Waikato Regional Council Technical Report 2016/03

Land use, demographic and economic projections for the Waikato region, 2013 to 2063

www.waikatoregion.govt.nz
ISSN 2230-4355 (Print)
ISSN 2230-4363 (Online)

Waikato
REGIONAL COUNCIL
Te Kaunihera a Rohe o Waikato

Prepared by:
WISE Modelling: Waikato Regional Council - Tony Fenton, Craig Briggs, Beat Huser,
Economic Projections: Market Economics Ltd – Garry McDonald
Population Projections: NIDEA University of Waikato – Michael Cameron, Bill Cochrane
Planning and Project Management: Waikato Regional Council (Beat Huser), Alchemists Ltd (Tony Fenton)

For:
Waikato Regional Council
Private Bag 3038
Waikato Mail Centre
HAMILTON 3240

February 2016

Document #: 3498086

Peer reviewed by:
Katie Mayes Date February 2016

Approved for release by:
Tracey May Date February 2016

Disclaimer

This technical report has been prepared for the use of Waikato Regional Council as a reference document and as such does not constitute Council's policy.

Council requests that if excerpts or inferences are drawn from this document for further use by individuals or organisations, due care should be taken to ensure that the appropriate context has been preserved, and is accurately reflected and referenced in any subsequent spoken or written communication.

While Waikato Regional Council has exercised all reasonable skill and care in controlling the contents of this report, Council accepts no liability in contract, tort or otherwise, for any loss, damage, injury or expense (whether direct, indirect or consequential) arising out of the provision of this information or its use by you or any other party.

Table of Contents

Executive summary v

Some observations and caveats viii

1 Introduction 1

2 Process Overview 1

3 WISE Modelling – Development of Land Use Projections 4

3.1 Overview 4

3.2 Update of WISE Model to Version 1.4 5

3.3 Validation of WISE Model and Adjustments to the Projections Scenario 5

4 Results: Land Use Projections by CAU 7

4.1 Process Methodology 7

4.2 Projection Results 7

4.2.1 Maps - Areas of change 10

4.2.2 Probability of Urbanisation 10

4.2.3 Changes in Key Land Uses - MCK 12

5 Population, household, and labour force projections for the Waikato Region, 2013-2061 18

5.1 Overview 18

5.2 Data and Methods 19

5.2.1 Data 19

5.2.2 Statistical Downscaling Method 19

5.2.3 Population Projections for Waikato Region 20

5.2.4 Population Projections for Territorial Authorities 22

5.2.5 Population ageing 28

5.3 Population Projections at the Census Area Unit Level for the Waikato Region 35

5.4 Discussion and Conclusion 47

6 Projections of economic outcomes 48

6.1 Introduction 48

6.2 Methodology 48

6.2.1 Model Selection 51

6.2.2 Data 52

6.2.3 Model Specification 52

6.3 Results 54

6.3.1 Introduction to Results 54

6.3.2 Regional Results 55

6.3.3 Projections of Economic Outcomes across Territorial Authorities 58

6.3.4 Projections for each Territorial Authority 62

6.3.5 Area Units 81

6.3.6 Comparison of the Future Proof Employment Projections against the MBIE Short-term Employment Forecasts 82

6.4 Conclusion 84

References 85
Appendices 87
Appendix 1: Land use estimates (2013) projections (2021 – 2061) by CAU 87
Appendix 2: Population Estimates (2006, 2013) and Projections (2021-2061) by CAU. 120
Appendix 3: Households estimates (2013) and projections (2021-2061) by CAU. 124
Appendix 4: Labour force projections (2021-2061) by CAU. 128
Appendix 5: Economic estimates (2013) and projections (2021-2061) by CAU. 132

List of figures

Figure 1: Work stream Process for developing updated population and economic output projections for Waikato region. 3
Figure 2: Process for generating up to date projections of land use for CAU level outcomes modelling 4
Figure 3: Probability Map – Urbanisation by 2063 11
Figure 4: Low Density Residential – North Waikato (Change 2013-2041). 12
Figure 5: Lifestyle Residential – North Waikato (Change 2013-2041). 13
Figure 6: Medium to High density Residential – Hamilton (Change 2013-2041) 14
Figure 7: Commercial – Hamilton (Change 2013-2041) 14
Figure 8: Manufacturing – North Waikato (Change 2013-2041). 15
Figure 9: Dairying – North Waikato (Change 2013-2041) 16
Figure 10: Sheep and Beef – North Waikato (Change 2013-2041) 17
Figure 11: Population projections for the Waikato Region, 2013-2063 21
Figure 12: Household projections for the Waikato Region, 2013-2063 21
Figure 13: Labour force projections for the Waikato Region, 2013-2063 22
Figure 14: Population projections for Thames-Coromandel District, 2013-2063 22
Figure 15: Population projections for Hauraki District, 2013-2063 23
Figure 16: Population projections for Waikato District, 2013-2063 23
Figure 17: Population projections for Matamata-Piako District, 2013-2063 24
Figure 18: Population projections for Hamilton City, 2013-2063 24
Figure 19: Population projections for Waipa District, 2013-2063 25
Figure 20: Population projections for Otorohanga District, 2013-2063 25
Figure 21: Population projections for South Waikato District, 2013-2063 26
Figure 22: Population projections for Waitomo District, 2013-2063 26
Figure 23: Population projections for Taupo District, 2013-2063 27
Figure 24: Population projections for part-Rotorua District, 2013-2063 27
Figure 25: Projected regional population changes by age group (2013 to 2063). 28
Figure 26: Annualised population growth rates, 2006-2013 36
Figure 27: Annualised population growth rates, 2013-2021 37
Figure 28: Annualised population growth rates, 2021-2031 39
Figure 29: Annualised population growth rates, 2031-2041 41
Figure 30: Annualised population growth rates, 2041-2051 42
Figure 31: Annualised population growth rates, 2051-2061 43
Figure 32: Population density, 2013 45
Figure 33: Population density, 2061 46
Figure 34: WISE Economic Model 50
Figure 35: Waikato Region Employment, 2007 to 2061 56
Figure 36: Waikato Region Value Added $2007million, 2007 to 2061 57
Figure 37: Projected Employment by Industry in Waikato's Territorial Authorities, 2007 to 2061 59
Figure 38: Projected Value Added by Industry in Waikato's Territorial Authorities, 2007 to 2061 61
Figure 39: Hamilton City Employment, 2007 to 2061 62
Figure 40: Hamilton East (CAU) Employment, 2007 to 2061 63
Figure 41: Hamilton City Value Added, 2007 to 2061 64
Figure 42: Waipa District Employment, 2007 to 2061 64
Figure 43: Cambridge North (AU) Employment, 2007 to 2061 65
Figure 44: Waipa District Value Added, 2007 to 2061 66

Figure 45: Waikato District Employment, 2007 to 2061 67
Figure 46: Waikato District Value Added, 2007 to 2061 67
Figure 47: Rotowaro (AU) Employment, 2007 to 2061 68
Figure 48: Taupo District Employment, 2007 to 2014 69
Figure 49: Tatua Employment (AU), 2007 to 2061 70
Figure 50: Taupo Value Added, 2007 to 2061 70
Figure 51: Matamata-Piako District Employment, 2007 to 2061 71
Figure 52: Matamata-Piako Value Added, 2007 to 2061 72
Figure 53: Thames-Coromandel District Employment, 2007 to 2061 73
Figure 54: Thames-Coromandel District Value Added, 2007 to 2061 73
Figure 55: South Waikato District Employment, 2007 to 2061 74
Figure 56: South Waikato District Value Added, 2007 to 2061 75
Figure 57: Hauraki District Employment, 2007 to 2061 76
Figure 58: Hauraki District Value Added, 2007 to 2061 76
Figure 59: Waitomo District Employment, 2007 to 2061 77
Figure 60: Mokauiti District Employment, 2007 to 2061 78
Figure 61: Waitomo District Value Added, 2007 to 2061 79
Figure 62: Otorohanga District Employment, 2007 to 2061 80
Figure 63: Otorohanga District Value Added, 2007 to 2061 80

List of tables

Table 1: Land Use Projection by Region and Territorial Authority - 2013 to 2061 (ha's) – for selected land uses 7
Table 2: Territorial Authority Population projections for the Waikato Region, 2013-2063 29
Table 3: Baseline and projected future population, households and labour force for the Waikato. 30
Table 4: Population proportions by land use type, 2013 and 2051 31
Table 5: Population densities (people per hectare) by land use type, 2013 and 2051 32
Table 6: Regression results 34
Table 7: Employment Impacts of Ruakura Inland Port, 2031 and 2061 51
Table 8: Independent Variables Used in the Partial Least Squares Regression Model by Industry Type 54
Table 9: Total Growth in employment by Territorial Authority, 2014 to 2031, and 2014 to 2061 58
Table 10: Projected changes in Value Added, 2014, 2031 and 2061, with Compound annual growth rates for those intervals. 60
Table 11: Areas with projected decline in employment, 2014 to 2061. 82
Table 12: Comparison of MBIE and Future Proof Employment 83

Executive summary

This report outlines the process undertaken and resulting data for land use, demographic and economic projections at a Census Area Unit (CAU) level for the Waikato Region, from a baseline in 2013 to 2063 (50 years time horizon). Projections include land use change, population dynamics (population, household, labour force) and economic development (value-added, employment). An overview is provided initially and then each projection output process is outlined.

Land Use

This section of the report provides a set of land use projections at the Census Area Unit (CAU) level for the Waikato Region. Projections are only provided for selected years (2021, 2031, 2041, 2051, and 2061). The land use projections were generated using the WISE model (Waikato Regional Council 2016). The land use projections were then used to support the modelling of the population and economic projections.

Prior to the land use projections being modelled the WISE model underwent a significant update. The updates improved the currency of territorial authority zoning, economic and population data and assumptions in the model. It also included an improvement in resolution from 200m to 100m cell size for modelling and a model start date was brought forward from 2006 to 2013. After the update process a single iteration validation exercise was undertaken with territorial authorities to test the appropriateness of zoning. This involved providing initial land use outputs from WISE for 2030 and seeking feedback on whether outcomes were plausible or appropriate given territorial authority zoning and development expectations. Adjustments were made to zoning setup based on the feedback.

The results for future land use projections indicate areas of plausible land use change. The land use figures provided by CAU for future time steps are from a single run of the WISE model. A Monte-Carlo method can also be used which uses repeated runs of the model and a 'random seed' to generate map of 'probability' or 'likelihood' of development of land use types (i.e. urban growth), for example Figure 3.

The changes in land use seen in the projections are in line with expected developments and zoning with increasing residential, commercial and industrial growth particularly around existing urban centres. There is significant growth in medium-high residential land use in Hamilton. The major rural land use change is further loss of sheep and beef to dairying land use.

Summary of results: Land use baseline and future projections for the Waikato region.

Land type (ha) / Year	2013	2021	2031	2041	2051	2061
Residential - Lifestyle	32895	33877	35274	36368	36796	36976
Residential - Low Density	8365	9028	9938	10556	10746	10808
Residential - Med-High Dens	112	120	129	137	138	135
Commercial	509	534	538	563	581	580
Manufacturing	1862	2113	2307	2487	2660	2834
Dairying	592147	637694	665999	683852	696558	707280
Sheep and Beef	615570	598700	577484	563276	553002	544441
Other Agriculture	7028	7243	7240	7130	6913	6660
Cropping	9275	10110	10823	11308	11442	11512
Forestry	289401	294141	292652	291441	290500	289626
Indigenous	654040	623069	613961	608864	606194	604310

Population

This section of the report provides a set of demographic projections at the Census Area Unit (CAU) level for the Waikato Region. Projections prepared for each CAU include population, household, and labour force projections for selected years (2021, 2031, 2041, 2051, and 2061). This report builds on a previous report on demographic projections at the territorial authority level, and uses a common set of underlying assumptions, as well as updating previous reports based on earlier data.

The projections were generated by statistically downscaling the territorial authority projections using the results obtained from a land use change model, embedded within the WISE (Waikato Integrated Scenario Explorer) model. The statistical downscaling method involves generating a regression model that predicts CAU-level population on the basis of the amount of land use of different types that is present in each CAU. The resulting models were fairly good, in terms of their in-sample and out-of-sample predictive performance.

The CAU-level population projections closely follow the pattern at the territorial authority level, but with additional local-level detail. Waikato District, Hamilton City, and Waipa District provide the majority of population growth over the projection period. However, this population growth is especially concentrated in the peri-urban area immediately surrounding Hamilton City, and the area closest to Auckland, while rural and peripheral areas decline in population. The household and labour force projections closely follow the population projections.

Summary of results: Baseline and projected future population growth for the Waikato, by territorial authority.

Area	Population			
	2013	2028	2043	2063
Thames-Coromandel	27,340	29,108	28,514	22,197
Hauraki	18,620	19,413	19,007	15,520
Waikato	66,530	84,271	101,980	116,370
Matamata-Piako	32,910	36,087	38,314	38,978
Hamilton City	150,180	190,998	229,794	262,493
Waipa	48,660	61,488	72,241	75,161
Otorohanga	9,610	10,090	10,003	8,475
South Waikato	23,190	23,076	21,353	17,318
Waitomo	9,295	8,696	7,809	6,090
Taupo	34,585	38,010	39,335	35,569
Rotorua (part)	3,820	3,990	3,880	3,087
Waikato region	**424,740**	**505,228**	**572,231**	**601,259**

Economic

This section of the report provides a set of economic projections at the Census Area Unit (CAU) level for the Waikato Region. Projections prepared for each CAU include employment and value added projections for selected years (2021, 2031, 2041, 2051, and 2061). The projections developed represent only one, albeit plausible, future among a set of futures, developed under a limited set of assumptions.

The methodology used to generate these projections follows a process which involves updating the WISE economic models final demand projections, inclusion of known investments and aspirations into the model (including the Ruakura inland port development). WISE is then run to produce supporting output data for a selected regression modelling approach (Partial Least Squares Regression) to determine employment and values add projections by CAU.

Results for employment and value add are also provided by territorial authority. The urban Hamilton city territorial authority is the dominant centre of employment for the region, with over 40 per cent of the region's employment (modified employment counts, MECs[1]). Hamilton city is four times larger than Waipa district and Waikato district, the second and third largest territorial authorities in employment terms. For value added there are higher growth rates within the next seventeen years in most of the territorial authorities , in comparison to the following period from 2014 to 2061. Results show that the Waikato district has the highest compounded annual growth rate, with Rotorua district the lowest.

Results are also provided by CAU, although caution is warranted on over-reliance on the reported CAU projections. These results are indicative of how the CAUs could transition into the future, but are in no way indicative of what will transpire. A decision to either relocate an industry, or locate a new/emerging industry in a particular area can have transformative effects to that locality. We are certain that such decisions will be taken, and hence the accuracy of the projections at CAU level should not be over-relied on.

Summary of results: Baseline and projected future employment and value-added by territorial authority.

Area	Employment 2014	Employment 2031	Employment 2061	Value-Added 2014	Value-Added 2031	Value-Added 2061
Thames-Coromandel	11,503	12,285	12,226	647	773	904
Hauraki	7,179	7,872	8,033	468	570	688
Waikato	20,008	25,255	32,063	1,343	1,858	2,182
Matamata-Piako	16,127	17,447	18,410	1,199	1,463	1,840
Hamilton City	85,754	110,927	136,530	5,311	7,522	10,596
Waipa	20,119	23,606	26,636	1,270	1,667	2,182
Otorohanga	4,484	4,691	4,724	298	356	433
South Waikato	9,008	9,030	8,510	697	834	981
Waitomo	5,005	5,349	5,451	379	460	569
Taupo	16,728	17,866	18,336	1,160	1,408	1,719
Rotorua (part)	2,118	1,923	1,816	158	179	213
Waikato region	**198,031**	**236,248**	**272,739**	**12,930**	**17,090**	**22,859**

Note: Employment recorded as 'Modified Employment Counts' (MEC).

Regional results for employment and value add are provided. These show it is projected that 75,000 additional MECs will be added to the Waikato region workforce (from 2014 levels), increasing the current total by 37 per cent, up to 272,739 MECs by 2061. Value added for the Waikato region was estimated at $\$_{2007}$12.9 billion in 2014, and projected to reach $\$_{2007}$17.1 billion in 2031 and $\$_{2007}$ 22.9 billion in 2061. This is an increase of 76% by 2061, from 2014 levels, and all industries are projected to grow. Manufacturing is the biggest industry (16.9% of total) in terms of value added or contribution to the region's GDP with $\$_{2007}$2.2bn in 2014 and projected to increase to $\$_{2007}$3.9bn by 2061.

[1] Modified employment counts (MECs) are employment counts adjusted to reflect estimates of the number of working proprietors.

Some observations and caveats

- *Projections are not forecasts or predictions.*
  No model can predict the future. The projections represent only one possible, albeit plausible, future. The WISE tool is considered the best available method within the Waikato region for developing plausible land use projections on which to base further analysis.

- *Projections are an artefact of both method and data.*
  Models are not reality but a representation of it based on input data, available knowledge and expert assumptions. Our population projections used statistical downscaling combined with projections of future land use to allocate territorial authority -level population to each CAU. Our economic projections rely on principally three data sources by CAU, namely: 1. Annual employment trends 2006 to 2013, 2. Land use by category (including known public sector infrastructure investments and development aspirations), and 3. Population.

- *Projections are uncertain*
  The further out in time, and the smaller the spatial scale considered, the higher the level of uncertainty associated with the projections. Demographies and economies are complex systems characterised by multi-scale dynamic feedbacks which cannot be predicted. For this reason it is not possible to fully quantify the uncertainty associated with our projections, it is however important that decision makers are aware that high levels of uncertainty exist, and this increases the further you project into the future. The burden of uncertainty rests with decision-makers. There is a risk that the detailed information provided for such a long time frame may result in a false sense of accuracy. Planners and policy analysts would be much more assisted in testing various plausible futures and better understanding the range of possible futures rather than detailing any of them to this level of detail.

- *Projections are often self-fulfilling*.
  At such small scales as those explored in this work (CAU level), both population projections and planning decisions are endogenous and this creates a potential self-fulfilling prophesy quality to these projections. For instance, if population is projected to increase in a given census area unit, then planners may create infrastructure that supports the additional population, leading to more development in that area and more population. However, if population had been projected to increase elsewhere instead, then infrastructure spending, development and population growth would be directed towards that area instead. Thus, these projections should not be taken as a 'most likely' future, but as <u>one tool</u> among many in the planning process. Instead of focusing on one future it is more useful to consider a range of plausible futures and explore what this may mean.

- *Our projections cannot mind read*.
  Private sector investors do not generally provide public information of the scale and extent (i.e. capex and opex) of their intended investments for competitive reasons. Therefore, while land use aspirations and large scale public sector infrastructure investments are factored into our economic projections, specific and detailed knowledge of large-scale private sector developments are not, e.g. new dairy, meat or forest processing plants. Private sector investments can only be implied from land use change. Where employment information for private sector investment is available to territorial local authorities then this information should overwrite the projections we have provided.

  The modelling of land use is based on defined zones and rules applied to these. However the implementation of these can be more complex when increased

discretion is applied by territorial authority or land use is directed by more commercial drivers. Understanding and capturing this complexity can require multiple runs and reviews of land use projections (if time allows) to increase plausibility.

- *We are breaking new ground.*
  There is not one universally accepted method for deriving small-area (CAU) population and economic projections. While some of the methodology used is standard practice (and had been published and peer-reviewed), the small area (CAU) projections methodology has never been done before. The projection work has been peer-reviewed (report available from Waikato Regional Council) and new methods and approaches used are also being written-up as peer-reviewed scientific papers.

- *We had limited time.*
  The multi-disciplinary nature of the projections involved four agencies (Waikato Regional Council, NIDEA, ME, RIKS), multiple and linked contracts and required consultation and input from territorial authorities and other organisations. Several models were used for the projections, with data transfer between them that required robust quality control, and careful checking and testing. Lessons were learnt from earlier projection work undertaken in 2014. However, these projections were undertaken following a significant update of the WISE model which was both time and resource intensive. The timelines provided only limited opportunity for validation of results with territorial authorities and repeated iterations of the validation process could have provided for further refinement of the projections.

While the achieved outputs reflect best current practice, possible further enhancement of the methodology have been identified and will be further explored and refined over time. It is vital that the agencies using the projection data agree on a common approach to undertake and share future projections (e.g. following the 2018 Census) to ensure consistency and cost effectiveness.

1 Introduction

This report describes future projections of land use, demographics and economics from a baseline in 2013 to 2063 (50 years time horizon). Future projections of land use change, population dynamics (population, household, labour force) and economic development (value-added, employment) are important to local government as an input into district, structure and infrastructure planning.

A set of projections for these indicators was developed in mid-late 2014 (Waikato Regional Council 2014). Since then the final data from the 2013 census has been made available by Statistics New Zealand, and a major update of the WISE model has also been undertaken.

The updated WISE model now has a starting date of 2013, previously 2006, with a corresponding update of land use, population and economic data to match this start date. The WISE model has also increased in resolution now operating at 100 x 100m cell size, down from the earlier 200 x 200m scale. The other major improvement to WISE is an entire review and update of zoning to capture new council plan zones and rules that have been developed in recent district and regional plans.

This document outlines the processes followed to create a common set of population and economic projections data by Census Area Units (CAU) for the Waikato. These outputs are aimed at providing consistency for the inputs used in a range of planning and modelling processes undertaken by Territorial Authorities (TA's), Future Proof, Waikato Regional Transport Model (WRTM) and Waikato Integrated Scenario Explorer (WISE). To generate these outputs, it is necessary to link together outputs from three modelling processes:

1. land use modelling (WISE, for future projections of land use change);
2. population modelling ('Whole of Waikato' population model (WoW), regression analysis at CAU level); and
3. economic modelling (Economic Futures Model (EFM) and additional CAU modelling).

The steps and methodology for these three processes are outlined below in section 2 of this report.

2 Process Overview

The steps undertaken in preparing the CAU level projections and the links between the three modelling processes are outlined in Figure 1. The two steps involved:

Step1: Updating of Core Data Sets

a) New population projections were developed based on new 2013 census data. These were reviewed prior to finalising.
b) These population projections are used in the 'Whole-of-Waikato' (WOW) model to provide an updated data file (territorial authority level population data) for use in economic (Economic Futures Model, EFM) and WISE modelling.
c) A major update of the WISE model has been undertaken to utilise latest data sets (population, land use, zoning, suitability), create a new start date of 2013, and improve the modelling scale to 100 x 100m.
d) A review of data outputs from the revised WISE model was undertaken with territorial authorities to ensure setup was plausible.
e) Updated sector economic data are provided from EFM into WISE

Step 2: Development of CAU level projections

a) WISE version 1.4 model is run – output data from WISE is provided to NIDEA (land use projections by CAU) and Market Economics (land use by CAU, employment, value added and gross output) to undertake their modelling for population (see section 5) and economic (see section 6) indicators, respectively, at CAU level.
b) Regression modelling by NIDEA produces final projection outputs for population by CAU.
c) Final population projections by CAU are provided to Market Economics to use in their modelling of economic indicators at CAU level.
d) Modelling by Market Economics produces final economic projection outputs by CAU.

The specific parts of this process are defined in the following sections for each of the three modelling processes. These provide further detail of the data used, assumptions made and processes followed.

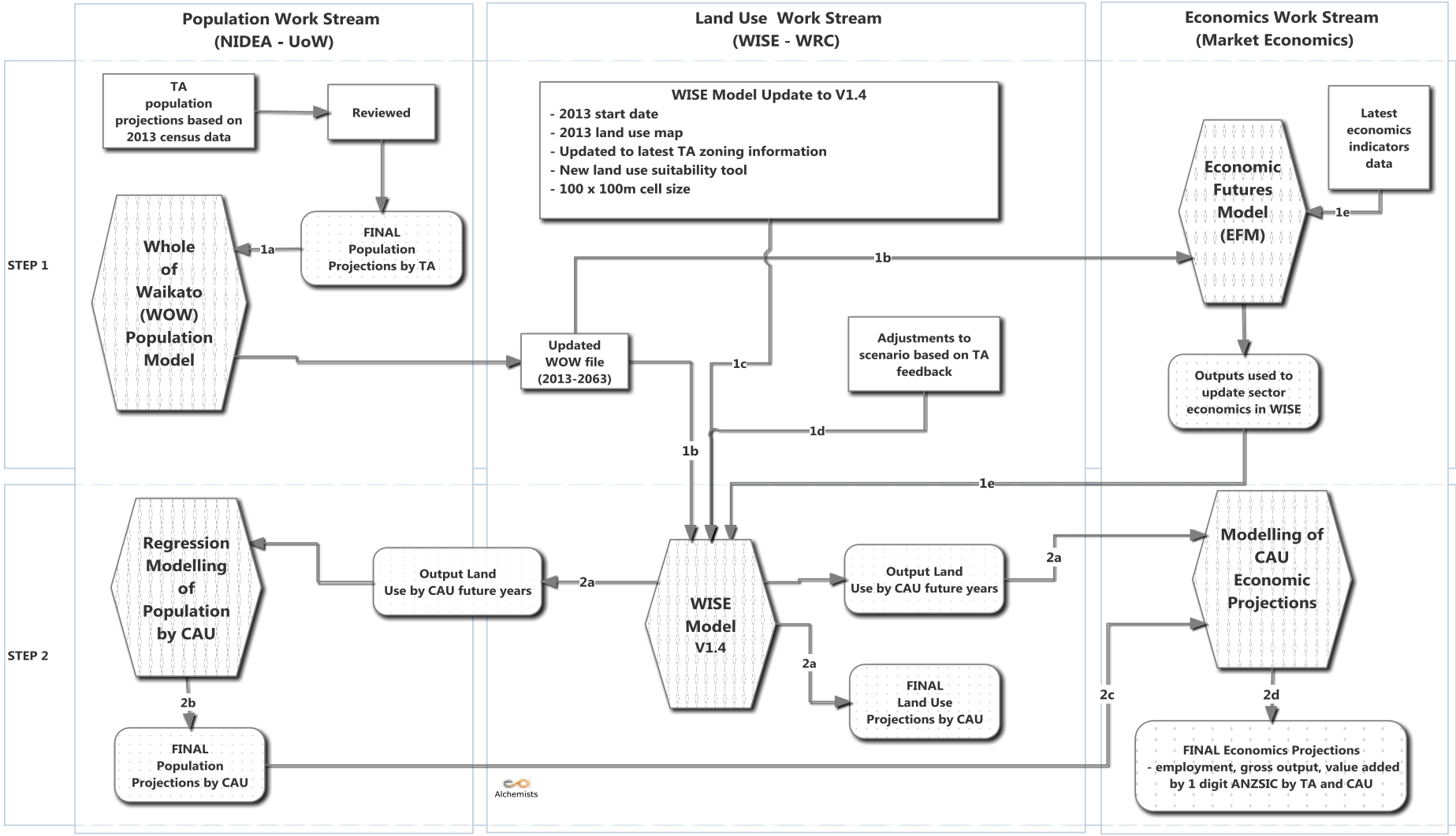

Figure 1: Work stream Process for developing updated population and economic output projections for Waikato region.

3 WISE Modelling – Development of Land Use Projections

Contributors:
Tony Fenton – Contractor (Alchemists Ltd)
Beat Huser, Craig Briggs – Waikato Regional Council

Acknowledgements
We thank staff from all territorial authorities for their valuable input. Their participation in workshops and provision of information and local knowledge was fundamental to the development, testing and validation of the projections.

3.1 Overview

This project required WISE to produce a robust projection of future land use for the Waikato Region. This projection of land use is required to support projection modelling of population and economic outcomes.

Figure 2 shows the process that was followed to produce the land use projections. The work firstly required a significant update of the WISE model. This required a number of data updates including an update of the initial land use layer, zoning and suitability layers, underlying population database (WOW file) and economic sector data (Figure 1).

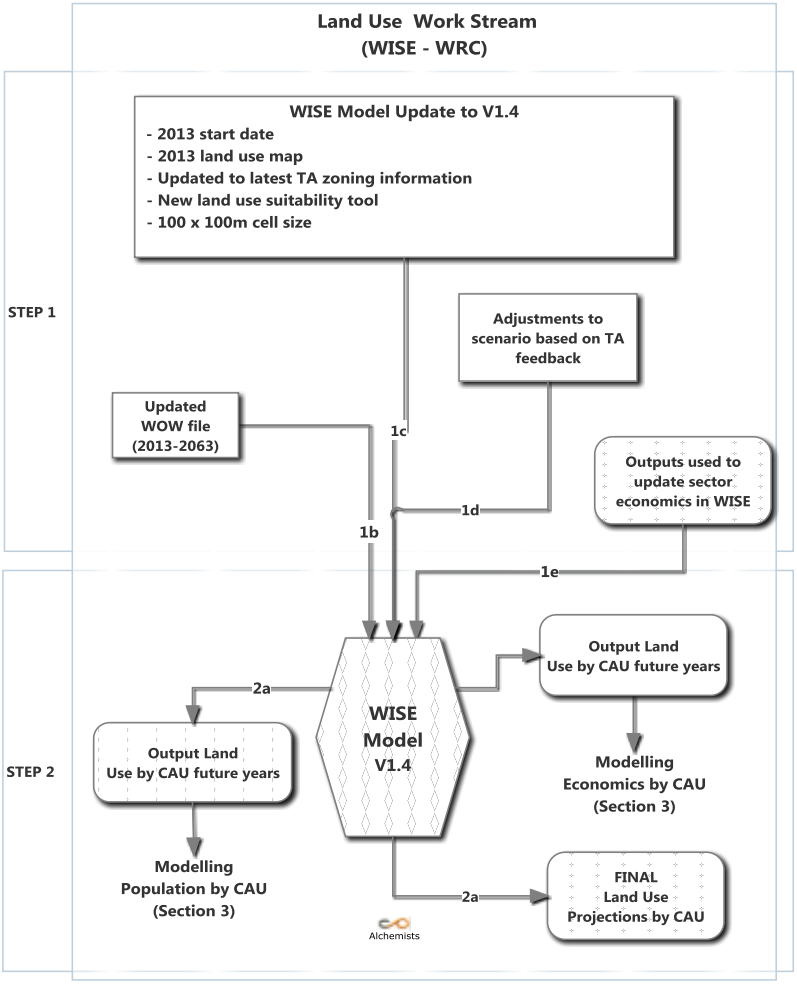

Figure 2: Process for generating up to date projections of land use for CAU level outcomes modelling

Updating these data sources is important to ensure that the model is 'current' and using the best available data and knowledge so that the scenario outputs are as robust as possible.

The initially developed territorial authority level population projections in 2014 were updated upon the release of final 2013 census results (Cameron and Cochrane (2015a)). Updated regional economic data was provided by Market Economics Ltd's Economic Futures Model (EFM).

3.2 Update of WISE Model to Version 1.4

The update of the WISE model has been undertaken with the objective of keeping it current and robust for scenario modelling work in the Waikato Region. The update had two significant changes. Firstly the starting date is now set to 2013, which required updating a number of key data inputs (initial land use layer, population data, economic data). Secondly the resolution of the model was increased to 100 x 100m this required all the spatial data layers in the model to be reviewed and updated.

Other data that has been updated included:

- Accessibility layers (transport network) – These were updated in 2014 as part of the initial projections work. They were reviewed again to ensure they were up to date.
- Suitability – A land use suitability tool has been added into WISE V1.4 which allows for improved definition and adjustment of suitability as part of scenario development. Landcare Research were contracted to provide recommended suitability settings for the reference scenario (Rutledge et. al., 2014).
- Zoning layers - Significant work was done in 2014 (Waikato Regional Council, 2014) and 2015 to update new zoning data across the region since WISE was first developed. A full review and update of zoning in the WISE model has been undertaken (Waikato Regional Council, 2015a). This has required an evaluation of all the zoning across the region and rules in plans that relate to them (Waikato Regional Council, 2015b). This provided a series of 'zoning matrix' tables for each territorial authority which outlines the zoning and restrictions to be setup in the WISE model. This process captured all the earlier work that was undertaken on zone updates in 2014. The second part of updating zoning involved sourcing the latest zoning spatial shape files from the territorial authorities. These were then matched to the 'zoning matrix' tables and converted into "grid" files that can be imported into WISE. These files are then loaded and matched to their respective rules information from the 'zoning matrix' tables to determine how each area will respond to land use changes when modelled.
- Climate layers – Underlying climate layers that support the hydrological model in WISE were updated to reflect latest climate projections based on the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC 2013, CLIMsystems 2015).
- For a full description of the current technical status of the WISE V1.4 model and specifics of updated components refer to the technical specifications document (Waikato Regional Council, 2016).

3.3 Validation of WISE Model and Adjustments to the Projections Scenario

After the updated WISE V1.4 model had been setup an initial set of land use maps from the baseline at 2013 into the future was created. These were provided to the territorial authorities for time steps of 2013 and 2030 for their validation. This process was to check the plausibility of the modelling and territorial authorities were asked to identify any changes that were not expected given their current zoning and planning documents.

This validation checking process identified a number of outcomes that were considered implausible and the WISE model was adjusted to improve model results. These included:

- Hamilton City and Waipa District residential zones being taken up by lifestyle blocks.
- Waikato District and Matamata-Piako District identified lifestyle blocks spreading into areas that should be more restricted.
- Residential and Industrial development not occurring where expected and in the right sequence.
- Location and extent of Medium-High density residential in Hamilton City.
- Location and extent of horticulture in many areas.

The key changes made to the scenario setup based on feedback were:

- Increasing restrictions on lifestyle block development in residential and industrial zoned areas in Hamilton City, Waikato District, and Waipa District.
- Inclusion of the current staging of development for the Ruakura inland port development as stimulating industrial growth into these areas.
- Inclusion of a zoning layer to represent the planned staging of industrial growth based on Future Proof (see table for opening up industrial land in Hamilton City, Waikato District, and Waipa District (Environmental Management Systems, 2015).
- Applying a specific rural residential layer to Waikato District to restrict lifestyle blocks where subdivision is not allowed.
- Creating 'staging' zones for residential growth in Waipa District to focus residential development where it is currently already underway and then opening up land to reflect Waipa District Council's Growth Strategy.
- Increasing the level of restriction in the Taupo catchment to stop further dairy farm development.

These changes were made to the initial 'reference' scenario in WISE. The model was then repeatedly run and settings tweaked to ensure the issues highlighted were solved or at least minimised.

4 Results: Land Use Projections by CAU

4.1 Process Methodology

After setting up of the WISE V1.4 model and further validation based on territorial authority feedback the resulting 'reference' scenario was run and land use projections for the following years were captured as 'geotiff' files: 2013, 2021, 2031, 2041, 2051, 2061.

For each of these time steps the 'geotiff' file is resampled to 20m cell size and then analysed in GIS software (Tabulate Area / Cross Tabulate process) against the Statistics New Zealand 2013 CAU layer.

This provides a database file for each time step that contains areas of each land use modelled in WISE by CAU's within the Waikato region. This data is then converted to hectares from (square metres) and loaded into a template spreadsheet that creates easy to view summaries of the data (see Waikato Regional Council Doc # 3492343).

4.2 Projection Results

A time step summary of this land use data for each time step, by territorial authority in the region is provided in Table 1. This provides a summary of the most relevant 11 land uses (out of a total of 25 land use classes).

Table 1: Land Use Projection by Region and Territorial Authority - 2013 to 2061 (ha's) – for selected land uses

Region

Region	Land type	2013	2021	2031	2041	2051	2061	
	Resid. - Lifestyle	32895	33877	35274	36368	36796	36976	
	Resid. - Low Dens	8365	9028	9938	10556	10746	10808	
	Resid. - Med-High Dens	112	120	129	137	138	135	
	Commercial	509	534	538	563	581	580	
	Manufacturing	1862	2113	2307	2487	2660	2834	
	Dairying	592147	637694	665999	683852	696558	707280	
	Sheep and Beef	615570	598700	577484	563276	553002	544441	
	other Agriculture	7028	7243	7240	7130	6913	6660	
	Cropping	9275	10110	10823	11308	11442	11512	
	Forestry	289401	294141	292652	291441	290500	289626	
	Indigenous	654040	623069	613961	608864	606194	604310	

Territorial Authority

TCDC	Land type	2013	2021	2031	2041	2051	2061	
	Resid. - Lifestyle	2197	2224	2250	2239	2180	2089	
	Resid. - Low Dens	1711	1780	1845	1840	1792	1718	
	Resid. - Med-High Dens	33	34	35	35	34	33	
	Commercial	108	108	108	108	108	108	
	Manufacturing	123	126	128	129	130	131	
	Dairying	13179	17190	21401	24220	26087	27726	
	Sheep and Beef	27669	28820	28663	28530	28490	28439	
	other Agriculture	83	103	115	122	101	74	
	Cropping	62	199	325	515	614	690	
	Forestry	30291	31603	31641	31636	31665	31683	
	Indigenous	139074	132466	128236	125478	123623	122105	

HDC	Land type	2013	2021	2031	2041	2051	2061	
	Resid. - Lifestyle	2158	2171	2194	2183	2130	2059	
	Resid. - Low Dens	650	664	689	687	670	647	
	Resid. - Med-High Dens	3	3	3	3	3	0	
	Commercial	42	43	43	44	46	46	
	Manufacturing	92	98	99	100	102	108	
	Dairying	56109	57675	58751	59722	60411	60693	
	Sheep and Beef	23117	23648	23389	23201	23029	22896	
	other Agriculture	66	158	173	177	160	141	
	Cropping	46	111	114	123	123	122	
	Forestry	4478	4586	4558	4536	4518	4505	
	Indigenous	35847	33609	32720	31935	31501	31479	

MPDC	Land type	2013	2021	2031	2041	2051	2061	
	Resid. - Lifestyle	2078	2110	2159	2190	2195	2203	
	Resid. - Low Dens	841	885	952	995	1002	1013	
	Resid. - Med-High Dens	8	8	9	9	9	9	
	Commercial	33	37	37	37	37	37	
	Manufacturing	189	260	289	307	325	347	
	Dairying	118852	124008	126879	128529	129652	130574	
	Sheep and Beef	20860	16913	14181	12629	11585	10748	
	other Agriculture	2342	2085	1864	1679	1564	1434	
	Cropping	1176	1157	1153	1148	1142	1139	
	Forestry	1682	1461	1395	1355	1325	1308	
	Indigenous	25251	24377	24328	24322	24322	24320	

Table 1 Cont: Land Use Projection by Territorial Authority - 2013 to 2061 (ha's)

Waikato DC	Land type	2013	2021	2031	2041	2051	2061
	Resid. - Lifestyle	14144	14781	15679	16523	17097	17574
	Resid. - Low Dens	1043	1297	1649	1976	2197	2384
	Resid. - Med-High Dens	5	6	7	9	9	10
	Commercial	99	106	112	135	153	157
	Manufacturing	512	602	687	815	937	1026
	Dairying	110254	118973	124596	127937	130707	133277
	Sheep and Beef	189046	187696	182071	177447	173706	170495
	other Agriculture	1642	1920	2113	2237	2215	2203
	Cropping	6191	6664	7035	7239	7327	7373
	Forestry	24421	25614	25421	25267	25117	24954
	Indigenous	70470	62343	60304	59728	59613	59453

Hamilton CC	Land type	2013	2021	2031	2041	2051	2061
	Resid. - Lifestyle	716	618	504	443	381	320
	Resid. - Low Dens	4036	4405	4706	4760	4814	4868
	Resid. - Med-High Dens	95	115	200	318	386	403
	Commercial	258	336	443	509	556	608
	Manufacturing	636	780	943	1057	1128	1164
	Dairying	2007	1710	1353	1118	977	910
	Sheep and Beef	856	722	492	417	377	346
	other Agriculture	7	10	9	9	7	7
	Cropping	43	43	38	25	9	3
	Forestry	33	16	12	11	11	11
	Indigenous	284	197	189	189	189	189

Waipa DC	Land type	2013	2021	2031	2041	2051	2061
	Resid. - Lifestyle	5024	5241	5560	5808	5889	5922
	Resid. - Low Dens	1316	1518	1813	2042	2116	2147
	Resid. - Med-High Dens	29	33	38	43	45	46
	Commercial	42	57	57	58	58	59
	Manufacturing	168	245	310	340	363	403
	Dairying	81725	90973	96393	99504	101782	103814
	Sheep and Beef	37727	29583	23655	20157	17788	15755
	other Agriculture	2286	2335	2302	2239	2220	2205
	Cropping	1032	992	981	959	913	837
	Forestry	2593	2146	1939	1805	1710	1620
	Indigenous	11351	10204	10121	10115	10111	10105

South Waikato D	Land type	2013	2021	2031	2041	2051	2061
	Resid. - Lifestyle	1165	1163	1161	1141	1109	1074
	Resid. - Low Dens	774	773	771	758	737	714
	Resid. - Med-High Dens	2	2	2	2	2	2
	Commercial	29	29	29	29	29	29
	Manufacturing	429	431	435	435	437	443
	Dairying	67248	74498	77533	78944	79795	80480
	Sheep and Beef	12174	7199	5173	4499	4228	4044
	other Agriculture	183	128	92	68	64	61
	Cropping	216	225	230	226	216	210
	Forestry	76387	75242	74385	73705	73175	72712
	Indigenous	19931	19080	18959	18949	18949	18949

Table 1 Cont: Land Use Projection by Territorial Authority - 2013 to 2061 (ha's)

Otorohanga DC	Land type	2013	2021	2031	2041	2051	2061
	Resid. - Lifestyle	1358	1366	1386	1381	1357	1319
	Resid. - Low Dens	194	199	211	211	208	202
	Resid. - Med-High Dens	3	3	3	3	3	3
	Commercial	9	9	9	9	9	9
	Manufacturing	27	27	27	27	27	27
	Dairying	60081	65690	70060	73546	75707	77347
	Sheep and Beef	66865	64176	60650	57923	55961	54435
	other Agriculture	23	61	89	98	97	96
	Cropping	84	162	232	237	235	238
	Forestry	7353	7363	7249	7175	7125	7068
	Indigenous	61741	59123	58327	57635	57507	57482
Waitomo	Land type	2013	2021	2031	2041	2051	2061
	Resid. - Lifestyle	850	825	814	797	774	748
	Resid. - Low Dens	268	246	243	239	233	226
	Resid. - Med-High Dens	0	0	0	0	0	0
	Commercial	57	55	54	54	53	47
	Manufacturing	71	73	80	83	87	91
	Dairying	24173	25220	25576	25762	25901	26105
	Sheep and Beef	164116	166607	166538	166482	166445	166402
	other Agriculture	130	157	174	188	182	167
	Cropping	19	114	192	228	232	236
	Forestry	17739	18247	18218	18195	18184	18171
	Indigenous	123172	119942	119668	119553	119485	119382
Taupo DC	Land type	2013	2021	2031	2041	2051	2061
	Resid. - Lifestyle	3921	3996	4072	4106	4066	3989
	Resid. - Low Dens	1569	1666	1765	1809	1792	1757
	Resid. - Med-High Dens	29	31	32	33	33	32
	Commercial	90	90	89	89	88	88
	Manufacturing	251	251	252	252	252	258
	Dairying	60525	63467	64808	65687	66516	67262
	Sheep and Beef	73996	74058	73165	72408	71770	71227
	other Agriculture	272	296	319	323	311	280
	Cropping	450	487	561	632	639	667
	Forestry	124459	127878	127846	127767	127682	127606
	Indigenous	167202	161926	161299	161149	161083	161035

A summary of this land use data for each CAU is provided in Appendix 1. A full set of the results are contained in Waikato Regional Council Doc#3492343.

4.2.1 Maps - Areas of change

WISE provides two methods for assessing change in land use over time:

1. Monte Carlo Tool which runs the model many times and creates a probability map of a certain change in land use; and
2. Map Comparison Kit (MCK) which allows for comparisons of land use change for a specific land use class between two time steps in the model projections, for example between the reference scenario (2013) and projected land use in 2030.

4.2.2 Probability of Urbanisation

The WISE model was run 50 times for a Monte Carlo analysis. Figure 3 shows the probability of urbanisation occurring in the northern-central part of the region during the period of modelling (2013-2063). In this map urbanisation is defined as the development of any of the following land uses: lifestyle, low density residential, med-high density residential, commercial, community services, or manufacturing. The 'probability' ratings are based on the frequency that these land uses would occur at a location over the 50 modelling cycles: High > 75%, Med 50-75%, low 25-50%.

