

Technical Note 51 – WRTM Input Demographics Summary

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Quality statement

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1 Background

1.1 Overview

The Waikato Regional Transportation Model (WRTM) is a suite of strategic transportation models that take a representation of the transport network and demographics by area as inputs, and produces forecast travel patterns as an output. The WRTM's geographic coverage is larger than the Waikato Region, also encompassing Franklin in the south of Auckland, Tauranga City, surrounding parts of the Bay of Plenty Region, and all of Rotorua including the part outside the Waikato Region.

The current WRTM suite has a base year of 2006, and was built to reflect observed behavioural data collected at that time. The WRTM has been rechecked over time, aligned with the New Zealand national Census cycle which provides known input demographics. The most recent check was using the 2018 Census, when demographics from Census were input to the WRTM and the forecasts confirmed as acceptable by comparing to observed data (traffic counts, travel times, bus boardings, etc).

The purpose of this technical note is to summarise:

- The future year input demographics, which control the traffic and transport forecasts produced by the 2018-updated WRTM.
- The issue in terms of the unrealistic traffic patterns produced.
- The modifications made to the demographics.

1.2 Future Year Demographics

The primary source of future year demographics for the WRTM is the WISE (Waikato Integrated Scenario Explorer) land use model. WISE forecasts the use of the land (land use), which is post-processed by other organisations to produce population, labour force, households, and employment by type (collectively “demographics”).

The current WISE model has a 2018 base for the projections (2018-based projections).

In addition, future year demographics have also been provided by Tauranga City Council (Tauranga and Bay of Plenty), Auckland Forecasting Centre (Franklin), with Statistics New Zealand projections used for the part of Rotorua outside of the Waikato Region.

Demographics have been produced for the years 2025, 2035, 2045, and 2055. This is referred to as the “Comprehensive 2018-based demographics”.

Medium and High growth scenarios have been produced.

2 Comprehensive 2018-based Demographics

2.1 Demographic Summary - Comprehensive

The input demographics for the base year of 2018 and the future years of 2025, 2035, 2045, and 2055 have been summed to Territorial Authority (TA) level and are provided in Appendix A.

The total High and Medium growth population and employment summed over the modelled area by year is shown below.



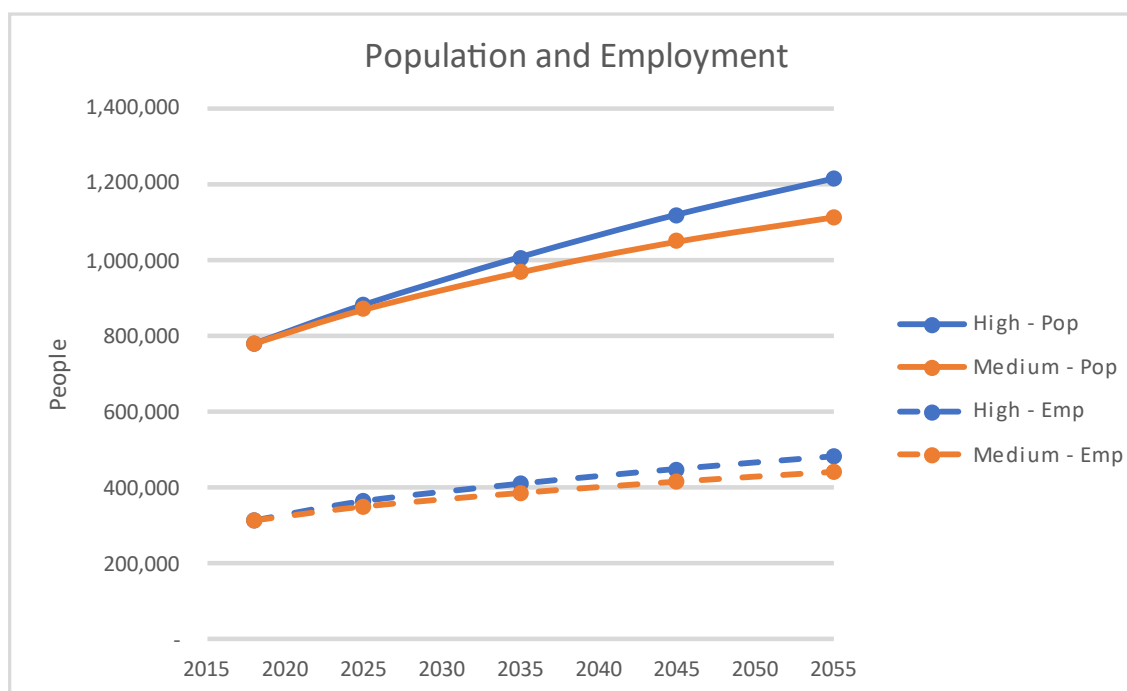


Figure 2-1: Total Population and Employment by Year, Comprehensive

As the slope of the line for employment is flatter, this shows the increase in population is greater than the increase in employment.

