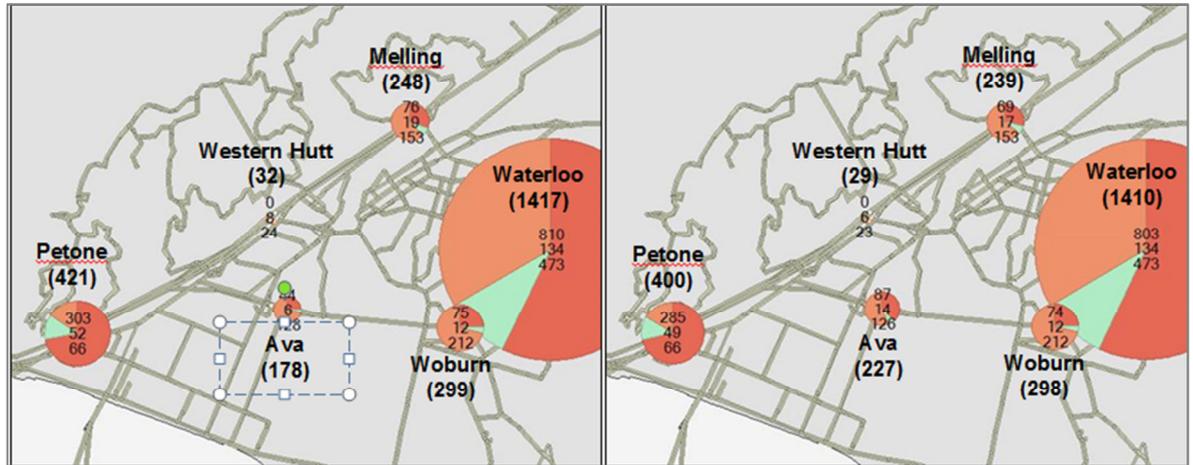
	Boards						Passenger km ('000s)					
	AM			IP			AM			IP		
	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff
Rail – P&R	4840	5027	4%	140	148	2%						
Rail – K&R	1180	1190	1%	50	47	2%						
Rail - Walk	6780	7049	4%	1010	1084	7%						
Rail - ALL	12800	13266	4%	1200	1279	6%	300	316	5%	22	24	9%
Bus	17860	18783	5%	5870	6093	4%	105	114	8%	38	40	4%
Ferry	210	204	-4%	10	8	14%	3	2	-3%	0	0	3%
Total	30870	32253	4%	7080	7380	4%	408	432	6%	60	64	6%

**2011 Test 2 Volume difference – Without and with Wairarapa fixed**



## Test 3 – New Park-and-Ride Site at Ava Station

### 2011 WPTM – Change in Boardings at Stations



## Test 4 – Equal Behavioural Weights

### 2011 WPTM

	Boards						Passenger km ('000s)					
	AM			IP			AM			IP		
	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff
Rail – P&R	4830	4640	-4%	230	210	-9%						
Rail – K&R	1020	960	-6%	40	40	0%						
Rail - Walk	6800	6270	-8%	980	750	-23%						
Rail - ALL	12650	11870	-6%	1250	1000	-20%	0	0	0	0	0	0
Bus	17520	18390	5%	5810	6130	6%	108	120	11%	37	42	14%
Ferry	190	50	-74%	20	0	-100%	2	1	-50%	0	0	0
<b>Total</b>	<b>30360</b>	<b>30310</b>	<b>0%</b>	<b>7080</b>	<b>7130</b>	<b>1%</b>	<b>110</b>	<b>121</b>	<b>10%</b>	<b>37</b>	<b>42</b>	<b>14%</b>

### 2013 WPTM

	Boards						Passenger km ('000s)					
	AM			IP			AM			IP		
	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff
Rail – P&R	4840	4649	-4%	140	122	-16%						
Rail – K&R	1180	1117	-5%	50	40	-13%						
Rail - Walk	6780	6283	-7%	1010	780	-23%						
Rail - ALL	12800	12049	-6%	1200	942	-22%	300	290	-3%	22	18	-17%
Bus	17860	18697	5%	5870	6142	5%	105	118	12%	38	43	13%
Ferry	210	81	-62%	10	0	-100%	3	1	-60%	0	0	-100%
<b>Total</b>	<b>30870</b>	<b>30827</b>	<b>0%</b>	<b>7080</b>	<b>7084</b>	<b>0%</b>	<b>408</b>	<b>409</b>	<b>0%</b>	<b>60</b>	<b>61</b>	<b>2%</b>