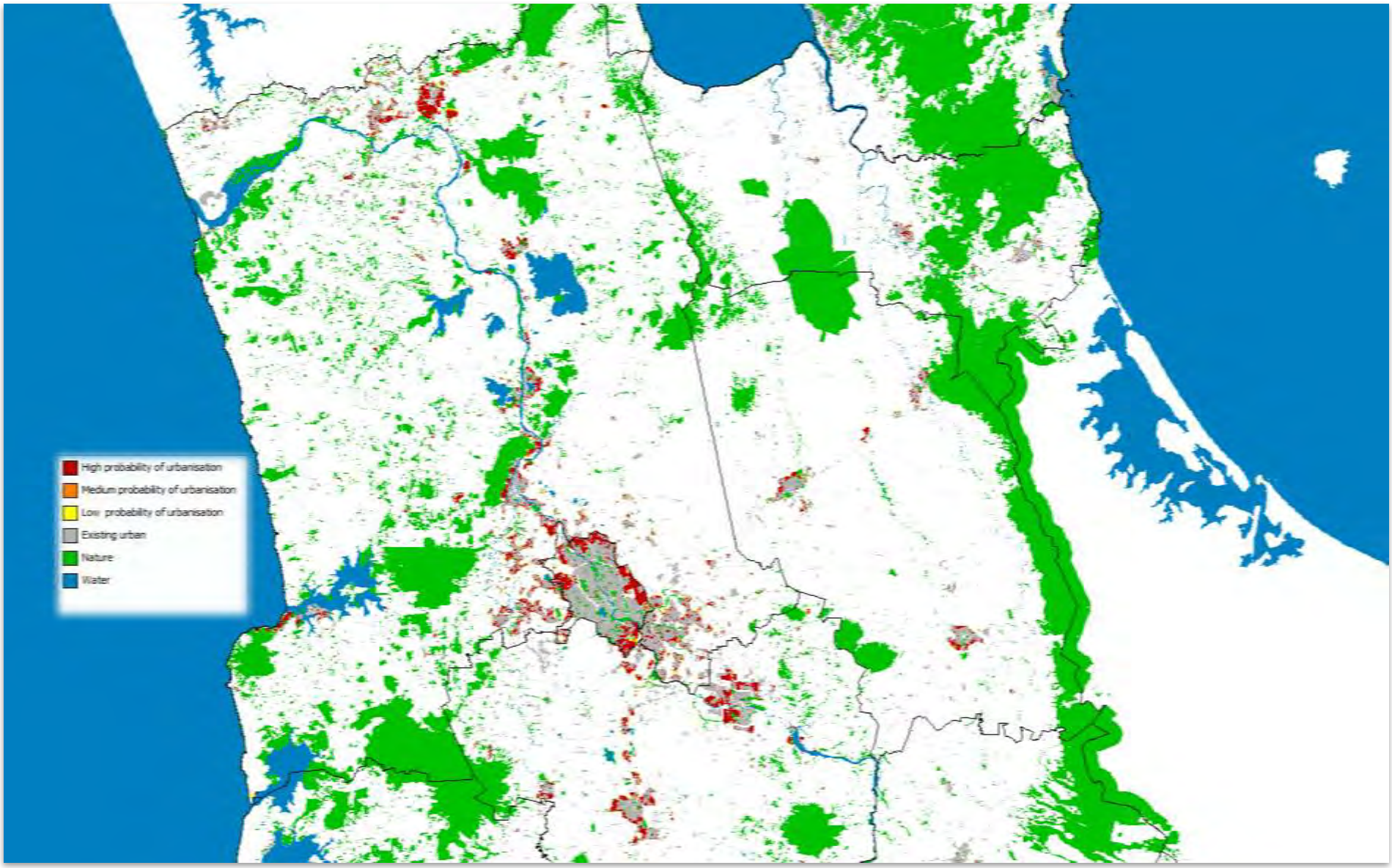

Figure 3: Probability Map – Urbanisation by 2063

4.2.3 Changes in Key Land Uses – Map Comparison Kit (MCK)

The main areas of change during the projections timeframe, e.g. between 2013 and 2041 in the maps below (Figure 4 to Figure 10) can be identified by analysing the maps in a tool call Map Comparison Kit (MCK). Results from this analysis show the change between two time steps as:

Green = no change
Red = change from this land use to another land use
Blue = change from another land use to this land use

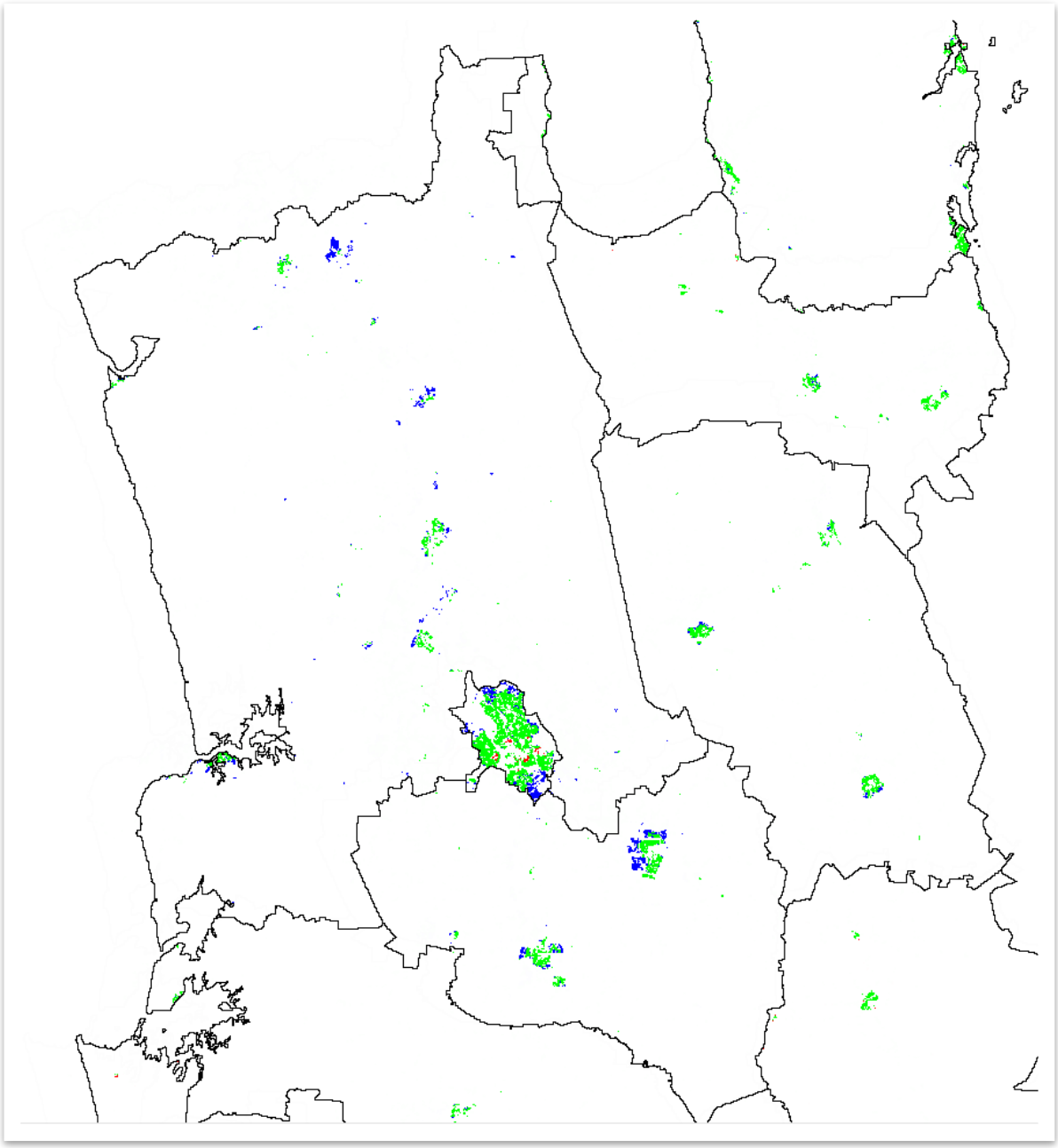

Figure 4: Low Density Residential – North Waikato (Change 2013-2041).

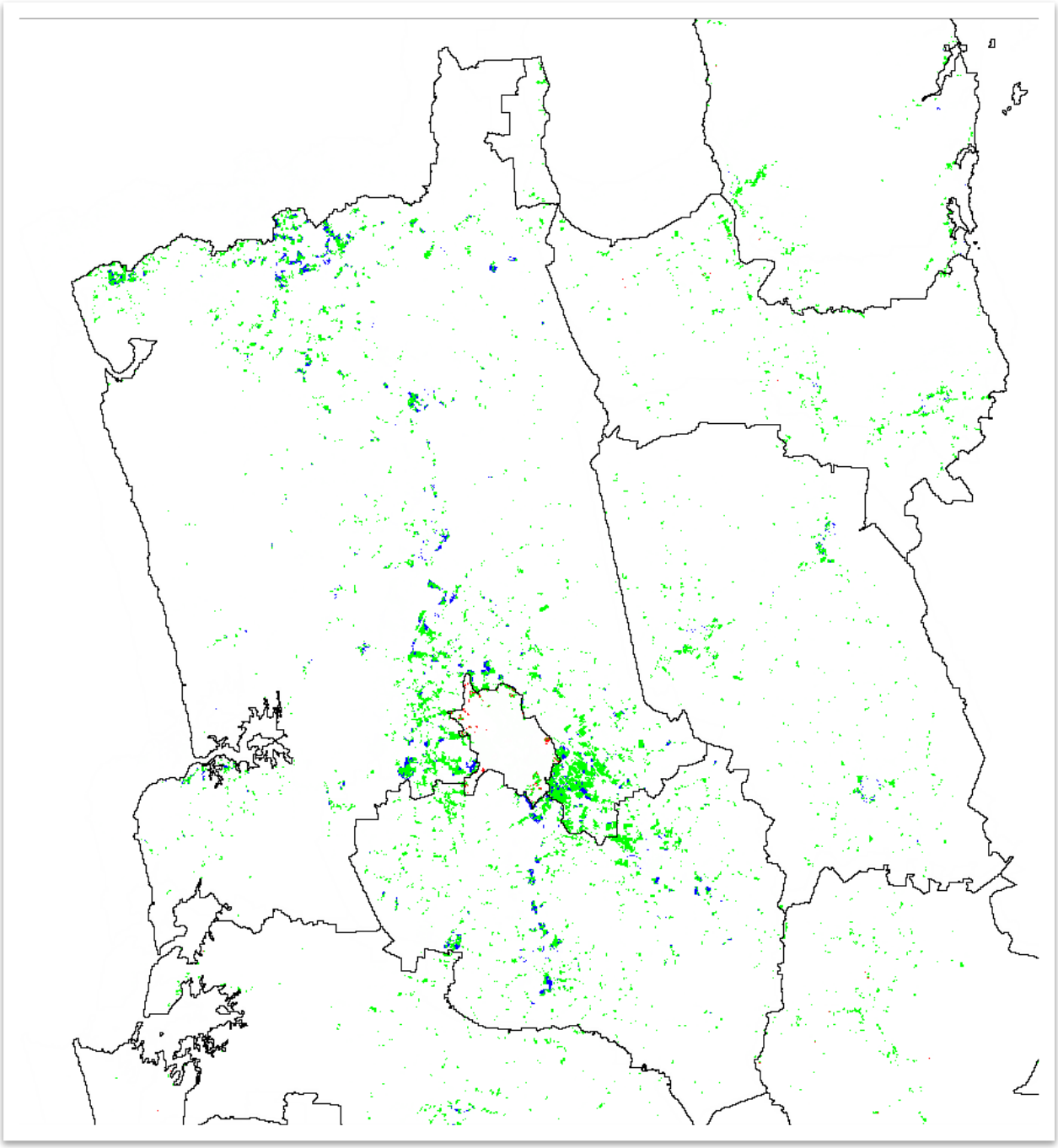

Figure 5: Lifestyle Residential – North Waikato (Change 2013-2041).

Green = no change
Red = change from this land use to another land use
Blue = change from another land use to this land use

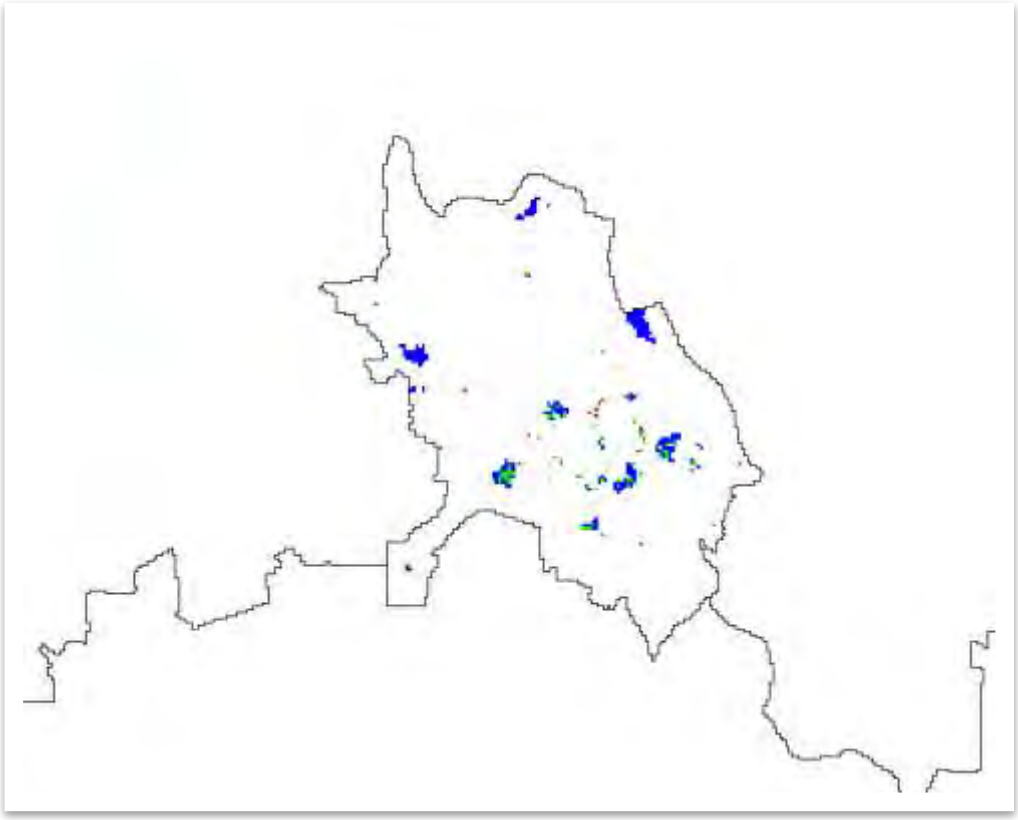

Figure 6: Medium to High density Residential – Hamilton (Change 2013-2041)

Green = no change
Red = change from this land use to another land use
Blue = change from another land use to this land use

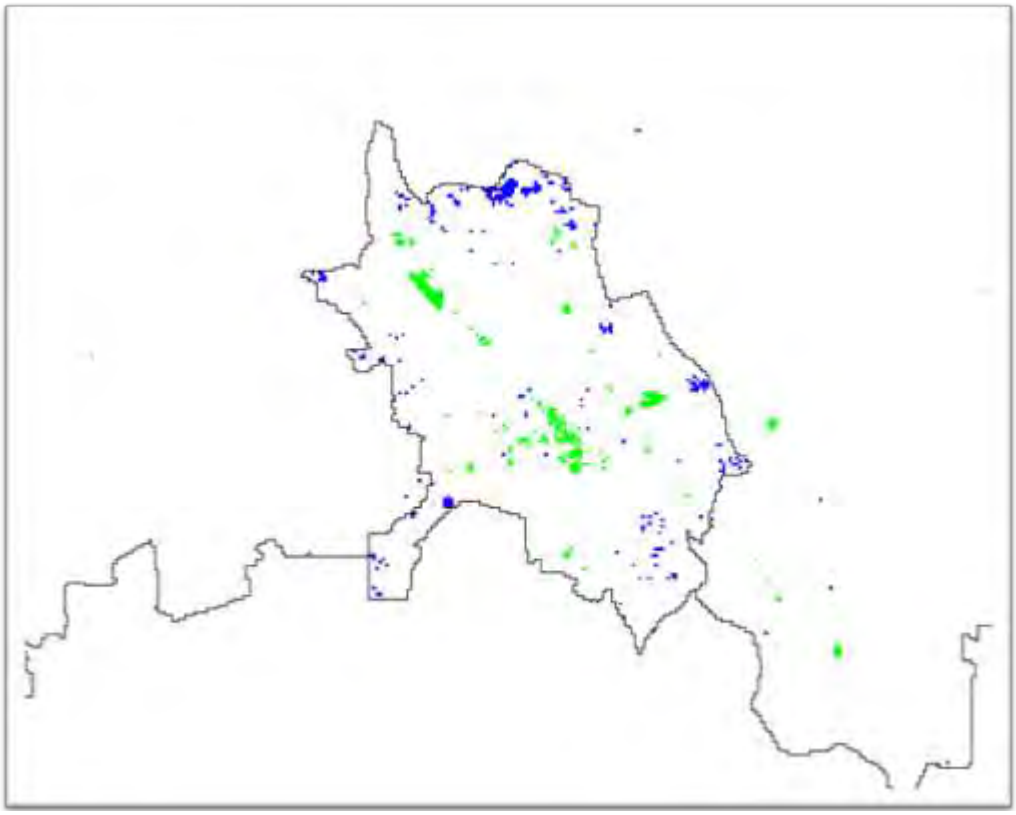

Figure 7: Commercial – Hamilton (Change 2013-2041)

Green = no change
Red = change from this land use to another land use
Blue = change from another land use to this land use

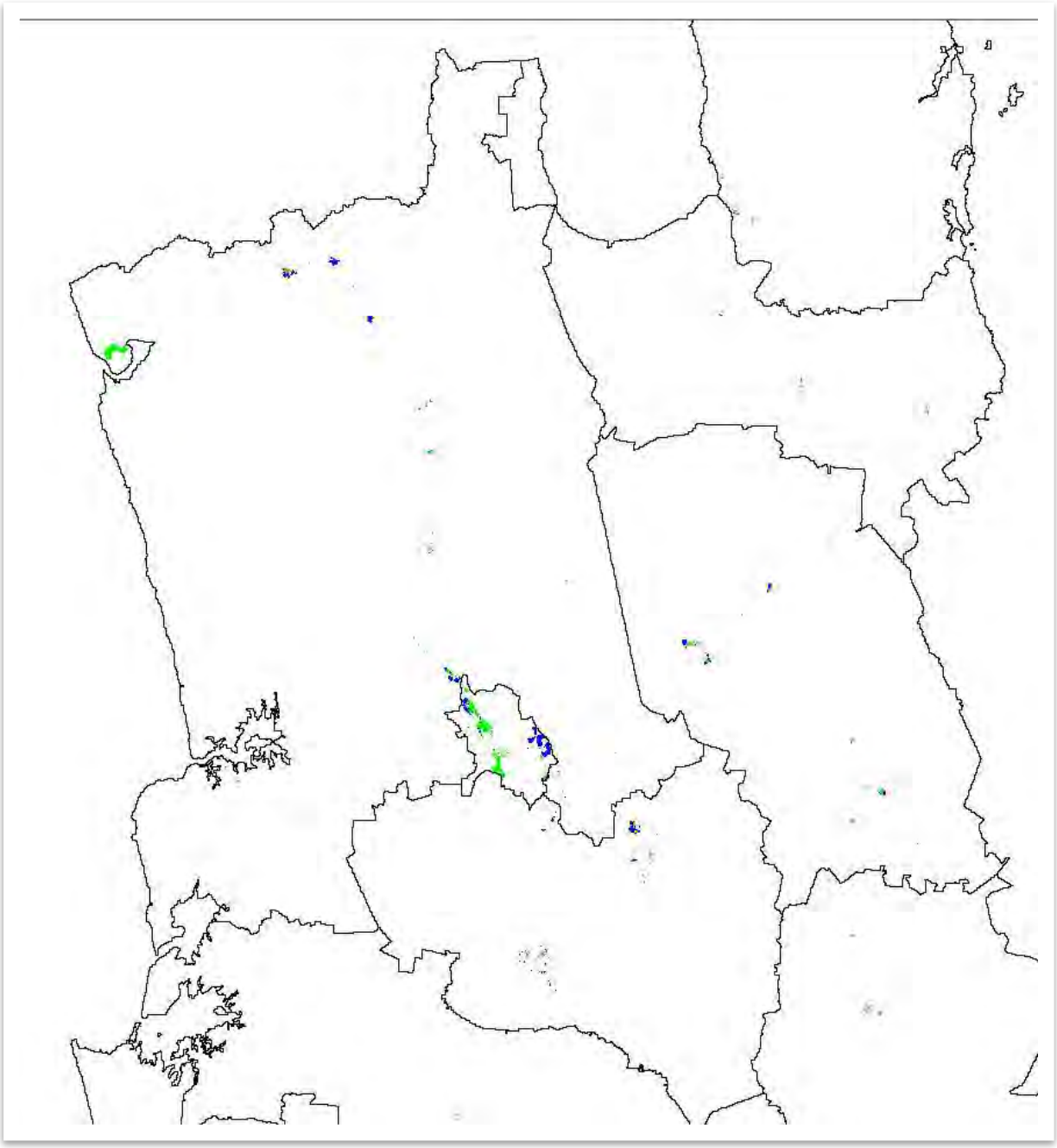

Figure 8: Manufacturing – North Waikato (Change 2013-2041).

Green = no change
Red = change from this land use to another land use
Blue = change from another land use to this land use

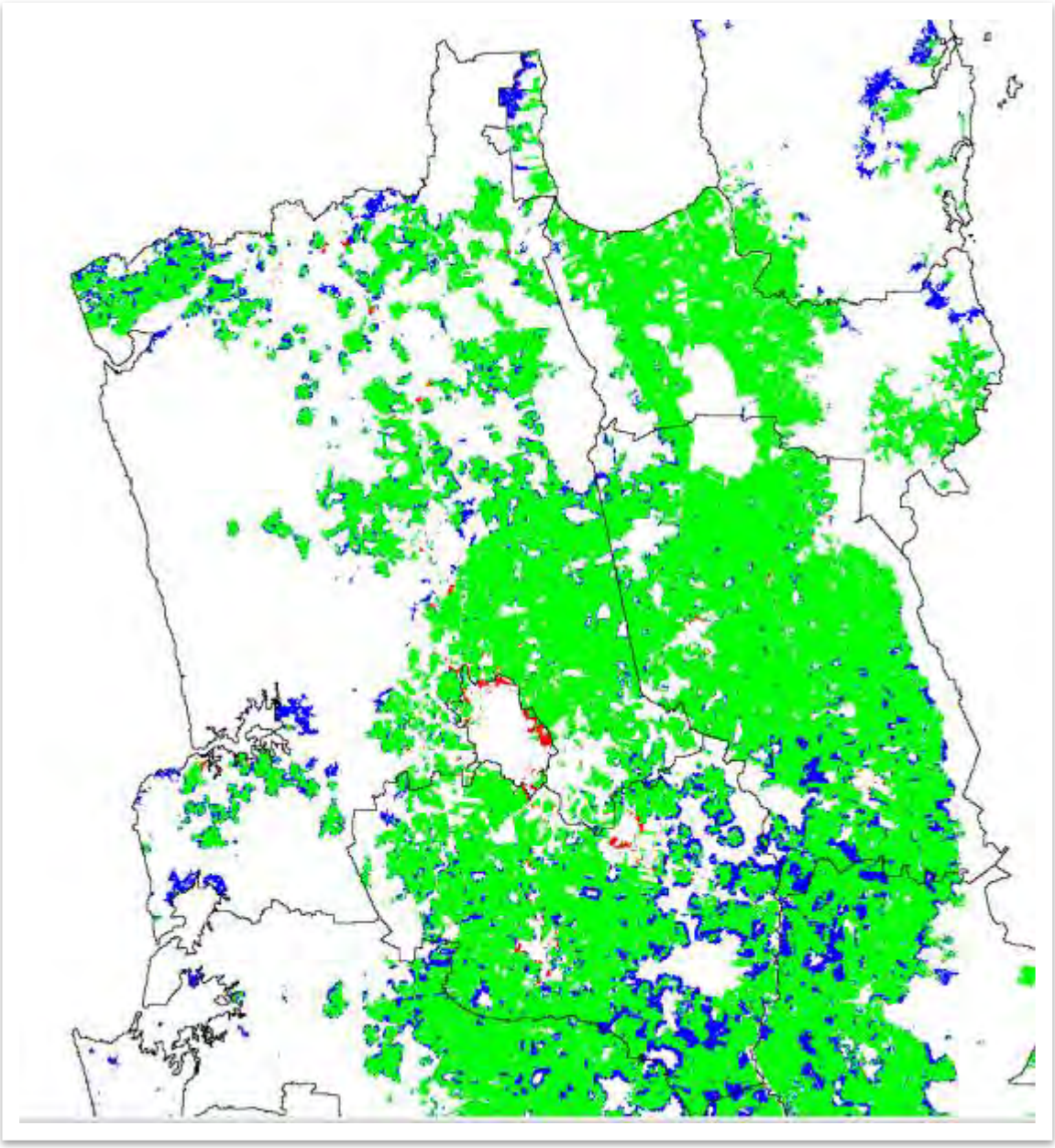

Figure 9: Dairying – North Waikato (Change 2013-2041)

Green = no change
Red = change from this land use to another land use
Blue = change from another land use to this land use

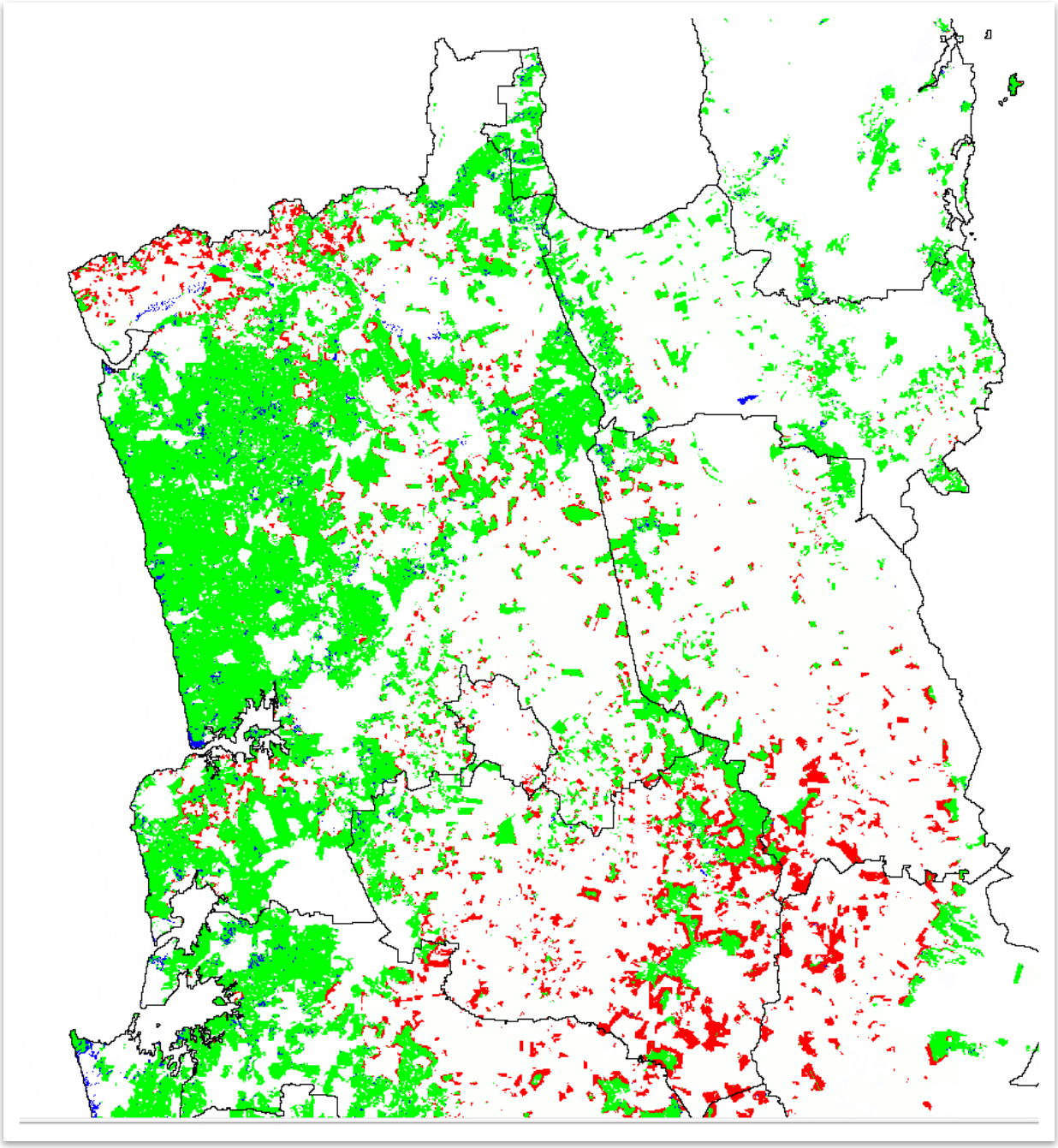

Figure 10: Sheep and Beef – North Waikato (Change 2013-2041)

Green = no change
Red = change from this land use to another land use
Blue = change from another land use to this land use

5 Population, household, and labour force projections for the Waikato Region, 2013-2061[2]

Contributors
Michael P. Cameron, Department of Economics and National Institute of Demographic and Economic Analysis, University of Waikato
William Cochrane, National Institute of Demographic and Economic Analysis and Facility of Arts and Social Sciences, University of Waikato

The views expressed in this section are those of the authors and do not reflect any official position on the part of the University of Waikato.

Disclaimer
The projections discussed in this section are based on historical data and assumptions made by the authors. While the authors believe that the projections can provide plausible and indicative inputs into planning and policy formulation, the reported numbers cannot be relied upon as providing precise forecasts of future population levels. The University of Waikato will not be held liable for any loss suffered through the use, directly or indirectly, of the information contained in this report.

Acknowledgements
We thank Statistics New Zealand (SNZ) for providing much of the data used to generate these demographic projections. We also thank Sialupapu Siameja and Anton Marais for research assistance, Natalie Jackson and Jacques Poot for helpful guidance, and Beat Huser, James Bevan, Ken Tremaine, Michael Spurr, Gary Knighton, Vishal Ramdumy, Garry McDonald, Tony Fenton, Hedwig van Delden, and participants at two stakeholder workshops and a seminar at Statistics New Zealand, and participants at the 8th International Conference on Population Geographies, for comments on the methodology and interim projections.

5.1 Overview

The Waikato Regional Council approached the University of Waikato in mid-2014 with a request to develop demographic (population, household and labour force) projections at the Census Area Unit (CAU) level for the Waikato region. This project was to build on a previous project that developed these projections at the territorial authority (territorial authority) level (Cameron and Cochrane, 2014a). The project resulted in an initial set of projections using land use projections with a 2006 base (Cameron and Cochrane, 2014b). These initial projections have been validated and presented at several conferences and seminars (Cameron, 2015; Cameron and Cochrane, 2015b; 2015c), and an evaluation of the in-sample and out-of-sample performance will be elaborated on in a forthcoming working paper.

The territorial authority-level demographic projections for the Waikato region have subsequently been updated to take into account the latest available demographic data (Cameron and Cochrane, 2015a). Moreover, the land use data have also been updated to a 2013 base and refined in consultation with local council planners. The combination of these two factors led to an opportunity to update the CAU-level population, household and labour force projections to take into account the updated land use data, and updated territorial authority-level projections data. This report outlines the resulting updated CAU-level projections.

[2] The population projections for territorial authorities in the Waikato (as shown in Step 1 of Figure 1) is documented in a separate report (Cameron. M and Cochrane, W. 2015: Population, family and household, and labour force projections for the Waikato Region, 2013-2063. Waikato Regional Council Technical Report 2015/28. http://waikatoregion.govt.nz/tr201447)

The CAU-level projections for the Waikato region are derived using a combination of the territorial authority-level population projections and projections of future land use. The territorial authority-level projections come from the Whole-of-Waikato population model (Cameron and Cochrane, 2015a) which is both incorporated into, and can be run separately from, the Waikato Integrated Scenario Explorer (WISE) model (Rutledge *et al*., 2008; 2010). The WISE model is a systems-based integrated model that incorporates economic, demographic, and environmental components across the Waikato Region. The land use projections come from the WISE model. In sum, the project involved estimating demographic projections for each CAU in the Waikato Region.

The report is structured as follows:

- Section 5.2 details the data and methodology used in preparing the projections;
- Section 5.3 presents and briefly discusses the CAU level population and household projections;
- Section 5.4 concludes.

5.2 Data and Methods

5.2.1 Data

The data used in the formulation of these projections was sourced from the Baseline Medium territorial authority-level population projections reported in Cameron and Cochrane (2015a), and from the land use outputs of the WISE model (Rutledge *et al*., 2008; 2010). Much of the data that was used in deriving the territorial authority-level population projections is from Statistics New Zealand (SNZ). The boundaries for the projections are consistent with boundaries at the time of the 2013 Census of Population and Dwellings. In all cases, the projections presented in this report are only for CAUs within the Waikato region. Thus, some CAUs in Waitomo District, Taupo District, and Rotorua District, are excluded because they lie outside the Waikato region.

5.2.2 Statistical Downscaling Method

There is not one universally accepted method for deriving small-area population projections. For instance, Statistics New Zealand uses the standard Cohort Component Method to project population at the CAU-level for New Zealand.[3] The standard Cohort Component Method is typically unable to be satisfactorily applied at such small-area levels, because of the unavailability of geographically-disaggregated data on birth rates, mortality rates, and migration (Smith and Shahidullah, 1995). Moreover pure demographic projections, such as those obtained from the Cohort Component Method, are unable to take account of a myriad of socio-economic, infrastructural, physical land use and other contextual factors that exert substantial influence over the spatial allocation of population and households at smaller geographical levels. Finally, the degree of uncertainty present in cohort component projections at smaller geographic levels increases substantially as the total population being projected decreases in absolute size (Cameron and Poot, 2011).

Because of the general unsuitability of pure demographic models to project population growth at the small-area level, a variety of alternative and largely non-demographic methods have been applied. The most common methods are collectively termed Urban Growth Models, and are described and reviewed in Triantakonstantis and Mountrakis (2012). These methods include: (1) Cellular Automata (CA) modelling; (2) Artificial neural networks modelling; (3) Fractal modelling; (4) Linear or logistic regression; (5) Agent-based modelling; and (6) Decision-trees modelling. A detailed review of each of these methods is outside the scope of this report, but they share an advantage over the pure demographic models in taking more explicitly into account the local socio-economic conditions and physical constraints at the small-area level. However, we note

[3] See http://www.stats.govt.nz/browse_for_stats/population/estimates_and_projections/area-unit-population-projections.aspx.

that in general none of these methods specifically model the underlying demographic processes that drive population change, which is a significant limitation.

An alternative to both the pure demographic approaches (such as the Cohort Component Method) and the non-demographic approaches (such as Urban Growth Models), is to combine the two approaches in order to leverage their particular strengths. By using demographic projections to derive estimates of the future population at a relatively broad geographical scale, then using a non-demographic approach to systematically downscale or apportion the population at the small-area level, we take account of both the underlying demographic processes that drive population change, and the local-level conditions that primarily determine the spatial allocation of households and people. Moreover, by combining the two methods the demographic model is not overextended to a point where the data necessary to derive population projection assumptions (fertility, mortality, and migration) are not readily available.

One combined approach is to allocate population on the basis of constrained future housing availability (the 'housing unit' method). For instance, Roskruge et al. (2011) used future zoning changes, combined with assumptions about rates of infill housing, to project the theoretical maximum number of housing units in each CAU and to allocate population within the Waikato District. In this project, we used an alternative method that uses statistical downscaling combined with projections of future land use to allocate territorial authority-level population to each CAU.

First, the population was projected at the regional and at the territorial authority level. These projections and the methodology employed to estimate them are described elsewhere (Cameron and Cochrane, 2015; Cameron and Cochrane, 2014a; Jackson et al., 2014), but a summary of the results is provided here. The territorial authority-level projected population was taken as an input into the next stages.

5.2.3 Population Projections for Waikato Region

Figure 11 presents the final population projections for the Waikato region as a whole to 2063 (red line), along with historical population estimates from Statistics New Zealand back to 1996 (blue line).

The 2015 updated projection increases over the entire projection period, from 424,740 in 2013 to 601,259 in 2063. Figure 12 shows the corresponding household projections for the Waikato region, while Figure 13 shows the corresponding labour force projections for the Waikato region. The 2015 updated household projection increases over the entire projection period, from 150,795 in 2013 to 263,518 in 2063. The 2015 updated labour force projection increases from 223,055 in 2013 to a peak of 341,736 in 2058 before declining to 263,518 in 2063.

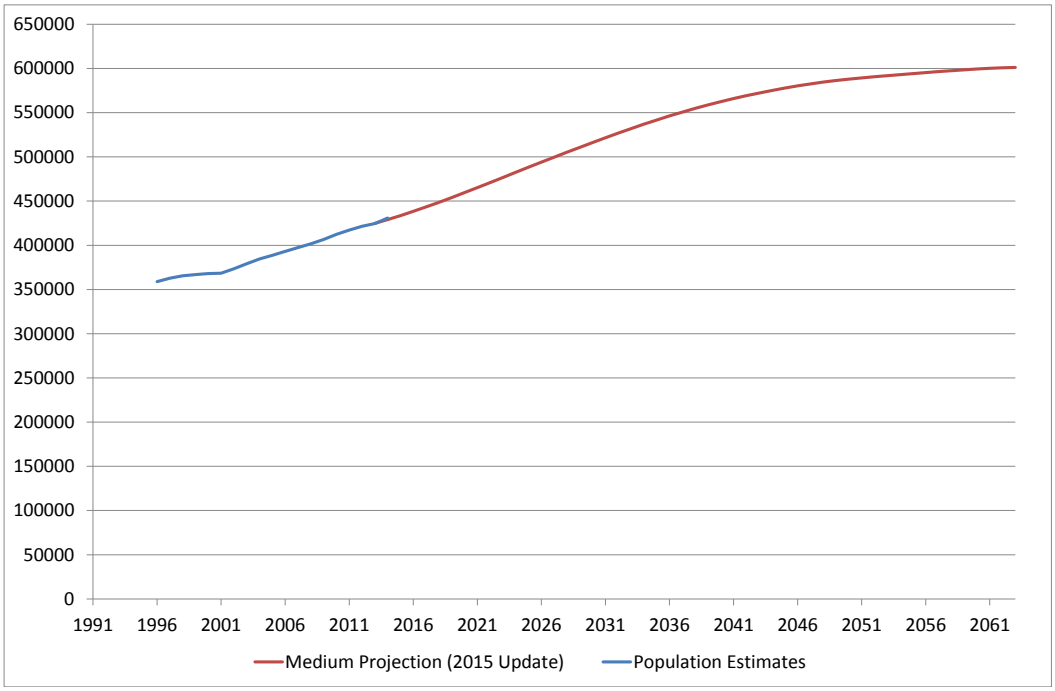

Figure 11: Population projections for the Waikato Region, 2013-2063

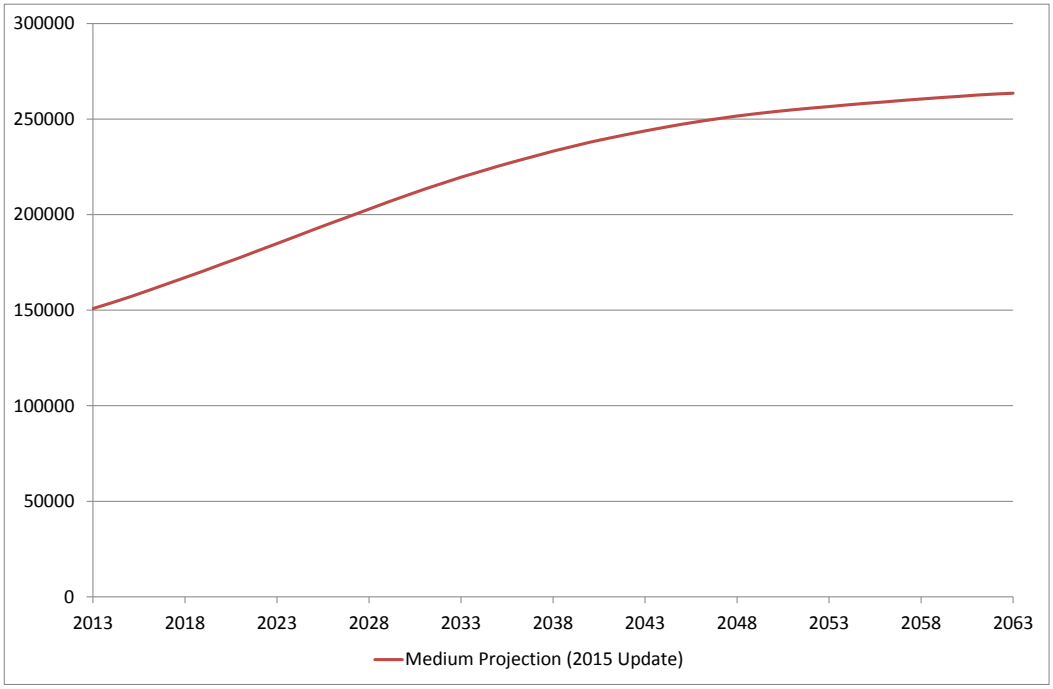

Figure 12: Household projections for the Waikato Region, 2013-2063

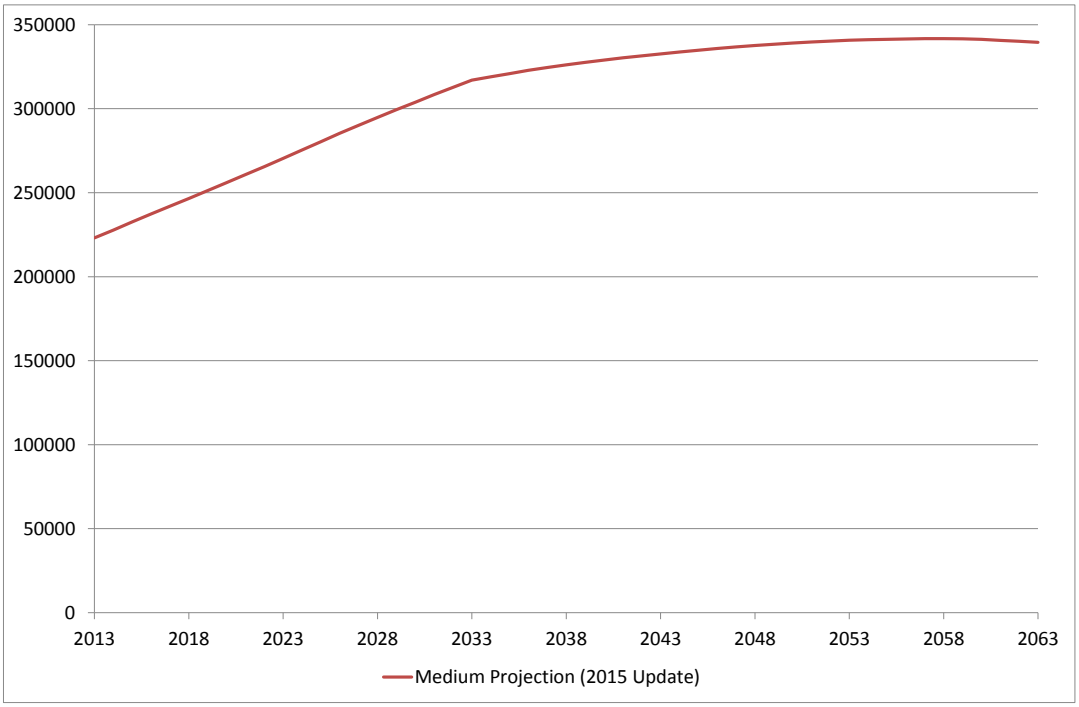

Figure 13: Labour force projections for the Waikato Region, 2013-2063

5.2.4 Population Projections for Territorial Authorities

5.2.4.1 Population Projections for Thames-Coromandel District

Figure 14 presents the final population projections for Thames-Coromandel District to 2063, along with historical population estimates from Statistics New Zealand back to 1991.

The 2015 updated projection increases from 27,340 in 2013 to a peak of 29,316 in 2034 before declining to 22,197 in 2063.

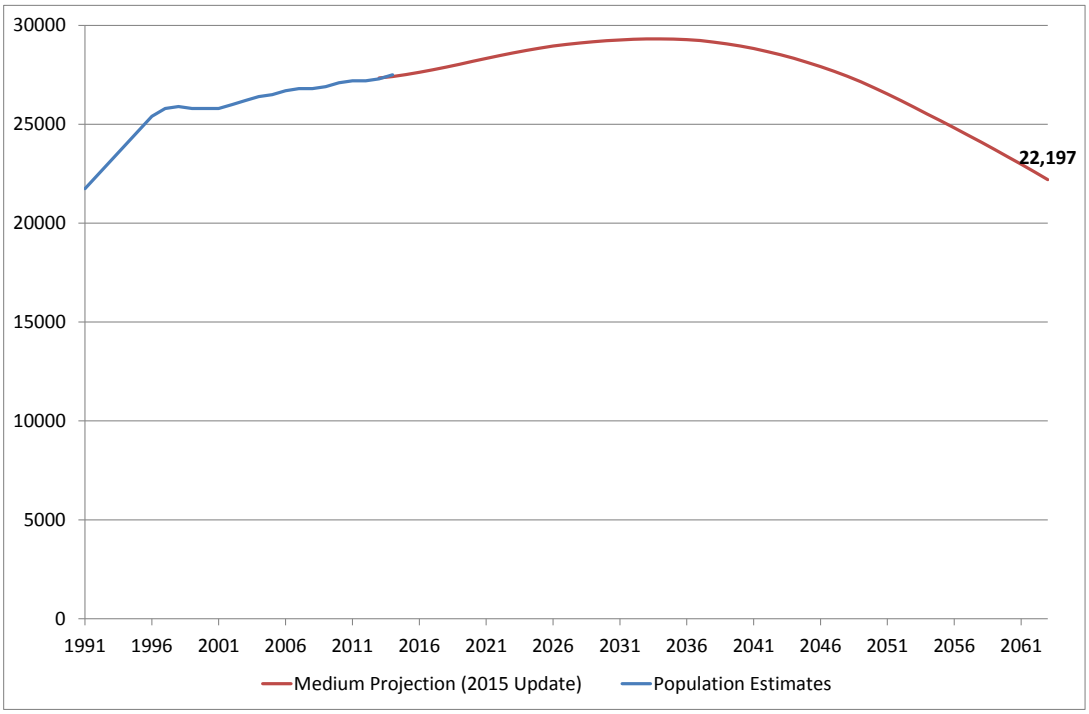

Figure 14: Population projections for Thames-Coromandel District, 2013-2063

5.2.4.2 Population Projections for Hauraki District

Figure 15 presents the final population projections for Hauraki District to 2063, along with historical population estimates from Statistics New Zealand back to 1991. The 2015 updated projection increases from 18,620 in 2013 to a peak of 19,572 in 2034 before declining to 15,520 in 2063.

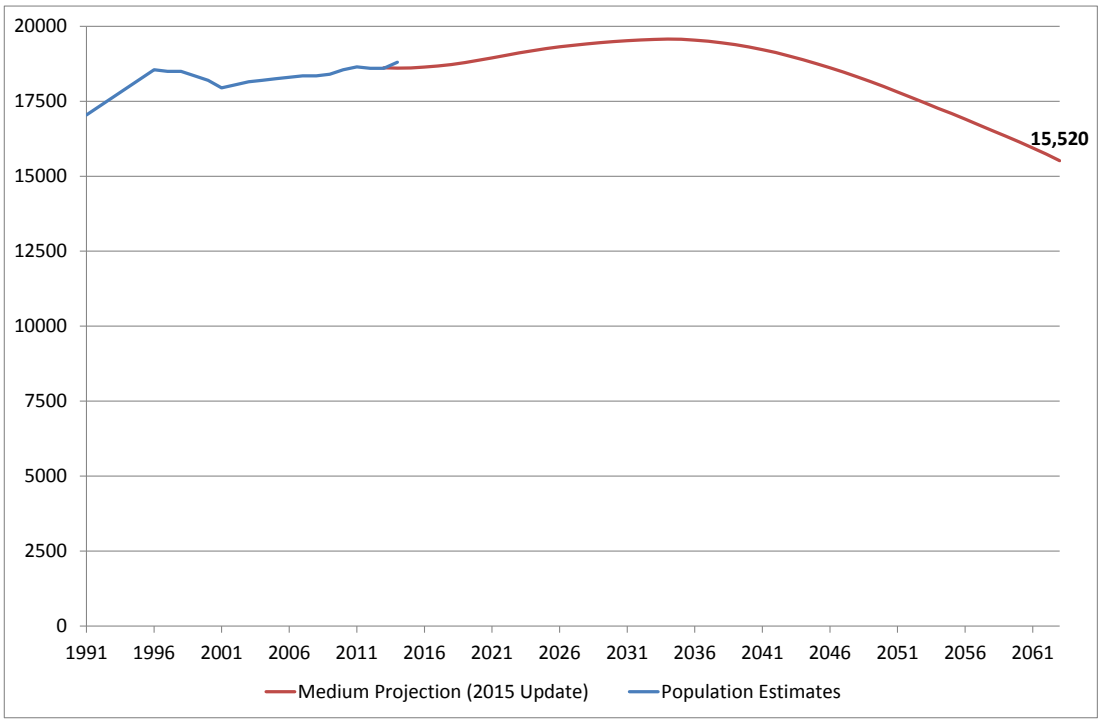

Figure 15: Population projections for Hauraki District, 2013-2063

5.2.4.3 Population Projections for Waikato District

Figure 16 presents the final population projections for Waikato District to 2063, along with historical population estimates from Statistics New Zealand back to 1991.
The 2015 updated projection increases from 66,530 in 2013 to 116,370 in 2063.