The High scenario population by TA is illustrated below.

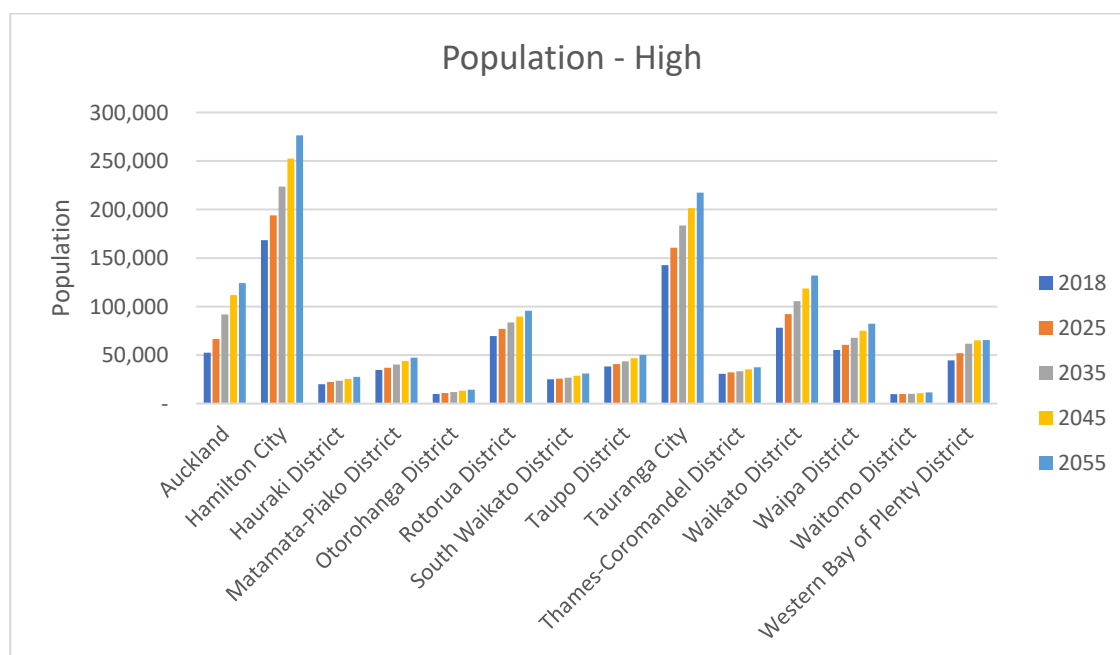


Figure 2-2: Population, High, Comprehensive

From 2018 to 2055, the percentage increases show:

- More than double the population in Auckland (Franklin)
- Significant growth in Hamilton and Waikato District (around 65%)



- Modest growth in Waitomo, Thames-Coromandel, and South Waikato (range of 17-24%)
- Elsewhere, growth averaging 40% (range of 31-52%)

In terms of numbers of people, Hamilton has the largest absolute increase (108k), followed by Tauranga City (75k) and the part of Auckland within the WRTM (72k), then the Waikato District (54k).

Simplistically, a strategic transport model uses population and labour force to determine the number of trips from home travelling to work, school, or other places. Employment is used in relative terms to determine where people want to travel too.

Totals by TA for 2018 and 2055 for the High growth scenario are shown below. Medium is not discussed in detail as the patterns are the same as for High. Population (pop), labour force (LF), and employment (emp) are in thousands. Differences are provided as well as the ratio of labour force to population and labour force to employment.

Table 2-1: Comprehensive High – Comparison of 2018 and 2055

TA	Population (000)		Labour Force (000)		Employment (000)			Differences (000)		LF/Pop		LF/Emp	
	2018	2055	2018	2055	2018	2055	Pop	LF	Emp	2018	2055	2018	2055
Auckland	52	124	27	67	17	36	72	39	19	0.52	0.54	1.57	1.85
Hamilton City	168	276	84	163	79	120	108	78	41	0.50	0.59	1.06	1.35
Hauraki District	20	28	9	11	7	10	8	2	3	0.46	0.40	1.29	1.14
Matamata-Piako District	35	47	18	25	15	21	13	8	6	0.51	0.54	1.16	1.22
Otorohanga District	10	14	5	8	4	6	4	3	2	0.52	0.55	1.32	1.40
Rotorua District	70	96	34	45	25	35	26	11	10	0.49	0.47	1.35	1.28
South Waikato District	25	31	11	15	9	12	6	4	3	0.45	0.50	1.28	1.29
Taupo District	38	50	20	27	17	22	12	7	6	0.52	0.54	1.20	1.21
Tauranga City	143	217	71	109	62	95	75	38	33	0.50	0.50	1.14	1.15
Thames-Coromandel District	31	37	14	15	12	17	7	1	5	0.46	0.39	1.19	0.86
Waikato District	78	132	41	70	24	39	54	29	16	0.52	0.53	1.73	1.77
Waipa District	55	82	29	46	22	32	27	16	10	0.53	0.55	1.33	1.40
Waitomo District	10	11	5	7	4	6	2	1	2	0.52	0.57	1.16	1.09
Western Bay of Plenty District	44	66	23	34	13	30	21	11	17	0.52	0.52	1.74	1.14
Total	780	1,213	392	641	311	482	433	248	171	0.50	0.53	1.26	1.33