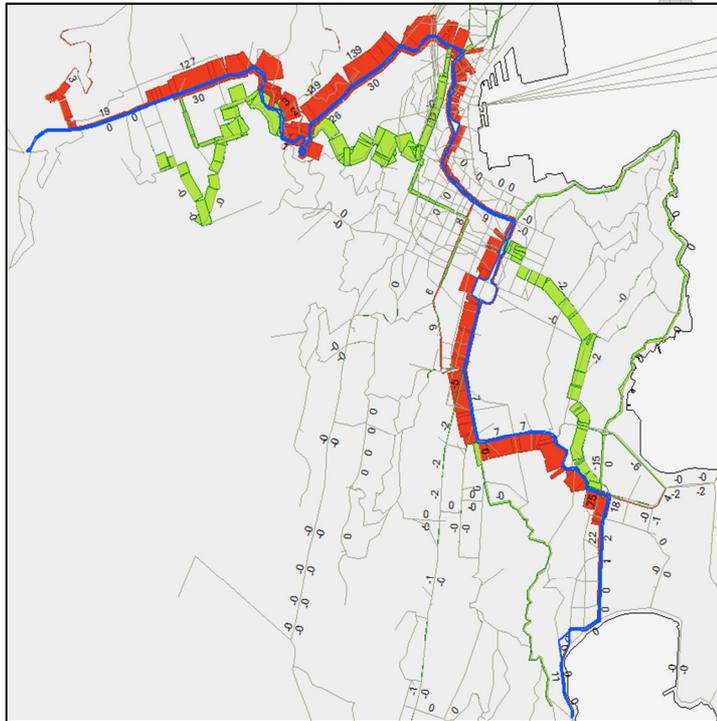




## 2013 WPTM

	Boards						Passenger km ('000s)					
	AM			IP			AM			IP		
	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff
Rail – P&R	4840	4835	0%	140	147	1%						
Rail – K&R	1180	1178	0%	50	373	711%						
Rail - Walk	6780	6792	0%	1010	1018	1%						
Rail - ALL	12800	12805	0%	1200	1538	28%	300	300	0%	22	22	2%
Bus	17860	17918	0%	5870	5909	1%	105	106	0%	38	38	0%
Ferry	210	216	1%	10	7	0%	3	3	1%	0	0	-1%
Total	30870	30939	0%	7080	7454	5%	408	408	0%	60	60	1%

## 2011 WPTM – Test 6 Change in Volumes



## Test 7 – Bus Route 3 BRT Conversion, with IVT Change

### 2011 WPTM

	Boards						Passenger km ('000s)					
	AM			IP			AM			IP		
	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff
Rail – P&R	4830	4820	0%	230	230	0%						
Rail – K&R	1020	1020	0%	40	40	0%						
Rail - Walk	6800	6800	0%	980	980	0%						
Rail - ALL	12640	12640	0%	1250	1250	0%	290	290	0%	22	22.4	0%
Bus	17520	17590	0%	5810	5840	0%	108	108	0%	37	37.2	0%
Ferry	190	190	0%	20	20	0%	2	2	0%	0	0.2	0%
Total	30360	30420	0%	7080	7120	0%	400	400	0%	60	59.9	0%

### 2013 WPTM

	Boards						Passenger km ('000s)					
	AM			IP			AM			IP		
	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff	Base	Test	Diff
Rail – P&R	4840	4836	0%	140	147	1%						
Rail – K&R	1180	1178	0%	50	47	2%						
Rail - Walk	6780	6794	0%	1010	1018	1%						
Rail - ALL	12800	12808	0%	1200	1212	1%	300	300	0%	22	22	2%
Bus	17860	17926	0%	5870	5909	1%	105	106	0%	38	38	0%
Ferry	210	214	0%	10	7	0%	3	3	0%	0	0	-1%
Total	30870	30948	0%	7080	7128	1%	408	408	0%	60	60	1%