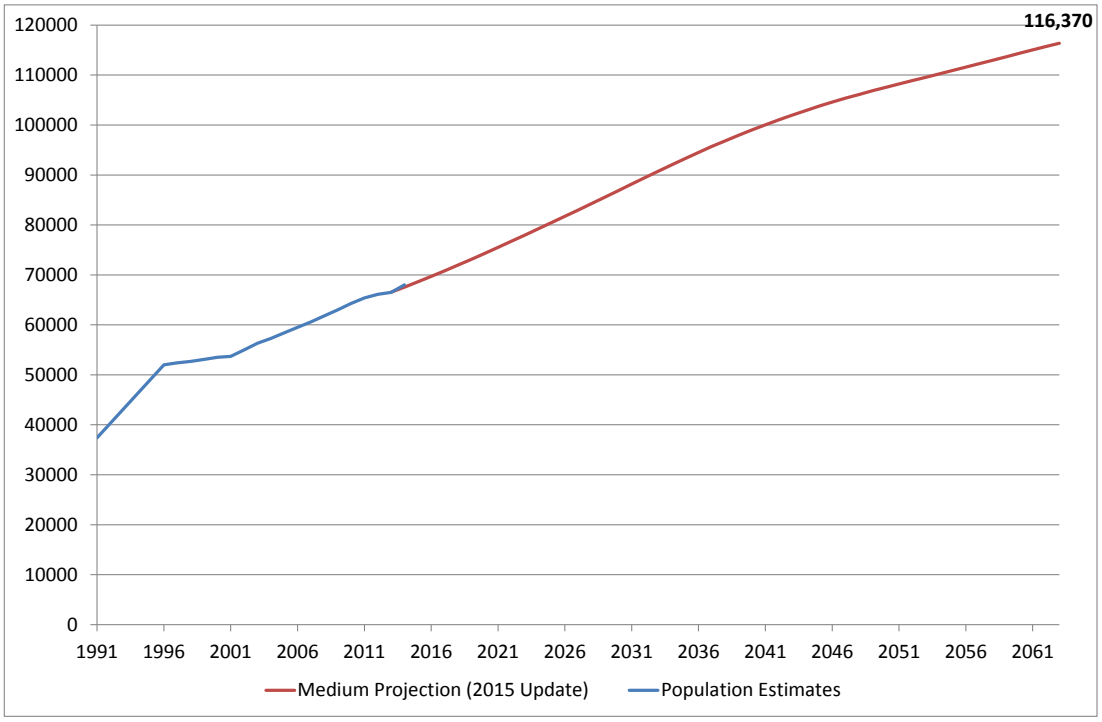

Figure 16: Population projections for Waikato District, 2013-2063

5.2.4.4 Population Projections for Matamata-Piako District

Figure 4 presents the final population projections for Matamata-Piako District to 2063, along with historical population estimates from Statistics New Zealand back to 1991.
The 2015 updated projection increases over the entire projection period, from 32,910 in 2013 to 38,978 in 2063.

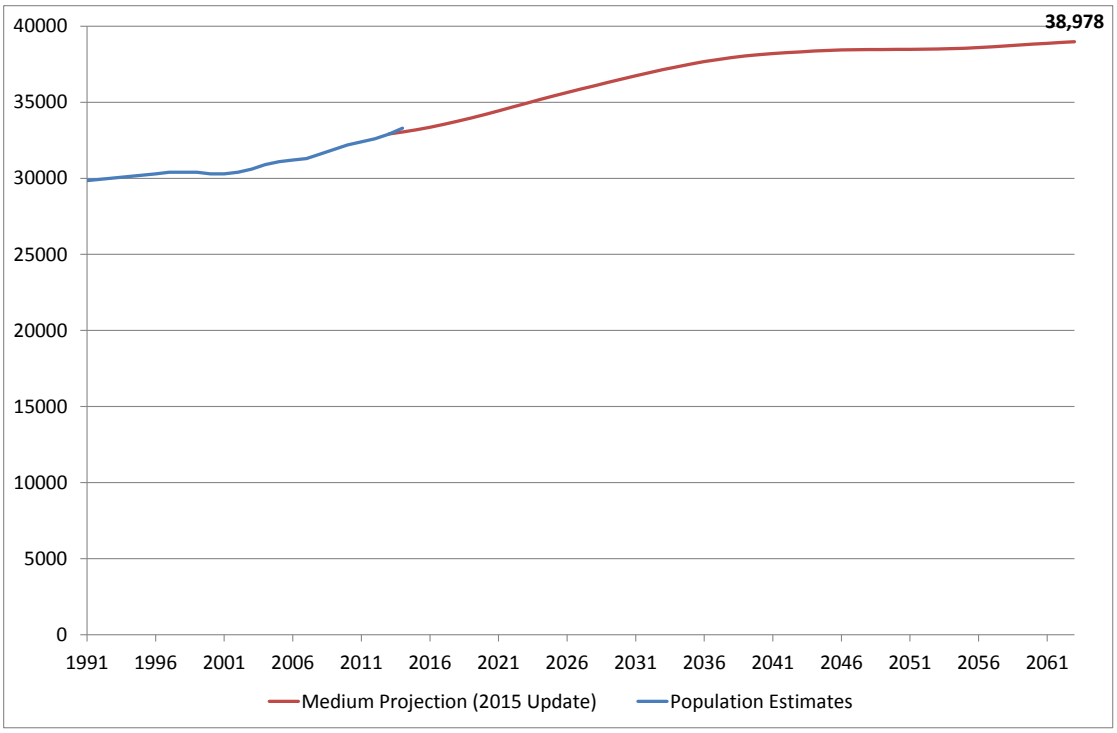

Figure 17: Population projections for Matamata-Piako District, 2013-2063

5.2.4.5 Population Projections for Hamilton City

Figure 18 presents the final population projections for Hamilton City to 2063, along with historical population estimates from Statistics New Zealand back to 1991.
The 2015 updated projection increases from 150,180 in 2013 to 262,493 in 2063.

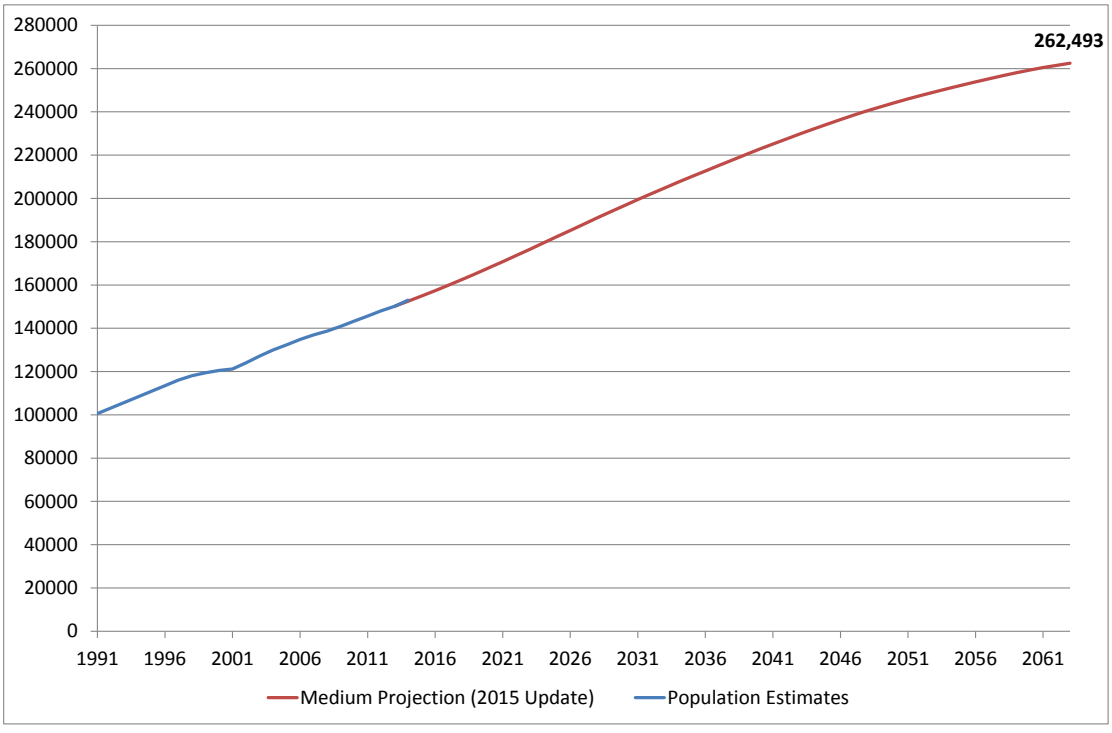

Figure 18: Population projections for Hamilton City, 2013-2063

5.2.4.6 Population Projections for Waipa District

Figure 19 presents the final population projections for Waipa District to 2063, along with historical population estimates from Statistics New Zealand back to 1991.
The 2015 updated projection increases over the entire projection period, from 48,660 in 2013 to 75,161 in 2063.

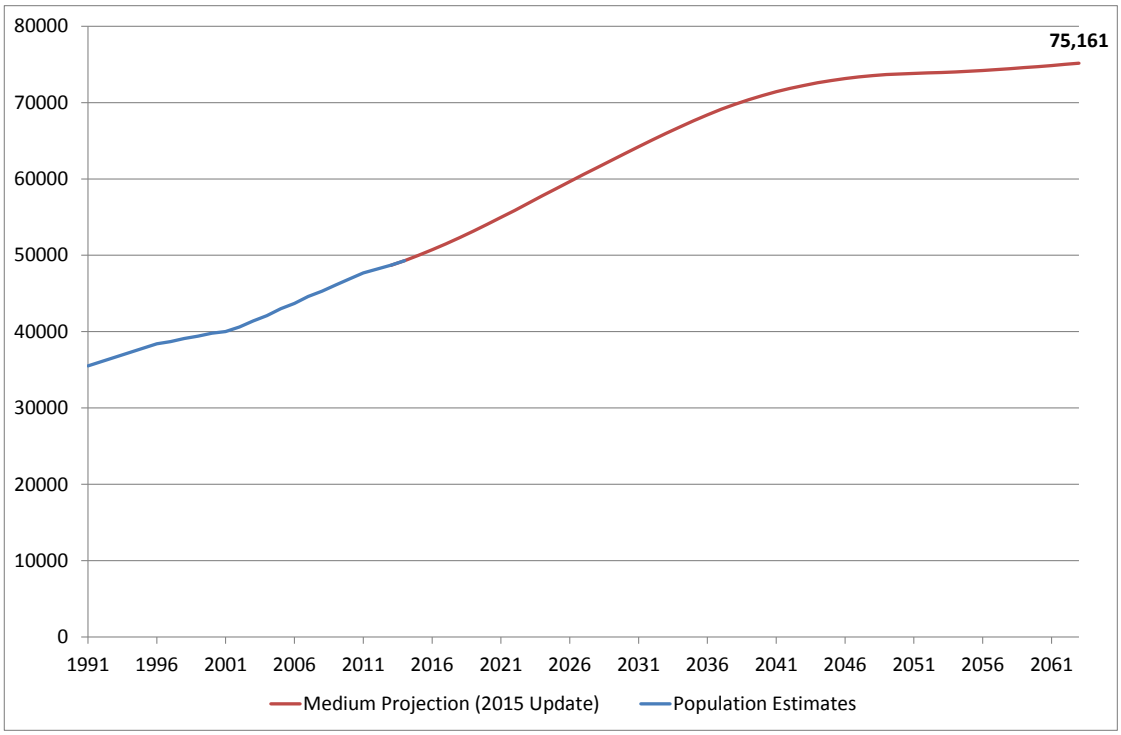

Figure 19: Population projections for Waipa District, 2013-2063

5.2.4.7 Population Projections for Otorohanga District

Figure 20 presents the final population projections for Otorohanga District to 2063, along with historical population estimates from Statistics New Zealand back to 1991.
The 2015 updated projection increases from 9,610 in 2013 to a peak of 10,233 in 2035 before declining to 8,475 in 2063.

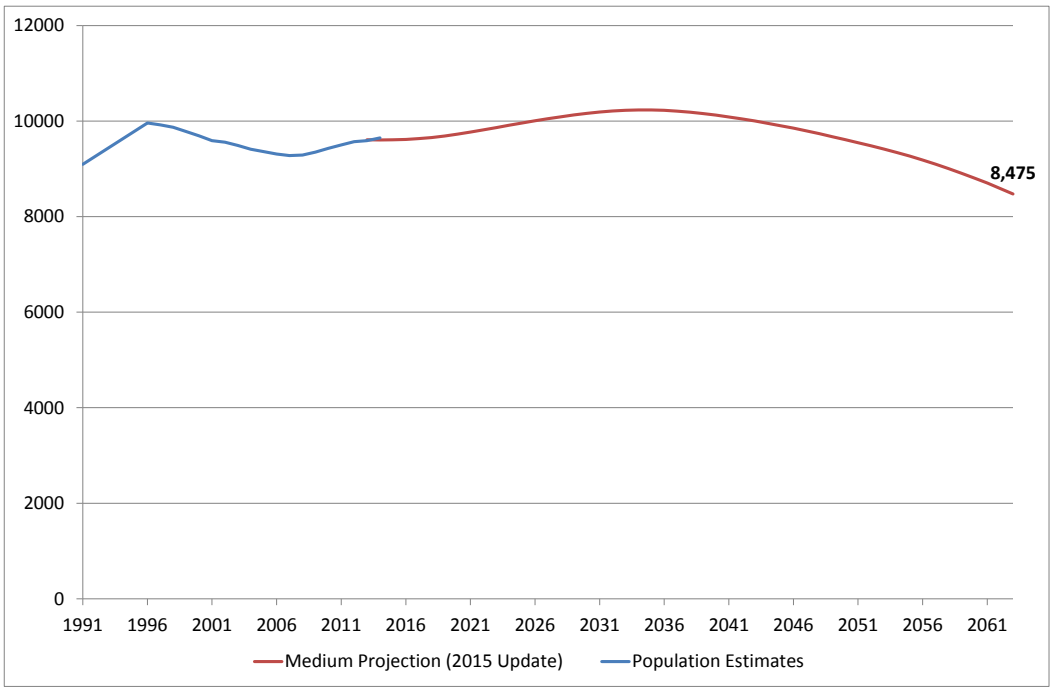

Figure 20: Population projections for Otorohanga District, 2013-2063

5.2.4.8 Population Projections for South Waikato District

Figure 21 presents the final population projections for South Waikato District to 2063, along with historical population estimates from Statistics New Zealand back to 1991. The 2015 updated projection decreases from 23,190 in 2013 to 17,318 in 2063. The substantially higher 2015-update projection reflects a higher base population and net migration, as well as slightly higher life expectancy and fertility.

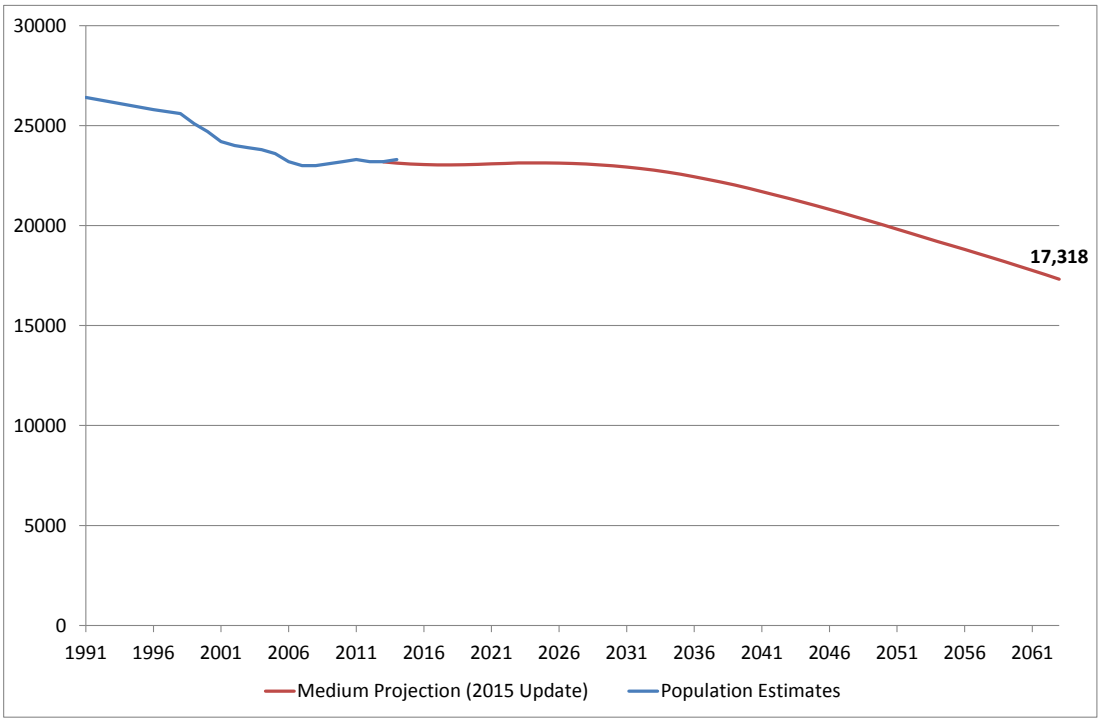

Figure 21: Population projections for South Waikato District, 2013-2063

5.2.4.9 Population Projections for Waitomo District

Figure 22 presents the final population projections for Waitomo District to 2063, along with historical population estimates from Statistics New Zealand back to 1991. The 2015 updated projection decreases from 9,295 in 2013 to 6,090 in 2063.

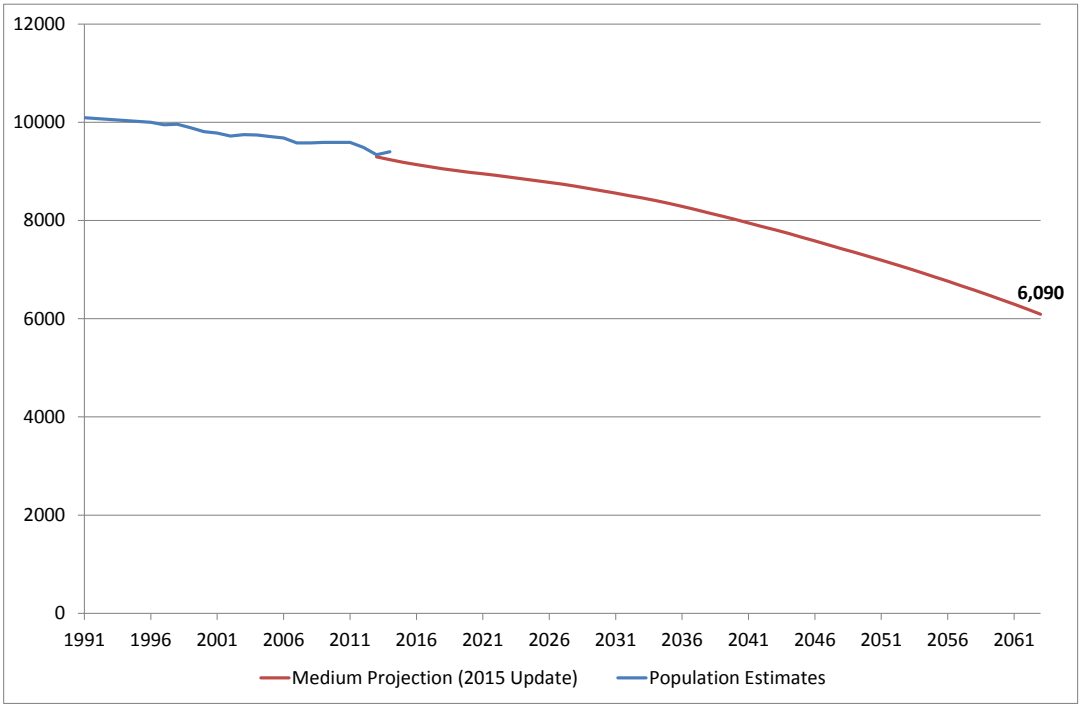

Figure 22: Population projections for Waitomo District, 2013-2063

5.2.4.10 Population Projections for Taupo District

Figure 23 presents the final population projections for Taupo District to 2063, along with historical population estimates from Statistics New Zealand back to 1991.
The 2015 updated projection increases from 34,585 in 2013 to a peak of 39,148 in 2040 before declining to 35,569 in 2063.

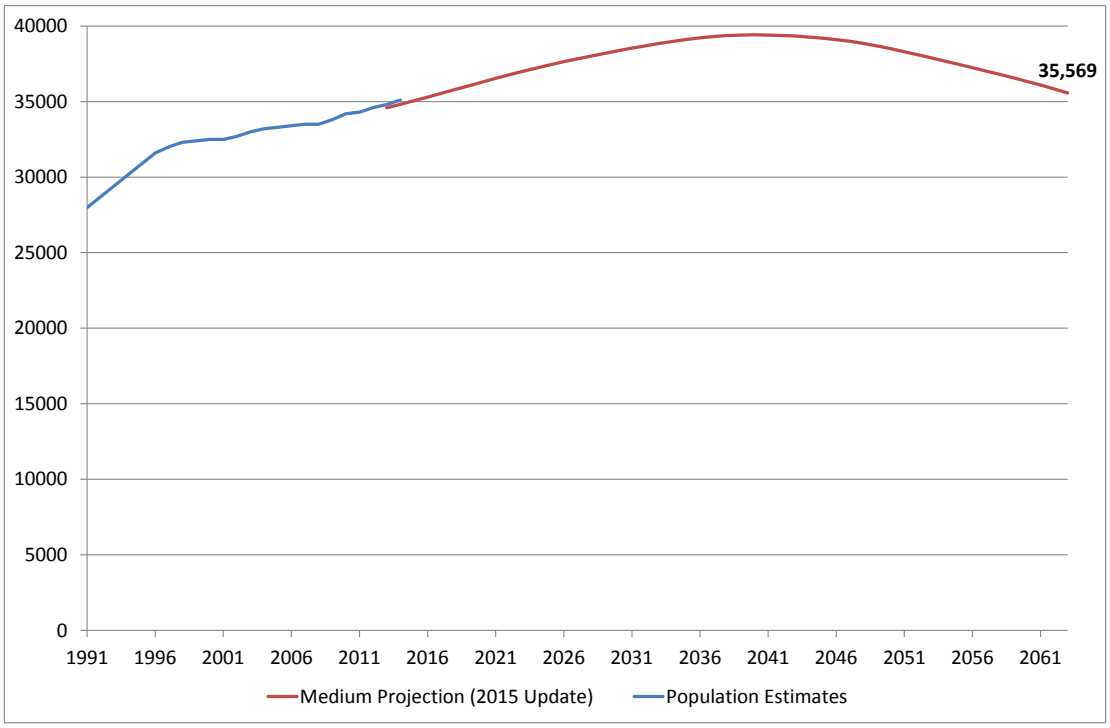

Figure 23: Population projections for Taupo District, 2013-2063

5.2.4.11 Population Projections for part-Rotorua District

Figure 11 presents the NIDEA 2015 update projection for part-Rotorua District to 2063.
The 2015 updated projection increases from 3,820 in 2013 to a peak of 4,009 in 2033 before declining to 3,087 in 2063.

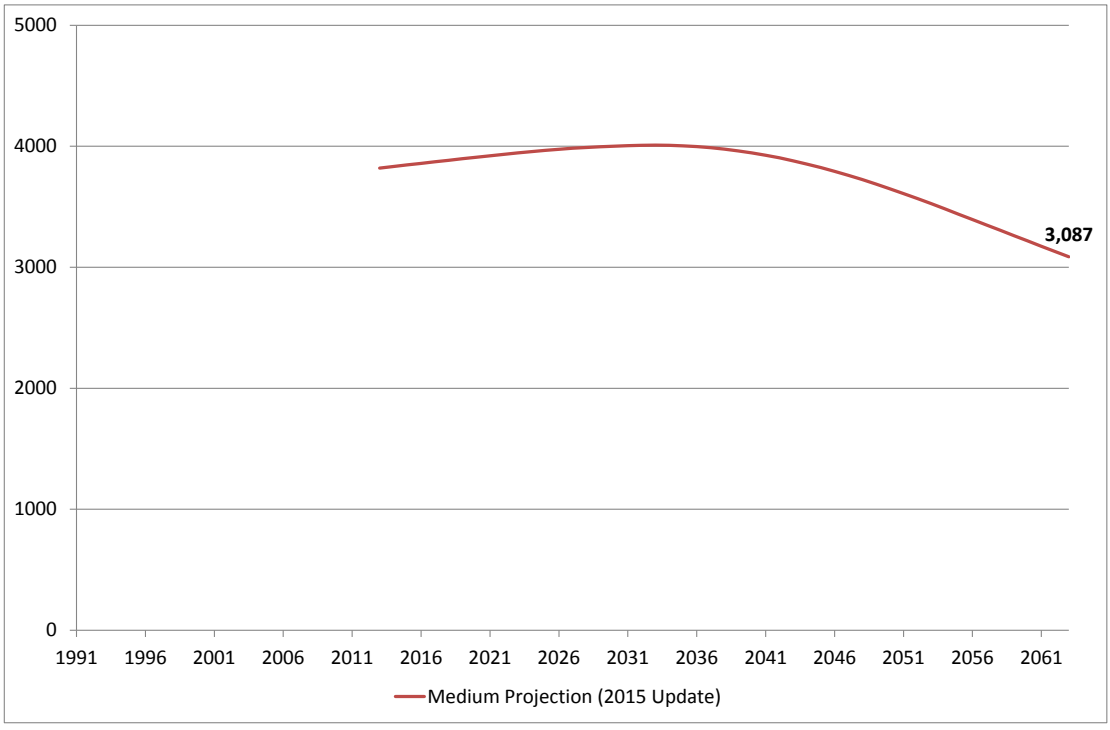

Figure 24: Population projections for part-Rotorua District, 2013-2063

5.2.5 Population ageing

Ageing is already happening in the Waikato region (and in New Zealand and many other developed countries). The over 65 year old population is set to increase from 61,585 in 2013 to 222,640 in 2063 and the number of economically active people aged 15 to 64 years old from 270,640 to 305,590. This will change the ratio of active workers per retiree from 4.4 in 2013 to 1.4 by 2063, a dramatic change (Figure 25).

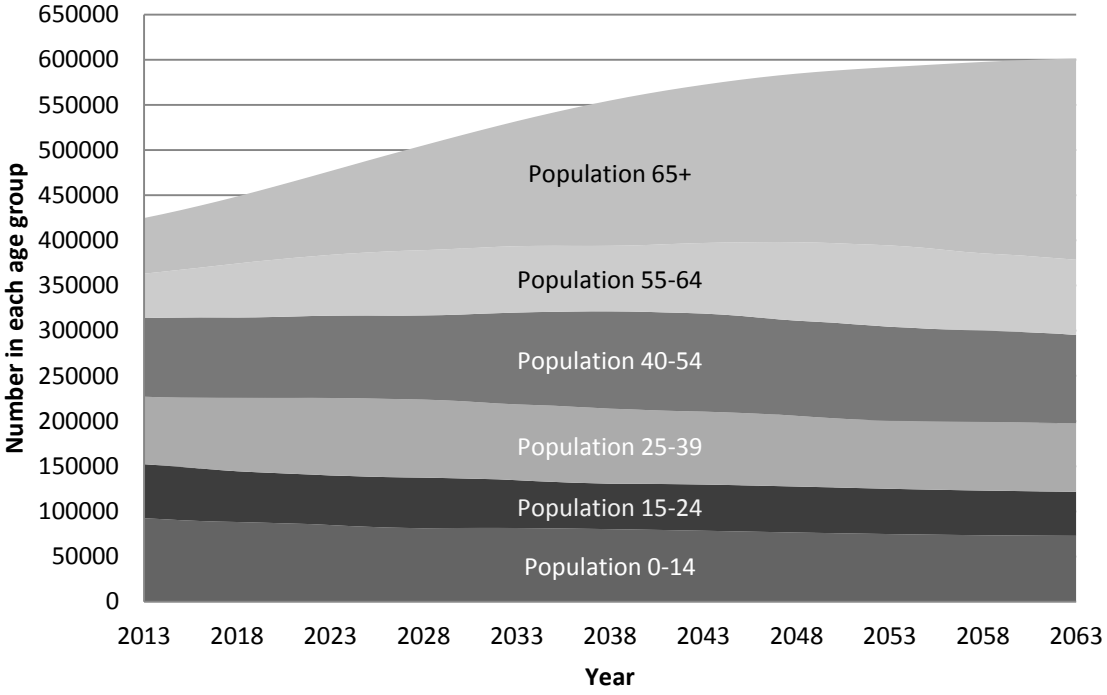

Figure 25: Projected regional population changes by age group (2013 to 2063).

Table 2 provides a comparison of projected populations in the Waikato region and its territorial authorities between the NIDEA projections (this report) and Statistics New Zealand's projections.

Table 3 summarises the baseline (2013) and projected future population, household and labour force numbers for the Waikato region and its territorial authorities.

Second, land use was projected using the WISE model. The WISE model is a systems-based integrated model that incorporates economic, demographic, and environmental components across the entire Waikato region (Rutledge *et al*., 2008; 2010). The WISE model begins with a base land use map (which as described in section 3 has been updated to 2013), incorporating 24 different land uses, including three different residential land use classes (medium-high density, low density, and lifestyle blocks) (Rutledge et al., 2010). At each (annual) time step, the economic and demographic models generate demands for economic and residential land use, which are inputs into a dynamic, spatially explicit land use change model (Huser et al., 2008; van Delden et al., 2008). The demographic input into the WISE model is the set of medium baseline territorial authority-level population projections for the Waikato region developed in the first step.

Table 2: Territorial Authority Population projections for the Waikato Region, 2013-2063

	2013		2028		2043		2063[1]
	NIDEA	SNZ	NIDEA	SNZ	NIDEA	SNZ	NIDEA
Thames-Coromandel	27,340	27,300	29,108	27,700	28,514	26,200	22,197
Hauraki	18,620	18,600	19,413	18,600	19,007	17,000	15,520
Waikato District	66,530	66,500	84,271	80,700	101,980	92,100	116,370
Matamata-Piako	32,910	32,900	36,087	34,900	38,314	34,500	38,978
Hamilton City	*150,180*	*150,200*	*190,998*	*184,400*	*229,794*	*212,900*	*262,493*
Waipa	48,660	48,700	61,488	56,000	72,241	60,400	75,161
Otorohanga	9,610	9,590	10,090	9,520	10,003	8,600	8,475
South Waikato	23,190	23,200	23,076	22,500	21,353	19,750	17,318
Waitomo	9,295	9,340	8,696	8,700	7,809	7,310	6,090
Taupo	34,585	34,800	38,010	36,200	39,335	35,300	35,569
Rotorua (part)	3,820	-	3,990	-	3,880	-	3,087
Waikato region	424,740	424,600	505,228	482,800	572,231	517,400	601,259

[1] SNZ projections only available up to 2043.

The land use change model is a 'Cellular Automata' (CA) model specified as one-hectare grid cells (100m x 100m). The CA model apportions land to different uses at each time step based on a combination of four factors (RIKS, http://www.riks.nl/products/Geonamica): (1) zoning (which constrains which land uses are available in which areas); (2) suitability (the biophysical suitability of land for different uses); (3) accessibility (assesses the attractiveness of a location for different land uses based on the proximity to desirable or undesirable features, transport network); and (4) local influence (assesses the attractiveness of a location for a land use based on the composition of land use in the surrounding neighbourhood). The CA land use model attempts to meet the external demands for land (from the economic and demographic models) by assigning cells with the highest transition potentials (determined by their zoning, suitability, accessibility and local influence) to new land uses. Transitions are made at each (annual) time step.

The demand for residential land of each type is determined by first assigning a given proportion of population in each territorial authority to each residential land use type, and a proportion to all non-residential land uses. The proportions are generally stable but vary over time for some territorial authorities, as shown in Table 4 for the years 2013 and 2040. Second, the number of residential land use cells of each type required is determined by combining the population in each residential land use calculated in the first step with population density values for each residential land use type. These population densities also vary over time, between pre-determined maximum and minimum values (see Table 5).

Table 3: Baseline and projected future population, households and labour force for the Waikato.

	Population				Households				Labour Force			
Area	**2013**	**2028**	**2043**	**2063**	**2013**	**2028**	**2043**	**2063**	**2013**	**2028**	**2043**	**2063**
Thames-Coromandel	27,340	29,108	28,514	22,197	11,529	14,099	14,672	11,816	13,305	15,798	14,930	10,421
Hauraki	18,620	19,413	19,007	15,520	7,378	9,029	9,648	8,322	8,974	10,721	10,401	7,826
Waikato	66,530	84,271	101,980	116,370	22,090	32,065	40,619	47,916	35,453	50,296	60,797	69,277
Matamata-Piako	32,910	36,087	38,314	38,978	12,284	14,574	15,980	16,465	17,303	20,780	21,910	22,332
Hamilton City	150,180	190,998	229,794	262,493	50,521	72,491	93,741	111,427	79,632	110,937	133,827	145,864
Waipa	48,660	61,488	72,241	75,161	17,572	25,656	32,232	34,482	26,599	36,963	41,948	43,141
Otorohanga	9,610	10,090	10,003	8,475	3,312	4,055	4,379	4,012	5,176	6,559	6,892	5,862
South Waikato	23,190	23,076	21,353	17,318	8,407	9,533	9,523	8,117	11,138	12,546	11,832	9,272
Waitomo	9,295	8,696	7,809	6,090	3,369	3,573	3,459	2,852	4,969	5,464	5,198	4,042
Taupo	34,585	38,010	39,335	35,569	12,913	16,015	17,617	16,494	18,423	22,312	22,596	19,778
Rotorua (part)	3,820	3,990	3,880	3,087	1,420	1,839	1,951	1,616	2,083	2,443	2,288	1,749
Waikato region	**424,740**	**505,228**	**572,231**	**601,259**	**150,795**	**202,929**	**303,821**	**263,519**	**225,068**	**294,819**	**332,619**	**339,564**

Table 4: Population proportions by land use type, 2013 and 2051

Territorial authority	Residential - Lifestyle Blocks	Residential - Low Density	Residential - Medium-High Density	Non-residential
2006				
Thames-Coromandel	0.0886	0.7071	0.0362	0.1681
Hauraki	0.1855	0.6538	0.0097	0.1510
Waikato	0.4471	0.3916	0.0084	0.1530
Matamata-Piako	0.1389	0.7079	0.0183	0.1349
Hamilton City	0.0119	0.8803	0.0679	0.0399
Waipa	0.2272	0.6355	0.0417	0.0955
Otorohanga	0.3120	0.4623	0.0228	0.2029
South Waikato	0.0954	0.8244	0.0086	0.0716
Waitomo	0.1644	0.5594	0.0000	0.2762
Taupo	0.0907	0.7641	0.0477	0.0975
Part-Rotorua	0.5490	0.1037	0.0000	0.3473
2051				
Thames-Coromandel	0.0845	0.7112	0.0362	0.1681
Hauraki	0.1793	0.6600	0.0097	0.1510
Waikato	0.3322	0.5064	0.0084	0.1530
Matamata-Piako	0.1255	0.7213	0.0183	0.1349
Hamilton City	0.0037	0.7488	0.2076	0.0399
Waipa	0.1755	0.6872	0.0417	0.0955
Otorohanga	0.2993	0.4751	0.0228	0.2029
South Waikato	0.0954	0.8244	0.0086	0.0716
Waitomo	0.1644	0.5594	0.0000	0.2762
Taupo	0.0832	0.7716	0.0477	0.0975
Part-Rotorua	0.5314	0.1213	0.0000	0.3473

The CAU-level populations were then projected in two parts: (1) the population located in residential land uses; and (2) the population located in non-residential land uses. The area of each land use type (in hectares) and the residential population densities (by residential land use type) were exported from the WISE model for 2013, 2021, 2031, 2041, and 2051. The number of hectares of each residential land use type and the residential population densities were used to calculate the residential population (i.e. the population located in residential land uses) for each year.

Table 5: Population densities (people per hectare) by land use type, 2013 and 2051

Territorial authority	Residential - Lifestyle Blocks	Residential - Low Density	Residential - Medium-High Density
2013			
Thames-Coromandel	1.10	11.20	30.00
Hauraki	1.60	18.70	60.00
Waikato	2.10	25.00	111.30
Matamata-Piako	2.20	27.70	75.40
Hamilton City	2.50	32.70	107.30
Waipa	2.20	24.90	70.00
Otorohanga	2.20	22.90	73.10
South Waikato	1.90	24.70	100.00
Waitomo	1.80	19.40	0.00
Taupo	0.80	16.80	55.00
Part-Rotorua	2.80	28.30	N/A
2051			
Thames-Coromandel	1.03	10.46	28.29
Hauraki	1.50	17.53	57.44
Waikato	2.10	25.00	113.19
Matamata-Piako	2.20	27.70	78.37
Hamilton City	2.50	38.14	131.62
Waipa	2.20	24.90	70.03
Otorohanga	2.10	21.81	72.64
South Waikato	1.71	22.18	85.51
Waitomo	1.53	17.27	0.00
Taupo	0.78	16.47	53.79
Part-Rotorua	2.61	25.77	N/A

To estimate the non-residential population (i.e. the population located in non-residential land uses), linear regression models were used. The 2013 data were used to construct an initial regression model that estimates the population associated with each hectare of each non-residential land use type (represented by each model parameter). The dependent variable was the population of each CAU after subtracting the population located in residential land uses. Eleven land uses were initially excluded from the models (bare surfaces, indigenous vegetation, other exotic vegetation, wetlands, fresh water, marine, aquaculture, utilities, mines and quarries, urban parks, and airports), because they were unlikely to contain much population. The three residential land uses were also excluded from the models, as the population in those land uses was already accounted for. That leaves ten land use variables in the model. Separate regression models were fitted for Waikato District, Hamilton City, and Waipa District, with a fourth combined model fitted for the remaining territorial authorities. The fourth model initially included territorial authority-level fixed effects to account for unobserved differences in population density profile between each territorial authority. Each model was reduced to a final preferred model by removing the least significant variable in a stepwise fashion until the root mean squared error (RMSE) was minimised.

This approach was validated and an evaluation based on 2006-2013 data was reported in Cameron and Cochrane (2014b; 2015b; 2015c) and will be reported on in detail in a forthcoming working paper. This validation involved a comparison with a naïve projection, and four alternative regression-based models for projecting the non-residential population. To summarise though, the root mean squared error (RMSE) and other measures of forecast accuracy do not differ substantially between in-sample and out-of-sample predictions. Thus we conclude that the models perform reasonably well in estimating population using land use data. However, because the 2006-base evaluation and the current projections are derived from different base land use maps, the models employed in the projections here differ from those used in the earlier projections. The final (2013-base) model results are presented in Table 6, with standard errors in parentheses below each coefficient estimate.

The regression models do a good job of predicting in-sample, with adjusted coefficients of determination (adjusted R^2) of between 0.316 (Hamilton City) and 0.789 (Waipa District), and RMSE of between 171 (Waipa District) and 538 (Rest of Waikato). These RMSE values are unambiguously lower than those estimated in the previous CAU-level projections model (Cameron and Cochrane, 2014b), which probably reflects the improvements in the base map for the land use model. However, the coefficients of determination for the Waikato District and Hamilton City models were smaller than in the previous projections. Ideally, the coefficient values would loosely be interpreted as the number of people (on average) residing in that land use class. However, this interpretation is problematic because the models may be subject to a high degree of multicollinearity. In part, this multicollinearity is driven by the nature of the land use change model, particularly because of the local influence parameters, wherein some land uses co-locate while others are kept apart. Multicollinearity doesn't create problems for the predictions from these models, as coefficients from models exhibiting multicollinearity are unbiased, but inefficient (Angrist and Pischke, 2008).

The regression models, along with the population densities and residential land use from the WISE model, provide a way of statistically downscaling the population of each territorial authority into the component CAUs. This was achieved by using the 2013-base regression model parameters (the estimated number of people per hectare of a given land use), and the estimates of future land use and residential population density to estimate the population in each of five future years (2021, 2031, 2041, 2051, and 2061).

First, the residential population was estimated using the residential population densities and the projected residential land in each year from WISE. Second, the non-residential population was estimated using the regression models in Table 3 and the projected non-residential land in each year from WISE. When added together, this provides an un-scaled population projection for each CAU. However, two issues arose with these un-scaled projections: (1) the projections demonstrated significant discontinuity with the known population trend between 2006 and 2013 for a number of CAUs; and (2) a number of CAUs were projected to quickly fall to zero population. To reduce the impact of the discontinuities, the in-sample residual was calculated for each CAU in 2013 (being the difference between the actual 2013 population and the estimated population using the regression model). This in-sample residual was added to the projected CAU populations. To reduce the impact of projected de-population of (particularly rural) CAUs, each un-scaled CAU population projection was constrained so that population would not fall by more than 25 percent over any ten-year period. This maximum constraint is similar to the maximum long-run population decline observed in any CAU over the period 2006-2013. Moreover, this adjustment is justifiable as the spatial distribution of population is subject to a substantial degree of inertia – once houses have been constructed in a given location, some population is likely to remain in that location for a long time. That is, population decline at small spatial scales is a relatively slow process, unlike that projected in the initial models.

Table 6: Regression results

Variable	Model			
	Waikato District	**Hamilton City**	**Waipa District**	**Rest of Waikato**
FE - Thames-Coromandel	-	-	-	958.7*** (215.8)
FE – Hauraki	-	-	-	387.1* (224.0)
FE – Waitomo	-	-	-	382.9* (228.3)
FE – Taupo	-	-	-	328.8** (143.0)
Commercial	15.52 (13.75)	-	-	-
Community Services	15.19 (9.22)	23.49*** (5.01)	-	9.058 (6.188)
Horticulture	-	66.26 (50.26)	-	-7.749*** (2.080)
Vegetable Crops	-	-	-	-
Other Crops	-1.153 (0.956)	-	0.988 (0.842)	-
Dairy Farming	0.071*** (0.015)	-	0.040*** (0.014)	0.058*** (0.008)
Sheep/Beef Farming	0.015 (0.013)	-3.718** (1.705)	0.059*** (0.018)	-
Other Agriculture	1.297 (0.940)	135.6 (110.0)	-	1.103* (0.614)
Forestry	-0.117 (0.077)	-	-	-
Manufacturing	-	-	-4.514 (3.353)	3.856** (1.904)
N	31	46	29	91
Adjusted R^2	0.504	0.316	0.789	0.515
Root Mean Squared Error	415	415	171	538

* p<0.1; ** p<0.05; *** p<0.01.

Then the combined population of all CAUs in each territorial authority was compared with the projected population of the territorial authority from the cohort component model. Discrepancies between the CAU-based population total and the territorial authority-level projection were eliminated by scaling (up or down) the population in each CAU until the two totals matched. This resulted in CAU-level population projections for each year, where the sum of the CAUs in each territorial authority matches the projected territorial authority-level population.

Several methods were considered for the development of CAU-level household projections, in an extension of the earlier work by Cameron and Cochrane (2014b). Applying similar regression-based models to those described above, using land use

and CAU-level population as predictors, did a poor job of modelling the number of households in each CAU, leading to a number of unresolvable and unsatisfactory discontinuities in the data. Instead, we applied two alternative methods to derive household projections directly from the CAU-level population projections. The first method was to apply a constant territorial authority-level ratio of households to population, derived from the corresponding territorial authority-level population and household projections. This method was applied in the earlier CAU-level projections (Cameron and Cochrane, 2014b), and ensures that the CAU-level household projections automatically sum to the corresponding territorial authority-level household projections for each territorial authority. However, this method suffers from an assumption that average household size is invariant across each territorial authority. That assumption is unlikely to hold true, especially considering differences in household size between urban and rural areas, and between new urban developments that are predominantly comprised of dwellings for families and infill areas that have substantial numbers of apartments and studio units.

The second (and preferred) method for deriving CAU-level household projections was to apply CAU-specific ratios of households to population. For this purpose we used the ratio of households to population for 2013, and held the ratio constant for each subsequent projection. This leads to CAU-level household projections that sum to more than the corresponding territorial authority-level projections (because of declining average household size over time), so we scale the resulting CAU-level projections to match the territorial authority-level total households in each year. In this report, we show only the household projections derived using this method.[4]

Labour force projections were developed from the population projections in each Census Area Unit by applying a constant territorial authority-level ratio of labour force to population derived from the corresponding territorial authority-level projection. The accuracy of labour force projections at the CAU level is not as critical as for population or household projections, so applying the simplest method to derive these projections is appropriate. It is important to note that the labour force projections relate to the location of *residence* of the labour force, not the location of employment.

5.3 Population Projections at the Census Area Unit Level for the Waikato Region

This section presents the population projections for each CAU in the Waikato region. The results are presented as a series of thematic maps that illustrate the degree of population increase or decrease in each CAU over the preceding period (2013-2021, 2021-2031, 2031-2041, 2041-2051, and 2051-2061). The population projections that were used to derive the data for these maps are available in Appendix 1, with associated household projections and labour force projections. As noted in Cameron and Cochrane (2014a; 2015a), these projections should be viewed as one possible future, based on known assumptions about future fertility, mortality and net migration, and should not be interpreted as forecasts of the future population distribution. However, the projection assumptions are based on a continuation of previous population trends that can reasonably be expected to continue into the future.

Figure 26 presents a map of historic population growth rates over the period 2006-2013, based on CAU-level population estimates in June 2006 and June 2013. Darker areas represent higher rates of population growth, and it is clear that substantial growth occurs across the entire region, but especially in Waikato District and Hamilton City. The CAUs that experienced the largest absolute increases in population over this seven-year period included Huntington (+4,370), Horsham Downs (+2,470), and Sylvester (+2,020), all in the north of Hamilton City, and Swayne (+1,290), to the north of Cambridge. The CAUs that experienced the largest absolute decreases in population included Strathmore (-290) in Tokoroa, Mangakino (-270) in South Waikato

[4] Household projections derived using the first method are available on request from the authors.

District, and Waihou-Walton (-260) in northern Matamata-Piako District. In relative terms, Sylvester (+43.0% annualised population growth), Swayne (+30.3%), Huntington (+11.2%), and Maunganamu (+10.8%) southeast of Taupo township experienced the largest gains, while Rangipo (-12.3%) in southern Taupo District, Mangakino (-4.1%), Kerepehi (-2.3%) in Hauraki District, and Mahoenui (-2.2%) in rural Waitomo District experienced the largest declines.