From this, we can see the following trends over the full modelled area:

- More of the population is in the labour force by 2055 (vs 2018), demonstrated by the increase in the labour force to population ratio.
- There are 248,000 additional people by 2055 in the labour force, but only 171,000 additional jobs. This is also shown in the labour force to employment ratio, which is higher in 2055 compared with 2018.

It is noted that the WRTM does not explicitly model unemployment, and that employment is effectively treated in relative terms (rather than absolute).

Considering the change in labour force versus employment by area, we can see:

- Hamilton City has the largest change from 2018 to 2055 in terms of people looking for work and available jobs. That is, the greatest shortfall in jobs compared with people looking for work occurs in Hamilton. However, Hamilton also has the largest absolute population and employment so we would expect the most change here.
- This is followed by the part of Auckland in the WRTM.
- Of note, Western Bay of Plenty is forecast to have more employment opportunities than people looking for work. This will attract people from other areas in the model.

2.2 Output Traffic Patterns

The comprehensive demographics summarised in the previous section were input to the WRTM, with a representation of the future year transport network. The resulting traffic flows demonstrated some unusual patterns, in particular:

- On SH29 between Hamilton and Tauranga, the tidal flow direction that currently occurs in the PM peak (i.e. people travel from Hamilton to Tauranga in the evening) reversed in 2055. Not only did the peak direction reverse, but the proportion of southbound to total traffic became massively skewed, with almost 90% of the traffic on SH29 travelling towards Hamilton in the PM peak (vs 45% in 2018). This is likely due to Hamilton residents looking for employment in Tauranga and Western Bay of Plenty.
- On SH1 between Hamilton and Cambridge, the tidality also reversed in 2055. In 2018, 45% of the traffic travelled towards Hamilton in the PM peak (i.e., PM peak direction is southbound in 2018). By 2055, this increased to almost 70% with the total traffic flow doubling between 2018 and 2055 (i.e., PM peak direction is northbound by 2055).

The patterns described above are from the Medium scenario demographics input to the PM peak period three-stage (vehicle-based) model. However, the High demographics and the AM peak period showed similar trends, albeit reversed in the AM peak.

If the demographics input to the WRTM do eventuate, then perhaps these traffic patterns will occur. But given the large numeric increases in flow, the reversal of the peak direction, and the change in the proportion of traffic travelling into Hamilton (vs total traffic on the road), the plausibility of these traffic patterns was called into question.

3 Modified Comprehensive 2018-based Demographics

3.1 Demographic Summary - Modified Comprehensive

The demographics were checked for processing errors – none were found.



It was noted that the geographic coverage of the WRTM extends beyond the Waikato Region boundary. As a result, projections produced by different organisations are combined in the WRTM. Therefore any 'balance' that might occur within the WISE land use model, could be changed after Auckland, Tauranga, and Rotorua demographic projections are combined in the WRTM.

A series of tests modifying the demographics and examining the resulting traffic flows was undertaken. These were not to 'correct' the forecast demographics, but to quantify what needed to be adjusted to produce traffic patterns that professionals would consider 'acceptable'. It is acknowledged that there is a significant amount of judgement, both in the adjustment of the demographics and the determination of whether the future year traffic flows are indeed 'appropriate'.

After numerous tests, the adjustment of the demographics honed in on the relationship between labour force and total employment by area. The WRTM primarily uses employment in relative terms, so total employment was factored to the total labour force ("factored emp") and differences by TA examined. Adjustments were then made for areas with larger differentials. These adjustments are not completely scientific - they involve a significant amount of judgement, followed by trial-and-error testing in the WRTM.

An example of the process for the 2055 High growth scenario is provided below.