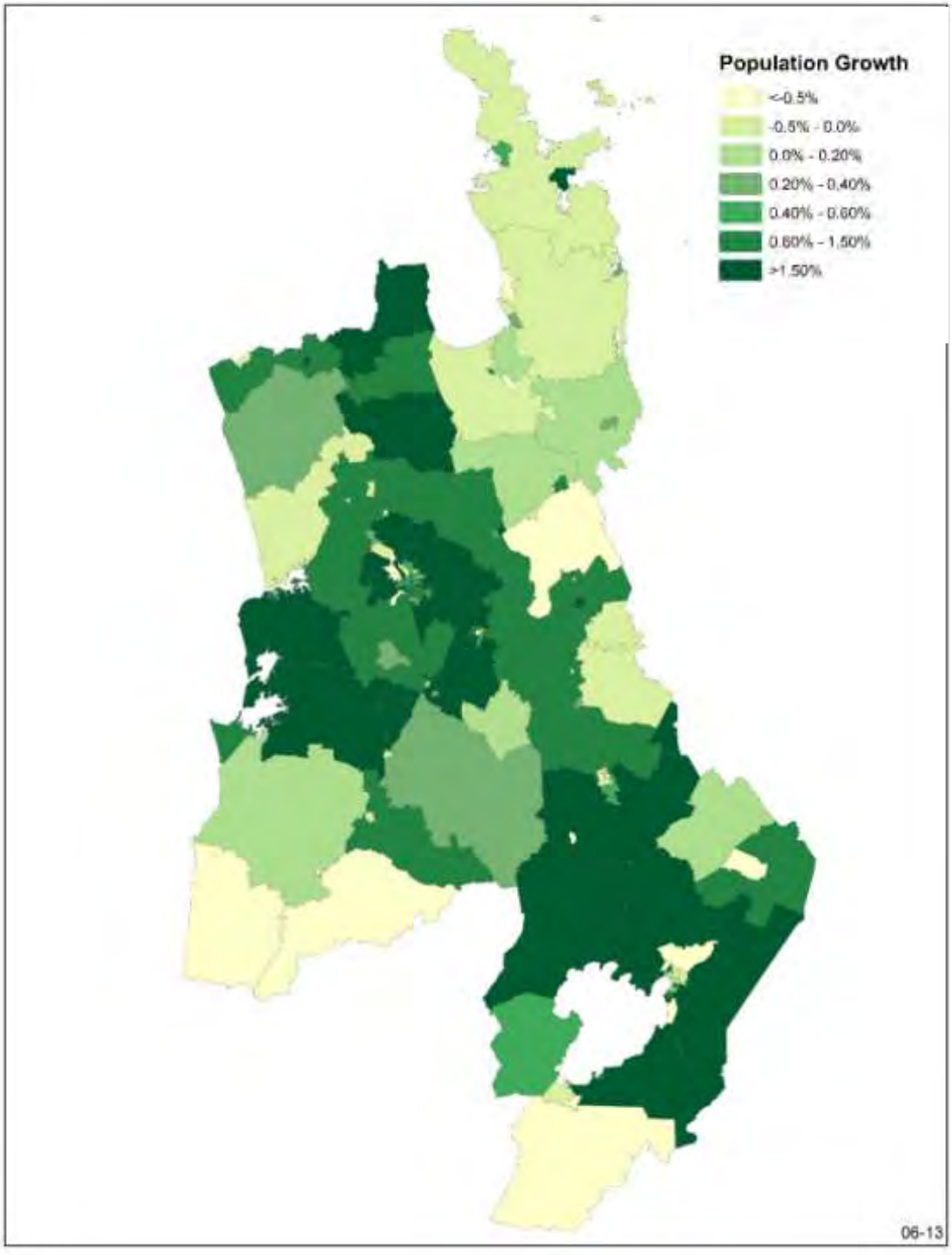

Figure 26: Annualised population growth rates, 2006-2013

Figure 27 presents a map of the projected population growth rates over the period 2013-2021, based on the WISE land use output and results of the 2013-based regression model. Over this period, many rural areas experience population decline, while population growth remains concentrated in Hamilton City, Waikato District, and Waipa District. The CAUs that are projected to experience the largest absolute increases in population over this eight-year period include Sylvester (+3,840), Horsham

Downs (+2,996), Pokeno (+1,951) in northern Waikato District, Peacocke (+1,604) to the south of Hamilton City, Huntington (+1,493), and Raglan (+1,130) on the west coast in Waikato District. The CAUs that are projected to experience the largest absolute decreases in population include Claudelands (-309) in Hamilton City, Marokopa (-229) in rural Waitomo District, Hinuera (-183) in Matamata-Piako District, and Frankton Junction (-119) in Hamilton City. In relative terms, Rotokauri (+25.6% annualised population growth), Newstead (+19.9%), Peacocke (+18.4%) and Sylvester (+13.5%), all on the outskirts of Hamilton City are projected to experience the largest gains, while Taharoa (-3.7%) in rural Waitomo District, Hinuera (-2.6%) in Matamata-Piako District, Marokopa (-1.9%), and Mahoenui (-1.9%), both in Waitomo District, are projected to experience the largest declines.

In terms of households (not shown in the figure), the same CAUs are projected to experience the largest absolute increase (though Huntington is projected to increase faster than Peacocke), and the same three CAUs are projected to experience the largest absolute decline (though Hinuera is projected to decline faster than Marokopa), while Frankton Junction is projected to experience an increase in households (despite declining total population). In relative terms, the rankings by projected changes in the number of households are very similar to those for population, and identical for those CAUs at the top and bottom of the rankings.

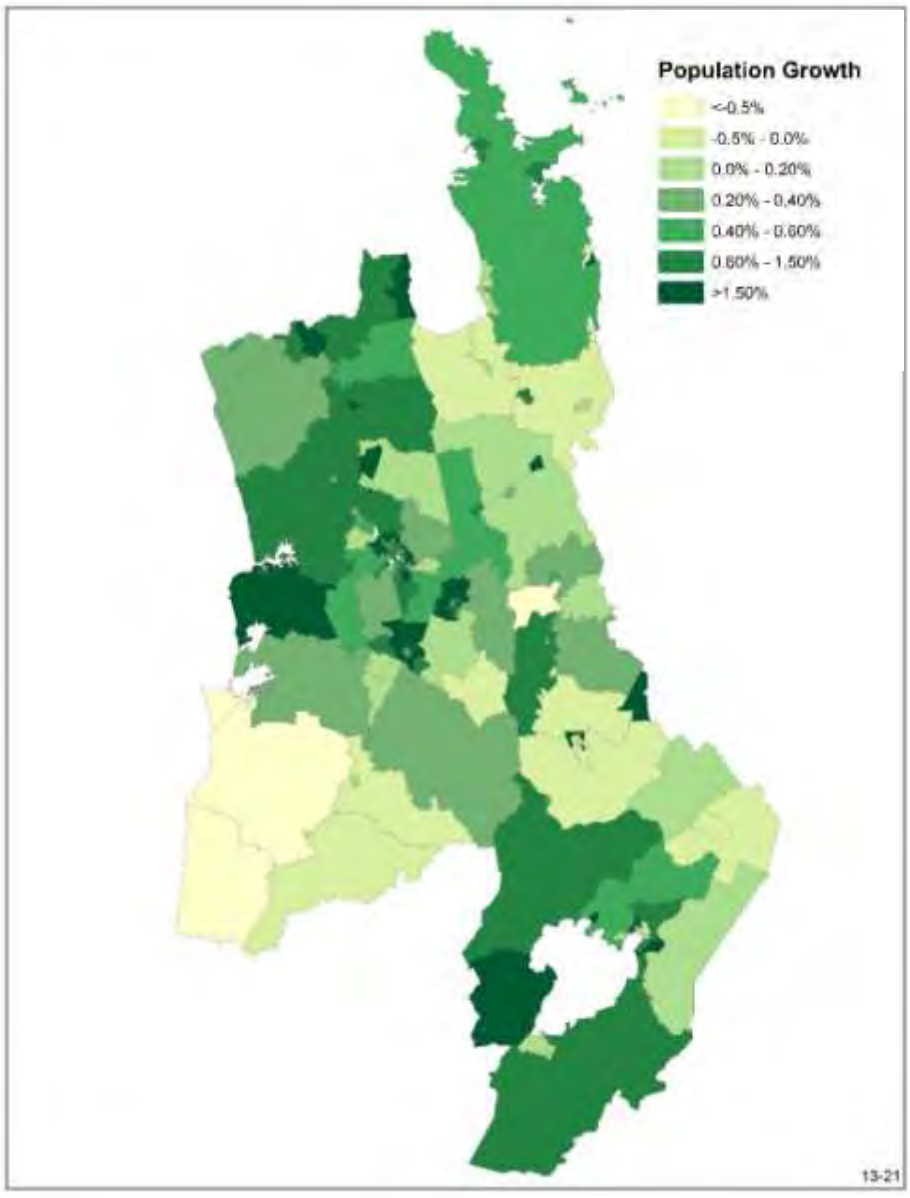

Figure 27: Annualised population growth rates, 2013-2021

Figure 28 presents a map of the projected population growth rates over the period 2021-2031, based on the WISE land use output and results of the 2013-based regression model. The map demonstrates a return to more consistent population growth across the Waikato CAUs, but especially in Waikato District, Hamilton City and Waipa District. The CAUs that are projected to experience the largest absolute increases in population over this eight-year period include Peacocke (+6,450), Pokeno (+4,702), Hautapu (+4,105) north of Cambridge, Newstead (+4,001), and Rotokauri (+2,298). The CAUs that are projected to experience the largest absolute decreases in population include Hinuera (-187), Te Kuiti (-183), and Hauraki Plains CAU (-82). In relative terms, Newstead (+17.7% annualised population growth), Peacocke (+14.8%), Burbush (+13.1%) in northwest Hamilton City, and Rotokauri (+11.8%) are projected to experience the largest gains, while Hinuera (-2.8%), Taharoa (-2.1%), Te Rapa North (-1.8%) in Hamilton City, and Piopio (-0.8%) in Waitomo District are projected to experience the largest declines.

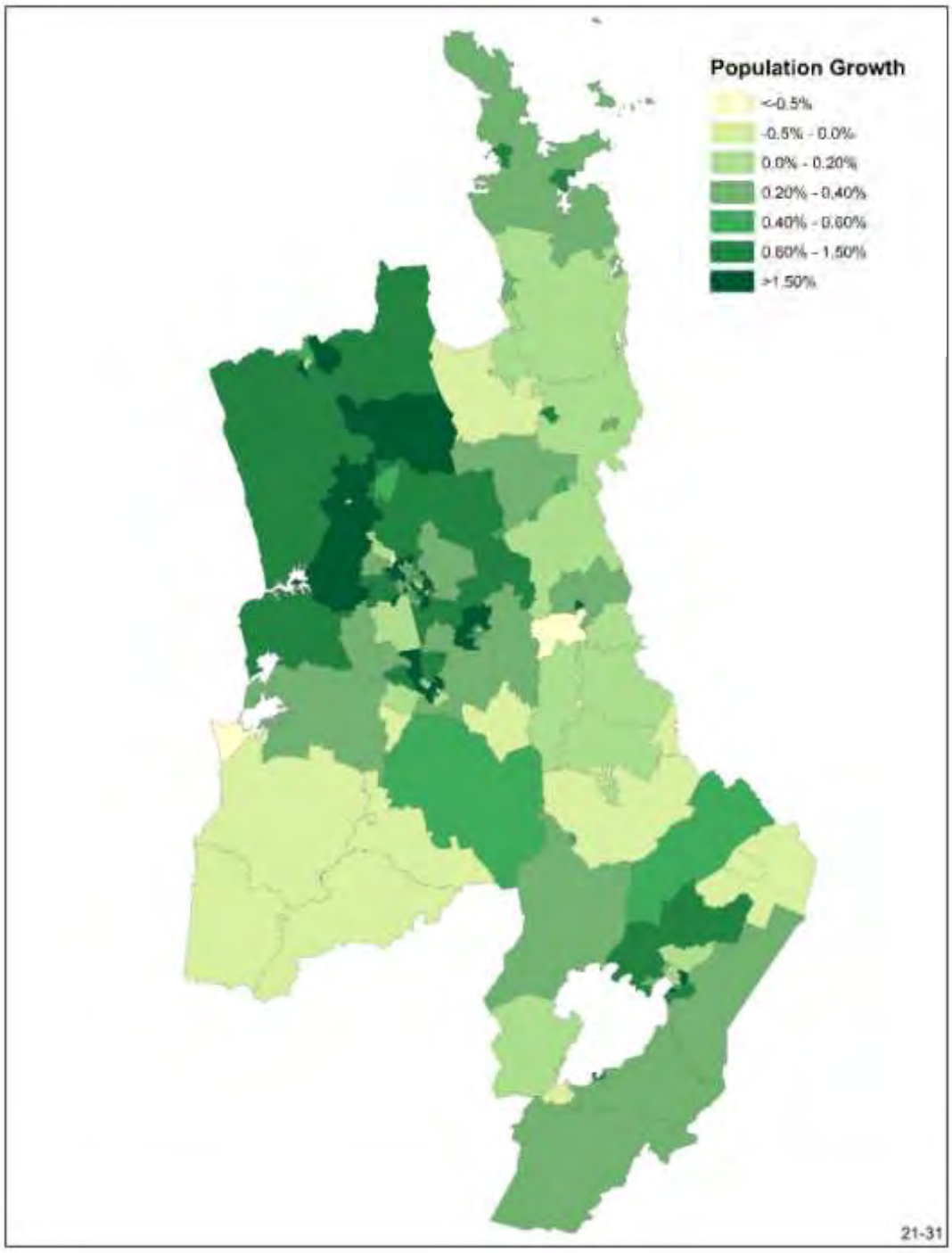

Figure 28: Annualised population growth rates, 2021-2031

In terms of households (not shown in the figure), the same CAUs are projected to experience the largest absolute increase, while Hinuera, Taharoa, Te Rapa North, and Piopio are the only CAUs projected to experience an absolute decline in the number of households. In relative terms, the rankings by projected changes in the number of households are very similar to those for population, and identical for those CAUs at the top and bottom of the rankings.

Figure 29 presents a map of the projected population growth rates over the period 2031-2041, based on the WISE land use output and results of the 2013-based regression model. Population growth remains concentrated in Hamilton City, Waikato District, and Waipa District, with population decline becoming more apparent in many peripheral CAUs. The CAUs that are projected to experience the largest absolute increases in population over this eight-year period include Rotokauri (+4,907), Peacocke (+3,756), Newstead (+3,570), Pukerimu (+2,936) to the west of Cambridge,

and Waikato Western Hills (+2,926) in Waikato District. The CAUs that are projected to experience the largest absolute decreases in population include Te Kuiti (-311), Putaruru (-209), Arapuni (-185), and Aotea (-161), the latter three all in South Waikato District, and Hikuai (-159) in Thames-Coromandel District. In relative terms, Pukerimu (+9.6% annualised population growth), Rotokauri (+9.3%), Newstead (+5.6%), and Waikato Western Hills (+4.4%) are projected to experience the largest gains, while Taharoa (-3.6%), Hinuera (-2.7 %), Te Rapa North (-1.7%) and Tirau (-1.3%), are projected to experience the largest declines.

In terms of households (not shown in the figure), the same CAUs are projected to experience the largest absolute increase, while Hinuera, Te Kuiti, Arapuni, and Tairua in Thames-Coromandel District are projected to experience the largest absolute decline in the number of households. In relative terms, the rankings by projected changes in the number of households are very similar to those for population, and identical for those CAUs at the top and bottom of the rankings.

Figure 30 presents a map of the projected population growth rates over the period 2041-2051, based on the WISE land use output and results of the 2013-based regression model. Over this decade, population growth is concentrated even more heavily in the north of the region, with many rural areas declining substantially in population. The CAUs that are projected to experience the largest absolute increases in population over this eight-year period include Rotokauri (+3,454), Newstead (+2,676), Peacocke (+2,500), Waikato Western Hills (+2,060), and Temple View (+1,628) in western Hamilton City. The CAUs that are projected to experience the largest absolute decreases in population include Te Rerenga (-684) in Thames-Coromandel District, Te Kuiti (-369), Putaruru (-352), Hikuai (-328), and Turua (-317) in Hauraki District. In relative terms, Temple View (+5.2% annualised population growth), Rotokauri (+3.5%), Mangatawhiri (+3.4%) in northern Waikato District, and Newstead (+2.8%) are projected to experience the largest gains, while Taharoa (-4.0%), Te Rapa North (-2.9%), Hinuera (-2.8%), Turua (-2.7%), and Omori (-2.5%) in southern Taupo District are projected to experience the largest declines.

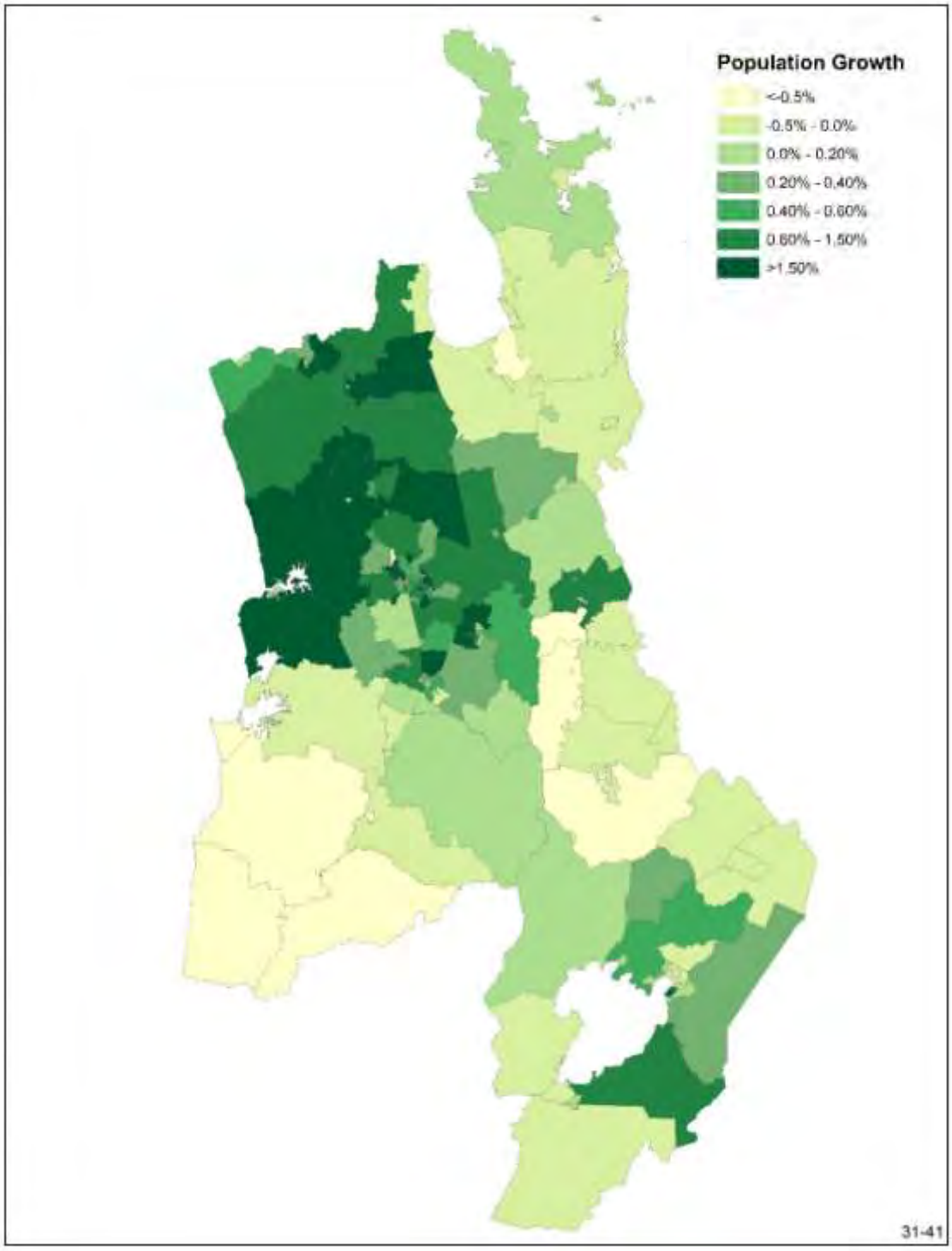

Figure 29: Annualised population growth rates, 2031-2041

In terms of households (not shown in the figure), the same CAUs are projected to experience the largest absolute increase (except that Peacocke is projected to increase faster than Newstead, with the addition of Pokeno ahead of Temple View), while Te Rerenga, Turua, Hikuai, Putaruru, and Pauanui Beach in Thames-Coromandel District are projected to experience the largest absolute decline in the number of households. In relative terms, the rankings by projected changes in the number of households are very similar to those for population, and identical for those CAUs at the top and bottom of the rankings (except for Hinuera declining faster than Te Rapa North in terms of total households).

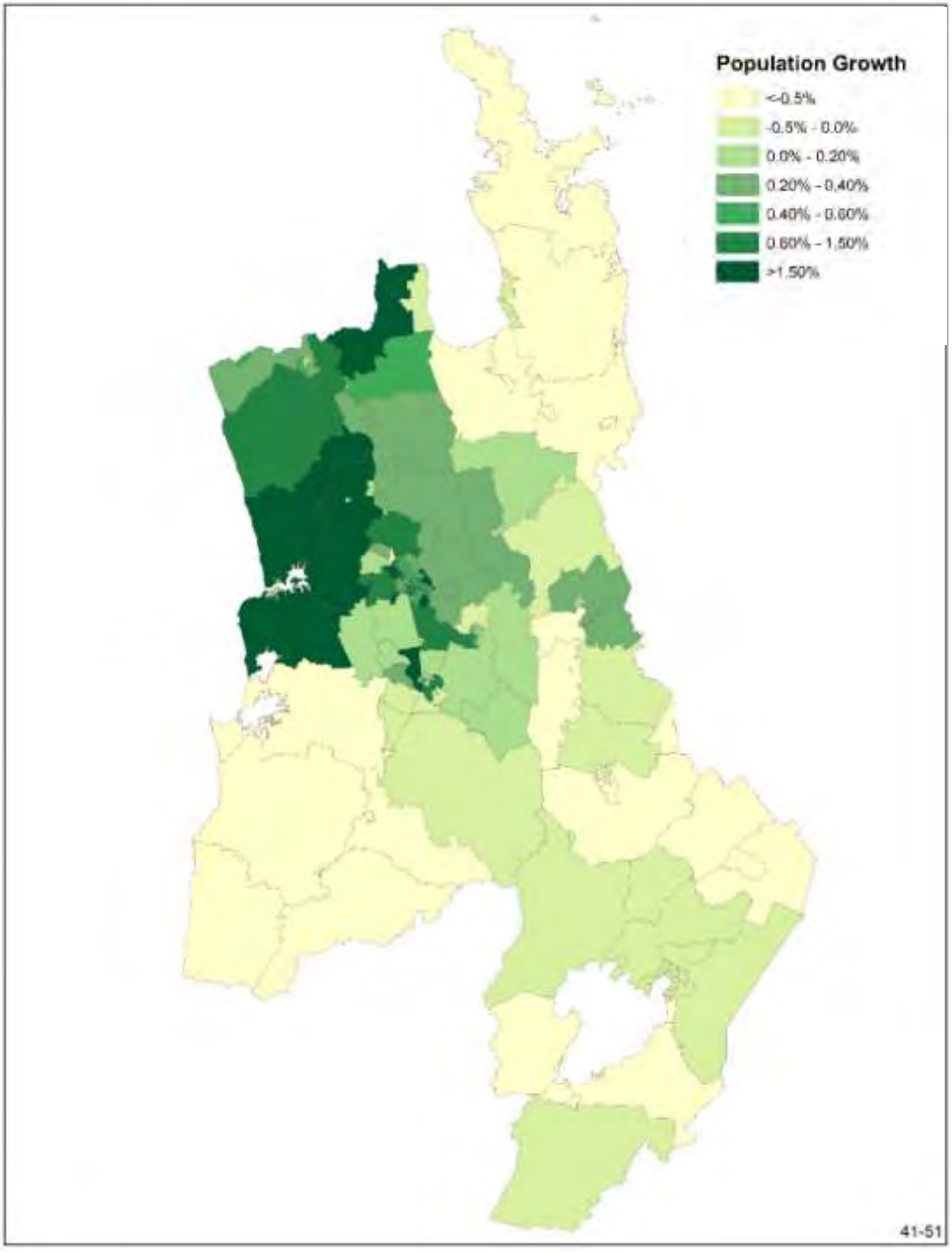

Figure 30: Annualised population growth rates, 2041-2051

Figure 31 presents a map of the projected population growth rates over the period 2051-2061, based on the WISE land use output and results of the 2013-based regression model. Over this decade, population growth is concentrated even more heavily in the north of the region, with many rural areas declining substantially in population. The CAUs that are projected to experience the largest absolute increases in population over this eight-year period include Peacocke (+2,434), Mangatawhiri (+1,801), Waikato Western Hills (+1,505), Te Uku (+876) in western coastal Waikato District, and Newstead (+871). The CAUs that are projected to experience the largest absolute decreases in population include Te Rerenga (-1,034), Te Kuiti (-496), Whitianga (-477), Hikuai (-454), and Whangamata (-448). In relative terms, Mangatawhiri (+4.6% annualised population growth), Te Uku (+1.8%), Temple View (+1.7%), and Kaipaki (+1.6%) on the northern boundary of Hamilton City are projected to experience the largest gains, while Taharoa (-4.5%), Pauanui Beach (-3.3%),

Kawhia Community (-3.2%), Omori (-3.1%), and Waitahanui (-3.1%) in Taupo District are projected to experience the largest declines.

In terms of households (not shown in the figure), the same CAUs are projected to experience the largest absolute increase (except that Newstead and Hamilton Lake are projected to increase faster than Te Uku), while Te Rerenga, Whangamata, Whitianga, Hikuai, and Te Kuiti are projected to experience the largest absolute decline in the number of households. In relative terms, the rankings by projected changes in the number of households are very similar to those for population, and identical for those CAUs at the top and bottom of the rankings (except for Waitahanui, Omori, and Te Rerenga declining faster than Kawhia Community in terms of total households).

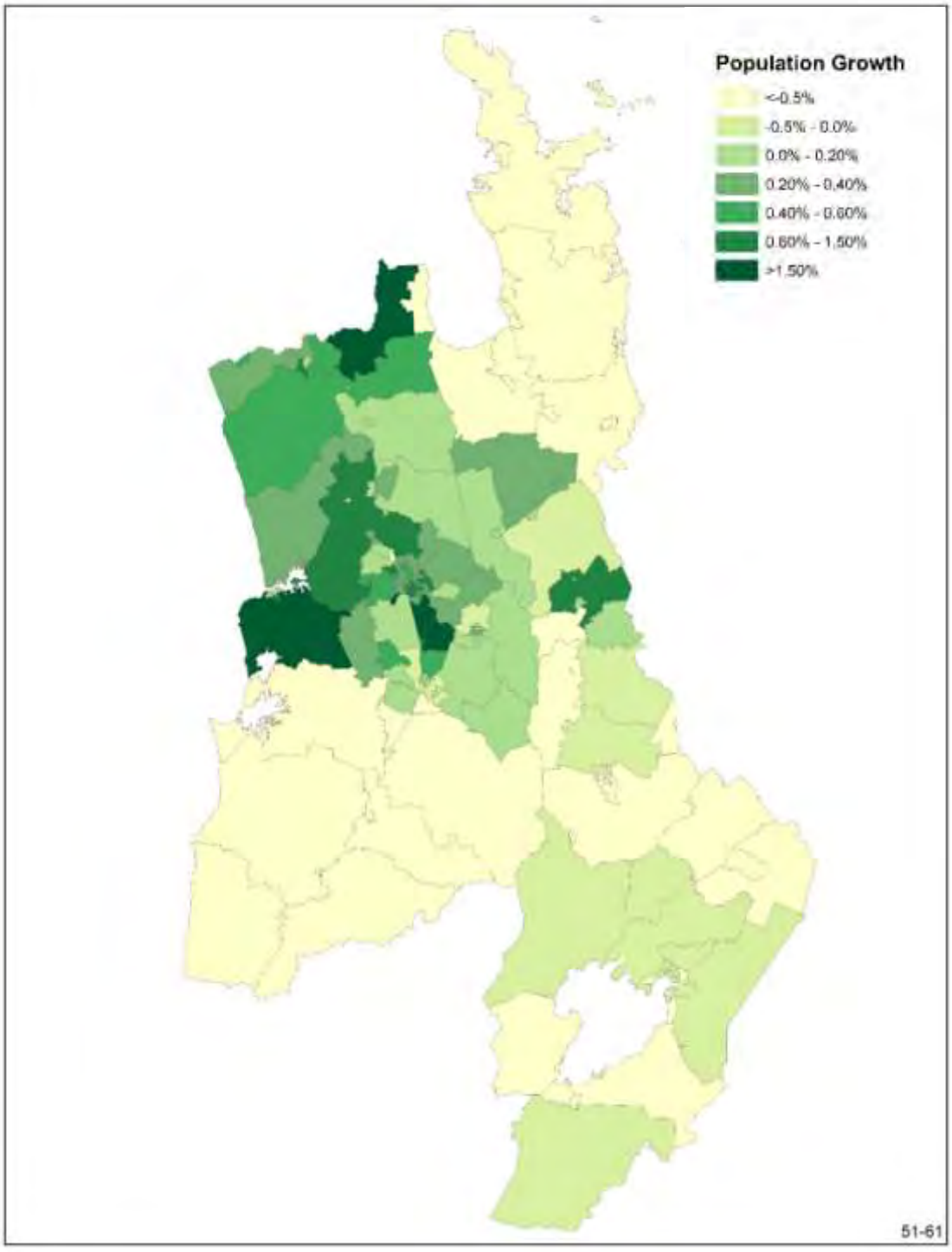

Figure 31: Annualised population growth rates, 2051-2061

The overall spatial pattern of growth across the region changes substantially between the 2006-13 period and the 2041-51 period. Growth is increasingly concentrated in urban settlements, especially Hamilton City and the surrounding areas, and in the north of the region, i.e. on the southern border of Auckland City. This is consistent with the influence that Auckland and Hamilton have on the population distribution in the region, both now and in the future. In contrast rural areas, particularly in the central, south and west of the region, decline in population. Overall, population growth reduces in significance – in the 2006-13 period, 43 of the 197 CAUs experienced population decline, but by 2051-2061 this has doubled to 86 CAUs being projected to experience population decline. The pattern of change in household numbers fairly closely follows that of population, with minor differences due to spatial differences in average household size.

Figure 32 and Figure 33 present maps of the population density in 2013 and in 2061, based on CAU-level population estimates in June 2013 and on the WISE land use output and results of the 2013-based regression model for 2061. Comparing the two maps further confirms that population growth across the region is concentrated mainly in the north of the region, and in the area immediately surrounding Hamilton City.

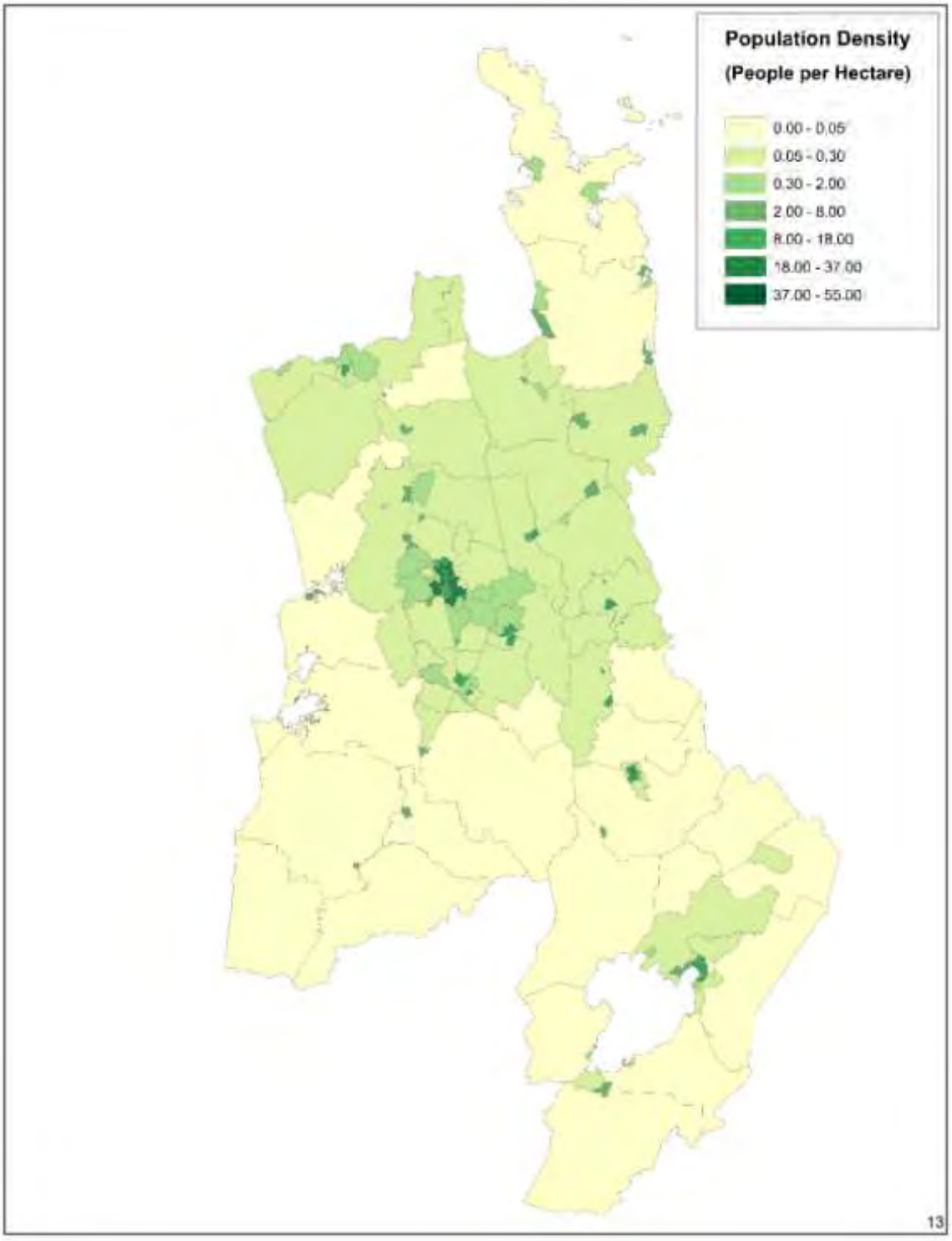

Figure 32: Population density, 2013

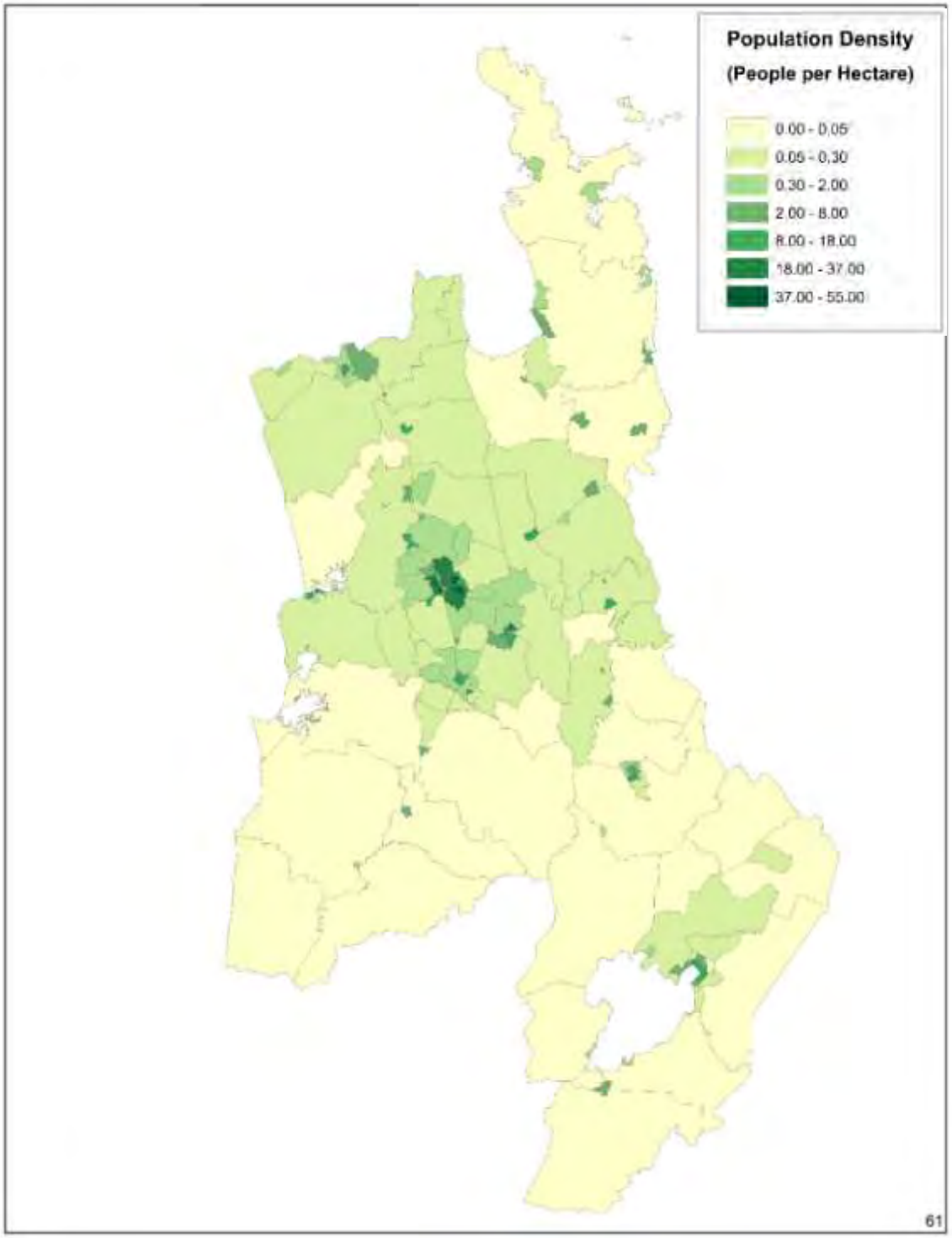

Figure 33: Population density, 2061

Population data at the CAU level are summarised in Appendix 2. A full set of the results are contained in Waikato Regional Council Doc#3491187.

5.4 Discussion and Conclusion

This report briefly outlined the methods and results of Census-Area-Unit-level demographic projections for the Waikato region from 2013 to 2061. Following an earlier report on Territorial-Authority-Level population projections (Cameron and Cochrane, 2015a), the overall picture is one of regional population growth. However, this overall growth masks substantial variation at the local level, with urban areas, peri-urban areas surrounding Hamilton City, and areas closer to Auckland continuing to grow throughout the projection period, while rural and peripheral areas tend to decline in population.

Comparing these results with the initial projections reported in Cameron and Cochrane (2014b), these projections show a lot more consistency with our *a priori* expectations. Expected growth cells in the outskirts of Hamilton City are projected to absorb most of the population growth, along with urban and peri-urban areas in the north of the region. These areas are projected to have the largest absolute and relative increases in population over the projection period, following the expected spatial pattern of growth in the region. In contrast, the fastest declining CAUs are those with small initial populations, as well as rural service towns. The same CAUs consistently rank at the top (or bottom) in terms of growth, which demonstrates that the projections do not wildly fluctuate over time. This gives us a high degree of confidence in the validity of these projections.

One final point should be highlighted. At such small scales as those explored in this report, both population projections and planning decisions are endogenous and this creates a potential self-fulfilling prophesy quality to these projections. For instance, if population is projected to increase in a given census area unit, then planners may create infrastructure that supports the additional population, leading to more development in that area and more population. However, if population had been projected to increase elsewhere instead, then infrastructure spending, development and population growth would be directed towards that area instead. Thus, these projections should not be taken as a 'most likely' future, but as one tool among many in the planning process.

6 Projections of economic outcomes

Contributors
Dr Garry McDonald, Joon Hwan Kim, Dr Nicola Smith and Dr Catherine Murray of Market Economics Ltd (ME)

6.1 Introduction

The employment, value added and gross output projections were generated through the use of the Waikato Integrated Scenarios Explorer (WISE) Spatial Decision Support System (SDSS). Projections were developed at the regional, territorial authority (territorial authority) and census area unit (CAU)[5] spatial areas annually for 2007 to 2014, and ten yearly for 2021 to 2061. The purpose of the 2007 to 2014 employment projections by region, territorial authority and CAU was to provide a historical validity check for the methodology developed below. It is important to note that while the projections are very closely aligned to known actuals for these years, this does not, in any way, ensure that the projections represent the known future. No projection method is capable of predicting the future. The projections developed represent only one, albeit plausible, future among a set of futures, developed under a limited set of assumptions. It is also important to note that the projections have a higher degree of certainty in the short run (1 to 5 years) than in the medium to long run (5+ years).

The methodology used to generate these projections is outlined below in five steps. This is followed by more detailed information on the selection of regression model applied as part of the methodology, available data, and mathematical specification. It is worth noting that these projections have been developed through the collaborative effort of several organisations. This includes central government agencies, Waikato Regional Council, all of the territorial authorities in the Waikato region, the University of Waikato, and several independent planning, economic and GIS consultants. Closely aligned with this collaboration has been the adoption of the Waikato Integrated Scenarios Explorer (WISE) Spatial Decision Support System (SDSS)[6]. The use of WISE represents a 'step change', but also 'test-bed', within New Zealand for the use of state-of-the-art technology in the development of these projections. The WISE SDSS is unique in its depth of coverage of socio-economic and environmental wellbeing through an integration of existing demographic, land use, economics, and environment models. This integrated systems-based approach provides unique insights into the key trade-offs (supply versus demand) faced within the Waikato region.

6.2 Methodology

Step 1: Update the WISE economic model final demand projections
A key driver of the WISE economic model[7] is final demand projections covering domestic consumption, international exports, interregional exports, gross fixed capital formation, and net changes in stocks. The following methods and data were used for updating:

- *Domestic consumption projections*: These are derived from University of Waikato's population model by age-sex projections. Adjustments, as outlined in the WISE technical specifications report (Waikato Regional Council 2016), are made for the different consumption characteristics of different age-sex cohorts.
- *International exports, gross fixed capital formation, and net changes in stocks*. These are derived econometrically from time series data supplied by

[5] Oceanic CAUs were left out of this analysis.
[6] WISE simulates demographic, economic, land-use, and environmental change across space (for a 100m x 100m spatial grid) and through time (yearly time steps for 2013 to 2061) for the Waikato Region. It was developed through a policy-science collaboration under New Zealand Government Foundation of Research, Science and Technology (FRST) funding. Full documentation of the underlying integrated models and how they interact is available in the WISE Technical Specification available from http://www.creatingfutures.org.nz/resources/publications.
[7] Also known as the Economic Futures Model.

Statistics New Zealand for international trade and capital expenditure. Particular attention was given to ensuring that local dynamics in key Waikato industries such as livestock farming, dairy farming, forestry, meat processing, dairy processing and forestry processing were appropriately considered. A key component of deriving these projections is validation against third party forecasts, and ensuring that constraints in the New Zealand labour and capital markets are considered.

- *Update of the Waikato region multi-regional input-output table*. This table, which is based on Statistics New Zealand's inter-industry study for the New Zealand economy for 2007, underpins the WISE economic model. A key part of the update of WISE was moving the economic model from an ANZSIC 1996 to 2006 base. Full technical documentation of this update is available from Market Economics Ltd upon request (100 pages). The interregional trade final demand projections are derived as part of this update.

Step 2: Update the WISE economic model for investments and aspirations

A workshop in May 2014 was held to determine likely major investments and growth aspirations over the next 30 years. A few councils, and NZTA, subsequently provided detailed investment information (expenditure and scheduled timing) for inclusion into the WISE economic model. This information, along with time series data on building consent information by territorial authority and CAU for the period 2002 to 2014 extracted from Statistics New Zealand, was used to validate the econometrically derived gross fixed capital formation construction sector growth rates for residential building, non-residential building and non-building construction activity within the Waikato region. A parallel GIS work stream ensured that these same investments and aspirations were captured in WISE geographically (largely through the use of road network additions and zoning areas and rules) through time (refer to section 1).

Step 3: Run the WISE model

Under this Step the WISE model was run. Figure 34 illustrates how WISE final demand projections are used to drive WISE. Specifically, these projections, along with the multi-regional input-output model contained within WISE, set *demand* for primarily non-residential land use types contained within WISE. The WISE land use model then allocates this demand (based on zoning, suitability, accessibility and spatial interactions rules) to land use types at a 100m x 100m grid cell resolution. Since land is a scare resource, with many competing uses, the WISE land use model may not sufficiently allocate land to fulfil demand. This typically only happens for the larger competing land uses types such as livestock farming, dairy farming, forestry, other farming and horticulture. The WISE economic model, in turn, accounts for this lack of land *supply* and reduces the economic output produced by those economic sectors, along with key down-stream industries, using the impacted land use types.

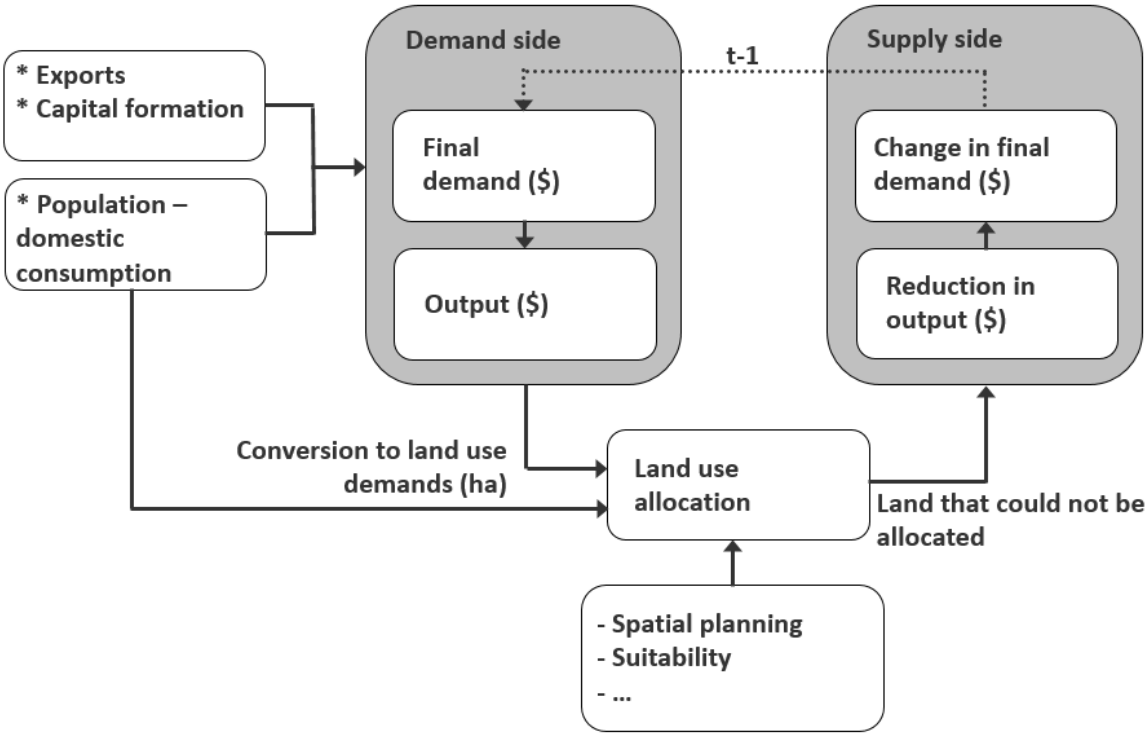

Figure 34: WISE Economic Model

Step 4: Update and re-run WISE model for Ruakura inland port development
In addition to the more general adjustments made to WISE outlined in Step 2 above, detailed analysis was undertaken of the potential impacts of the Ruakura Inland Port. This is a major future development in the Waikato region by Tainui Group Holdings. The new development will generate significant increases in economic activity within the region as well as increased inter-regional trade. Moreover, the new development will significantly change the future spatial pattern of the region. The latest WISE settings incorporate, in both land use and economic terms, the Ruakura development. Furthermore, this extends to the CAU projections where the Ruakura development and its influence of other areas are also incorporated.

In response to the proposed development, two independent economic impact assessments (EIA) have been conducted. The first study undertaken by Castalia Strategic Advisors (2010) was used in the Board of Inquiry for the development. Subsequently, Market Economics in conjunction with Nimmo-Bell Ltd have undertaken a separate EIA, melding the latest available data on Stage 1 of the Ruakura development with that produced by Castalia Strategic Advisors. This included reviewing and updating the estimates produced by Castalia where necessary. Specifically, the Market Economics-Nimmo-Bell EIA analyses the first stage of the development through to 2026, based on a bottom-up approach considering investment schedules, land use/building footprints, construction and operational employment, and economic interdependencies. Castalia's EIA is based on a macroeconomic accounting method[8] and covers economic benefits of the inland port into the future up to 2061. The latest version of WISE incorporates aspects of both studies. Specifically, the Market Economic-Nimmo Bell work was used to update the economic projections out to 2026, while the reviewed Castalia Strategic Advisors work was used in developing projections from 2027 to 2061.

Overall, the new development generates substantial additional employments in the light industrial, road transport and logistic industries, and has a minor negative impact on agricultural industries resulting from land use conversion. Table 7 summarises changes in employment from the development.

[8] The macroeconomic accounting method is based on projecting changes to the components of GDP accounting, consumption, investment, government spending, and trade.

Table 7: Employment Impacts of Ruakura Inland Port, 2031 and 2061

	ANZSIC 1-digit Sectors	Projected MECs in 2031 without Ruakura	Projected MECs in 2031 with Ruakura	Employment Difference in 2031	Projected MECs in 2061 without Ruakura	Projected MECs in 2061 with Ruakura	Employment Difference in 2061
A	Agriculture, Forestry and Fishing	27,769	27,767	0.0%	28,242	28,210	-0.1%
B	Mining	1,584	1,584	0.0%	1,526	1,526	0.0%
C	Manufacturing	24,536	25,030	2.0%	27,276	28,972	6.2%
D	Electricity, Gas, Water and Waste Services	2,787	2,793	0.2%	3,716	3,723	0.2%
E	Construction	20,790	20,968	0.9%	25,261	25,476	0.8%
F	Wholesale Trade	9,127	9,475	3.8%	10,409	11,710	12.5%
G	Retail Trade	21,313	21,450	0.6%	21,357	21,561	1.0%
H	Accommodation and Food Services	15,032	15,072	0.3%	17,651	17,830	1.0%
I	Transport, Postal and Warehousing	7,597	8,285	9.1%	9,682	12,186	25.9%
J	Information Media and Telecommunications	1,726	1,747	1.2%	1,424	1,462	2.6%
K	Financial and Insurance Services	3,111	3,149	1.2%	3,550	3,636	2.4%
L	Rental, Hiring and Real Estate Services	4,395	4,412	0.4%	3,827	3,850	0.6%
M	Professional, Scientific and Technical Services	17,922	18,066	0.8%	22,577	22,953	1.7%
N	Administrative and Support Services	9,251	9,326	0.8%	11,654	11,848	1.7%
O	Public Administration and Safety	10,519	10,520	0.0%	12,750	12,752	0.0%
P	Education and Training	19,481	19,757	1.4%	22,762	24,016	5.5%
Q	Health Care and Social Assistance	24,285	24,333	0.2%	26,157	26,351	0.7%
R	Arts and Recreation Services	5,219	5,219	0.0%	6,407	6,408	0.0%
S	Other Services	7,296	7,296	0.0%	8,269	8,270	0.0%
	Total	233,740	236,248	1.1%	264,497	272,739	3.1%

Notes: MECs = Modified Employment Counts. This is a measure of the number of employees within an industry based on Statistics New Zealand's Employment Count measure, but modified to take account estimates of the number of working proprietors within each industry.

Step 5: CAU economic projections

This step of the methodology involved deriving employment and value added projections, by 1-Digit ANZSIC industry, for each CAU within the Waikato region. For these purposes we rely on a regression model, where the available input data is: (1) the estimated population by CAU, (2) land use by category and by CAU (ha), (3) total region economic output by 48 industries, (4) total region value added by 48 industries, and (5) total region employment by 48 industries. Input (1) is obtained from the population regression model described above (sections 2 and 5), while inputs (2)-(5)[9] are obtained as outputs from the WISE model.

The output from the economic projection regression model is the estimated share of total regional employment, by industry type, for each CAU. When multiplied by the total regional employment for each industry, projections of employment by industry and by CAU are obtained. The estimates of employment are then converted to estimates of value added, by applying a value added-to-employment ratio for each industry type, and adjusting for estimated growth in productivity (i.e. value added per worker) over time.

6.2.1 Model Selection

There are a number of factors that need to be taken into consideration when selecting an appropriate regression model for the derivation of employment, given the available input datasets. There are a variety of different indicators that are potentially related in a casual way to employment, and it can be difficult to identify the important variables or indicators for inclusion in the model. If a model is constructed without excluding unnecessary variables, the model may be subject to a well-known 'over-fitting' problem, where the model projects known dependent variables near-perfectly, but fails to produce good projections for future variables. This problem is more predominant in cases where there are more causal factors identified than observations. Also important to consider is that economic variables are often highly correlated in magnitude or direction with other economic variables. In our data, land uses are highly correlated among themselves, where an increase in one land use category must be accompanied by decrease in land use for at least one other category. Moreover, the dependent variables in our study, employment by industry, are highly correlated with each other. In

[9] Economic output, employment and value added is obtained by WISE's 48 industries yearly for 2006-2014, and 10-yearly intervals onwards.

part this reflects the tendency for co-location of industries that support each other. This phenomenon is called the 'multi-collinearity' problem.

The Partial Least Squares Regression (PLSR) is a predictive econometric model developed specifically for data with a large number of independent variables exhibiting the multi-collinearity problem. The PLSR method overcomes inherent problems in the data by mathematically transforming it to more predictable data. Note that the method is concerned with predicting unknown variables (i.e. the 'dependent variables'), rather than understanding the underlying relationships between variables.

6.2.2 Data

In order to construct the PLSR model, a set of historic data is required, containing both dependent and independent variables. The aim is to derive a set of parameters for the PLSR model that will enable unknown dependent variables to be derived, based on estimates of future independent variables. Below is a brief description of the historic and future datasets:

(1) *Employment* - Historical employment data is derived from Statistics New Zealand's Business Directory. This data, originally measured in Employment Counts (ECs), is translated to the Modified Employment Count (MEC) measure. MECs are Employment Counts (ECs) adjusted to reflect estimates of the number of working proprietors. The employment data is then transformed into shares of total regional employment by industry and year, i.e.:

$$emp_{i,a,t} = \frac{EMP_{i,a,t}}{\sum_a EMP_{i,a,t}}$$

Where $emp_{i,a,t}$ is a the share of total region employment in industry i at year t and within CAU a, and $EMP_{i,a,t}$ is the total employment in industry i at year t within CAU a. Note that we undertake all the modelling at the level of 48 different industry types, and the results are aggregated to the level of 1D-ANZSIC as a final step.

(2) *Land Use* – Both historic and forecast land use by category are obtained from the WISE model. The WISE model generates land use by 25 types for the whole region at the granularity of 100m X 100m square cells (WISE version 1.4). Land use maps were extracted from WISE and cookie-cut by 2013 CAU boundaries to determine land use (ha) by type within each CAU. Comparable to employment, the land use data is then transformed to derive the *share* of total regional land use by land use category for each CAU and year.

(3) *Population* – Historic population data by CAU and the years 2007-2014 is obtained from WISE. As explained above, future estimates of population by CAU are obtained from the population regression model. Once again, the data is translated into *shares* of total regional population by CAU.

6.2.3 Model Specification

(1) Standard (ordinary least-squares) regression models seek to derive dependent variables directly from the independent variables. The PLSR model, however, employs a more indirect approach to the estimation of the dependent variables. The historic data for the independent and dependent variables are transformed into two matrices, *T* and *U* respectively. These matrices are chosen such that the relationship between them is as strong as possible. For the future time periods, the PLSR model seeks to predict *U* from *T*, and then transform the predicted *U* back to the dependent variable. Mathematically, the PLSR model method can be described as maximizing covariance between matrices *T* and *U* where:

$$X = TP^T + E$$
$$Y = UQ^T + F$$

(2) In the above matrix, *X* is a matrix of independent variables, *Y* is a matrix of dependent variables, *T* is a matrix of transformed *X*. Furthermore, *U* is a matrix of transformed *Y*, *P* and *Q* are matrices of weights given to the *T* and *U* matrices respectively, and *E* and *F* are error terms with independent, identical random normal distribution. Unlike OLS regression, separate equations for both dependent and independent variables of the PLSR need to be simultaneously solved. Therefore, the above equations are iteratively processed.

(3) Although the PLSR model eliminates the problem of including many independent variables within the model, like all regression models it needs to be carefully specified to ensure theoretical soundness and a statistically robust prediction. In this study, initial dependent variables were chosen to reflect the theoretical correlation between dependent and independent variables. Moreover, covariance of the independent variables were analysed to infer the predictive power of the variables. This processes filters out unnecessary independent variables before the actual PLSR analysis. Accordingly, the specific data applied in the PLSR model varied depending on the particular industry under investigation. Table 8 below provides a summary of the data applied as independent variables for each of the 48 industries modelled.

(4) The computed PLSR model can be cross-validated to test the predictive power when utilising varying numbers of trends (i.e. components of the T matrix) within the model. This study used the Leave One Out (LOO) cross validation technique. Generally, the Root Mean Squared Error (RMSE) value for the model decreases with additional trends, until a local or global optimal number of trends is reached, and then the RMSE starts to increase again with inclusion of further trends.

Table 8: Independent Variables Used in the Partial Least Squares Regression Model by Industry Type

Industry Type	Independent Variables Included	
	Types of Land Use	Population (Yes/No)
1 Horticulture & fruit growing	Residential - Lifestyle Blocks, Biofuel Cropping, Vegetable Cropping, Other Cropping, Dairy Farming, Sheep, Beef or Deer Farming, Other Agriculture	No
2 Sheep, beef cattle & grain farming	Residential - Lifestyle Blocks, Biofuel Cropping, Vegetable Cropping, Other Cropping, Dairy Farming, Sheep, Beef or Deer Farming, Other Agriculture	No
3 Dairy cattle farming	Residential - Lifestyle Blocks, Biofuel Cropping, Vegetable Cropping, Other Cropping, Dairy Farming, Sheep, Beef or Deer Farming, Other Agriculture	No
4 Poultry, deer & other livestock farming	Residential - Lifestyle Blocks, Biofuel Cropping, Vegetable Cropping, Other Cropping, Dairy Farming, Sheep, Beef or Deer Farming, Other Agriculture	No
5 Forestry & logging	Forestry	No
6 Fishing & aquaculture	Aquaculture	Yes
7 Agri, forestry & fishing support svcs	Commercial, Horticulture, Vegetable Cropping, Other Cropping, Dairy Farming, Sheep, Beef or Deer Farming, Forestry, Manufacturing, Aquaculture	Yes
8 Mining, quarrying, exploration & support svcs	Mines and Quarries	No
10 Meat & meat product manuf	Manufacturing	Yes
11 Dairy product manuf	Manufacturing	Yes
12 Other food manuf	Manufacturing	Yes
13 Beverage & tobacco product manuf	Manufacturing	Yes
14 Textile & apparel manuf	Manufacturing	Yes
15 Wood product manuf	Manufacturing	Yes
16 Pulp, paper product manuf	Manufacturing	Yes
17 Printing	Manufacturing	Yes
18 Petroleum & coal product manuf	Manufacturing	Yes
19 Chem, polymer & rubber product manuf	Manufacturing	Yes
20 Non-metallic mineral product manuf	Manufacturing	Yes
21 Primary metal & metal product manuf	Manufacturing	Yes
22 Fabricated metal product manuf	Manufacturing	Yes
23 Transport equipment manuf	Manufacturing	Yes
24 Machinery & equipment manuf	Manufacturing	Yes
25 Furniture & other manuf	Manufacturing	Yes
26 Electricity generation & supply	Manufacturing, Utilities	Yes
27 Gas supply	Manufacturing, Utilities	Yes
28 Water, sewerage, drainage & waste svcs	Manufacturing, Utilities	Yes
29 Construction	Commercial, Manufacturing, Residential - Medium to High Density	Yes
30 Wholesale trade	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
31 Retail Trade	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
32 Accommodation & food svcs	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
33 Road transport	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
34 Other trans & support, postal & storage svcs	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
35 Air & space transport	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
36 Info media & telecommunications	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
37 Finance	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
38 Insurance & superannuation funds	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
39 Auxiliary finance & insurance svcs	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
40 Rental, hiring & real estate svcs	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
42 Prof, scientific, technical, admin & support svcs	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
43 Central govt admin, defence & public safety	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
44 Local govt admin	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
45 Education & training	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
46 Health care & social assistance	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
47 Arts & recreation svcs	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes
48 Personal & other svcs	Residential - Lifestyle Blocks, Residential - Low Density, Residential - Medium to High Density, Commercial, Community Services	Yes

6.3 Results

6.3.1 Introduction to Results

This section presents results from the modelling for economic drivers and projections. The most significant development in the modelling undertaken for this project has been the production of detailed spatial projections at the CAU level. These projections, as

outlined in the methodology section of this report, are based on change in land use patterns as derived from the Waikato Integrated Scenarios Explorer (WISE) Spatial Decisions Support System, historical employment trends taken from Statistics New Zealand Business Directory, and independent population projections produced by NIDEA at the Univesity of Waikato. Results for employment and value added are presented at the regional (section 6.3.2) and territorial authority (territorial authority) levels (section 6.3.3). While it is beyond the scope of this study to present written results for CAU, a brief discussion of the CAU projections is given in section 6.5. This illustrates the level of detail for which results are available. The Waikato Regional Council, along with all of its constituent territorial authorities, have been provided with a spreadsheet version of the results which may be queried in detail.

Employment[10] and value added[11] projections are available at ten yearly intervals, from 2013 to 2061, which enables an analysis of nineteen[12] industry transitions over time, across all CAUs. This equates to a very large database of approximately 40,000 projection datapoints. The most significant benefit of modelling this level of resolution is that industry projections can be analysed at a detailed spatial resolution, with projections of where industries could be located, 'on the ground', given the land use change constraints that have emerged through the WISE modelling processes (in terms of zoning, suitability, accessibility and established spatial relationships that exist). This includes careful consideration of known public sector infrastructure investment and also of emergent local authority development aspiriations. To fully appreciate the results presented in this section, it is important that the land use changes identified in the WISE modelling be referred to. These are outlined in the earlier sections of this report.

The aggregate growth projections at a regional level have been modelled and reported on, in the Waikato Integrated Scenario Explorer (WISE). What is novel is how this regional growth is distributed across the eleven territorial authorities within the Waikato region, and indeed across the CAUs of each territorial authority. The relatively smooth growth projections of the region mask the changes that can be significantly volatile within separate areas, as industries evolve, respond to local conditions (particularly land use change constraints), and ultimately relocate. For this reason, it is important to acknowledge that the results presented in this section are projections and not predictions – it is not possible to predict the future.

6.3.2 Regional Results

6.3.2.1 Employment

In 2014, there were 198,031 people employed in the Waikato region. By 2031, it is projected to increase to 236,248 MECs and by 2061, it is projected that 75,000 additional MECs will be added to the Waikato region workforce (from 2014 levels), increasing the current total by 37 per cent, up to 272,739 MECs by 2061.

[10] Employment is measured by Modified Employee Counts (MECs). A MEC job year is the employment of one person, measured as one Modified Employment Count, for one year. Statistics New Zealand, under the Business Frame (which matches businesses almost exactly with their employees), collect annual data on employment by meshblock at the 6-digit ANZSIC industry level, one employee is termed an 'EC' or Employee Count. ECs are head counts of people employed in an industry. Thus, if a person is employed in more than one industry then they are counted twice. ECs also do not account for self-employed, business proprietors. For this reason, Market Economics Ltd has created modified employment counts (MECs) based on the EC data, which includes estimates of the numbers of working proprietors for each industry type. Overall, MECs when compared with alternative employment measures, such as the Census of Population and Dwellings, will over count employment, probably in the order of 10 to 15 percent. It must also be noted that the Census of Population and Dwellings which is typically a five yearly survey, dependent upon recipient response, and in the case of employment information has a high no-respondent rate. Neither dataset is therefore completely adequate in measuring employment.

[11] All value added figures are presented in constant $NZ\$_{2007}$ million dollars, the base year of the modelling.

[12] Industries are defined in terms of the Australia New Zealand Standard Industrial Classification (ANZSIC) 2006 definitional set at a 1 digit level. For value added projections, the component for owner occupied dwellings is extracted from the rental hiring and real estate services industry, and shown as a separate industry. There is no employment activity associated with owner occupied dwellings. It is an imputed value for rent that would be paid if houses were not owned. This imputed rent industry is not shown in employment data, as there are no people employed in this category.

Employment in the nineteen ANZSIC industries (excluding owner occupied dwellings) for the Waikato region are shown in Figure 35 (ordered by the projected relative size of the industries in employment terms in 2061). The flatter the curve for each industry, the least change in absolute numbers employed, over the next 50 years (e.g. the mining and information, media and telecommunications industries), whereas the steeper the curve, the greater the increase in people employed in that industry (e.g. the construction industry). Agriculture, forestry and fishing is currently the industry with greatest employment (26,312 MECs, or 13.3% of the Waikato workforce in 2014), followed by manufacturing (11.3% of total). These two industries are projected to retain the highest numbers employed for the region in 2061, although their relative share of total regional employment declines slightly (10.3% and 10.6% respectively), indicating relatively higher growth rates of employment in other industries. The construction industry has the highest projected growth rate in employment, with nearly 60 per cent more wokers employed in the industry by 2061, compared to 2014. Rental, hiring and real estate services and Information media and telecom are the only two industries with projected decline in the number of people employed from the 2014 base.

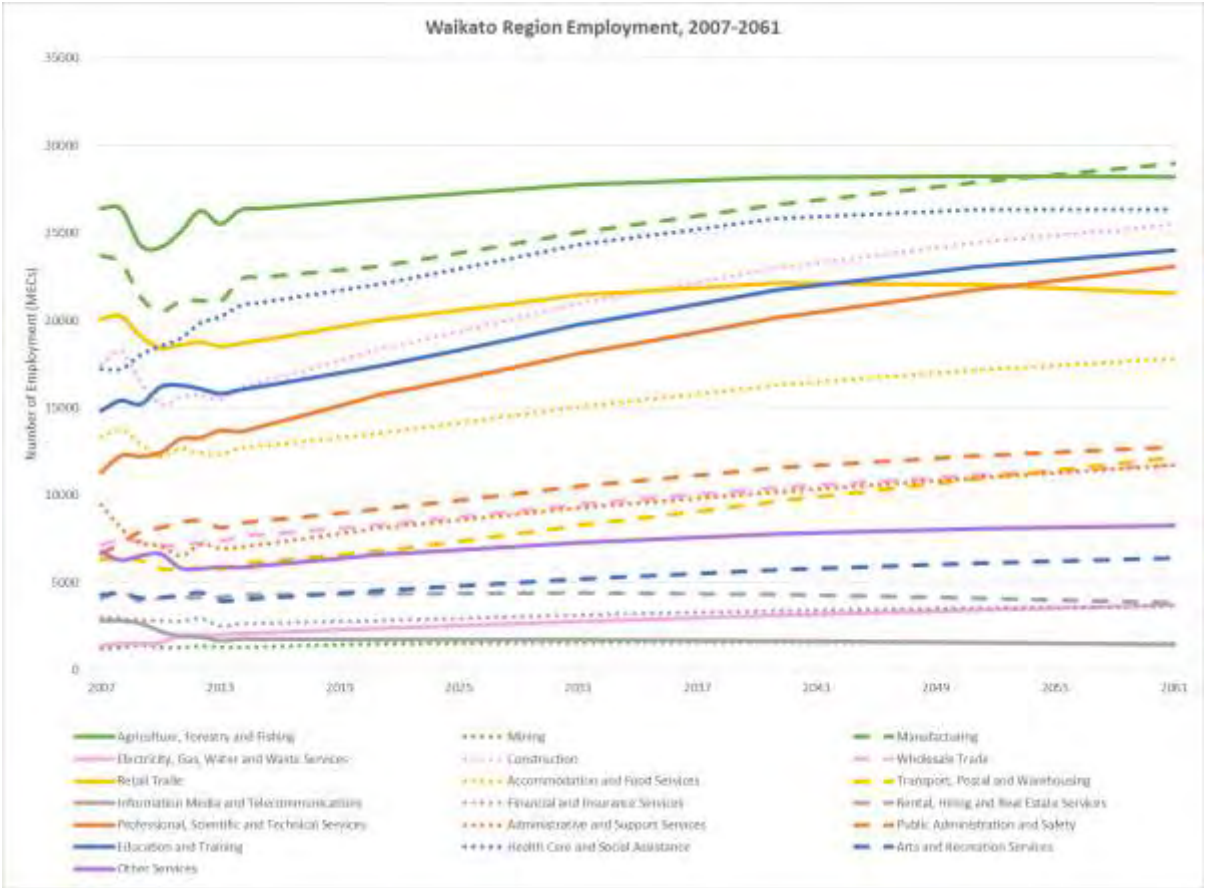

Figure 35: Waikato Region Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame

6.3.2.2 Regional Value Added

Value added for the Waikato region was estimated at $\$_{2007}$11.9 billion in 2007, increasing to $\$_{2007}$12.9 billion in 2014, and projected to reach $\$_{2007}$17.1 billion in 2031 and $\$_{2007}$ 22.9 billion in 2061 (Figure 36). This is an increase of 76% by 2061, from 2014 levels, and all industries are projected to grow.

Manufacturing is the biggest industry (16.9% of total) in terms of value added or contribution to the region's GDP with $\$_{2007}$2.2bn in 2014 and projected to increase to $\$_{2007}$3.9bn by 2061. This is followed by Agriculture, forestry and fishing ($\$_{2007}$1.5bn in 2014; $\$_{2007}$2.3bn in 2061, or 10% of regional total).

Construction is the third largest industry in value added terms ($\$_{2007}$0.98bn in 2014, expanding to $\$_{2007}$1.9bn in 2061, contributing 8% of regional total value added).

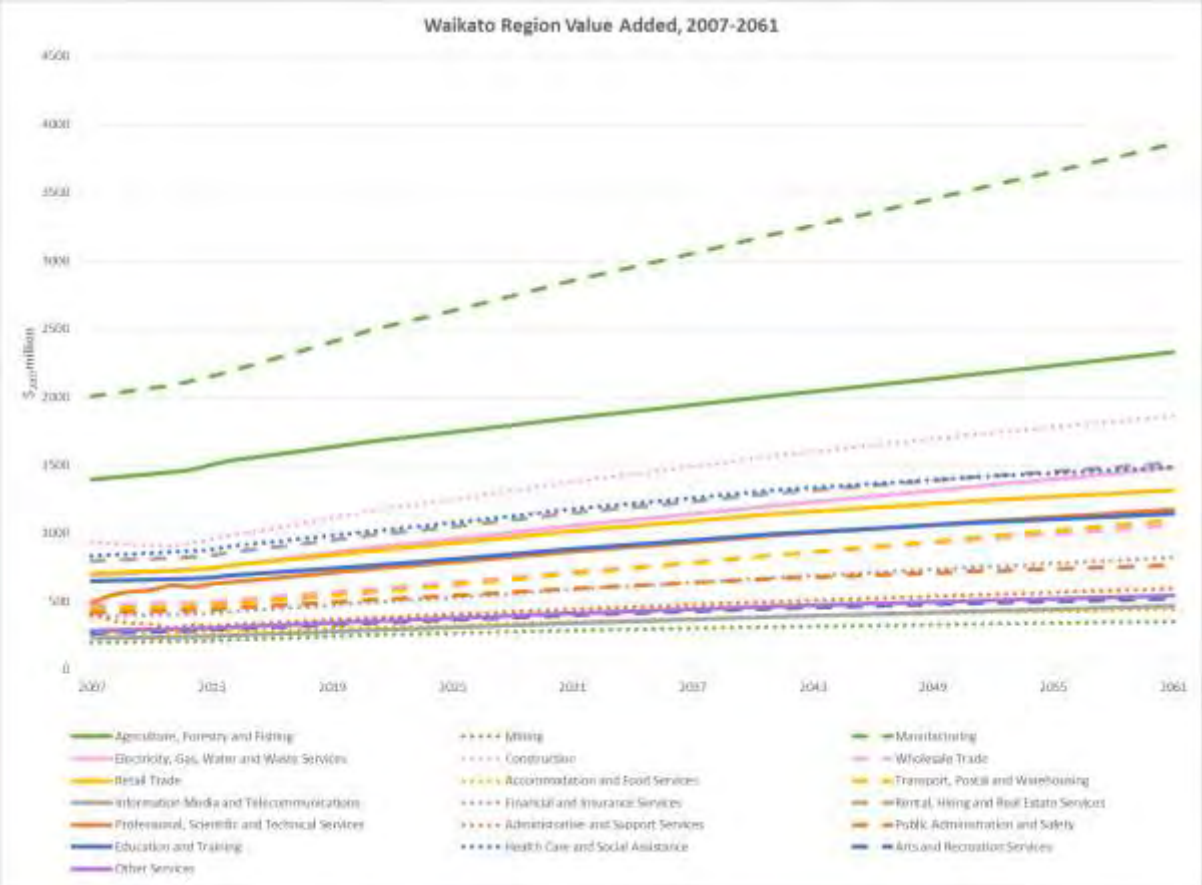

Figure 36: Waikato Region Value Added $2007million, 2007 to 2061

Note: The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

As stated, regional level projections have been modelled and reported on, in previous WISE reports. We now turn to the projected changes to employment and value added of industries within the eleven territorial authorities of the Waikato region.

6.3.3 Projections of Economic Outcomes across Territorial Authorities

6.3.3.1 Employment in the Territorial Authorities

Table 9 shows the numbers of Modified Employment Counts (MECs) in each territorial authority, with projected changes to 2031 and 2061, and the compound annual growth rate for the periods 2014-2031 and 2014-2061. Hamilton City territorial authority is the dominant centre of employment for the region, with over 40 per cent of the region's employment (MECs). Hamilton City is four times larger than Waipa District and Waikato District, the second and third largest territorial authorities in employment terms. Hamilton City is projected to have the highest increase in MECs by 2061, with an increase of over 50,000 MECs. Of the more rural districts, Matamata-Piako District is projected to have the strongest growth in employment, out to 2061, whereas South Waikato District is projected to have a decrease in employment.

Table 9: Total Growth in employment by Territorial Authority, 2014 to 2031, and 2014 to 2061

Territorial Authority	Actual MECs in 2014	Projected MECs in 2031	Compounded Annual Growth Rate (2014-2031)	Projected MECs in 2061	Compounded Annual Growth Rate (2014-2061)
Hamilton City	85,754	110,927	1.53%	136,530	0.99%
Waipa District	20,119	23,606	0.94%	26,636	0.60%
Waikato District	20,008	25,255	1.38%	32,065	1.01%
Taupo District	16,728	17,866	0.39%	18,336	0.20%
Matamata-Piako District	16,127	17,447	0.46%	18,410	0.28%
Thames-Coromandel District	11,503	12,285	0.39%	12,226	0.13%
South Waikato District	9,008	9,030	0.01%	8,510	-0.12%
Hauraki District	7,179	7,872	0.54%	8,033	0.24%
Waitomo District	5,004	5,349	0.39%	5,451	0.18%
Otorohanga District	4,484	4,691	0.27%	4,724	0.11%
Rotorua District (part in Waikato)	2,118	1,923	-0.57%	1,816	-0.33%
Total	198,031	236,248	1.04%	272,739	0.68%

Agriculture is the dominant industry in employment terms for most of Waikato's territorial authorities. There are only three exceptions: Hamilton City employs most of its workforce in the health care and social assistance industry; in Matamata-Piako more people are employed in the manufacturing industry (since 2008, before then more were employed in agriculture); and in Thames-Coromandel, more people are employed in retail trade than any other industry. The Hauraki District is interesting, as there is projected to be a huge increase in numbers employed in manufacturing by 2061, as well as slow decrease in agriculture employment by 2061, which will narrow the gap considerably between those employed in the two largest industries of agriculture and manufacturing. Figure 37 on the following page presents the projected growth rates in the 10 Waikato territorial authorities[13], enabling a comparison of the main employment trends in each territorial authority and projected changes. The employment data presented between 2007 and 2014 is actual data, whereas the data from 2015 to 2061 is projected from the modelling. This comparable graphic clearly shows the territorial authorities where there are one or two dominant industries (e.g. Otorohanga and Waitomo), and those with more diversified industry employment (e.g. Hamilton City and Thames-Coromandel). Note that the vertical scale measuring the number of MECs varies between the territorial authority. Also, further discussion of the changes within each territorial authority is given in section 6.3.4.

[13] Excludes Rotorua District (part in Waikato Region).

Figure 37: Projected Employment by Industry in Waikato's Territorial Authorities, 2007 to 2061

6.3.3.2 Value Added in Territorial Authorities

Table 10 shows the relative size of each territorial authority in terms of value added or GDP contribution, currently, in 2031, and in 2061. It also shows the compound annual growth rates for each territorial authority between 2014 and 2031, and then between 2014 and 2061. There are higher growth rates in value added within the next seventeen years in most of the territorial authorities, in comparison to the following period from 2014 to 2061. This table shows that the Waikato District has the highest compounded annual growth rate, with Rotorua District the lowest.

Table 10: Projected changes in Value Added, 2014, 2031 and 2061, with Compound annual growth rates for those intervals.

Territorial Authority	Value Added in 2014	Projected Value Added in 2031	Compounded Annual Growth Rate (2014-2031)	Projected Value Added in 2061	Compounded Annual Growth Rate (2014-2061)
Hamilton City	5,311	7,522	2.07%	10,596	1.48%
Waipa District	1,270	1,667	1.61%	2,182	1.16%
Waikato District	1,343	1,858	1.93%	2,735	1.52%
Taupo District	1,160	1,408	1.14%	1,719	0.84%
Matamata-Piako District	1,199	1,463	1.18%	1,840	0.91%
Thames-Coromandel District	647	773	1.06%	904	0.72%
South Waikato District	697	834	1.06%	981	0.73%
Hauraki District	468	570	1.17%	688	0.82%
Waitomo District	379	460	1.14%	569	0.87%
Otorohanga District	298	356	1.06%	433	0.80%
Rotorua District (part in Waikato)	158	179	0.73%	213	0.64%
Total	12,930	17,090	1.65%	22,859	1.22%

Figure 38 on the following page presents the projected growth rates by industry in the 10 Waikato territorial authorities, enabling a comparison of the main value added trends in each territorial authority and projected changes. This information is shown in one A3 size page, and although difficult to determine details, it serves to highlight the diversity of industry change across the territorial authorities in the Waikato region. Note, the scales (in monetary terms) differ for each territorial authority and, as can also be seen from Table 10 above, the level of economic activity across the territorial authorities has a wide range, from Hamilton City with a value added of over $\$_{2007}$5.3bn to Otorohanga District with $\$_{2007}$298 million.
A detailed summary of the changes for each territorial authority is provided in section 6.3.4.

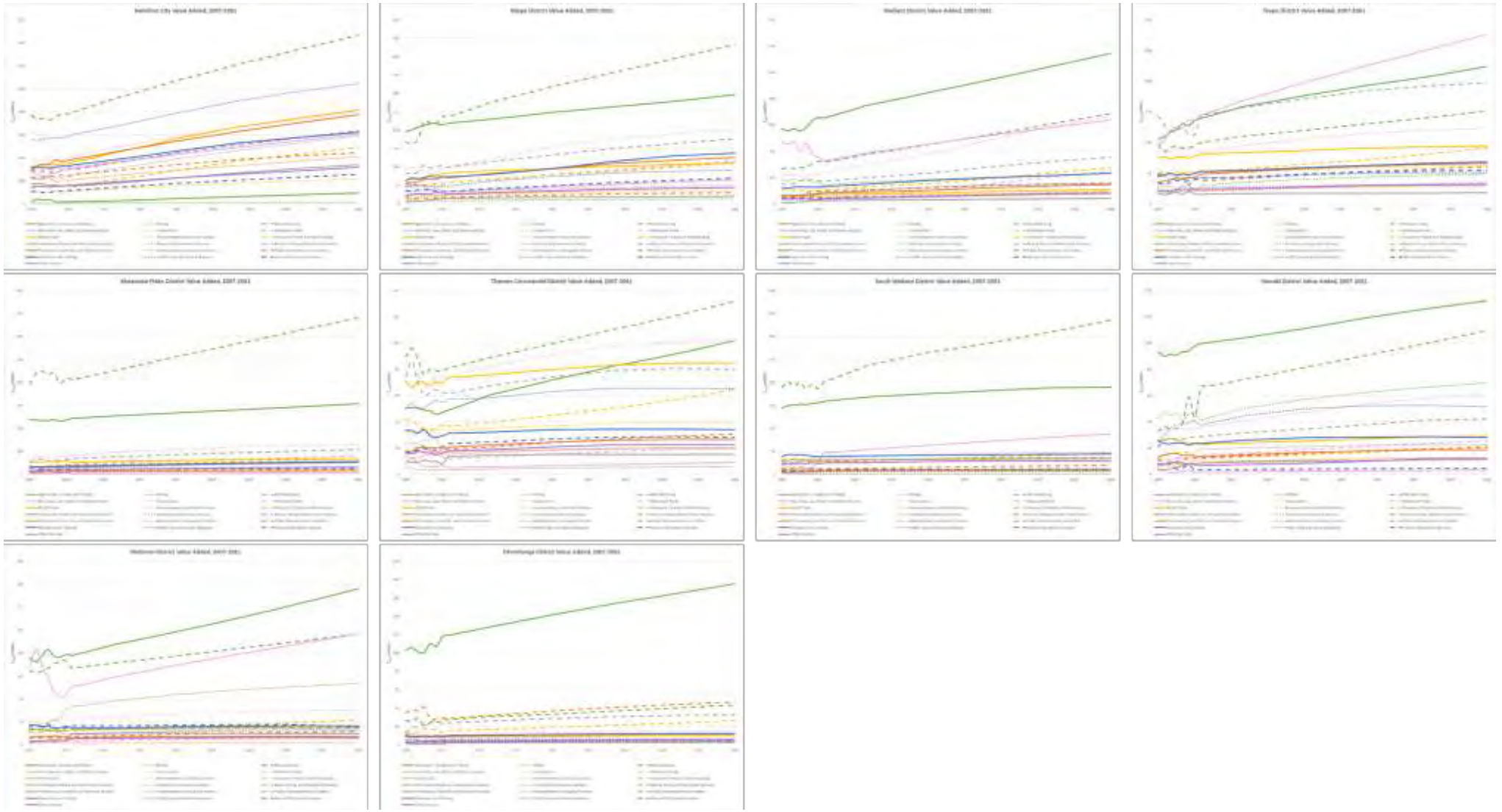

Figure 38: Projected Value Added by Industry in Waikato's Territorial Authorities, 2007 to 2061

Note: The vertical scale on the each line charts varies. The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

6.3.4 Projections for each Territorial Authority

6.3.4.1 Hamilton City

Hamilton City is the dominant territorial authority in terms of economic activity in the Waikato region. With a value added contribution of $\$_{2007}$5.3 billion in 2014 and a workforce of close to 86,000 MECs, it dwarfs the other territorial authority economies. Unsurprisingly with its relative size, it has a diversified industry structure.

The biggest industry in employment terms is, and is projected to continue to be, the health care and social assistance sector (Figure 39). With 13,874 MECs in 2014, 16.2% of Hamilton City's employees are in this industry. Retail trade is the second biggest in terms of employment (8,874 MECs or 10.3%) followed by manufacturing (8,707 MECs or 10.2%) and professional, scientific and technical services (8,270 MECs, 9.6%). It is worth noting that some of the smaller industries in Hamilton City are bigger than equivalent industries in other territorial authorities, even though they may be a dominant economic industry in the other territorial authorities (e.g. electricity, gas, water and waste services).

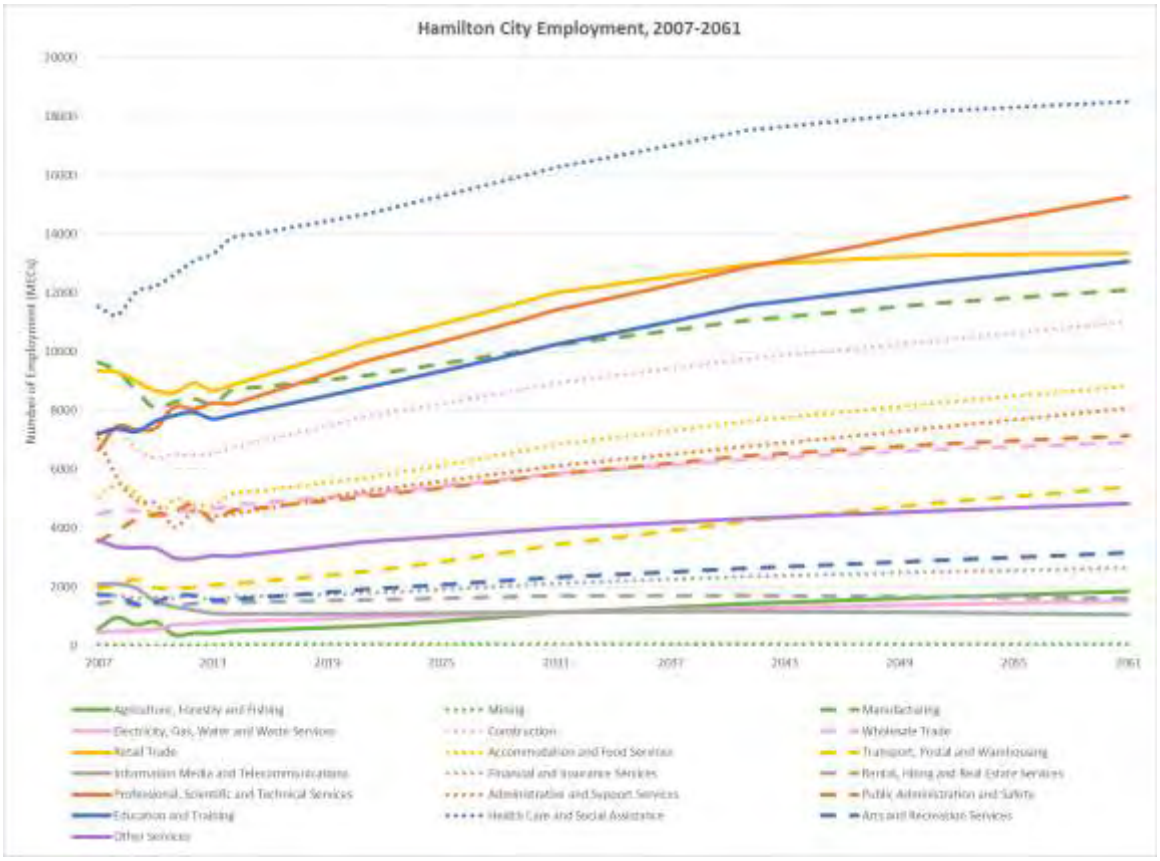

Figure 39: Hamilton City Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

The projections for each territorial authority can be explored by CAU. We extracted an example of an urban centre AU within Hamilton City for illustrative purposes (Figure 40). Hamilton East is projected to have growth in its dominant three industries out to 2061, reflecting the recent (up to 2014) trends.

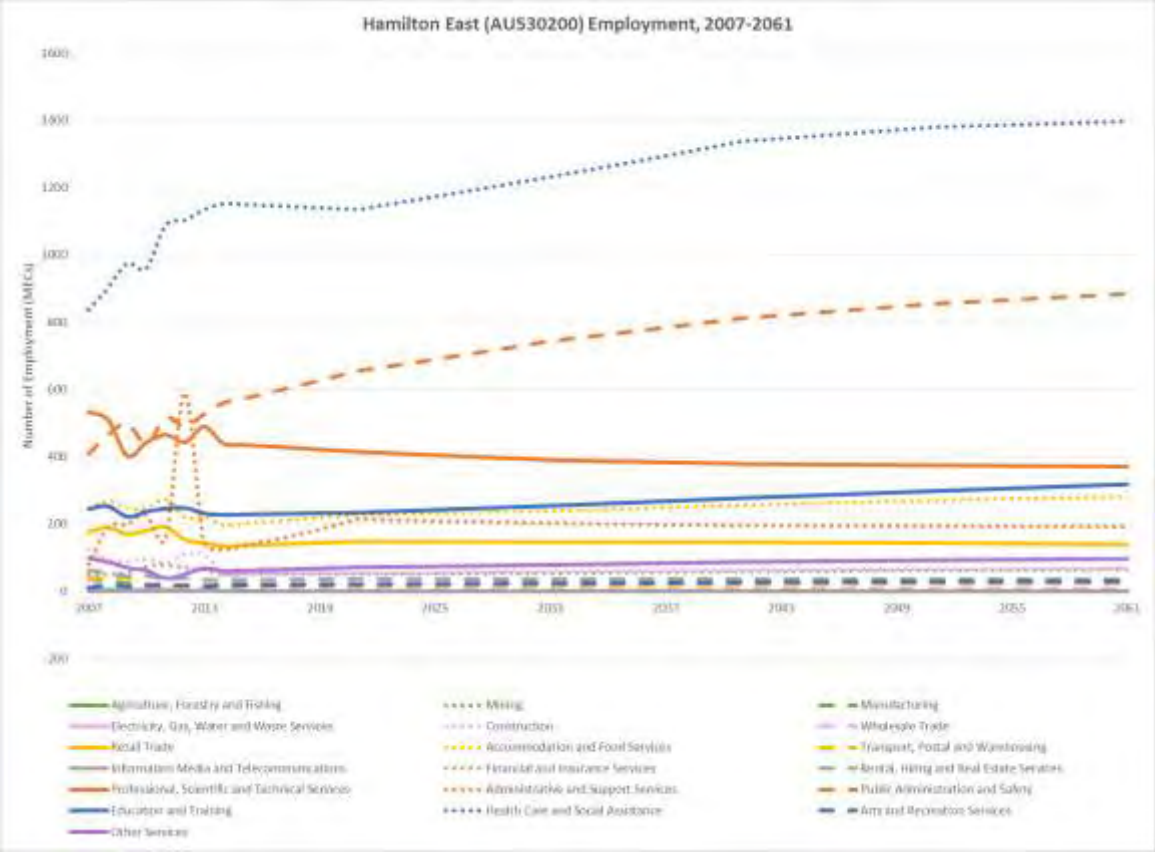

Figure 40: Hamilton East (CAU) Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

In terms of value added or GDP, manufacturing is the dominant industry for Hamilton East (Figure 40). Valued at $\$_{2007}$801m in 2014, manufacturing is also projected to be the fastest growing industry in the city out to 2061 ($\$_{2007}$1.5bn by 2061, contributing 13.9% of total Hamilton City value added). The health care and social assistance industry is estimated to have contributed $\$_{2007}$606m in value added in 2014, followed by construction ($\$_{2007}$413m), professional, scientific and technical services ($\$_{2007}$389m). The value added of all Hamilton City industries are projected to increase out to 2061, indicating a persistently growing economy.

6.3.4.2 Waipa District

The Waipa District is the second largest territorial authority in the Waikato region, in terms of economic activity. Similar to other rural territorial authorities in the Waikato, the Waipa District is predominantly driven by agriculture, with 4,225 people employed (MECs) out of a 20,119 MEC total (21.0%), in 2014. Manufacturing is the industry that employs the second greatest number of people (2,343 MECs in 2014, or 11.6% or total employed), followed closely by retail trade (2,059 MECs or 10.2%). By 2061, it is projected that these three industries will have 14.8%, 6.8% and 10.9% of the district's total employees respectively (Figure 42). The construction industry and professional scientific and technical services industry are both considerable industries in the district in terms of employment.