Table 3-1: Example of Adjustment to 2055 High Employment

TA	2055 High					
	Labour Force	Employment	Factored Employment	Diff, LF – Fact Emp	Adjustment	Modified Emp
Auckland	66,708	36,018	47,897	18,810	14,000	50,018
Hamilton City	162,529	120,398	160,107	2,422	2,000	122,398
Hauraki District	11,050	9,710	12,913	-1,862		9,710
Matamata-Piako District	25,438	20,851	27,728	-2,290		20,851
Otorohanga District	7,795	5,564	7,399	396		5,564
Rotorua District	44,944	35,203	46,814	-1,870		35,203
South Waikato District	15,451	11,952	15,894	-443		11,952
Taupo District	27,128	22,444	29,846	-2,718		22,444
Tauranga City	108,801	94,759	126,012	-17,212	-13,000	81,759
Thames-Coromandel District	14,635	16,934	22,519	-7,884	-6,000	10,934
Waikato District	69,863	39,468	52,485	17,377	13,000	52,468
Waipa District	45,522	32,435	43,133	2,389	2,000	34,435
Waitomo District	6,550	6,033	8,023	-1,473		6,033
Western Bay of Plenty District	34,097	29,885	39,742	-5,644	-4,000	25,885
Total	640,512	481,654	640,512	0	8,000	489,654



When we consider that employment is used in relative terms in the WRTM, the pattern of adjustments that may be warranted is slightly different to the pattern summarised in the commentary in Section 2.1. This highlights the challenge of adjusting demographics to produce traffic flows that will be perceived as realistic or likely.

The changes incorporated for the 2055 High scenario were:

- The part of Auckland within the WRTM needs more employment as does Waikato District.
- Hamilton only needs a modest increase in employment, and this is because Hamilton is numerically large and a significant overall proportion of the modelled area.
- In contrast, Tauranga needs a large decrease in employment.
- Thames-Coromandel and Western Bay of Plenty need a small decrease in employment.

The changes to employment introduced to form the “modified” demographics are summarized below. The changes were applied proportionally by TA, which effectively spreads the change over a wide area. Also, employment was typed was also reduced in proportion to the change in total.

Table 3-2: Changes in Employment, forming the “modified” comprehensive demographics

TA	Change in Employment							
	High				Medium			
	2025	2035	2045	2055	2025	2035	2045	2055
Auckland	3,500	9,000	12,000	14,000	3,000	8,500	12,500	15,000
Hamilton City	-8,000	-5,000		2,000	-7,000	-4,000		2,000
Tauranga City	-4,000	-6,500	-10,500	-13,000	-6,000	-8,500	-12,000	-13,500
Thames-Coromandel District	-2,000	-4,000	-5,000	-6,000	-2,000	-3,000	-4,500	-5,000
Waikato District	10,500	11,000	12,000	13,000	11,000	11,000	12,000	12,000
Waipa District	2,000	2,000	1,500	2,000	2,000	2,000		
Western Bay of Plenty District	3,000			-4,000	3,000			-4,000
Total	5,000	6,500	10,000	8,000	4,000	6,000	8,000	6,500

In most cases, the change has the same sign and increases in absolute terms over time. Outliers include:

- Hamilton City, where employment is reduced in 2025 and 2035, there is no change in 2045, and it is increased slightly for 2055.
- Waipa, where there is a modest constant increase in all years for the High scenario and 2025 and 2035 Medium, but no change in 2045 and 2055 Medium.
- Tauranga City, the Medium scenario has greater reductions than the High scenario. This reflects that only one set of demographics was provided for Tauranga, and the change required in the Medium case is therefore slightly greater than High.
- Western Bay of Plenty, where employment has a small increase in 2025 and a modest decrease in 2055, but no changes for the intermediate years.



The input demographics for the base year of 2018 and the resulting modified demographics for the future years of 2025, 2035, 2045, and 2055 have been summed to Territorial Authority (TA) level and are provided in Appendix B.

3.2 Output Traffic Patterns

Using the modified demographics as input, the WRTM produced traffic flows which were more similar to current patterns in terms of tidality and were therefore considered by transport professionals as more likely to occur and plausible. Again, this is based on professional judgement.

It is noted that while tidality patterns were generally acceptable with the modified demographics, the magnitude of the traffic flows has increased considerably (which is expected), and the peak direction has changed in some locations. The change in peakiness, however, is not as extreme as with the comprehensive demographics.

4 Summary

There are various sources of input demographics for the WRTM, particularly because the model is larger than the Waikato Region. For the core Waikato Region, the demographics are produced by post-processing land use predicted by the WISE model. Demographics for the southern part of Auckland, Tauranga City, and the Western Bay of Plenty were sourced from the local authorities, while Statistics New Zealand projections were used for the part of Rotorua within the model.

This is referred to as the “comprehensive” demographics, which has a 2018-based projection, and forecast years of 2025, 2035, 2045 and 2055.

Inputting these demographics to the WRTM led to output traffic flows that were very different to current patterns, and hence generated concern and discussion. In particular, the peak direction changed on some key routes, for example, instead of most traffic travelling into Hamilton in the morning peak, the reverse occurred. Not only did the peak direction change in some key locations, but the proportion of the peak direction to the total flow became very large.

This led to an examination of the input demographics, and testing what needed to change in the demographics to produce output traffic flows considered more likely, noting this is entirely based on judgement rather than science.