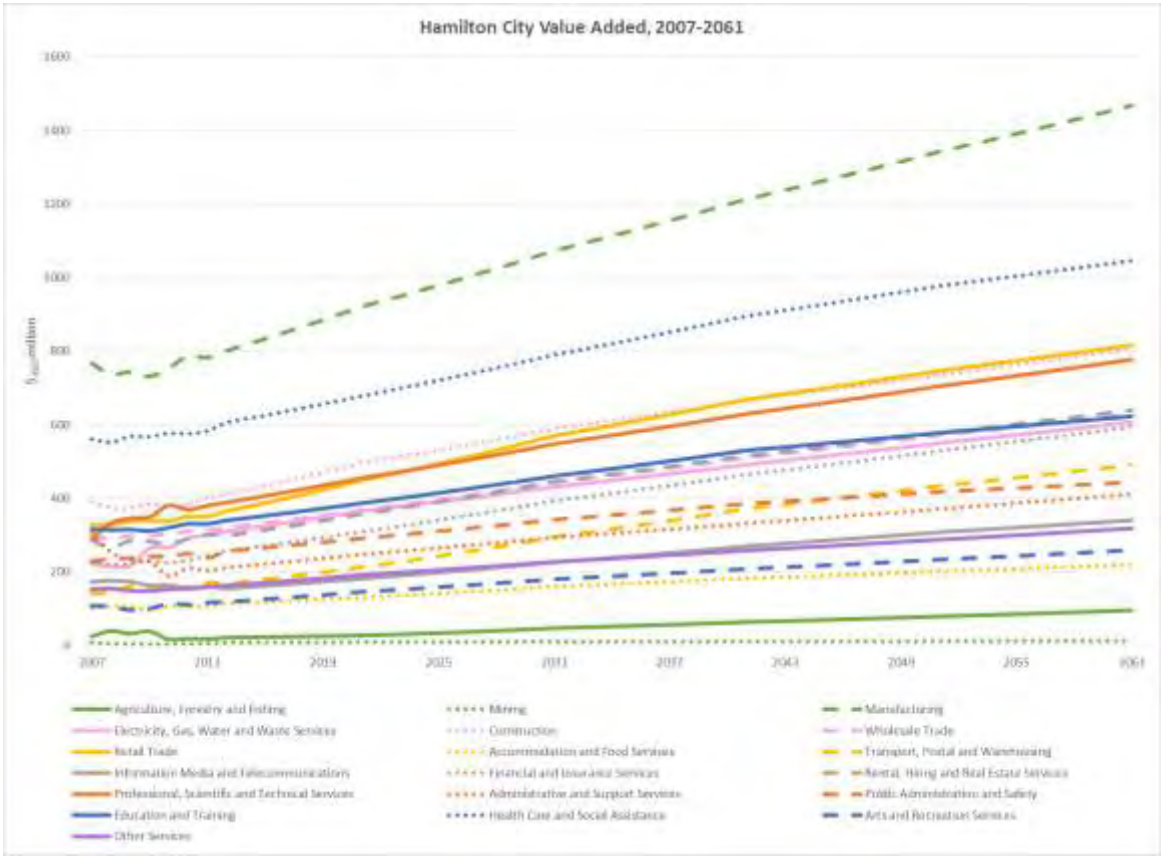

Figure 41: Hamilton City Value Added, 2007 to 2061

Note: The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

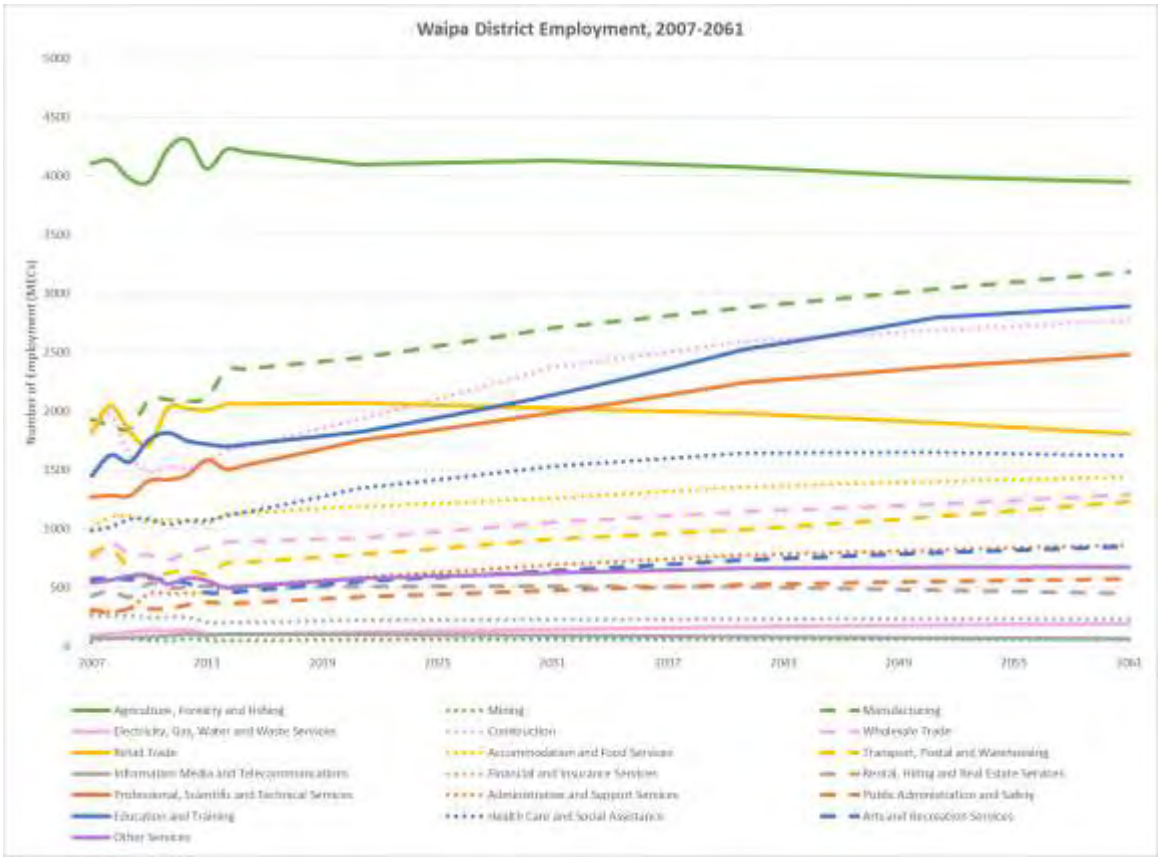

Figure 42: Waipa District Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

In terms of economic contribution to the district's GDP, or value added, manufacturing is the greatest contributor, with $\$_{2007}$237m in 2014. It surpassed agriculture ($\$_{2007}$219m), the second largest value added industry in the district, in 2010. Construction contributed $\$_{2007}$101m in 2014 followed by rental, hiring and real estate services contributing $\$_{2007}$100m.

In terms of projected changes of industry's value added contribution to the district's economy out to 2061 (Figure 44), there is a slight increase projected in electricity, gas, water and waste services (albeit from a low base), and increases in both retail trade and professional, scientific and technical services.

The somewhat smooth growth rates at a territorial authority level mask more volatile projections at an AU level, with projected changes to the industry structure. We include employment projections for Cambridge North, with actual data up to 2014, and modelled data out to 2061 (Figure 43). This is an example of a quite diversified AU, with numerous industries.

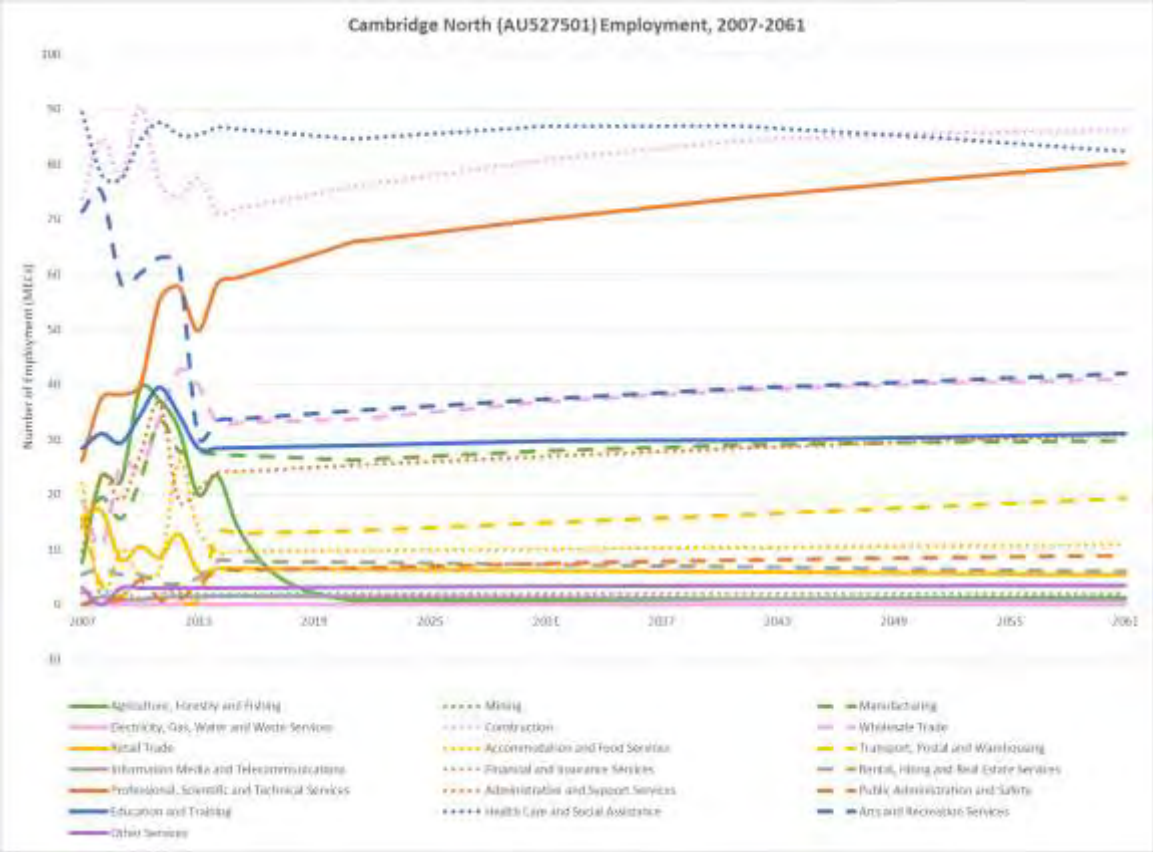

Figure 43: Cambridge North (AU) Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

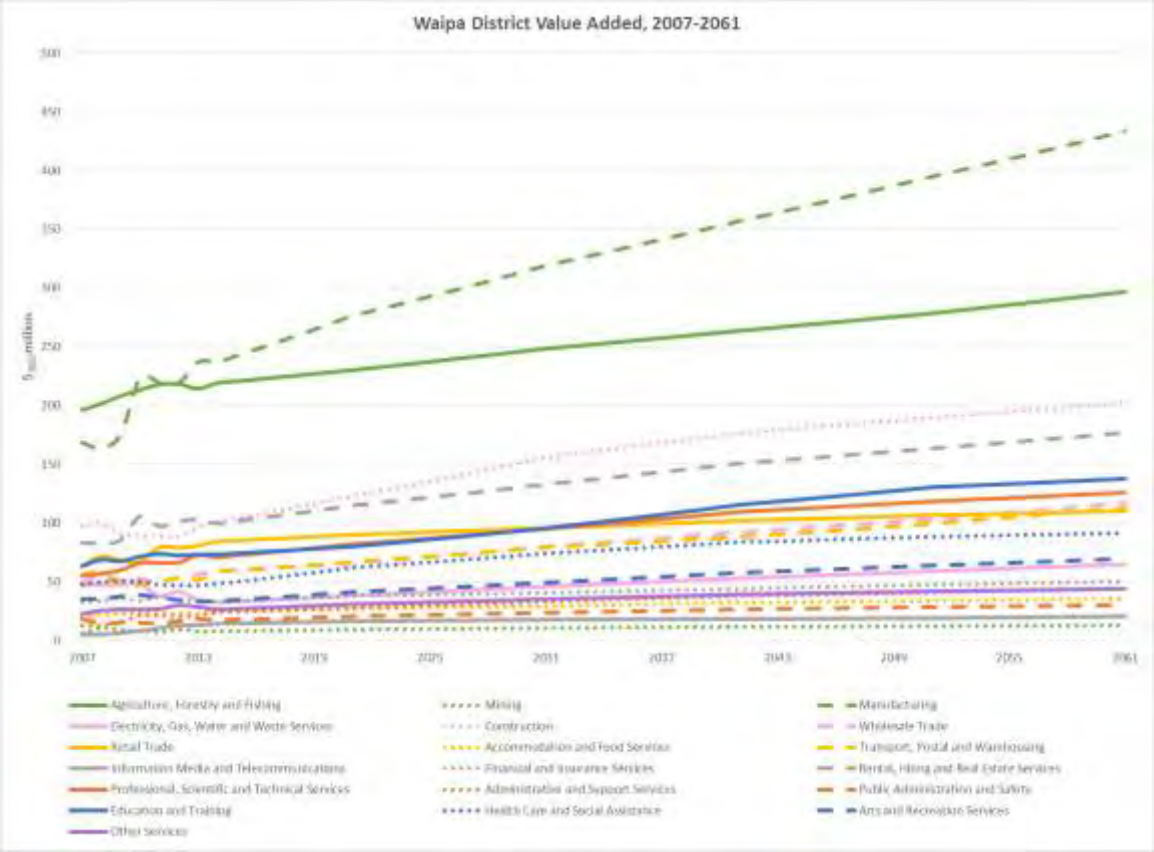

Figure 44: Waipa District Value Added, 2007 to 2061

Note: The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

6.3.4.3 Waikato District

The Waikato District is dominated by agriculture, forestry and fishing, with 6,662 of the 20,008 people employed, situated in this sector in 2014. This is 33.3% of the district's MECs. Agriculture is projected to grow to 8,511 MECs by 2061 (Figure 45). Construction is the second largest in terms of employment, with 1,959 MECs employed in 2014. Manufacturing and education & training are the third and fourth largest industries in terms of employment in 2014, with 1,773 and 1,531 MECs respectively. An industry that is projected to grow rapidly in this district is the wholesale trade industry, estimated to grow from 310 MECs in 2014 to 1,381 MECs employed in 2061.

Agriculture is estimated to have contributed $\$_{2007}$327m to the Waikato District, or 24.3% of the $\$_{2007}$1.34 billion total. Agriculture has the greatest projected total growth in terms of value added, reaching $\$_{2007}$573m by 2061 (Figure 46). The contribution of manufacturing to the district's economy is also set to rise, increasing by 117% from $\$_{2007}$159m in 2014 to $\$_{2007}$344m by 2061. The contribution of electricity, gas, water and waste water services to the district's economy was second to agriculture in 2014 with $\$_{2007}$165m and projected to reach $\$_{2007}$320m in 2061.

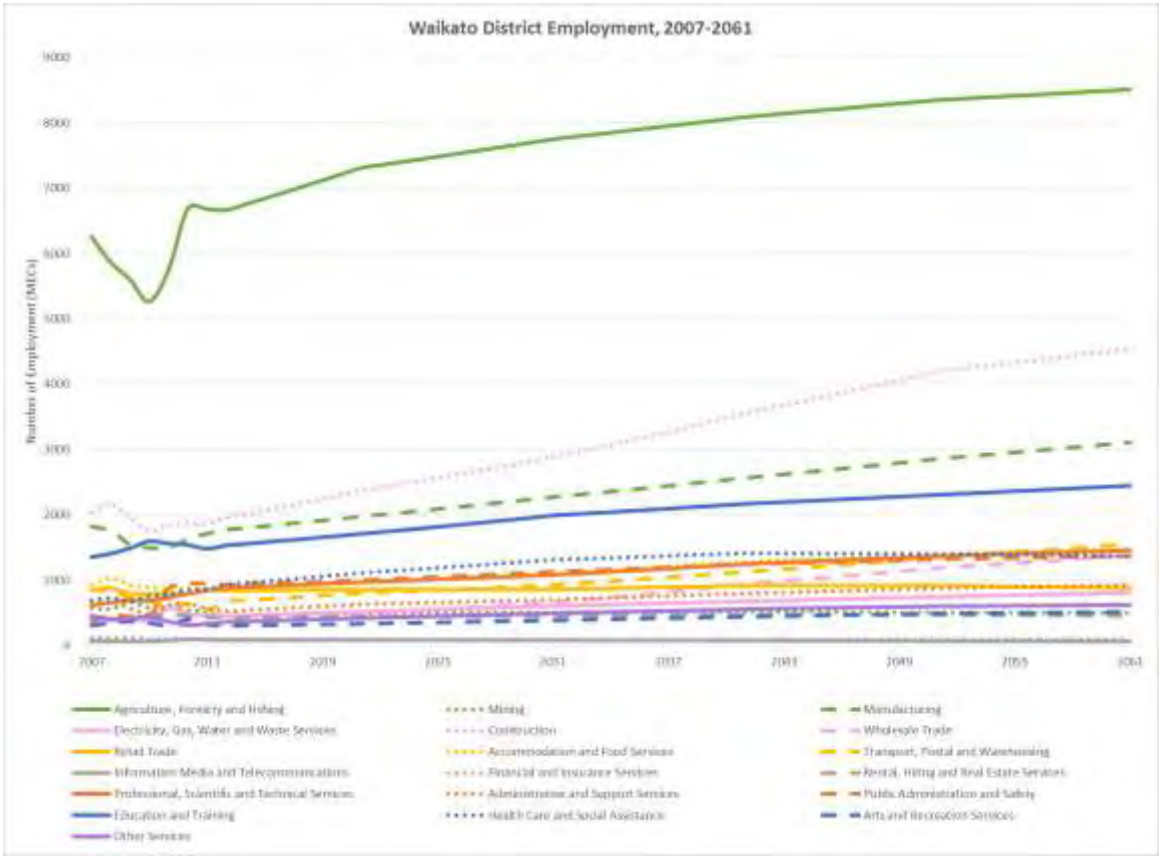

Figure 45: Waikato District Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

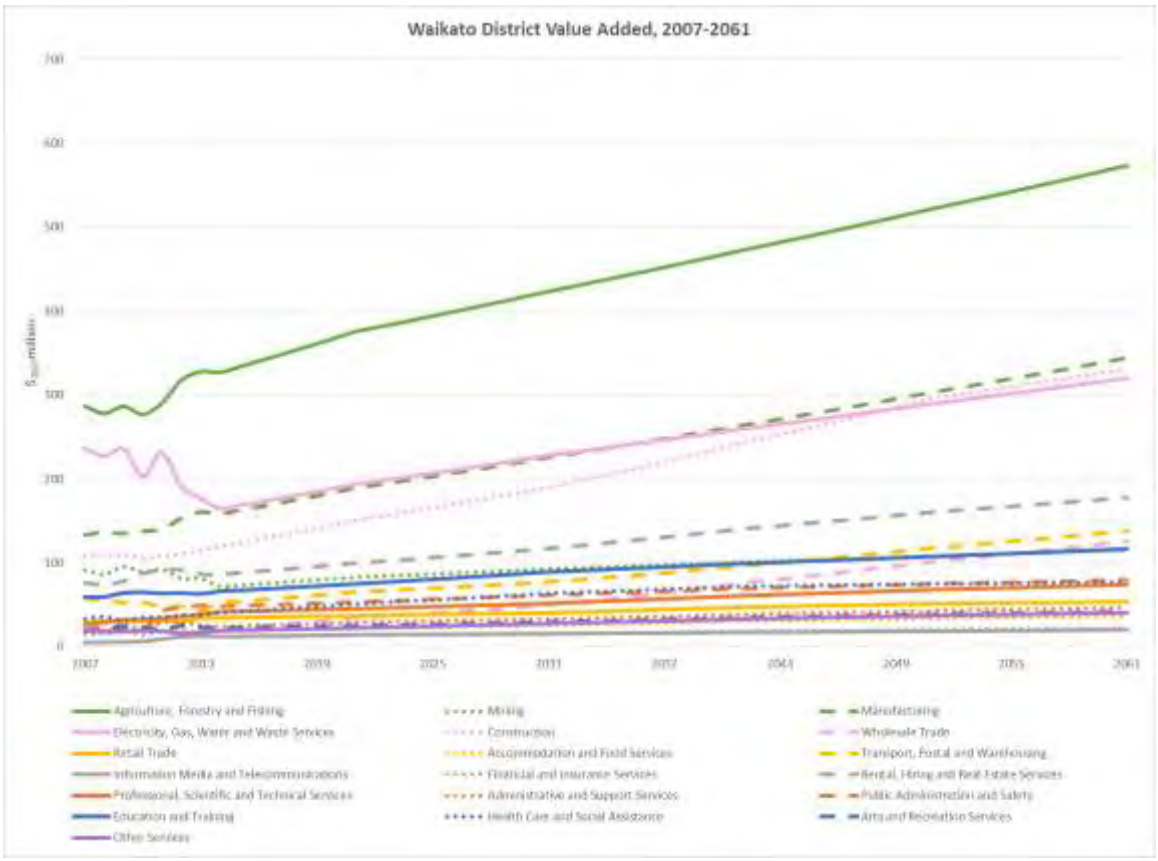

Figure 46: Waikato District Value Added, 2007 to 2061

Note: The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

We selected an area unit within the Waikato region that is highly dependent on one industry. In this case, Rotowaro is clearly dependent on coal mining (Figure 47). Given significant declines recently in employment, the modelled projections return a further decline in employment out to 2016, then stabilisation. However, it is not clear that the decline in employment in coal mining would continue, and caution is warranted in reporting at an AU level, as there is much uncertainty at the level of accuracy of projections at this resolution.

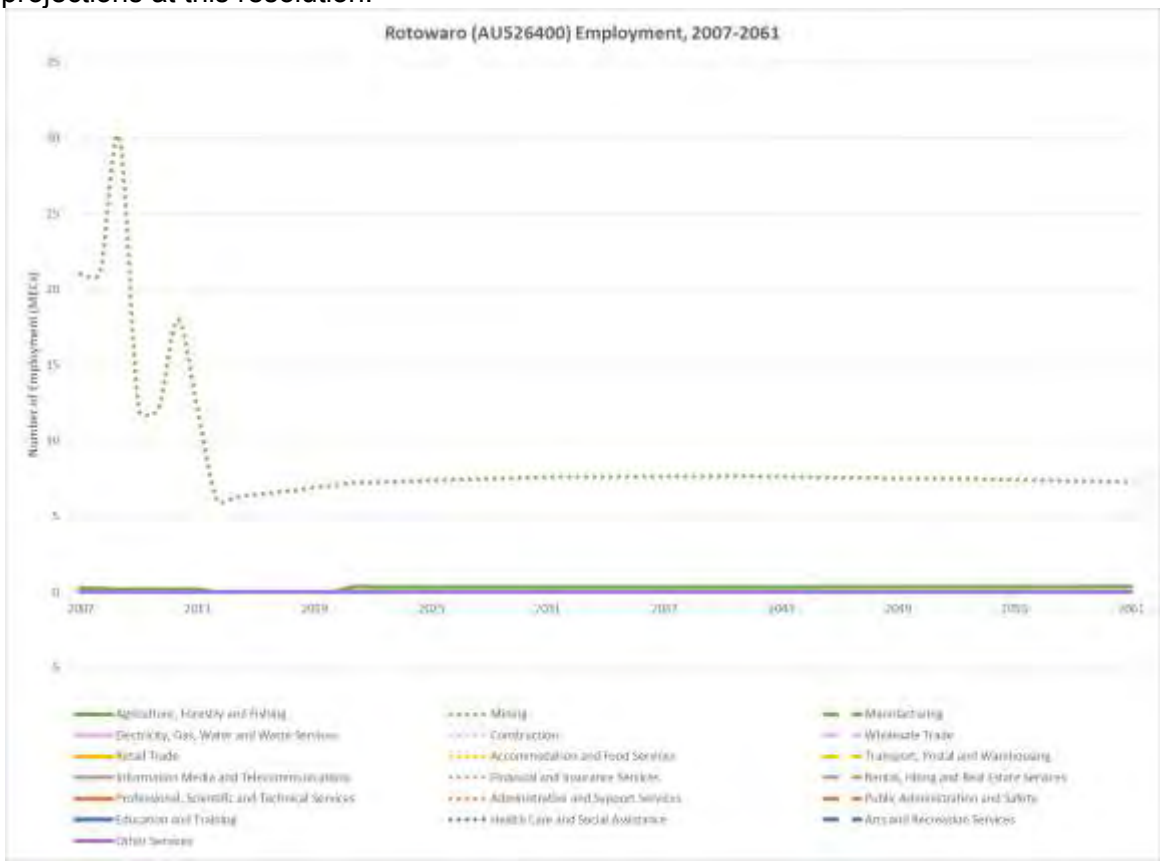

Figure 47: Rotowaro (AU) Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

6.3.4.4 Taupo District

The Taupo District is the fourth largest in the Waikato, in terms of economic activity, with a value added contribution of $\$_{2007}$1.16 billion in 2014, and 16,728 associated workers or MECs. Although a significant proportion of Taupo district's workforce is within agriculture, forestry and fishing, with 2,094 MECs in 2014 (12.5%), this constitutes a smaller proportion of the total workforce than in other districts of the Waikato region. The Taupo economy is more diversified, reflecting the importance of tourism. Taupo is clearly also a service centre, for more rural outlying districts. These characteristics are illustrated by the dominance of service industries such as accommodation and food services, which is the highest industry by employment in the district (2,288 MECs). In terms of economic structure, the Taupo District generally has similar characteristics to the Thames-Coromandel District, although Taupo is bigger in terms of economic activity.

Retail trade and the construction industries are ranked third and fourth in employment terms in 2014, with 1,978 and 1,398 MECs respectively in 2014. There is decline projected in retail trade out to 2061 (Figure 48), whereas the other dominant industries are projected to increase in employment terms.

The electricity, gas, water and waste services industry is the largest in terms of contribution to the economy for the Taupo District. Its contribution of $\$_{2007}$144m in 2014 is just above that of rental, hiring and real estate ($\$_{2007}$144m) and agriculture

($_{2007}$140m). The differential between the three industries, although all three projected to grow, will widen as the electricity, gas, water and waste industry is projected to nearly double, to $_{2007}$276 by 2061. Agriculture is projected to fall short of that by 2061, at $_{2007}$224m.

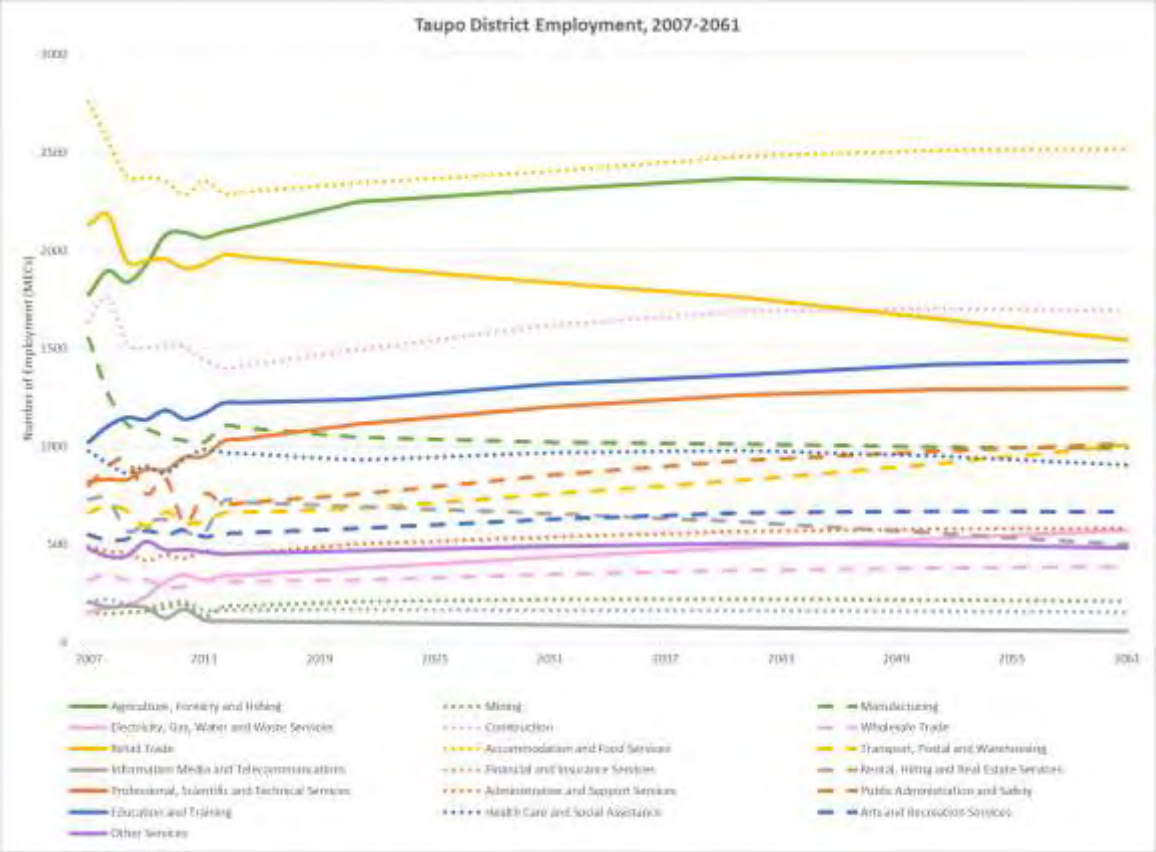

Figure 48: Taupo District Employment, 2007 to 2014

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

Once again, economic activities within individual AUs can be tracked. We extracted one AU, Tatua, which is an example of a district currently dependent on agriculture, but experienced significant fluctuations in employment (Figure 49).

Currently, Taupo is the third largest district within the Waikato region in terms of electricity, gas, water and waste after Hamilton and Waikato, and this industry continues to exhibit strong growth in the future. Retail trade is projected to continue to grow slowly within the district. As can be seen from the value added graph (Figure 50), there are a diversity of industries contributing to the Taupo District.

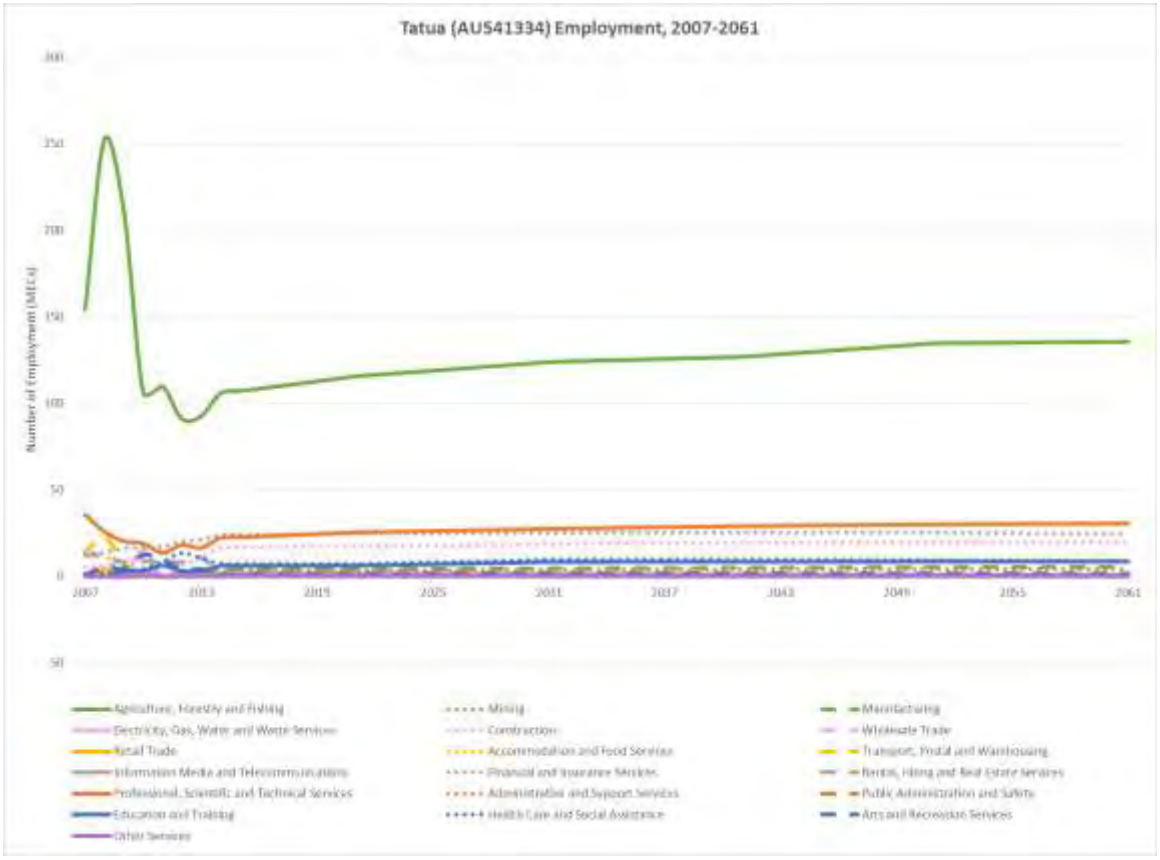

Figure 49: Tatua Employment (AU), 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

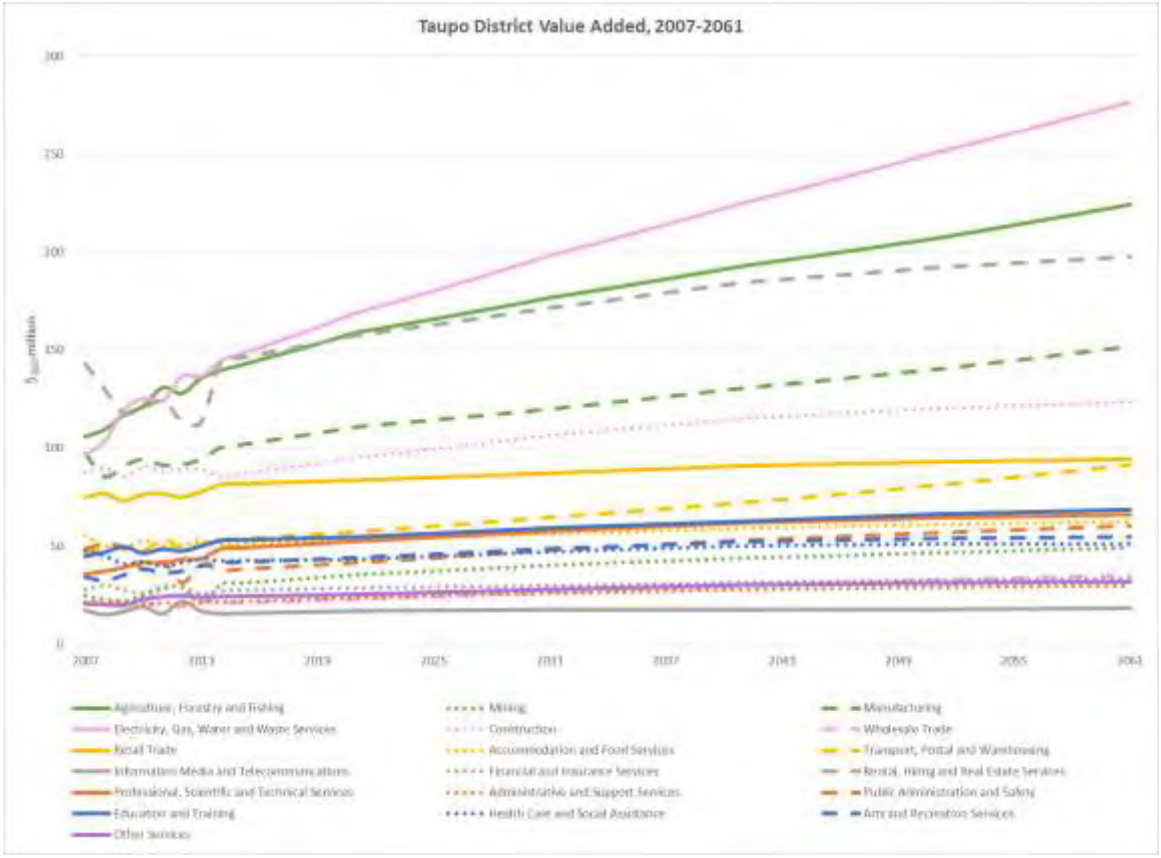

Figure 50: Taupo Value Added, 2007 to 2061

Note: The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

6.3.4.5 Matamata-Piako District

Matamata-Piako District is interesting, as it is the only rural territorial authority where manufacturing has caught up to agriculture in terms of employment, bucking trends evident elsewhere. This occurred in 2008, and manufacturing is projected to remain the largest industry in employment, above agriculture, out to 2061 (Figure 51). It should also be noted that a considerable amount of manufacturing within the Waikato region is linked to agriculture production directly, in the form of meat, dairy and food processing. In 2014, there were 3,749 MECs in manufacturing and 3,772 MECs in agriculture, out of the district's total of 16,127 employees. These two industries employ just under half (46.6%) of Matamata-Piako's employees.

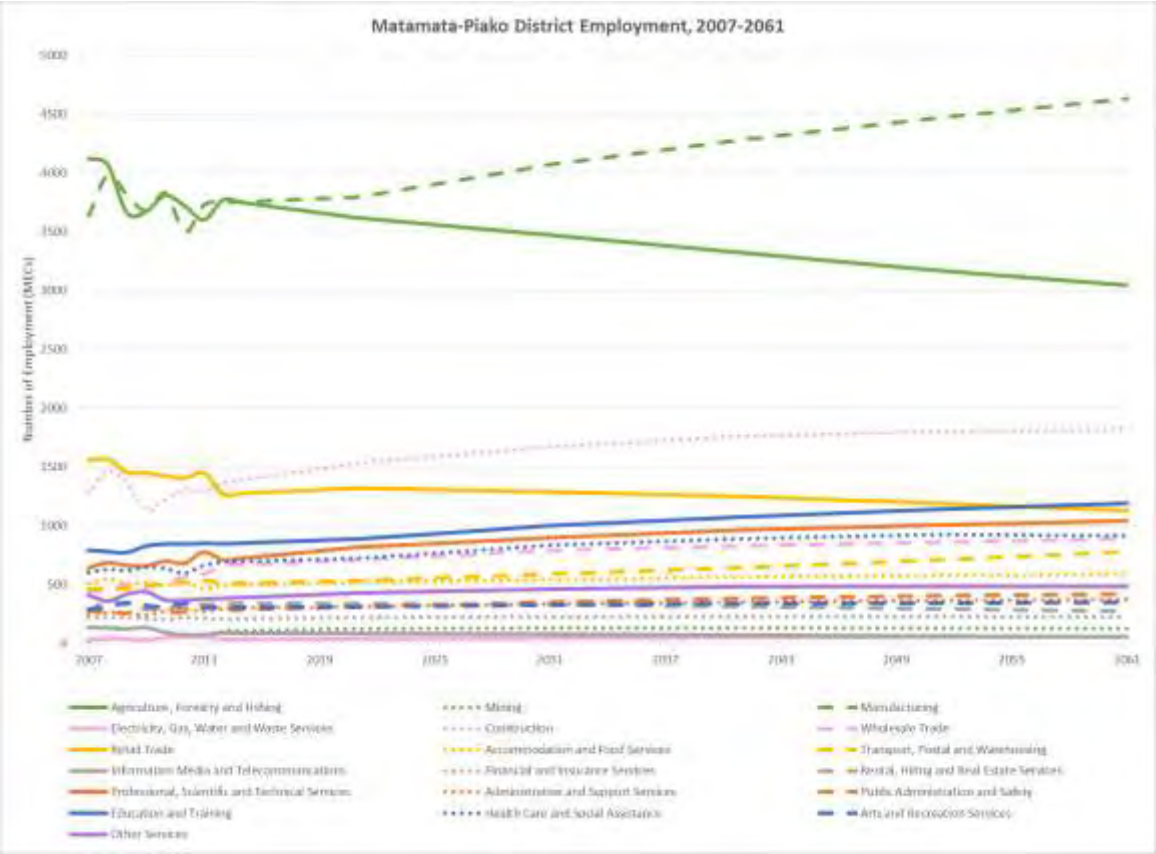

Figure 51: Matamata-Piako District Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

Construction is third largest, in terms of numbers employed, with 1,368 MECs in 2014. This industry is projected to increase to 1,820 MECs in 2061. The retail trade industry was the fourth largest employer in 2014. It had 1,270 MECs in 2014 and is projected to decrease marginally to 1,129 by 2061.

The contribution of manufacturing to the GDP or value added of the district is on an upward trend, with the recession between 2008 and 2009 an evident disruption to this trend. Manufacturing contributed $\$_{2007}$412m to the economy in 2014 (34.4% of the district's total value added, or GDP), and is projected to increase to $\$_{2007}$682 in 2061 (Figure 52). The agricultural contribution to the district's value added was $\$_{2007}$244m in 2014, and this is projected to increase by an additional 26% by 2061, to $\$_{2007}$308m. The other major industry that shows significant relative growth above other industries is construction, projected to increase from a $\$_{2007}$83m value added industry in 2014, to $\$_{2007}$133m in 2061.

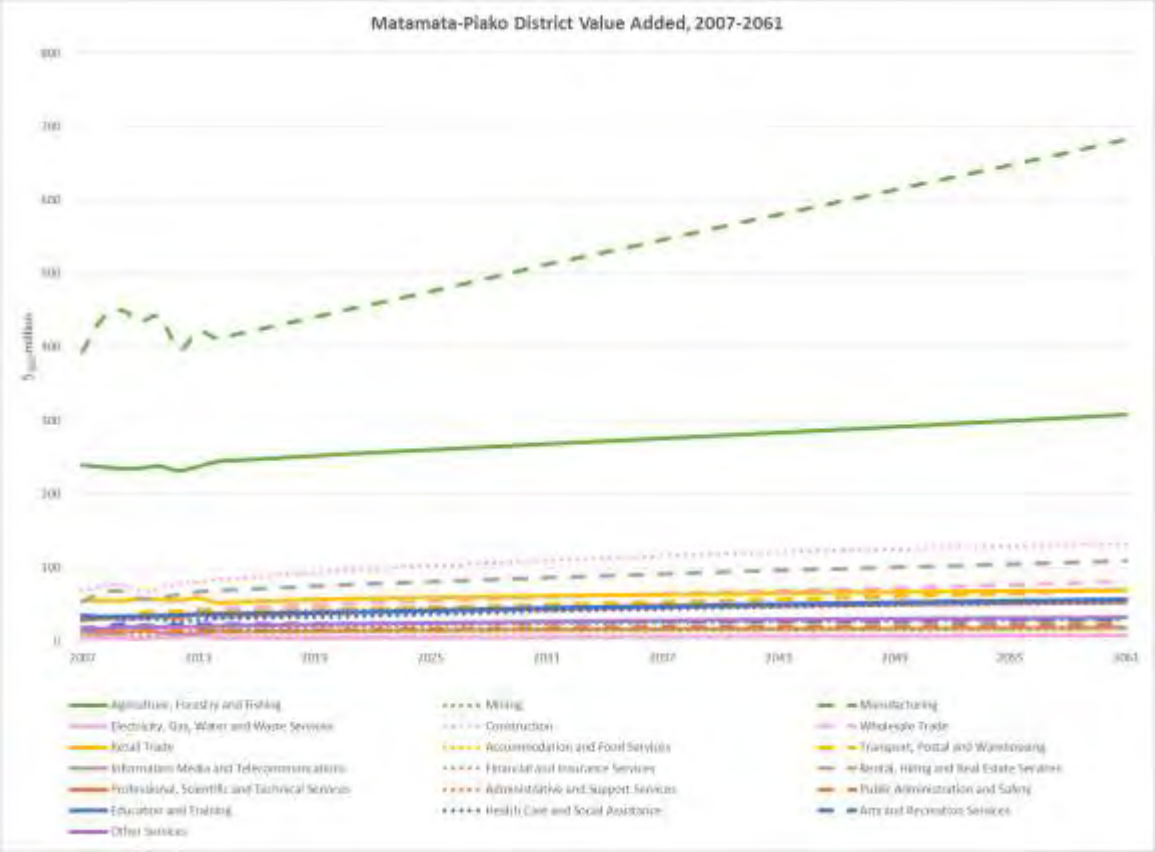

Figure 52: Matamata-Piako Value Added, 2007 to 2061

Note: The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

6.3.4.6 Thames Coromandel District

The Thames Coromandel District has a relatively diversified industry structure, with five industries employing over 1,000 MECs in 2014. Retail trade is the largest employer in the territorial authority with 1,789 MECs, but is projected to decrease to 1,389 MECs in 2061 (Figure 53). Employment in accommodation and food services are projected to increase marginally from 1,504 MECs to 1,611 MECs by 2061, overtaking the number employed in agriculture, forestry and fishing. Construction is another industry with projected high growth rates, projected to be the third highest industry by employment by 2061. Currently (2014), the healthcare and social assistance industry has the third highest number in employment, but is projected to decline to sixth position by 2061, with the manufacturing and agricultural industries projected to employ more people. Employment in transport industry is projected to grow significantly by 55% from 463 MECs in 2014 to 715 MECs in 2061.

Although manufacturing is not the greatest employer, it contributes the greatest dollar amount to the Thames-Coromandel District's economy with $\$_{2007}$81m in 2014. This trend is set to extend into the future (Figure 54). Similarly, construction, although fourth in terms of employment, is second in terms of contribution to value added ($\$_{2007}$74m in 2014), reflecting difference in labour intensities of production across sectors. The agriculture industry's contribution to the economy is projected to overtake retail for Thames-Coromandel District by 2061, increasing to $\$_{2007}$102m from $\$_{2007}$49m in 2014.