A set of “modified” comprehensive demographics were produced. This was formed by reallocating employment around the region to improve the balance between labour force and employment by TA.

Inputting the modified comprehensive demographics to the WRTM led to output traffic flows that seemed more likely to occur in reality (again, based on judgement). The tidality was similar to current patterns, although it did still reverse in some locations. In particular, the highly directional flows no longer occurred, with the proportion of peak direction to total flow within more typical ranges.

It is stressed that the adjustment of the employment is not highly scientific nor exact, and is not the result of any planning knowledge. There is some logic to the adjustments, but it is very much trial-and-error, with judgement applied to determine whether the resulting traffic flows are appropriate.



Appendix A – Comprehensive Demographics by TA (Unadjusted)

Table A 1: Population, High

TA	Population				
	2018	2025	2035	2045	2055
Auckland	52,485	66,642	91,941	111,887	124,173
Hamilton City	168,432	194,026	223,684	252,588	276,440
Hauraki District	20,024	22,224	23,544	25,457	27,602
Matamata-Piako District	34,564	36,977	40,191	43,824	47,423
Otorohanga District	9,977	10,845	11,879	13,148	14,278
Rotorua District	69,632	77,090	83,662	89,778	95,727
South Waikato District	25,068	25,673	26,687	28,714	31,088
Taupo District	38,330	40,817	43,583	46,826	50,118
Tauranga City	142,711	160,664	183,595	201,448	217,422
Thames-Coromandel District	30,670	32,100	33,399	35,260	37,372
Waikato District	78,245	92,217	105,498	118,613	131,932
Waipa District	55,298	60,614	67,734	75,044	82,357
Waitomo District	9,816	9,826	10,082	10,653	11,472
Western Bay of Plenty District	44,466	52,034	61,664	65,107	65,525
Total	779,717	881,749	1,007,142	1,118,347	1,212,930

Table A 2: Households, High

TA	Households				
	2018	2025	2035	2045	2055
Auckland	17,964	23,522	33,803	42,868	48,805
Hamilton City	57,651	68,787	81,209	93,958	105,189
Hauraki District	7,860	8,888	9,714	10,646	11,461
Matamata-Piako District	13,009	14,215	15,934	17,587	19,201
Otorohanga District	3,457	3,801	4,317	4,763	5,196
Rotorua District	24,425	27,092	29,478	31,692	33,861
South Waikato District	8,897	9,072	9,527	10,207	11,059



TA	Households				
	2018	2025	2035	2045	2055
Taupo District	14,507	15,463	17,006	18,358	19,709
Tauranga City	52,957	59,888	69,592	76,001	80,667
Thames-Coromandel District	13,257	13,815	14,959	16,008	16,982
Waikato District	25,866	30,786	36,122	41,226	46,181
Waipa District	20,342	22,603	25,792	28,806	31,730
Waitomo District	3,598	3,624	3,814	4,064	4,382
Western Bay of Plenty District	16,207	19,029	23,120	24,628	24,894
Total	279,995	320,585	374,387	420,812	459,317

Table A 3: Labour Force, High

TA	Labour Force (WRTM definition)				
	2018	2025	2035	2045	2055
Auckland	27,306	34,551	48,609	59,852	66,708
Hamilton City	84,136	100,253	123,370	146,258	162,529
Hauraki District	9,185	9,227	9,689	10,546	11,050
Matamata-Piako District	17,706	19,222	21,219	23,500	25,438
Otorohanga District	5,140	5,634	6,413	7,137	7,795
Rotorua District	34,407	34,760	38,390	41,855	44,944
South Waikato District	11,299	11,696	12,692	14,038	15,451
Taupo District	19,785	21,336	23,324	25,341	27,128
Tauranga City	70,867	79,850	91,493	100,626	108,801
Thames-Coromandel District	14,129	13,875	13,856	14,414	14,635
Waikato District	40,688	47,941	56,062	63,862	69,863
Waipa District	29,397	32,932	37,496	42,079	45,522
Waitomo District	5,137	5,250	5,536	6,017	6,550
Western Bay of Plenty District	23,042	26,986	32,060	33,875	34,097
Total	392,224	443,512	520,207	589,399	640,512



Table A 4: Employment, High

TA	Employment				
	2018	2025	2035	2045	2055
Auckland	17,355	24,838	29,452	33,229	36,018
Hamilton City	79,419	89,943	101,809	111,801	120,398
Hauraki District	7,138	7,931	8,647	9,130	9,710
Matamata-Piako District	15,328	17,605	18,869	20,014	20,851
Otorohanga District	3,883	4,799	5,072	5,391	5,564
Rotorua District	25,411	28,279	30,758	32,999	35,203
South Waikato District	8,839	9,750	10,898	11,447	11,952
Taupo District	16,523	18,840	20,323	21,501	22,444
Tauranga City	61,896	69,097	78,395	86,918	94,759
Thames-Coromandel District	11,910	13,480	14,686	16,088	16,934
Waikato District	23,573	28,847	33,054	36,340	39,468
Waipa District	22,079	24,971	27,682	30,464	32,435
Waitomo District	4,444	4,956	5,429	5,787	6,033
Western Bay of Plenty District	13,214	19,065	23,715	27,031	29,885
Total	311,011	362,401	408,789	448,140	481,654