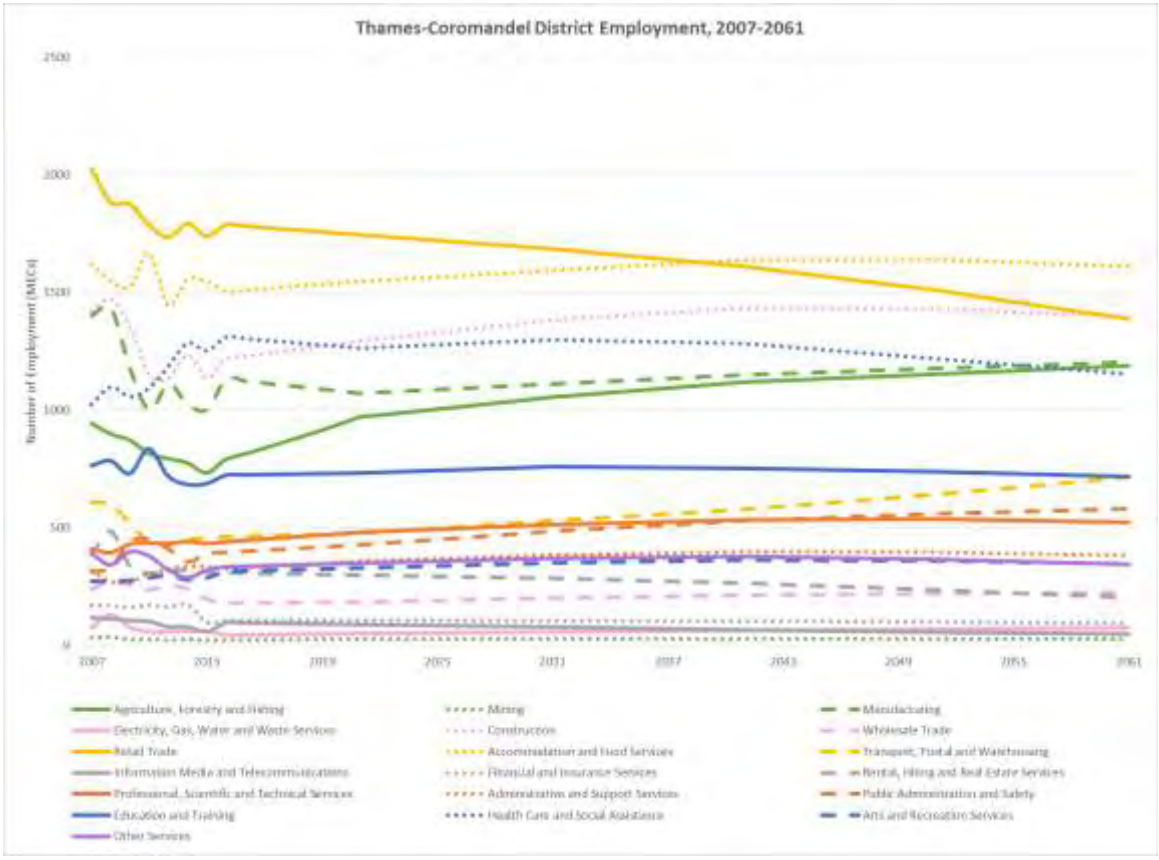

Figure 53: Thames-Coromandel District Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

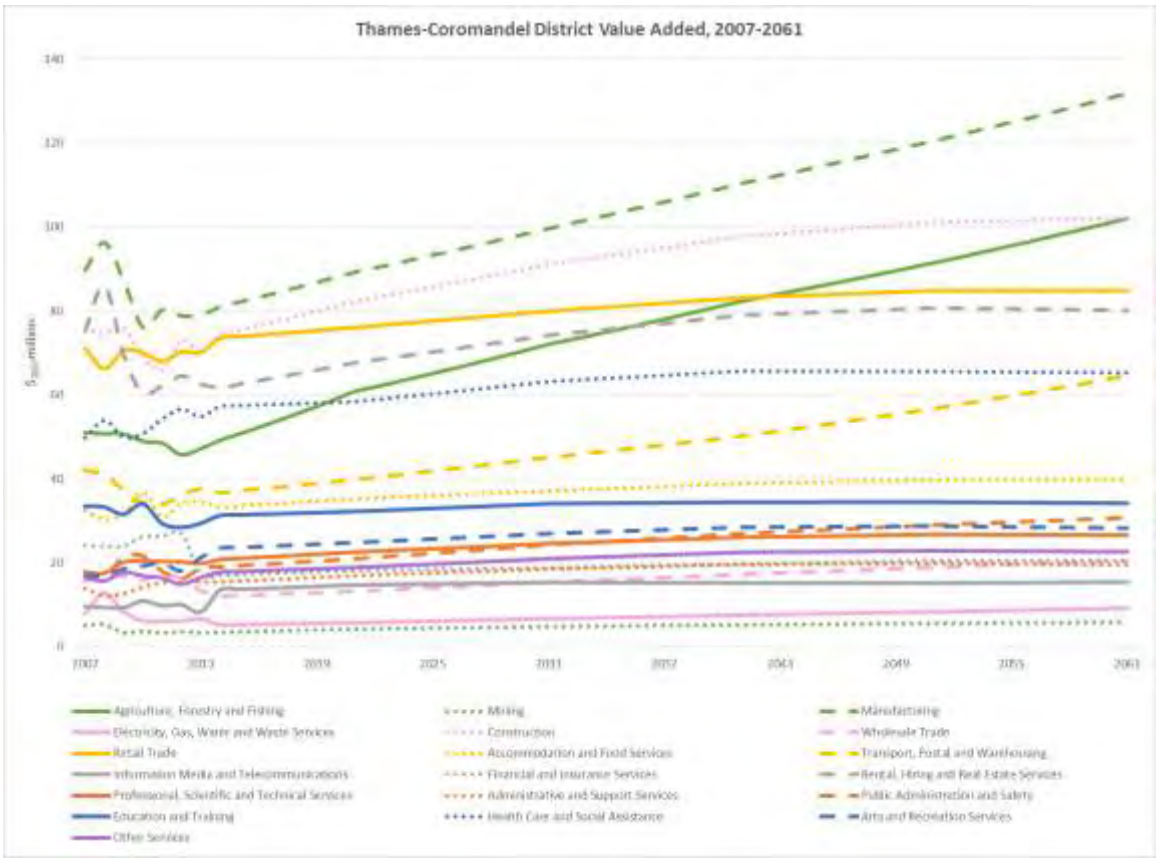

Figure 54: Thames-Coromandel District Value Added, 2007 to 2061

Note: The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

6.3.4.7 South Waikato District

The South Waikato District has approximately 5% of the Waikato region's workforce. Being a rural district, agriculture dominates the economy in terms of employment, with manufacturing following second. In 2014, there were 2,209 MECs employed in agriculture. This is projected to decrease to 1,701 by 2061 (Figure 55). Similarly, manufacturing decreases from 1,494 MECs in 2014 to 1,338 MECs by 2061. The education and training industry was the third largest in terms of employment in 2014, with 908 MECs, followed closely by retail trade with 752 MECs. There is little change in the education industry projections out to 2051. However, the retail industry decreases by 25% from 752 MECs in 2014 to 564 MECs in 2061. The electricity, gas, water and waste services sector exhibits the most substantial growth, increasing 68% from 128 MECs in 2014 to 215 MECs in 2061.

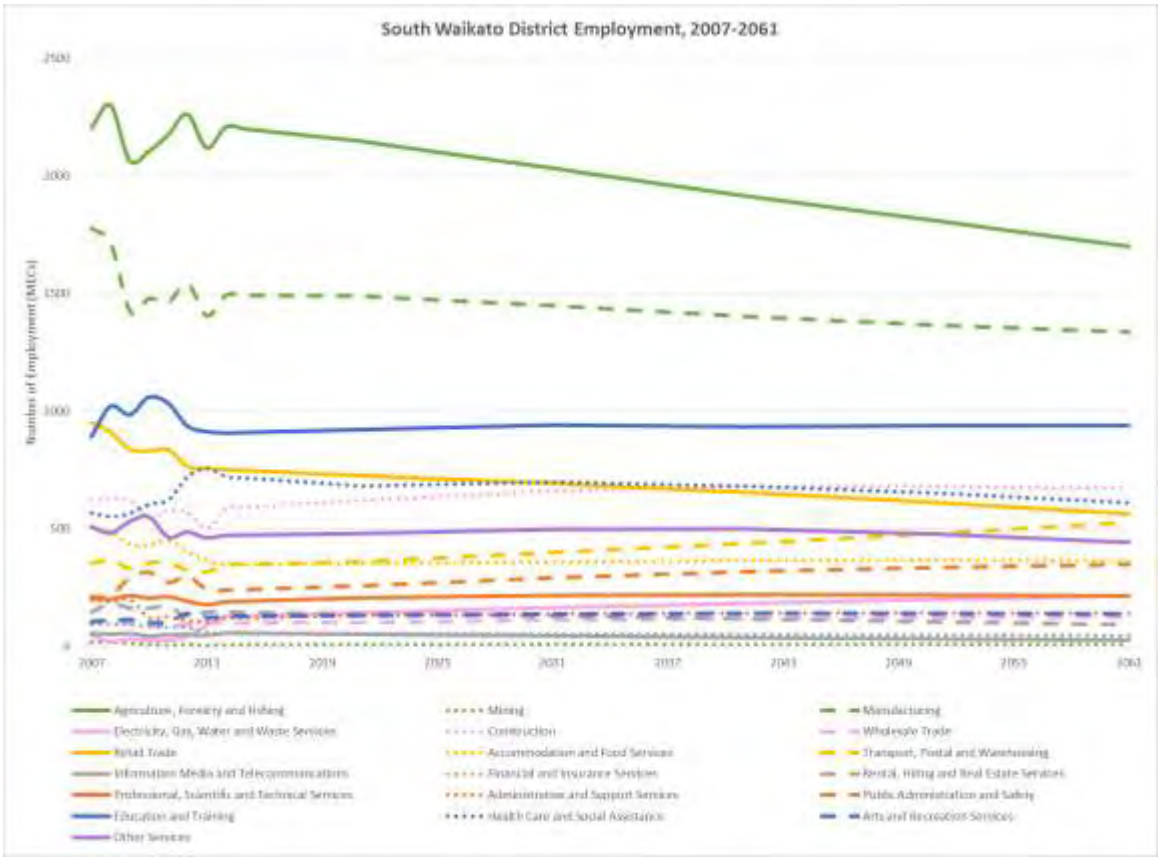

Figure 55: South Waikato District Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

Despite not employing the greatest number of people, manufacturing contributes the most to the South Waikato District in terms of value added or GDP. This trend is set to continue into the future, with both manufacturing and agriculture projected to increase their value added contributions (Figure 56). Manufacturing contributed $\$_{2007}$202m to the district economy in 2014, with agriculture contributing $\$_{2007}$159m. These values are projected to increase to $\$_{2007}$336m and $\$_{2007}$190m respectively by 2061 reflecting increase in productivity over time. These two industries together contribute to half of the region's value added.

Similar to employment, the value added contribution of electricity, gas, water and waste services industry value added is projected to increase significantly over the study period.

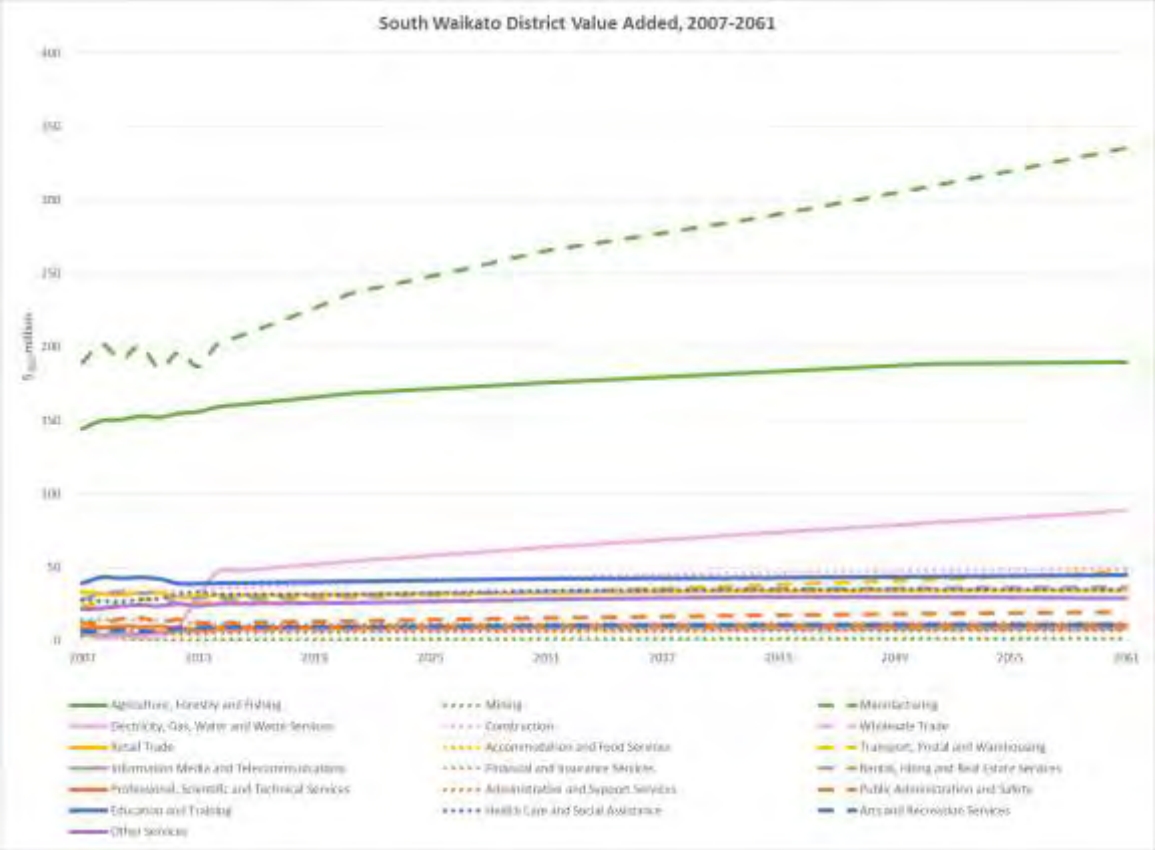

Figure 56: South Waikato District Value Added, 2007 to 2061

Note: The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

6.3.4.8 Hauraki District

The Hauraki District is currently heavily dependent on agriculture, with over 1,570 MECs in 2014, or just over one in five people employed in agriculture. Although agriculture is projected to remain the dominant employer by 2061 (Figure 57), there is considerable growth of employment in manufacturing in the district, projected to grow from 795 MECs in 2014 to 1,084 in 2061. This is a considerable increase for this region, constituting the greatest percentage growth of employment in manufacturing for the Waikato region. The health care and social assistance industry is the second largest industry in 2014 with 864 MECs. However, it is projected to be overtaken by the manufacturing industry to become the third largest in terms of employment by 2061, reaching 911 MECs by 2061. As in the other areas with relatively substantial population and economic growth, quite substantial increases in construction industry employment are projected. The fifth largest industry, retail trade, is projected to decline in employment, continuing the downward trend to 560 MECs in 2014, and to 472 MECs by 2061.

In terms of value added contribution to the economy, the agriculture, forestry and fishing industry is the largest, with $\$_{2007}$100m in 2014, projected to increase to $\$_{2007}$132 by 2061 (Figure 58). The second largest contributor in value added terms is manufacturing, although its contribution in 2014 was only half the value of agriculture – with $\$_{2007}$66m. That gap will lessen, as manufacturing is projected to contribute $\$_{2007}$110m by 2061. There are no other significant projected changes to the Hauraki District's economy, with incremental increases in the other industries' value added.

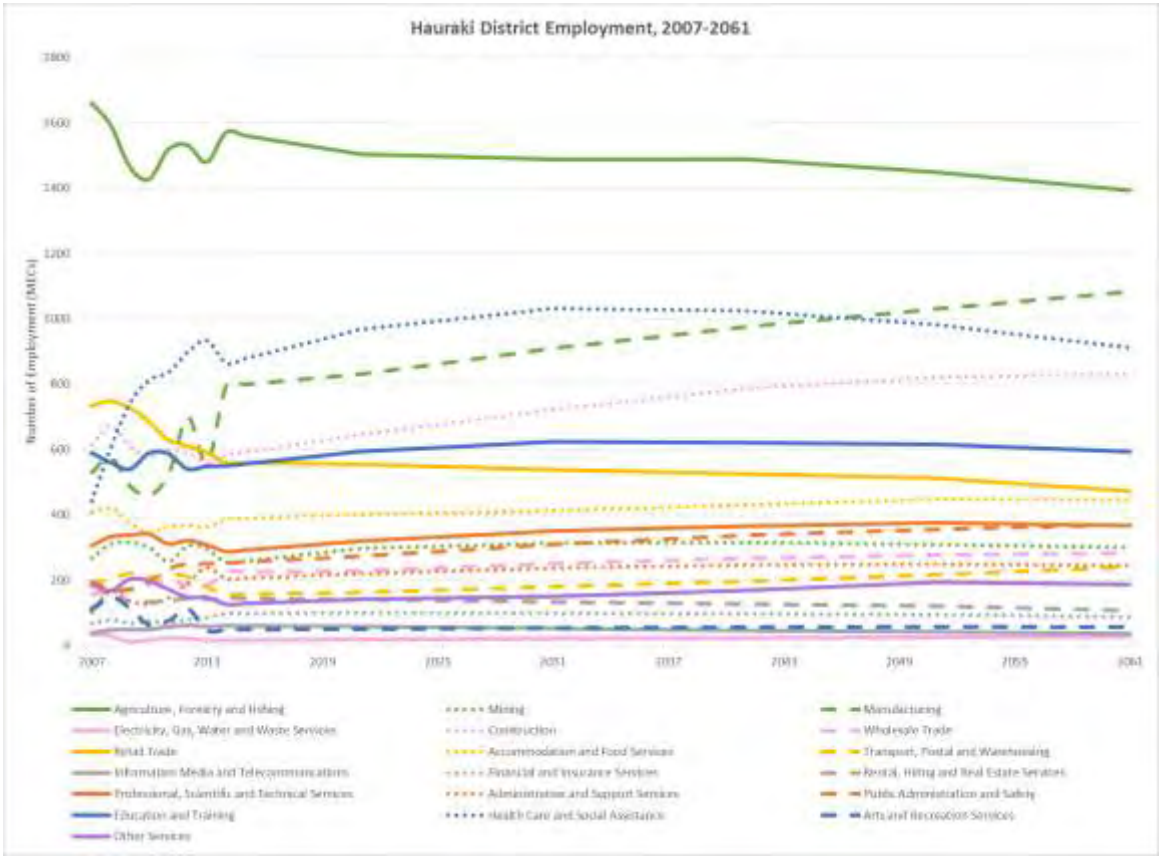

Figure 57: Hauraki District Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

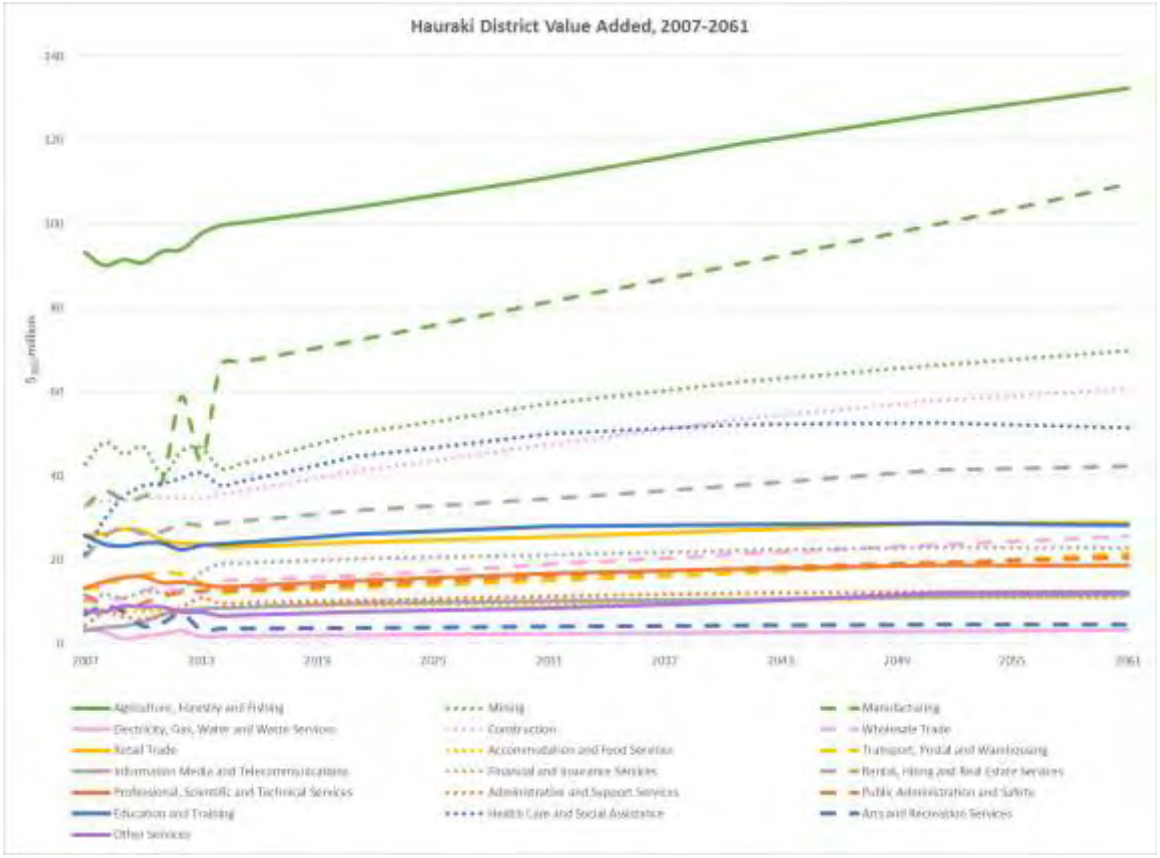

Figure 58: Hauraki District Value Added, 2007 to 2061

Note: The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

6.3.4.9 Waitomo District

The Waitomo District is similar in structure to the South Waikato District, although the Waitomo economy is about half the size of South Waikato, in terms of both employment (5,004 MECs in 2014) and value added ($\$_{2007}$379m). Agriculture is the dominant industry in the Waitomo District, followed by manufacturing. 1,433 people were employed in the agriculture, forestry and fishing industry in 2014, and this figure is projected to increase to 1,709 MECs by 2061 (Figure 59). Manufacturing had 677 MECs in 2014, with a marginal increase to 716 MECs projected for 2061. The construction industry is the third largest, in terms of employment, with 362 MECs in 2014 increasing to 418 MECs in 2061.

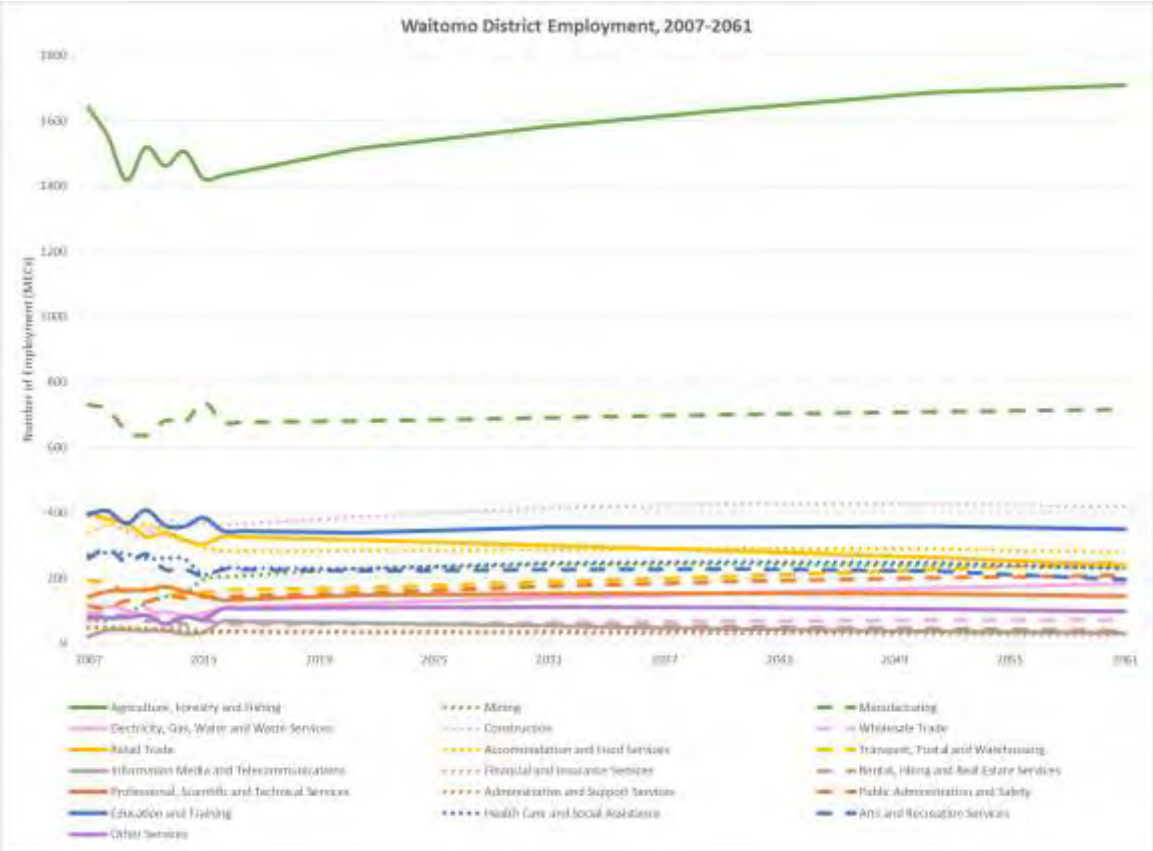

Figure 59: Waitomo District Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

As an example of projected employment changes at AU level within the Waitomo District, we extracted Mokauiti (Figure 60). This is an AU particularly dependant on agriculture. Again, these projections are not deterministic, as it is impossible to predict whether trends based on recent behaviours will continue fifty years into the future.

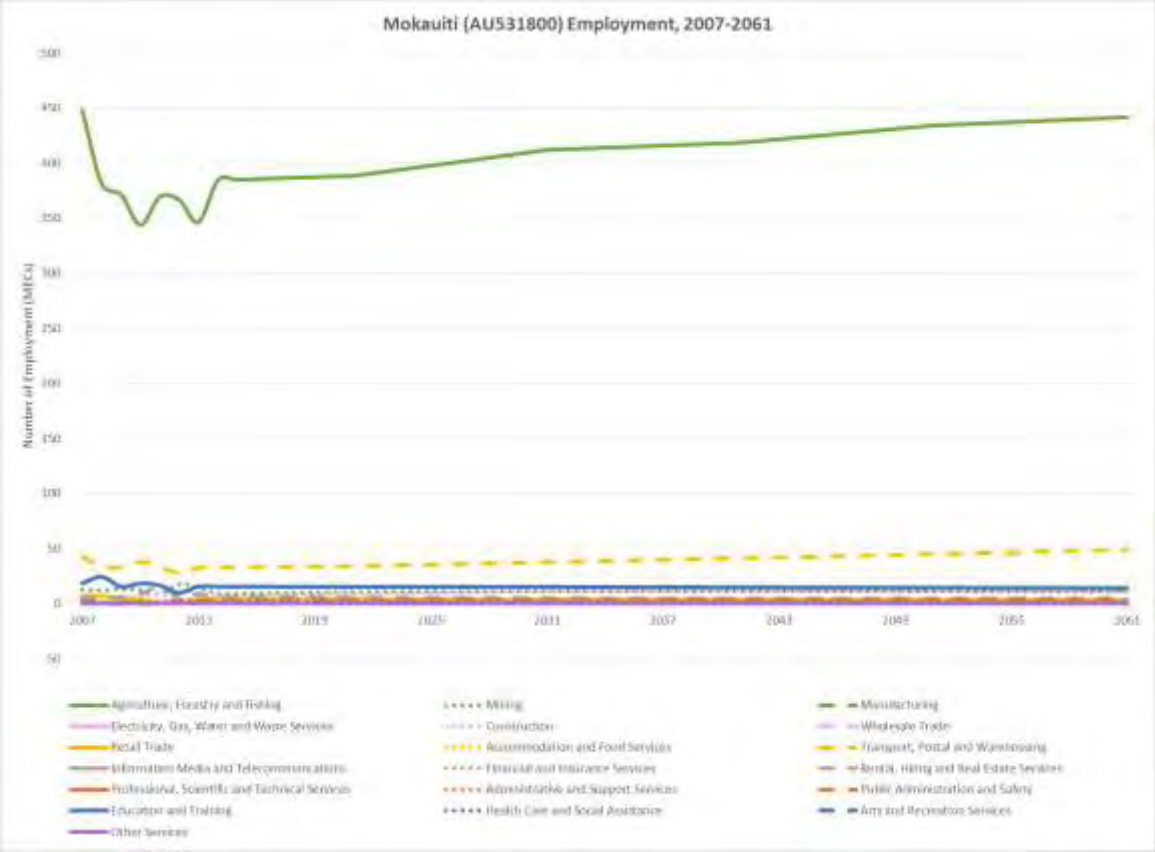

Figure 60: Mokauiti District Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

Nearly half of industries within the Waitomo District are projected to shed employees by 2061. These include 87 MECs from the retail trade industry, 36 MECs from information media and telecommunications, 31 MECs from arts and recreation services, and 28 from rental, hiring and real estate services. The loss from service sectors could indicate a process of rural out migration, particularly as the population ages and people move closer to centres offering services such as healthcare.

Total GDP or value added for the Waitomo District was $\$_{2007}$379m in 2014. This is expected to rise to $\$_{2007}$569 by 2061 (Figure 61). Agriculture contributed $\$_{2007}$78m of value added while manufacturing contributed $\$_{2007}$67m in 2014, with increases to $\$_{2007}$136m and $\$_{2007}$97m projected in 2061 respectively. The mining activity in the district increases considerably from a $\$_{2007}$33m in 2014, to $\$_{2007}$54m by 2061. The contribution of the electricity, gas, water and waste services industry to the district's economy is projected to increase significantly as well, from $\$_{2007}$51m in 2014 to $\$_{2007}$97m by 2061. Although beginning from a relatively low base, the percentage increase in the construction industry is also relatively high (i.e. $\$_{2007}$31m of value added by 2061 from $\$_{2007}$22m in 2014).

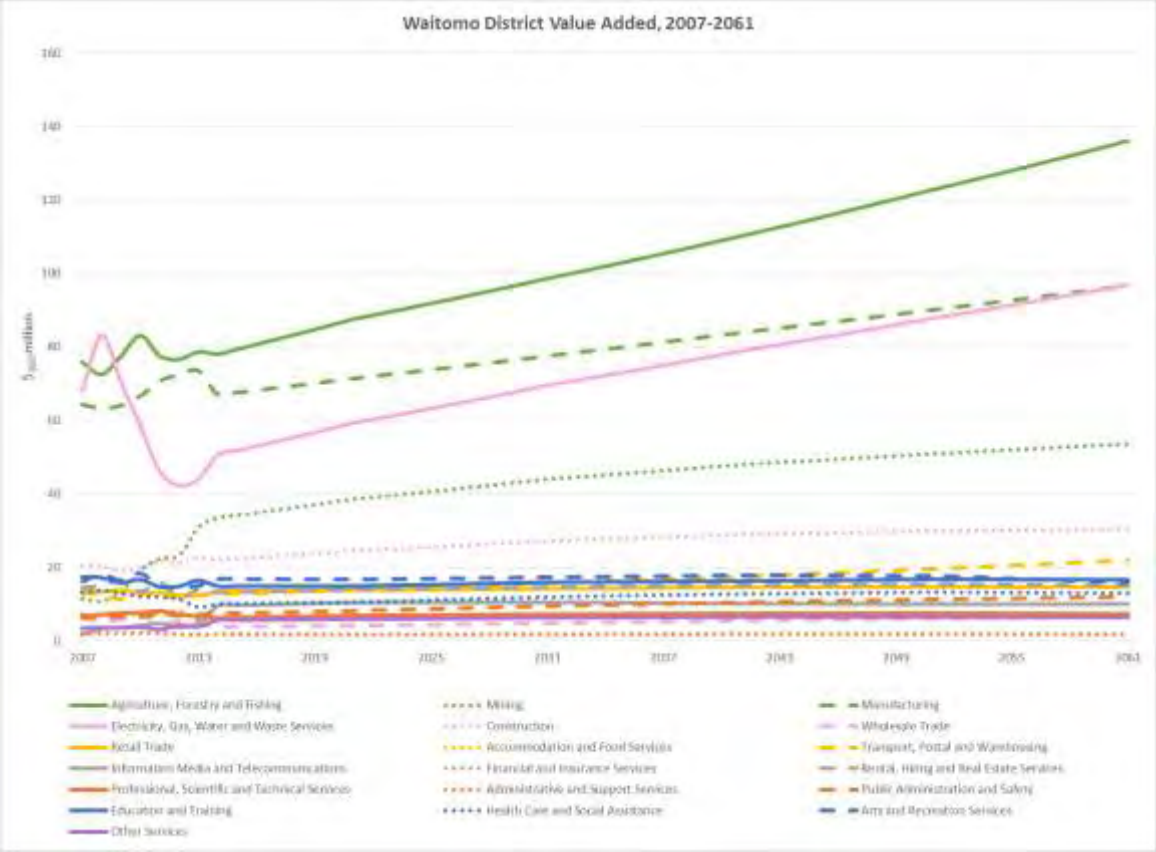

Figure 61: Waitomo District Value Added, 2007 to 2061

Note: The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

6.3.4.10 Otorohanga District

Otorohanga is the second smallest district in the Waikato region in terms of economic activity. It is dominated by the agriculture, forestry and fishing industry. In 2014, 1,824 people (or 41% of the district's MECs) were employed in agriculture, out of a total of 4,484 MECs. Public administration and safety is currently the second largest industry by employment, with 502 MECs, followed by manufacturing with 296 MECs. All other industries in the district employed less than 250 MECs in 2014 (Figure 62).

Given the dominance of agriculture, it is not surprising that it contributes the greatest amount of value added or GDP to the district. In 2014, the value added of agriculture was $\$_{2007}$119m, or 40% of the district's total GDP of $\$_{2007}$298m. Agriculture is projected to increase to $\$_{2007}$175m by 2061 in value added terms (Figure 63), which would constitute 41% of the district's value added (of $\$_{2007}$433). The public administration and safety industry grows considerably from $\$_{2007}$29m in 2014 to $\$_{2007}$47m in 2061. Other industries are projected to grow over the next 50 years with significant increase in mining, electricity, gas, water and waste services, wholesale trade, and transport.

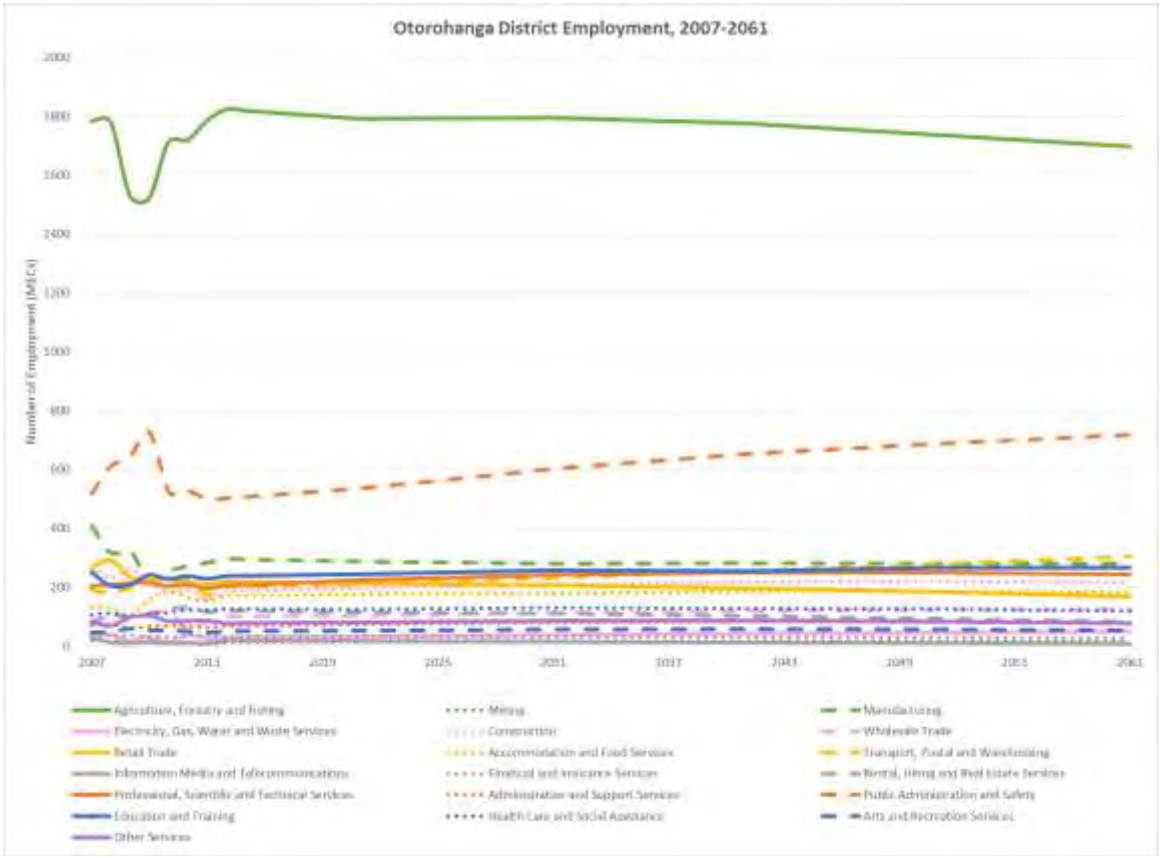

Figure 62: Otorohanga District Employment, 2007 to 2061

Note: The employment figures for 2007 through to 2014 are actuals derived from Statistics New Zealand's 2014 Business Frame.

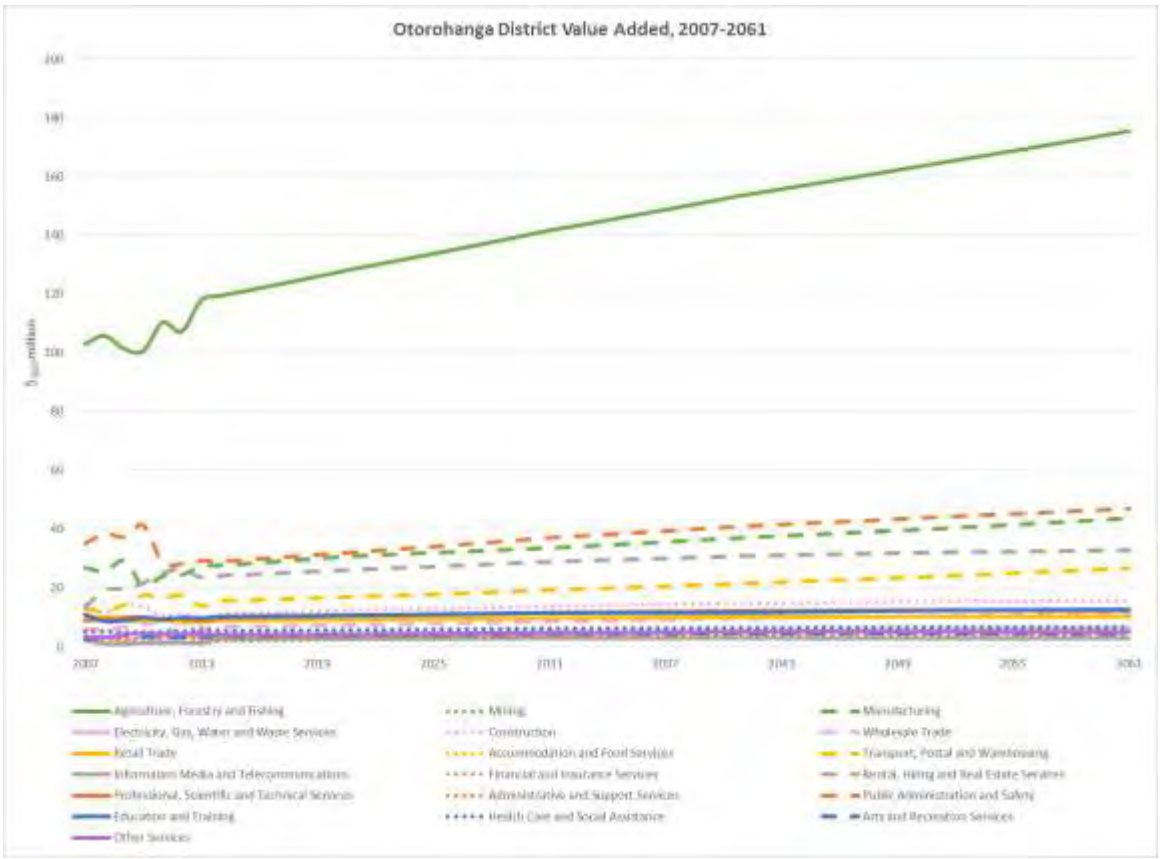

Figure 63: Otorohanga District Value Added, 2007 to 2061

Note: The value added figures for 2007 to 2014 are estimates based on M.E's multi-regional input-output table for the financial year ending March 2007 as derived from the latest available Statistics New Zealand Inter-Industry Study of the New Zealand economy.

6.3.5 Area Units

Data on the projected changes in value added and employment is now available at the CAU level. As we analyse 200 CAUs in the Waikato region, it is not possible to report on all of the AUs in this document. However, we wish to direct readers to the level of economic detail that is now available for use, for planning and decision making. For illustrative purposes, we have already reported on selected AUs in the above sections on projected changes to territorial authorities.

Caution is warranted on over-reliance on the reported projections. These results are indicative only of how the CAUs could transition into the future, but are in no way indicative of what will transpire. The area unit projections can be seen to be accurate in as much as the CAUs follow recent trends, given the land use constraints that were identified through the WISE modelling. A decision to either relocate an industry, or locate a new/emerging industry in a particular area can have transformative effects to that locality, and we are certain that such decisions will be taken.

We have undertaken a cursory analysis of the trends in the projected CAU data. For example, in terms of concentration of employment, five CAUs within the Waikato region have significant proportions of the region's employees, four of which are within Hamilton City territorial authority. By 2061, Hamilton Central is projected to have 10.8% of total MECs, Te Rapa - 8.0%, Frankton Junction - 5.0%, Hamilton Lake - 3.8%, and Taupo Central in Taupo District 2.0% of the region's total. The four largest AUs of Hamilton already make up 27.5% of the Waikato region total. Seven AUs have more than 2% of the region's MECs, and ten AUs have between 1-2%, while the remaining 183 area units have less than 1% of the region's MECs in 2061. Unsurprisingly, this reinforces the overall dominance of employment within Hamilton City.

Although there is overall growth in employment in Waikato region, some territorial authorities and AUs are projected to experience a decline in employment between 2014 and 2061. These are shown in Table 9. Most of these changes are marginal, with the noticeable exceptions of Kinleith, Te Poi, Arapuni, Lichfield, Golden Springs and Ngakuru, with losses of over 100 MECs in each, constituting a loss of over 10 per cent of their 2014 workforce, for each of those three areas. Further analysis of the changes within each AU is required, to enable an understanding of the industries which are projected to lose employees. The spatial modelling enables an analysis by area unit level. Although it is too detailed to present each area unit in this report, it is worth noting that the projected changes by industry can be explored at the AU level, giving a valuable insight into how industry is likely or could change within territorial authorities. We stress that this is only one projected pathway, and there are an infinite number of alternative pathways.

As an example of the level of detail, Table 11 presents the results of an inquiry into declining employment by 2061, and similar inquiries of declines/growth in particular industries can be undertaken at an AU level. It is also useful to look at projected changes in a nearer timeframe (2031), as trends out to that time may be different from the 'average trends' out to 2061.

Table 11: Areas with projected decline in employment, 2014 to 2061.

Territorial Authority	Area Unit	Actual MECs in 2014	Projected MECs in 2031	Compounded Annual Growth Rate (2014-2031)	Projected MECs in 2061	Compounded Annual Growth Rate (2014-2061)
Waipa District	Allen Road	92	87	-0.30%	76	-0.41%
Waipa District	Pokuru	195	176	-0.59%	159	-0.43%
Waipa District	Rotongata	279	254	-0.55%	220	-0.50%
Waipa District	Rotoorangi	870	860	-0.07%	854	-0.04%
Waipa District	Te Rore	122	109	-0.65%	96	-0.50%
Waipa District	Tokanui	146	128	-0.77%	110	-0.59%
Waikato District	Gordonton	321	305	-0.29%	317	-0.03%
Taupo District	Broadlands	172	159	-0.47%	158	-0.18%
Taupo District	Tongariro	200	199	-0.03%	190	-0.11%
Matamata-Piako District	Te Poi	325	264	-1.20%	222	-0.80%
Thames-Coromandel District	Tairua	430	451	0.28%	414	-0.08%
Thames-Coromandel District	Whangamata	1,497	1,519	0.08%	1,440	-0.08%
South Waikato District	Arapuni	776	745	-0.24%	651	-0.37%
South Waikato District	Kinleith	892	857	-0.24%	625	-0.76%
South Waikato District	Lichfield	930	867	-0.41%	752	-0.45%
South Waikato District	Putaruru	1,386	1,410	0.10%	1,330	-0.09%
South Waikato District	Strathmore	269	262	-0.16%	230	-0.33%
South Waikato District	Tapapa	467	463	-0.04%	459	-0.04%
Hauraki District	Hauraki Plains	1,067	1,021	-0.26%	974	-0.19%
Otorohanga District	Te Kawa	123	108	-0.75%	89	-0.67%
Rotorua District (part in Waikato)	Arahiwi	70	68	-0.23%	65	-0.16%
Rotorua District (part in Waikato)	Golden Springs	895	766	-0.91%	697	-0.53%
Rotorua District (part in Waikato)	Ngakuru	634	599	-0.34%	532	-0.38%

A full set of the results are contained in Waikato Regional Council Doc#3492118.

6.3.6 Comparison of the Future Proof Employment Projections against the MBIE Short-term Employment Forecasts

The Ministry of Business, Innovation and Employment (MBIE) produces regular short-term employment forecasts to support immigration and education policy development. The forecasts are at a high level of industry and occupation detail, and cover each regional council in New Zealand. Specifically, the forecasts cover the period from March 2015 to March 2018.

The MBIE estimates are based on forecasts of key macroeconomic variables, such as interest rates, GDP and exchange rate, as developed by Treasury and the Reserve Bank. The industry level macroeconomic forecasts are then used with the labour force productivity to derive the industry level employment forecasts by each regional council. The forecasts by occupations and skill levels are calculated by using occupational shares for each industry.

The employment forecasts for the Waikato region suggest that there will be continued growth in the total employment, although the growth rate peaks in the 2015 March year and is expected to slow over the next three years. Industries focused on domestic consumption experience growth from increase in construction, private and hospitality service industries. Commodity based industries such as agriculture, forestry and mining are projected to experience declines in employment caused by a forecasted decrease in global demand for associated commodities.

A detailed comparison of the regional and CAU level employment forecasts presented in this report and those developed by MBIE is not possible for two key reasons: (1) the two series of forecasts use different employment definitions and measures; and (2) base year employment data used in the MBIE forecasts does not correspond with estimates from the 2013 Census of Population and Dwellings, 2013 Business Frame, or Household Labour Force Survey – in fact, they are substantially different. Thus, further work, beyond the scope of this study, is required to reconcile the MBIE forecasts with these established datasets. We have, however, compared the annualised geometric growth rates from 2015-2018 in the MBIE forecast and 2014-2021 forecasts included in the Waikato Integrated Scenario Explorer (WISE).

Overall, general direction and broad magnitude of growth rates are comparable between both sets of forecasts. Industries experiencing decreasing trends, particularly

forestry, textile manufacturing, and wood product manufacturing, are shared across the two projection sets. The MBIE forecasts generally have greater magnitude of change compared to the WISE forecasts. Some industries greatly affected by global demands, such as mining, were forecasted to decline in the MBIE forecast while WISE forecasted slow but continued growth. Table 12 summarises the differences between the two sets of forecasts.

The employment growth rate differences between the MBIE and the WISE forecasts are related to the fundamental differences in the purpose of the forecast. The MBIE forecasts are short-term employment changes based on business cycles, short-term trends and global economic environments. Therefore, MBIE method focuses on up to date available data. For example, the most recent MBIE short-term forecast utilises decreases in global commodity demand following a slowdown in the Chinese economy. The MBIE forecast are more suited for short-term policy advisory. The WISE forecasts are long-term employment forecasts based on long-term structural changes in the regional economy arising from technology and demographic shift, aspirations of the governing body and major long-term developments. The data used in the WISE forecasts are based on the most up to date regional council plans and aspirations. The WISE employment forecasts, for example, include additional economic activities associated with the development of the Ruakura inland port.