Table A 5: Population, Medium

TA	Population				
	2018	2025	2035	2045	2055
Auckland	52,485	66,628	91,892	111,811	124,080
Hamilton City	168,432	191,545	212,866	231,959	248,001
Hauraki District	20,024	21,728	22,170	23,115	24,192
Matamata-Piako District	34,564	36,150	37,796	39,651	41,398
Otorohanga District	9,977	10,575	11,168	11,922	12,536
Rotorua District	69,632	74,444	76,932	78,475	79,514
South Waikato District	25,068	25,136	25,147	26,047	27,181
Taupo District	38,330	39,925	40,990	42,376	43,674
Tauranga City	142,711	160,664	183,595	201,448	217,422
Thames-Coromandel District	30,670	31,411	31,455	31,973	32,702



TA	Population				
	2018	2025	2035	2045	2055
Waikato District	78,245	90,399	99,814	108,491	116,639
Waipa District	55,298	59,330	63,763	68,036	71,935
Waitomo District	9,816	9,618	9,487	9,637	9,954
Western Bay of Plenty District	44,466	52,034	61,664	65,107	65,525
Total	779,717	869,588	968,739	1,050,048	1,114,753

Table A 6: Households, Medium

TA	Households				
	2018	2025	2035	2045	2055
Auckland	17,964	23,515	33,787	42,843	48,777
Hamilton City	57,651	68,487	78,299	87,619	95,898
Hauraki District	7,860	8,724	9,252	9,831	10,224
Matamata-Piako District	13,009	13,947	15,135	16,156	17,051
Otorohanga District	3,457	3,719	4,096	4,370	4,622
Rotorua District	24,425	26,171	27,127	27,743	28,186
South Waikato District	8,897	8,919	9,076	9,394	9,811
Taupo District	14,507	15,180	16,162	16,863	17,459
Tauranga City	52,957	59,893	69,597	75,997	80,667
Thames-Coromandel District	13,257	13,567	14,235	14,740	15,111
Waikato District	25,866	30,267	34,418	38,083	41,285
Waipa District	20,342	22,187	24,461	26,396	28,040
Waitomo District	3,598	3,558	3,625	3,727	3,857
Western Bay of Plenty District	16,207	19,030	23,122	24,627	24,894
Total	279,995	317,165	362,391	398,389	425,882



Table A 7: Labour Force, Medium

TA	Labour Force (WRTM definition)				
	2018	2025	2035	2045	2055
Auckland	27,306	34,551	48,609	59,852	66,708
Hamilton City	84,136	99,005	117,603	134,533	145,896
Hauraki District	9,185	9,007	9,067	9,440	9,454
Matamata-Piako District	17,706	18,780	19,903	21,106	21,963
Otorohanga District	5,140	5,498	6,044	6,471	6,831
Rotorua District	34,407	34,686	36,964	38,365	39,187
South Waikato District	11,299	11,462	11,979	12,713	13,471
Taupo District	19,785	20,871	21,926	22,827	23,457
Tauranga City	70,867	79,850	91,493	100,626	108,801
Thames-Coromandel District	14,129	13,533	12,882	12,732	12,321
Waikato District	40,688	46,992	53,029	58,230	61,282
Waipa District	29,397	32,225	35,248	37,968	39,415
Waitomo District	5,137	5,144	5,220	5,444	5,685
Western Bay of Plenty District	23,042	26,986	32,060	33,875	34,097
Total	392,224	438,588	502,025	554,183	588,566

Table A 8: Employment, Medium

TA	Employment				
	2018	2025	2035	2045	2055
Auckland	17,355	24,443	28,800	32,334	34,933
Hamilton City	79,419	85,489	93,970	101,292	107,142
Hauraki District	7,138	7,358	7,733	7,956	8,156
Matamata-Piako District	15,328	16,448	17,346	17,900	18,333
Otorohanga District	3,883	4,329	4,524	4,688	4,815
Rotorua District	25,411	27,337	28,400	29,040	29,457
South Waikato District	8,839	9,212	9,619	9,893	10,664
Taupo District	16,523	17,692	18,623	19,291	19,927
Tauranga City	61,896	69,017	78,250	86,713	94,487



TA	Employment				
	2018	2025	2035	2045	2055
Thames-Coromandel District	11,910	12,579	13,256	13,805	14,211
Waikato District	23,573	26,574	29,304	31,679	33,585
Waipa District	22,079	23,337	25,132	26,750	28,364
Waitomo District	4,444	4,715	4,961	5,226	5,468
Western Bay of Plenty District	13,214	18,940	23,506	26,769	29,586
Total	311,011	347,470	383,425	413,337	439,128



Appendix B – Modified Comprehensive Demographics by TA

Table B-1: Population, High

TA	Population				
	2018	2025	2035	2045	2055
Auckland	52,485	66,642	91,941	111,887	124,173
Hamilton City	168,432	194,026	223,684	252,588	276,440
Hauraki District	20,024	22,224	23,544	25,457	27,602
Matamata-Piako District	34,564	36,977	40,191	43,824	47,423
Otorohanga District	9,977	10,845	11,879	13,148	14,278
Rotorua District	69,632	77,090	83,662	89,778	95,727
South Waikato District	25,068	25,673	26,687	28,714	31,088
Taupo District	38,330	40,817	43,583	46,826	50,118
Tauranga City	142,711	160,664	183,595	201,448	217,422
Thames-Coromandel District	30,670	32,100	33,399	35,260	37,372
Waikato District	78,245	92,217	105,498	118,613	131,932
Waipa District	55,298	60,614	67,734	75,044	82,357
Waitomo District	9,816	9,826	10,082	10,653	11,472
Western Bay of Plenty District	44,466	52,034	61,664	65,107	65,525
Total	779,717	881,749	1,007,142	1,118,347	1,212,930

Table B-2: Households, High

TA	Households				
	2018	2025	2035	2045	2055
Auckland	17,964	23,522	33,803	42,868	48,805
Hamilton City	57,651	68,787	81,209	93,958	105,189
Hauraki District	7,860	8,888	9,714	10,646	11,461
Matamata-Piako District	13,009	14,215	15,934	17,587	19,201
Otorohanga District	3,457	3,801	4,317	4,763	5,196
Rotorua District	24,425	27,092	29,478	31,692	33,861
South Waikato District	8,897	9,072	9,527	10,207	11,059



TA	Households				
	2018	2025	2035	2045	2055
Taupo District	14,507	15,463	17,006	18,358	19,709
Tauranga City	52,957	59,888	69,592	76,001	80,667
Thames-Coromandel District	13,257	13,815	14,959	16,008	16,982
Waikato District	25,866	30,786	36,122	41,226	46,181
Waipa District	20,342	22,603	25,792	28,806	31,730
Waitomo District	3,598	3,624	3,814	4,064	4,382
Western Bay of Plenty District	16,207	19,029	23,120	24,628	24,894
Total	279,995	320,585	374,387	420,812	459,317

Table B-3: Labour Force, High

TA	Labour Force (WRTM definition)				
	2018	2025	2035	2045	2055
Auckland	27,306	34,551	48,609	59,852	66,708
Hamilton City	84,136	100,253	123,370	146,258	162,529
Hauraki District	9,185	9,227	9,689	10,546	11,050
Matamata-Piako District	17,706	19,222	21,219	23,500	25,438
Otorohanga District	5,140	5,634	6,413	7,137	7,795
Rotorua District	34,407	34,760	38,390	41,855	44,944
South Waikato District	11,299	11,696	12,692	14,038	15,451
Taupo District	19,785	21,336	23,324	25,341	27,128
Tauranga City	70,867	79,850	91,493	100,626	108,801
Thames-Coromandel District	14,129	13,875	13,856	14,414	14,635
Waikato District	40,688	47,941	56,062	63,862	69,863
Waipa District	29,397	32,932	37,496	42,079	45,522
Waitomo District	5,137	5,250	5,536	6,017	6,550
Western Bay of Plenty District	23,042	26,986	32,060	33,875	34,097
Total	392,224	443,512	520,207	589,399	640,512



Table B-4: Employment, High

TA	Employment				
	2018	2025	2035	2045	2055
Auckland	17,355	28,338	38,452	45,229	50,018
Hamilton City	79,419	81,943	96,809	111,801	122,398
Hauraki District	7,138	7,931	8,647	9,130	9,710
Matamata-Piako District	15,328	17,605	18,869	20,014	20,851
Otorohanga District	3,883	4,799	5,072	5,391	5,564
Rotorua District	25,411	28,279	30,758	32,999	35,203
South Waikato District	8,839	9,750	10,898	11,447	11,952
Taupo District	16,523	18,840	20,323	21,501	22,444
Tauranga City	61,896	65,097	71,895	76,418	81,759
Thames-Coromandel District	11,910	11,480	10,686	11,088	10,934
Waikato District	23,573	39,347	44,054	48,340	52,468
Waipa District	22,079	26,971	29,682	31,964	34,435
Waitomo District	4,444	4,956	5,429	5,787	6,033
Western Bay of Plenty District	13,214	22,065	23,715	27,031	25,885
Total	311,011	367,401	415,289	458,140	489,654

Table B-5: Population, Medium

TA	Population				
	2018	2025	2035	2045	2055
Auckland	52,485	66,628	91,892	111,811	124,080
Hamilton City	168,432	191,545	212,866	231,959	248,001
Hauraki District	20,024	21,728	22,170	23,115	24,192
Matamata-Piako District	34,564	36,150	37,796	39,651	41,398
Otorohanga District	9,977	10,575	11,168	11,922	12,536
Rotorua District	69,632	74,444	76,932	78,475	79,514
South Waikato District	25,068	25,136	25,147	26,047	27,181
Taupo District	38,330	39,925	40,990	42,376	43,674
Tauranga City	142,711	160,664	183,595	201,448	217,422



TA	Population				
	2018	2025	2035	2045	2055
Thames-Coromandel District	30,670	31,411	31,455	31,973	32,702
Waikato District	78,245	90,399	99,814	108,491	116,639
Waipa District	55,298	59,330	63,763	68,036	71,935
Waitomo District	9,816	9,618	9,487	9,637	9,954
Western Bay of Plenty District	44,466	52,034	61,664	65,107	65,525
Total	779,717	869,588	968,739	1,050,048	1,114,753

Table B-6: Households, Medium

TA	Households				
	2018	2025	2035	2045	2055
Auckland	17,964	23,515	33,787	42,843	48,777
Hamilton City	57,651	68,487	78,299	87,619	95,898
Hauraki District	7,860	8,724	9,252	9,831	10,224
Matamata-Piako District	13,009	13,947	15,135	16,156	17,051
Otorohanga District	3,457	3,719	4,096	4,370	4,622
Rotorua District	24,425	26,171	27,127	27,743	28,186
South Waikato District	8,897	8,919	9,076	9,394	9,811
Taupo District	14,507	15,180	16,162	16,863	17,459
Tauranga City	52,957	59,893	69,597	75,997	80,667
Thames-Coromandel District	13,257	13,567	14,235	14,740	15,111
Waikato District	25,866	30,267	34,418	38,083	41,285
Waipa District	20,342	22,187	24,461	26,396	28,040
Waitomo District	3,598	3,558	3,625	3,727	3,857
Western Bay of Plenty District	16,207	19,030	23,122	24,627	24,894
Total	279,995	317,165	362,391	398,389	425,882



Table B-7: Labour Force, Medium

TA	Labour Force (WRTM definition)				
	2018	2025	2035	2045	2055
Auckland	27,306	34,551	48,609	59,852	66,708
Hamilton City	84,136	99,005	117,603	134,533	145,896
Hauraki District	9,185	9,007	9,067	9,440	9,454
Matamata-Piako District	17,706	18,780	19,903	21,106	21,963
Otorohanga District	5,140	5,498	6,044	6,471	6,831
Rotorua District	34,407	34,686	36,964	38,365	39,187
South Waikato District	11,299	11,462	11,979	12,713	13,471
Taupo District	19,785	20,871	21,926	22,827	23,457
Tauranga City	70,867	79,850	91,493	100,626	108,801
Thames-Coromandel District	14,129	13,533	12,882	12,732	12,321
Waikato District	40,688	46,992	53,029	58,230	61,282
Waipa District	29,397	32,225	35,248	37,968	39,415
Waitomo District	5,137	5,144	5,220	5,444	5,685
Western Bay of Plenty District	23,042	26,986	32,060	33,875	34,097
Total	392,224	438,588	502,025	554,183	588,566

Table B-8: Employment, Medium

TA	Employment				
	2018	2025	2035	2045	2055
Auckland	17,355	27,443	37,300	44,834	49,933
Hamilton City	79,419	78,489	89,970	101,292	109,142
Hauraki District	7,138	7,358	7,733	7,956	8,156
Matamata-Piako District	15,328	16,448	17,346	17,900	18,333
Otorohanga District	3,883	4,329	4,524	4,688	4,815
Rotorua District	25,411	27,337	28,400	29,040	29,457
South Waikato District	8,839	9,212	9,619	9,893	10,664
Taupo District	16,523	17,692	18,623	19,291	19,927
Tauranga City	61,896	63,017	69,750	74,713	79,487



TA	Employment				
	2018	2025	2035	2045	2055
Thames-Coromandel District	11,910	10,579	10,256	9,305	9,211
Waikato District	23,573	37,574	40,304	43,679	48,585
Waipa District	22,079	25,337	27,132	26,750	28,364
Waitomo District	4,444	4,715	4,961	5,226	5,468
Western Bay of Plenty District	13,214	21,940	23,506	26,769	25,586
Total	311,011	351,470	389,425	421,337	447,128