Table 12: Comparison of MBIE and Future Proof Employment

MBIE Sectors	MBIE 2015 Employment	MBIE 2015-18 Employment Growth Rates	WISE 2014 Employment	WISE 2014-21 Employment Growth Rates
Agriculture	13,787	2.7%	24,539	0.6%
Fishing	231	7.4%	323	2.1%
Forestry and logging	196	-9.0%	1,061	-0.6%
Mining and quarrying	693	-8.3%	1,367	1.5%
Food, beverage and tobacco manufacturing	6,390	3.9%	8,213	0.8%
Textiles and apparel manufacturing	474	-8.8%	406	-1.2%
Wood and paper products manufacturing	1,205	-1.9%	2,123	-0.9%
Printing, publishing and recorded media	408	-0.3%	906	1.5%
Chemicals manufacturing	1,727	-2.7%	1,659	2.3%
Non-metallic mineral products manufacturing	706	6.5%	559	1.8%
Metal product manufacturing	2,897	2.9%	3,033	1.6%
Machinery and equipment manufacturing	3,397	5.6%	3,869	2.1%
Furniture and other manufacturing	514	1.3%	549	1.4%
Electricity, gas and water supply	1,825	1.9%	2,071	2.1%
Construction	16,006	3.9%	15,904	2.1%
Wholesale trade	6,796	2.0%	7,480	1.5%
Retail trade (including motor vehicle repairs)	15,623	2.9%	18,697	1.0%
Accommodation, cafes and restaurants	9,181	3.7%	12,502	1.2%
Transport and storage	4,369	1.6%	5,885	2.1%
Communication services	1,661	-2.7%	1,704	0.4%
Finance and insurance	2,710	-3.5%	2,539	1.5%
Property services	3,185	5.6%	4,191	0.5%
Business services	17,244	4.4%	21,093	1.8%
Government admin. and defence	8,978	2.7%	8,283	1.5%
Education	12,965	2.2%	15,982	1.2%
Health and community services	16,134	3.9%	20,426	1.1%
Cultural and recreational services	4,107	2.1%	4,056	1.7%
Personal and other community services	6,213	1.7%	5,997	1.4%
Total	159,619	2.9%	195,416	1.3%

6.4 Conclusion

This modelling exercise has projected changes in economic indicators within the Waikato region, at a very detailed spatial and industry level. Specifically, employment and value added for two hundred area units and 19 industries has been generated for the Waikato region. This provides unprecedented information for exploration of economic futures for the Waikato region. Patterns of industry and spatial change can be investigated across the whole region, as well as changes in economic structure within AUs themselves. Although the modelling generally forecasts growth across the region, there are some areas that will face contraction of specific industries. There are also some significant changes projected for the structure of economies at a local level.

References

Angrist J, Pischke S 2008. Mostly harmless econometrics: An empiricists' companion. Princeton, NJ, Princeton University Press.

Bryant J, Jacobsen V, Bell M, Garrett D 2004. Labour force participation and GDP in New Zealand. Treasury Working Paper No. 04/07. Wellington, Treasury.

Cameron MP 2015. Using land-use modelling to statistically downscale population projections to small areas. Presented at the Statistics New Zealand seminar, Christchurch, 11 February.

Cameron MP, Poot J 2011. Lessons from stochastic small-area population projections: The case of Waikato subregions in New Zealand. Journal of Population Research 28(2-3), 245-265.

Cameron MP, Cochrane W 2014a. Population, family and household, and labour force projections for the Waikato Region, 2013-2063. Research report commissioned by Waikato Regional Council. Hamilton, New Zealand, University of Waikato.

Cameron MP, Cochrane W 2014b. Small-area population, household, and labour force projections for the Waikato Region to 205. Research report commissioned by Waikato Regional Council. Hamilton, New Zealand, University of Waikato.

Cameron MP, Cochrane W 2015a. Population, household, and labour force projections for the Waikato Region, 2013-2063 (2015 update). Waikato Regional Council Technical Report 2015/28. Hamilton, New Zealand, Waikato Regional Council.

Cameron MP, Cochrane W 2015b. Using land-use modelling to statistically downscale population projections to small areas. Presented at the 55th European Regional Science Association Congress, Lisbon, 25-28 August.

Cameron MP, Cochrane W 2015c. Using land-use modelling to statistically downscale population projections to small areas. Presented at the 8th International Conference on Population Geographies, Brisbane, 30 June-3 July.

Castalia Strategic Advisors 2010. Ruakura intermodal terminal. Report to Tainui Group Holdings. Wellington, New Zealand, Castalia Limited.

Huser B, Rutledge D, van Delden H, Wedderburn ME, Cameron M, Elliot S, Fenton T, Hurkens J, McBride G, McDonald G, O'Connor M, Phyn D, Poot J, Price R, Small B, Tait A, Vanhout R, Woods RA 2009. Development of an integrated spatial decision support system (ISDSS) for local government in New Zealand. Proceedings of the MODSIM09 International Congress on Modelling and Simulation. Christchurch, Lincoln University. 2370-2376.

Intergovernmental Panel on Climate Change (IPCC) 2013. Climate change 2013: The physical science basis: Contribution of Working Group I to the fifth assessment report of the Intergovernmental Panel on Climate Change. Cambridge, United Kingdom, Cambridge University Press.

Jackson NO, Cameron MP, Cochrane W 2014. 2014 review of demographic and labour force projections for the Waikato Region for the Period 2013-2063. Research report commissioned by Hamilton City Council, Waikato District Council, and Waipa District Council. Hamilton, National Institute for Demographic and Economic Analysis, University of Waikato.

Roskruge M, Cameron MP, Cochrane W 2011. Waikato district sub-district population projections, 2011-2031. Research report commissioned by Waikato District

Council. Hamilton, National Institute for Demographic and Economic Analysis, University of Waikato.

Rutledge D, Cameron M, Elliott S, Fenton T, Huser B, McBride G, McDonald G, O'Connor M, Phyn D, Poot J, Price R, Scrimgeour F, Small B, Tait A, van Delden H, Wedderburn L, Woods RA 2008. Choosing regional futures: Challenges and choices in building integrated models to support long-term regional planning in New Zealand, Regional Science Policy and Practice 1(1), 85-108.

Rutledge D, Cameron M, Elliott S, Hurkens J, MacDonald G, McBride G, Phyn D, Poot J, Price R, Schmidt J, van Delden H, Tait A, Woods R 2010. WISE – Waikato Integrated Scenario Explorer, technical specifications version 1.1 Research report commissioned by Environment Waikato (Waikato Regional Council). Hamilton, Landcare Research.

Rutledge D, Fraser S, Palmer D, Price R 2014. WISE land-use suitability: Review and recommendations. Landcare Research Report, May 2014. Waikato Regional Council document no. 3083060.

Sherman, C 2015. Waikato region land use/zoning matrix. Prepared for Waikato Regional Council by Environmental Management Services Ltd. Waikato Regional Council document no. 3379780 (report) and no. 3379779 (data).

Smith SK, Shahidullah M 1995. An evaluation of population projection errors for census tracts. Journal of the American Statistical Association 90(429), 64-71.

Triantakonstantis D, Mountrakis G 2012. Urban growth prediction: A review of computational models and human perceptions. Journal of Geographic Information System 4(6), 555-587.

Urich P, Li Y 2015. Wise climate change scenarios readme file. Report prepared for Waikato Regional Council. Hamilton, CLIMsystems. (Waikato Regional Council document no. 3384464).

Van Delden H, Gutiérrez E, Van Vliet J, Hurkens J 2008. Xplorah: a multi-scale integrated land use model. In: Sànchez-Marrè M, Béjar J, Comas J, Rizzoli A, Guariso G eds. Proceedings of the iEMSs fourth biennial meeting: Integrating sciences and information technology for environmental assessment and decision making. Barcelona, Catalonia. 827-834.

Waikato Regional Council 2014. Demographic and economic projections for Waikato: Preliminary results 2013. Unpublished report. Waikato Regional Council document no. 3219004.

Waikato Regional Council 2015. WISE zoning and land use update (March/April 2015): Process and requirements. Unpublished report. Waikato Regional Council document no. 3296199.

Waikato Regional Council 2016 in press. WISE V1.4 technical specifications. Unpublished report. Waikato Regional Council document no. 3506882.

Appendices

Appendix 1: Land use estimates (2013) projections (2021 – 2061) by CAU

(Ordered by TA - values in hectares)

TCDC	AU2013	AU2013_NAM	Land use type	2013	2021	2031	2041	2051	2061	Trend line
	533000	Whitianga	Resid. - Lifestyle	62	71	76	75	74	73	
			Resid. - Low Dens	284	306	335	337	337	337	
			Resid. - Med-High Dens	11	11	11	11	11	11	
			Commercial	0	19	19	19	19	19	
			Manufacturing	16	16	16	16	16	16	
			Dairying	267	260	246	248	315	410	
			Sheep and Beef	655	700	683	679	675	672	
			other Agriculture	0	1	1	1	0	0	
			Cropping	0	0	0	1	1	1	
			Forestry	161	191	196	197	198	199	
			Indigenous	787	726	725	724	662	572	
	533100	Coromandel	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	235	235	237	237	235	229	
			Resid. - Low Dens	52	66	79	80	80	78	
			Resid. - Med-High Dens	1	1	1	1	0	0	
			Commercial	0	7	7	7	7	7	
			Manufacturing	2	2	2	2	2	2	
			Dairying	16	194	493	598	607	693	
			Sheep and Beef	236	222	203	199	198	198	
			other Agriculture	0	0	0	1	1	0	
			Cropping	0	18	19	23	23	26	
			Forestry	51	59	59	59	59	60	
			Indigenous	1221	1020	724	622	617	537	
	533200	Te Rereriga	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	848	854	862	855	813	766	
			Resid. - Low Dens	385	394	400	399	369	310	
			Resid. - Med-High Dens	1	2	2	2	2	2	
			Commercial	0	31	31	31	31	31	
			Manufacturing	11	11	11	11	11	11	
			Dairying	4909	7050	9581	11906	13454	14747	
			Sheep and Beef	20054	20847	20774	20675	20643	20604	
			other Agriculture	75	92	100	105	88	66	
			Cropping	57	160	267	422	518	582	
			Forestry	15703	16675	16699	16699	16728	16757	
			Indigenous	66454	62340	59821	57553	55996	54765	
	533300	Whangamata	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	94	98	101	103	101	99	
			Resid. - Low Dens	334	337	337	337	337	337	
			Resid. - Med-High Dens	8	8	8	8	8	8	
			Commercial	0	7	7	7	7	7	
			Manufacturing	8	8	8	8	8	8	
			Dairying	4	4	3	3	3	3	
			Sheep and Beef	60	56	55	55	55	55	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	1	1	1	
			Forestry	34	36	35	35	35	36	
			Indigenous	37	36	36	36	36	36	
	533400	Tairua	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	32	32	33	33	33	33	
			Resid. - Low Dens	128	128	131	124	119	113	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	1	1	1	1	1	
			Manufacturing	5	6	6	6	6	6	
			Dairying	35	60	60	60	60	60	
			Sheep and Beef	48	56	52	54	54	55	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	2	3	3	3	
			Forestry	9	17	17	22	27	32	
			Indigenous	152	114	114	114	114	114	
	533501	Moanataiari	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	1	1	1	1	1	1	
			Resid. - Low Dens	77	80	80	80	80	80	
			Resid. - Med-High Dens	3	3	3	3	3	3	
			Commercial	0	20	20	20	20	20	
			Manufacturing	5	5	5	5	5	5	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	1	1	1	
			Forestry	0	0	0	0	0	0	
			Indigenous	527	524	524	524	524	524	

TCDC	533502	Parawai	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	100	103	103	103	103	100	
			Resid. - Low Dens	157	162	165	165	165	165	
			Resid. - Med-High Dens	3	3	3	3	3	3	
			Commercial	0	8	8	8	8	8	
			Manufacturing	16	16	16	16	16	16	
			Dairying	151	171	171	171	171	174	
			Sheep and Beef	90	98	96	96	96	96	
			other Agriculture	0	0	0	0	0	0	
			Cropping	1	1	1	21	22	22	
			Forestry	1	1	1	1	1	1	
			Indigenous	188	162	162	147	147	147	
	533602	Pauanui Beach	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	4	4	4	4	3	2	
			Resid. - Low Dens	168	168	168	168	160	154	
			Resid. - Med-High Dens	6	6	6	6	6	6	
			Commercial	0	7	7	7	7	7	
			Manufacturing	4	4	4	4	4	4	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	30	48	48	48	51	51	
			other Agriculture	0	0	0	0	0	0	
			Cropping	4	4	4	7	9	15	
			Forestry	6	34	37	37	41	42	
			Indigenous	153	153	153	152	152	152	
	533603	Hikuai	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	801	804	813	810	797	765	
			Resid. - Low Dens	88	100	109	110	108	104	
			Resid. - Med-High Dens	0	0	1	1	1	1	
			Commercial	0	6	6	6	6	6	
			Manufacturing	56	58	60	61	62	63	
			Dairying	7796	9443	10841	11228	11471	11633	
			Sheep and Beef	6330	6622	6581	6553	6547	6538	
			other Agriculture	8	10	14	15	12	8	
			Cropping	0	15	31	34	35	37	
			Forestry	14325	14589	14596	14584	14575	14555	
			Indigenous	67605	65452	64037	63666	63436	63320	
	533604	Te Puru-Thornton Bay	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	21	21	21	21	21	21	
			Resid. - Low Dens	38	39	41	40	40	40	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	2	2	2	2	2	
			Manufacturing	0	0	0	0	0	0	
			Dairying	2	8	6	6	6	6	
			Sheep and Beef	167	172	172	172	172	172	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	1	1	1	1	
			Forestry	1	1	1	2	2	2	
			Indigenous	1951	1940	1940	1940	1940	1940	

Hauraki DC	AU2013	AU2013_NAM	Land use type	2013	2021	2031	2041	2051	2061	
	521136	Kaiaua	Resid. - Lifestyle	142	142	143	143	143	143	
			Resid. - Low Dens	38	38	38	38	38	38	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	1	1	2	4	4	
			Manufacturing	0	0	0	0	0	0	
			Dairying	1736	2333	2915	3062	3070	3077	
			Sheep and Beef	3603	3792	3782	3775	3765	3756	
			other Agriculture	9	97	114	119	119	119	
			Cropping	0	8	8	13	13	13	
			Forestry	267	288	287	287	283	283	
			Indigenous	2124	1215	620	466	466	466	
	533800	Ngatea	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	7	7	7	7	7	7	
			Resid. - Low Dens	54	54	55	55	53	41	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	7	7	7	7	7	
			Manufacturing	7	7	7	7	7	7	
			Dairying	42	42	42	42	44	56	
			Sheep and Beef	12	13	12	12	12	12	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	

Hauraki DC	533901	Hauraki Plains	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	502	502	502	495	477	446	
			Resid. - Low Dens	8	8	8	7	3	2	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	7	7	7	7	7	
			Manufacturing	6	6	6	6	6	7	
			Dairying	29927	30302	30429	30532	30646	30763	
			Sheep and Beef	8144	8511	8399	8308	8225	8156	
			other Agriculture	34	42	41	40	32	20	
			Cropping	44	58	59	59	57	56	
			Forestry	1535	1598	1595	1588	1585	1582	
			Indigenous	8312	7615	7592	7592	7592	7592	

	533902	Turua	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	368	368	368	363	333	294	
			Resid. - Low Dens	20	20	20	17	5	0	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	1	1	1	1	1	1	
			Dairying	7296	7299	7302	7309	7353	7400	
			Sheep and Beef	733	732	729	730	734	738	
			other Agriculture	17	17	17	17	8	1	
			Cropping	0	0	0	0	2	2	
			Forestry	1	0	0	0	0	0	
			Indigenous	27	26	26	26	26	26	

	533903	Kerepehi	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	33	33	35	34	33	32	
			Resid. - Low Dens	21	21	21	21	21	19	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	17	19	19	20	20	22	
			Dairying	651	650	651	652	653	655	
			Sheep and Beef	37	36	33	32	32	31	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	1	1	1	1	1	1	

	534200	Ohinemuri	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	856	858	860	861	858	858	
			Resid. - Low Dens	86	88	89	89	89	88	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	15903	16495	16863	17574	18095	18192	
			Sheep and Beef	10079	10084	9991	9906	9825	9769	
			other Agriculture	0	0	0	0	0	0	
			Cropping	1	44	46	50	50	50	
			Forestry	2651	2677	2653	2638	2627	2617	
			Indigenous	25322	24694	24423	23792	23358	23336	

	534300	Paeroa	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	83	90	91	91	90	90	
			Resid. - Low Dens	185	194	211	213	213	213	
			Resid. - Med-High Dens	1	1	1	1	1	1	
			Commercial	0	11	11	11	11	11	
			Manufacturing	35	38	39	39	41	44	
			Dairying	434	430	427	428	428	428	
			Sheep and Beef	348	320	304	301	299	296	
			other Agriculture	6	2	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	7	7	7	7	7	7	
			Indigenous	5	5	5	5	5	5	

	534400	Waihi	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	167	171	188	189	189	189	
			Resid. - Low Dens	238	241	246	246	246	246	
			Resid. - Med-High Dens	2	2	2	2	2	2	
			Commercial	0	17	17	17	17	17	
			Manufacturing	26	27	27	27	27	27	
			Dairying	120	123	122	122	122	122	
			Sheep and Beef	160	159	139	138	138	138	
			other Agriculture	1	1	1	1	1	1	
			Cropping	1	1	1	1	1	1	
			Forestry	16	16	16	16	16	16	
			Indigenous	55	53	53	53	53	53	

MPDC	AU2013	AU2013_NAM	Land use type	2013	2021	2031	2041	2051	2061	Trend line
	534500	Tahuroa	Resid. - Lifestyle	518	520	527	531	533	537	
			Resid. - Low Dens	10	10	23	28	30	30	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	14	24	27	28	30	30	
			Dairying	22822	23354	23708	24013	24287	24532	
			Sheep and Beef	6014	5733	5369	5052	4771	4523	
			other Agriculture	202	200	197	196	194	193	
			Cropping	131	128	128	128	128	128	
			Forestry	170	121	108	104	100	98	
			Indigenous	2043	1835	1834	1833	1833	1832	
	534602	Waitoa	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	14	14	16	18	18	18	
			Resid. - Low Dens	16	16	16	16	16	16	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	8	10	12	13	15	15	
			Dairying	528	532	530	526	523	523	
			Sheep and Beef	3	2	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	2	0	0	0	0	0	
			Indigenous	6	4	4	4	4	4	
	534603	Springdale	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	282	283	288	291	291	291	
			Resid. - Low Dens	6	6	6	6	6	6	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	1	1	1	1	1	
			Manufacturing	9	15	24	30	41	62	
			Dairying	28059	28681	29038	29285	29509	29716	
			Sheep and Beef	5343	5184	4878	4635	4425	4237	
			other Agriculture	448	400	380	371	355	315	
			Cropping	25	24	24	23	20	18	
			Forestry	334	339	335	331	325	325	
			Indigenous	8272	7848	7807	7805	7805	7805	
	534604	Waihou-Walton	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	465	465	471	474	474	475	
			Resid. - Low Dens	18	18	19	19	19	19	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	2	2	2	2	2	
			Manufacturing	12	26	28	28	28	28	
			Dairying	38528	39357	39904	40227	40422	40552	
			Sheep and Beef	2497	1894	1388	1109	949	858	
			other Agriculture	411	367	330	290	260	222	
			Cropping	272	270	268	267	264	263	
			Forestry	859	798	787	779	777	774	
			Indigenous	8036	7918	7918	7917	7917	7917	
	534800	Te Aroha	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	117	132	145	149	149	150	
			Resid. - Low Dens	178	195	200	200	200	203	
			Resid. - Med-High Dens	1	1	1	1	1	1	
			Commercial	0	3	3	3	3	3	
			Manufacturing	10	10	10	10	10	10	
			Dairying	153	168	167	169	172	168	
			Sheep and Beef	141	118	98	52	88	87	
			other Agriculture	5	2	1	1	1	1	
			Cropping	0	0	0	0	0	0	
			Forestry	7	6	5	5	5	5	
			Indigenous	391	372	372	372	372	372	
	534901	Morrinsville West	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	45	45	45	44	44	45	
			Resid. - Low Dens	92	98	101	102	102	102	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	6	6	6	6	6	
			Manufacturing	33	46	55	65	68	68	
			Dairying	75	72	66	65	65	66	
			Sheep and Beef	23	13	13	13	12	10	
			other Agriculture	15	15	9	2	0	0	
			Cropping	3	2	2	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	14	13	12	11	11	11	

MPDC	534902	Morrinsville East	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	43	44	47	48	48	48	
			Resid. - Low Dens	198	210	216	228	232	232	
			Resid. - Med-High Dens	1	1	2	2	2	2	
			Commercial	0	10	10	10	10	10	
			Manufacturing	15	18	18	18	18	18	
			Dairying	57	46	34	21	15	15	
			Sheep and Beef	3	2	2	2	2	2	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	23	18	18	18	18	18	

	535000	Waharoa	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	2	2	2	3	3	3
			Resid. - Low Dens	13	13	14	14	14	14
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	3	3	3	3	3	3
			Dairying	10	10	10	10	10	10
			Sheep and Beef	3	4	3	2	2	2
			other Agriculture	0	0	0	0	0	0
			Cropping	2	2	2	2	2	2
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

	535220	Okauia	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	348	353	359	366	367	368
			Resid. - Low Dens	8	8	9	12	13	18
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	3	3	3	3	3
			Manufacturing	14	34	38	38	38	39
			Dairying	14105	15385	15932	16233	16354	16402
			Sheep and Beef	2016	924	469	220	130	107
			other Agriculture	685	563	464	400	363	330
			Cropping	411	404	404	402	402	402
			Forestry	109	45	36	31	27	25
			Indigenous	2971	2952	2948	2948	2948	2948

	535231	Te Poi	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	85	86	87	87	87	87
			Resid. - Low Dens	4	4	4	4	4	4
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	4	5	5	5	5	5
			Dairying	7808	8229	8474	8619	8687	8751
			Sheep and Beef	1250	921	702	582	517	459
			other Agriculture	59	34	21	3	2	2
			Cropping	69	64	64	66	66	66
			Forestry	95	74	61	54	50	44
			Indigenous	3355	3303	3301	3300	3300	3300

	535242	Hinuera	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	131	131	131	131	131	131
			Resid. - Low Dens	1	1	1	1	1	1
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	1	1	1	1	1
			Manufacturing	25	25	25	25	25	25
			Dairying	6644	8108	8974	9333	9587	9820
			Sheep and Beef	3544	2105	1254	919	686	461
			other Agriculture	478	472	444	409	383	367
			Cropping	259	260	260	260	260	260
			Forestry	107	79	63	51	41	37
			Indigenous	140	114	114	114	114	114

	535501	Matamata North	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	6	7	7	8	8	8
			Resid. - Low Dens	117	120	124	125	125	125
			Resid. - Med-High Dens	6	6	6	6	6	6
			Commercial	0	7	7	7	7	7
			Manufacturing	34	35	35	35	35	35
			Dairying	5	4	3	2	1	1
			Sheep and Beef	3	0	0	0	0	0
			other Agriculture	5	4	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

MPDC	535502	Matamata South	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	25	30	35	40	42	42	
			Resid. - Low Dens	180	186	220	239	240	243	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	4	4	4	4	4	
			Manufacturing	7	8	8	8	8	8	
			Dairying	57	61	39	25	20	18	
			Sheep and Beef	19	12	4	2	2	1	
			other Agriculture	33	28	17	6	5	3	
			Cropping	4	4	2	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	

Waikato DC	AU2013	AU2013_NAM	Land use type	2013	2021	2031	2041	2051	2061	
	521114	Redoubt	Resid. - Lifestyle	42	45	58	70	78	80	
			Resid. - Low Dens	0	1	3	5	5	8	
			Resid. - Med-High Dens	0	0	1	1	1	1	
			Commercial	0	0	0	1	1	1	
			Manufacturing	2	2	2	2	2	2	
			Dairying	71	79	85	88	90	95	
			Sheep and Beef	312	324	289	269	257	243	
			other Agriculture	43	43	43	43	43	43	
			Cropping	144	157	170	172	174	179	
			Forestry	4	4	4	4	4	4	
			Indigenous	43	42	42	42	42	41	

	521115	Opuawhanga	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	111	117	130	139	145	152	
			Resid. - Low Dens	0	0	1	2	2	2	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	5	27	43	69	93	94	
			Dairying	23	35	42	42	42	42	
			Sheep and Beef	365	317	282	245	221	211	
			other Agriculture	38	45	43	40	37	37	
			Cropping	228	249	259	273	276	277	
			Forestry	2	25	15	6	1	1	
			Indigenous	119	116	116	116	116	116	

	521117	Buckland South	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	309	341	368	384	397	407	
			Resid. - Low Dens	2	2	2	2	2	2	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	178	228	269	273	278	281	
			Sheep and Beef	609	418	287	236	202	180	
			other Agriculture	173	174	170	165	164	165	
			Cropping	529	605	645	672	686	695	
			Forestry	27	24	24	24	23	23	
			Indigenous	114	104	101	100	100	100	

	521131	Pokeno	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	701	749	867	985	1054	1108	
			Resid. - Low Dens	13	71	232	266	302	319	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	3	3	3	6	6	
			Manufacturing	4	5	28	74	125	147	
			Dairying	576	690	724	733	765	806	
			Sheep and Beef	2881	2570	2122	1828	1625	1482	
			other Agriculture	37	40	33	29	29	29	
			Cropping	177	233	278	301	312	324	
			Forestry	120	192	189	188	185	179	
			Indigenous	447	410	406	404	403	403	

	521135	Mangatawhiri	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	447	460	491	525	560	598	
			Resid. - Low Dens	3	3	8	14	46	112	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	7	7	7	7	7	7	
			Dairying	6491	7298	7853	8193	8385	8551	
			Sheep and Beef	6805	6742	6430	6133	5892	5679	
			other Agriculture	76	109	116	119	119	119	
			Cropping	1163	1163	1175	1180	1180	1174	
			Forestry	744	894	889	887	870	820	
			Indigenous	14300	13505	13214	13124	13124	13123	

Waikato DC	521153	Otaua	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	801	827	880	917	940	957	
			Resid. - Low Dens	3	3	3	4	5	5	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	1	1	1	1	1	
			Manufacturing	256	256	256	256	256	256	
			Dairying	8127	9305	9939	10286	10519	10659	
			Sheep and Beef	3733	2700	1958	1527	1232	1051	
			other Agriculture	88	95	94	94	94	93	
			Cropping	184	271	317	361	377	390	
			Forestry	1190	1490	1483	1480	1473	1471	
			Indigenous	746	684	684	683	683	682	

	526106	Pukeoware	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	125	131	138	139	144	149
			Resid. - Low Dens	0	0	0	0	0	0
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	55	100	131	139	148	156
			Sheep and Beef	367	259	176	127	91	72
			other Agriculture	0	1	1	1	1	1
			Cropping	174	237	281	320	343	352
			Forestry	12	11	11	11	11	9
			Indigenous	34	29	29	29	29	29

	526200	Tuakau	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	110	147	157	165	169	174
			Resid. - Low Dens	132	139	141	144	144	144
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	18	18	18	18	18
			Manufacturing	34	42	43	43	43	43
			Dairying	27	11	8	4	4	4
			Sheep and Beef	60	27	22	17	14	12
			other Agriculture	1	2	2	2	2	2
			Cropping	9	9	7	8	9	8
			Forestry	7	8	7	7	7	7
			Indigenous	15	12	11	11	11	11

	526400	Rotowaro	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	0	0	0	0	0	0
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	5	8	8	8	10	10
			Sheep and Beef	9	10	10	10	8	8
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	4	4	4	4	4	4
			Indigenous	0	0	0	0	0	0

	526500	Raglan	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	66	72	78	81	85	85
			Resid. - Low Dens	164	207	226	226	226	226
			Resid. - Med-High Dens	1	1	1	1	1	1
			Commercial	0	1	1	1	1	1
			Manufacturing	2	3	3	3	3	3
			Dairying	111	91	74	72	67	67
			Sheep and Beef	38	14	3	2	1	1
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	6	4	1	1	1	1
			Indigenous	13	12	12	12	12	12

	526601	Waikato Western Hills	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	1206	1287	1380	1483	1552	1607
			Resid. - Low Dens	37	43	58	159	232	283
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	2	2	2	3	3
			Manufacturing	0	0	0	0	0	0
			Dairying	9082	10559	11526	11862	12188	12565
			Sheep and Beef	19384	19736	19331	18892	18562	18276
			other Agriculture	57	153	231	315	304	298
			Cropping	126	136	146	150	149	149
			Forestry	4788	4938	4884	4851	4812	4765
			Indigenous	13311	11453	10757	10603	10515	10370

Waikato DC	526602	Te Uku	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	504	521	539	560	576	591	
			Resid. - Low Dens	10	26	31	52	84	114	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	31	35	36	37	37	
			Manufacturing	10	11	11	12	12	12	
			Dairying	5105	6225	7322	8051	8541	8979	
			Sheep and Beef	21661	21565	21024	20478	19975	19515	
			other Agriculture	18	28	37	39	39	38	
			Cropping	21	94	143	152	151	151	
			Forestry	2230	2191	2150	2113	2082	2059	
			Indigenous	15613	14635	14082	13888	13883	13883	

	526701	Onewhero	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	1167	1175	1236	1279	1325	1355
			Resid. - Low Dens	56	56	67	83	92	98
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	2	2	2	2	2	2
			Dairying	4646	5454	6127	6609	7012	7387
			Sheep and Beef	50411	51250	50652	50123	49648	49230
			other Agriculture	164	207	273	319	320	318
			Cropping	2771	2807	2872	2910	2943	2958
			Forestry	3883	4041	4036	4011	3996	3991
			Indigenous	9384	7732	7453	7357	7346	7340

	526702	Te Akau	Land use type	2006	2013	2021	2031	2041	2052
			Resid. - Lifestyle	203	208	215	224	234	242
			Resid. - Low Dens	1	1	3	20	28	29
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	8	8	8	8	8
			Manufacturing	0	0	0	0	0	0
			Dairying	3191	3442	3623	3753	3909	4060
			Sheep and Beef	38812	39451	39279	39130	38962	38811
			other Agriculture	9	39	57	68	68	67
			Cropping	77	111	139	139	139	139
			Forestry	3710	3793	3782	3775	3767	3760
			Indigenous	3829	3087	3060	3050	3050	3049

	526900	Te Kauwhata	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	142	172	188	196	197	198
			Resid. - Low Dens	43	79	125	138	141	141
			Resid. - Med-High Dens	0	0	0	1	1	1
			Commercial	0	2	2	2	2	2
			Manufacturing	7	8	17	17	17	17
			Dairying	50	39	11	5	10	13
			Sheep and Beef	138	65	32	10	5	3
			other Agriculture	0	0	0	0	0	0
			Cropping	34	34	33	32	30	29
			Forestry	2	1	0	0	0	0
			Indigenous	0	0	0	0	0	0

	527004	Matangi	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	1011	1030	1052	1072	1081	1094
			Resid. - Low Dens	10	10	11	12	13	13
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	1	1	1
			Manufacturing	6	6	6	7	7	7
			Dairying	285	290	283	283	281	277
			Sheep and Beef	644	626	611	589	582	573
			other Agriculture	21	21	21	21	21	21
			Cropping	114	118	118	118	118	118
			Forestry	15	13	13	12	12	12
			Indigenous	103	94	94	92	91	91

	527111	Whitikahu	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	300	300	313	335	346	351
			Resid. - Low Dens	4	4	8	37	38	38
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	1	1
			Manufacturing	13	13	13	13	13	13
			Dairying	23551	24093	24493	24814	25129	25434
			Sheep and Beef	4955	4635	4246	3876	3550	3240
			other Agriculture	6	11	16	18	18	18
			Cropping	2	2	2	2	2	2
			Forestry	234	231	225	223	221	221
			Indigenous	1027	816	789	786	786	786

Waikato DC	527112	Taupiri Community	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	19	25	43	48	52	55	
			Resid. - Low Dens	22	27	27	27	27	27	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	1	1	1	
			Manufacturing	2	2	2	2	2	2	
			Dairying	53	44	26	20	16	14	
			Sheep and Beef	9	9	8	8	7	7	
			other Agriculture	0	0	0	0	0	0	
			Cropping	1	1	1	1	1	1	
			Forestry	1	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	

	527122	Gordonton	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	259	268	279	291	294	304	
			Resid. - Low Dens	3	4	4	4	4	4	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	1	1	
			Manufacturing	1	1	1	1	1	1	
			Dairying	3742	3768	3781	3787	3794	3787	
			Sheep and Beef	181	161	139	115	100	93	
			other Agriculture	0	0	0	0	0	0	
			Cropping	20	20	20	20	18	18	
			Forestry	6	3	1	1	1	1	
			Indigenous	16	13	13	13	13	13	

	527123	Kainui	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	910	946	1019	1099	1152	1218	
			Resid. - Low Dens	5	8	14	20	27	30	
			Resid. - Med-High Dens	0	1	1	1	1	1	
			Commercial	0	0	0	5	7	8	
			Manufacturing	0	0	0	2	3	3	
			Dairying	8413	8500	8489	8461	8446	8417	
			Sheep and Beef	963	873	800	729	678	633	
			other Agriculture	11	11	11	11	11	11	
			Cropping	49	49	52	52	52	52	
			Forestry	25	12	9	8	7	7	
			Indigenous	98	84	81	81	81	81	

	527125	Eureka	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	849	875	911	937	961	985	
			Resid. - Low Dens	0	1	1	5	5	5	
			Resid. - Med-High Dens	0	0	0	1	1	1	
			Commercial	0	9	9	9	9	9	
			Manufacturing	0	0	1	3	4	6	
			Dairying	9596	9678	9750	9813	9874	9916	
			Sheep and Beef	1538	1448	1343	1244	1157	1094	
			other Agriculture	21	21	18	18	18	17	
			Cropping	45	45	45	45	44	40	
			Forestry	13	9	8	7	6	5	
			Indigenous	42	31	31	31	31	31	

	527131	Tamahere-Tauwhare	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	2185	2296	2366	2428	2454	2478	
			Resid. - Low Dens	8	8	16	35	36	39	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	13	13	16	18	18	
			Manufacturing	10	11	11	11	11	14	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	3832	3517	3201	2937	2760	2608	
			other Agriculture	413	415	411	400	400	400	
			Cropping	160	160	160	160	160	160	
			Forestry	144	110	95	88	85	81	
			Indigenous	491	421	417	407	407	406	

	527210	Waerenga	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	356	368	396	423	438	454	
			Resid. - Low Dens	4	12	55	61	61	61	
			Resid. - Med-High Dens	1	1	1	1	1	1	
			Commercial	0	3	3	3	3	3	
			Manufacturing	38	41	45	48	49	51	
			Dairying	14131	15287	15951	16403	16813	17207	
			Sheep and Beef	20183	19723	18990	18494	18070	17660	
			other Agriculture	148	160	166	169	168	168	
			Cropping	130	131	138	138	135	133	
			Forestry	1116	1159	1152	1140	1138	1137	
			Indigenous	4948	4221	4205	4202	4202	4202	

Waikato DC	527221	Maramarua	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	293	300	318	359	390	407	
			Resid. - Low Dens	4	5	8	22	22	22	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	1	1	1	1	2	
			Manufacturing	8	23	33	39	47	50	
			Dairying	6843	7404	7574	7681	7798	7926	
			Sheep and Beef	6768	7033	6859	6691	6540	6391	
			other Agriculture	248	264	279	281	281	281	
			Cropping	2	1	1	2	2	2	
			Forestry	6024	6368	6358	6345	6331	6318	
			Indigenous	4367	3785	3747	3745	3745	3745	

	527222	Meremere	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	1	1	1	1	1
			Resid. - Low Dens	19	29	32	32	32	32
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	4	4	4	4	4
			Dairying	15	5	2	2	2	2
			Sheep and Beef	4	1	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	2	1	1	1	1	1

	527401	Huntly West	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	15	22	34	45	52	53
			Resid. - Low Dens	102	117	125	132	132	133
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	1	1	1
			Manufacturing	9	9	9	9	9	9
			Dairying	189	190	178	171	169	171
			Sheep and Beef	146	139	131	119	113	109
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	8	1	1	1	1	1
			Indigenous	33	27	27	27	27	27

	527402	Huntly East	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	74	102	122	139	158	168
			Resid. - Low Dens	174	211	217	229	233	233
			Resid. - Med-High Dens	2	2	2	2	2	3
			Commercial	0	10	10	16	17	17
			Manufacturing	40	44	47	50	50	52
			Dairying	495	801	911	930	962	978
			Sheep and Beef	1333	1318	1267	1212	1156	1126
			other Agriculture	0	4	6	6	6	6
			Cropping	0	0	0	0	0	0
			Forestry	62	59	58	58	58	58
			Indigenous	1172	858	768	767	767	767

	527912	Te Kowhai	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	621	633	645	660	664	670
			Resid. - Low Dens	19	19	19	19	19	19
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	1	1	1
			Manufacturing	0	0	0	0	0	0
			Dairying	1763	1802	1828	1854	1875	1899
			Sheep and Beef	823	789	751	710	688	661
			other Agriculture	16	16	16	16	16	16
			Cropping	16	16	16	15	13	10
			Forestry	4	2	2	2	2	2
			Indigenous	104	88	88	88	88	88

	527913	Whatawhata	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	1103	1137	1216	1283	1335	1359
			Resid. - Low Dens	10	11	13	13	13	15
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	1	4	10	12
			Manufacturing	1	2	2	3	4	7
			Dairying	2665	2793	2844	2884	2898	2935
			Sheep and Beef	1561	1474	1344	1234	1162	1094
			other Agriculture	45	45	45	45	45	45
			Cropping	14	15	15	15	15	15
			Forestry	36	22	19	18	17	16
			Indigenous	0	0	0	0	0	0

Waikato DC	527916	Horotiu	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	128	133	138	148	156	162	
			Resid. - Low Dens	14	15	15	15	15	15	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	1	1	1	1	1	
			Manufacturing	32	56	74	110	143	192	
			Dairying	745	731	722	692	661	619	
			Sheep and Beef	395	383	369	353	343	330	
			other Agriculture	0	4	4	4	4	4	
			Cropping	0	0	0	0	0	0	
			Forestry	1	1	0	0	0	0	
			Indigenous	45	38	38	38	38	38	

	528200	Ngaruawahia	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	88	94	102	108	110	113
			Resid. - Low Dens	179	185	186	198	214	218
			Resid. - Med-High Dens	1	1	1	1	1	1
			Commercial	0	3	3	3	3	3
			Manufacturing	23	26	26	27	29	31
			Dairying	30	24	23	22	21	21
			Sheep and Beef	126	121	115	107	104	101
			other Agriculture	11	15	22	14	8	7
			Cropping	0	0	0	0	0	0
			Forestry	3	3	3	3	2	1
			Indigenous	52	47	38	35	26	22

Hamilton CC	AU2013	AU2013_NAM	Land use type	2013	2021	2031	2041	2051	2061
	527005	Sylvester	Resid. - Lifestyle	43	40	36	31	29	23
			Resid. - Low Dens	69	172	207	208	208	209
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	10	23	28	30	35
			Manufacturing	0	0	0	0	0	0
			Dairying	102	55	6	3	2	2
			Sheep and Beef	51	7	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	8	6	6	6	6	6

	527006	Flagstaff	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	142	156	156	156	156	156
			Resid. - Med-High Dens	3	3	2	2	2	2
			Commercial	0	2	4	4	4	4
			Manufacturing	0	0	0	0	0	0
			Dairying	5	1	0	0	0	0
			Sheep and Beef	8	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

	527007	Horsham Downs	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	84	77	67	61	50	38
			Resid. - Low Dens	128	209	214	214	214	214
			Resid. - Med-High Dens	0	0	10	21	21	20
			Commercial	0	7	41	63	74	87
			Manufacturing	0	0	0	0	0	0
			Dairying	141	77	27	2	2	2
			Sheep and Beef	13	2	2	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

	527008	Rototuna	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	103	103	103	103	103	103
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	2	2	2	2	2
			Manufacturing	0	0	0	0	0	0
			Dairying	0	0	0	0	0	0
			Sheep and Beef	0	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	1	1	1	1	1	1

Hamilton CC	527009	Huntington	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	25	26	24	22	19	15	
			Resid. - Low Dens	235	281	289	289	289	289	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	17	18	20	23	27	
			Manufacturing	1	2	2	2	2	2	
			Dairying	12	5	3	3	3	3	
			Sheep and Beef	9	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	33	7	2	2	2	2	

	527124	Newstead	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	77	54	37	26	18	11
			Resid. - Low Dens	6	28	54	53	52	52
			Resid. - Med-High Dens	0	0	25	50	68	70
			Commercial	0	37	49	58	64	69
			Manufacturing	2	79	215	305	347	357
			Dairying	617	487	305	189	133	124
			Sheep and Beef	59	58	51	44	41	37
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	1	2	2	2
			Forestry	0	0	0	0	0	0
			Indigenous	17	9	9	9	9	9

	527810	Peacocke	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	201	192	168	159	143	126
			Resid. - Low Dens	16	72	243	333	382	429
			Resid. - Med-High Dens	0	0	0	0	1	1
			Commercial	0	3	18	26	39	56
			Manufacturing	0	0	0	0	0	0
			Dairying	243	242	188	141	116	88
			Sheep and Beef	214	178	74	36	23	10
			other Agriculture	0	0	0	0	0	0
			Cropping	24	24	21	17	6	1
			Forestry	1	1	0	0	0	0
			Indigenous	19	10	8	8	8	8

	527820	Temple View	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	60	50	38	29	24	20
			Resid. - Low Dens	27	30	47	49	73	94
			Resid. - Med-High Dens	0	0	0	3	8	6
			Commercial	0	5	14	20	24	28
			Manufacturing	0	0	0	0	0	0
			Dairying	153	155	150	148	124	106
			Sheep and Beef	147	151	142	142	139	136
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	1	1	1	1	1	1

	527917	Te Rapa North	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	64	52	33	26	20	15
			Resid. - Low Dens	0	0	0	0	0	0
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	4	8	10	13
			Manufacturing	19	25	42	59	81	84
			Dairying	214	225	229	215	204	204
			Sheep and Beef	27	27	21	21	15	14
			other Agriculture	2	2	2	2	0	0
			Cropping	0	0	0	0	0	0
			Forestry	7	7	7	7	7	7
			Indigenous	1	1	1	1	1	1

	528310	Bryant	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	190	192	192	192	192	192
			Resid. - Med-High Dens	1	1	1	1	1	1
			Commercial	0	0	0	0	0	0
			Manufacturing	5	5	5	5	5	5
			Dairying	0	0	0	0	0	0
			Sheep and Beef	0	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	3	3	3	3	3	3

Hamilton CC	528320	Pukete	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	0	0	0	0	0	0	
			Resid. - Low Dens	80	81	81	81	81	81	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	

	528402	Pukete West	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	2	2	2	2	2	1
			Resid. - Low Dens	60	61	61	61	61	62
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	1	1	1	1	1	1
			Dairying	1	0	0	0	0	0
			Sheep and Beef	0	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

	528403	Te Rapa	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	3	3	2	1	1	1
			Resid. - Low Dens	13	14	17	17	17	17
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	77	77	79	79	79
			Manufacturing	260	276	277	278	278	278
			Dairying	14	3	1	1	1	1
			Sheep and Beef	41	32	21	8	3	3
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	3	3	3	3	3	3
			Indigenous	0	0	0	0	0	0

	528405	Burbush	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	77	56	39	32	26	20
			Resid. - Low Dens	0	1	25	25	25	26
			Resid. - Med-High Dens	0	0	0	4	6	6
			Commercial	0	0	7	10	13	15
			Manufacturing	4	24	32	38	43	66
			Dairying	360	348	346	345	347	336
			Sheep and Beef	149	158	139	134	127	117
			other Agriculture	4	6	6	6	6	6
			Cropping	3	3	0	0	0	0
			Forestry	2	2	2	1	1	1
			Indigenous	2	2	2	2	2	2

	528406	Rotokauri	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	65	55	46	42	38	38
			Resid. - Low Dens	3	14	64	64	65	65
			Resid. - Med-High Dens	0	0	0	37	59	59
			Commercial	0	4	9	15	18	18
			Manufacturing	45	59	59	59	60	61
			Dairying	97	90	85	59	32	31
			Sheep and Beef	122	94	35	25	24	24
			other Agriculture	0	1	0	0	0	0
			Cropping	15	15	15	5	0	0
			Forestry	1	1	0	0	0	0
			Indigenous	0	0	0	0	0	0

	528501	Nawton	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	138	139	139	139	139	139
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	2	2	2	2	2
			Manufacturing	1	1	1	1	1	1
			Dairying	1	0	0	0	0	0
			Sheep and Beef	0	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	2	2	2	2	2	2

Hamilton CC	528503	Crawshaw	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	0	0	0	0	0	0	
			Resid. - Low Dens	70	72	72	72	72	72	
			Resid. - Med-High Dens	1	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	2	0	0	0	0	0	
			Sheep and Beef	1	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	
	528504	Grandview	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	0	0	0	0	0	0	
			Resid. - Low Dens	86	86	86	86	86	86	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	1	1	1	1	1	1	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	
	528505	Brymer	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	5	5	5	5	5	5	
			Resid. - Low Dens	81	85	85	85	85	85	
			Resid. - Med-High Dens	0	0	0	0	1	1	
			Commercial	0	2	2	2	3	3	
			Manufacturing	0	0	0	0	0	0	
			Dairying	6	1	1	1	0	0	
			Sheep and Beef	6	2	2	2	1	1	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	2	2	2	2	2	2	
	528601	Dinsdale North	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	3	3	3	3	3	3	
			Resid. - Low Dens	125	126	126	126	126	126	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	3	3	3	3	3	
			Manufacturing	0	0	0	0	0	0	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	
	528602	Dinsdale South	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	4	2	1	1	1	1	
			Resid. - Low Dens	121	123	124	124	123	123	
			Resid. - Med-High Dens	0	0	0	0	1	1	
			Commercial	0	6	7	7	7	7	
			Manufacturing	4	4	4	4	4	4	
			Dairying	4	1	1	1	1	1	
			Sheep and Beef	1	2	1	1	1	1	
			other Agriculture	1	1	1	1	1	1	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	
	528700	Beerescourt	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	0	0	0	0	0	0	
			Resid. - Low Dens	116	118	118	118	118	118	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	1	1	1	1	1	
			Manufacturing	1	1	1	1	1	1	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	4	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	

Hamilton CC	528800	Maeroa	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	0	0	0	0	0	0	
			Resid. - Low Dens	105	108	108	108	108	108	
			Resid. - Med-High Dens	1	1	1	1	1	1	
			Commercial	0	1	1	1	1	1	
			Manufacturing	1	1	1	1	1	1	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	5	0	0	0	0	0	
			Indigenous	4	4	4	4	4	4	

	528900	Frankton Junction	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	37	39	39	39	38	36
			Resid. - Med-High Dens	6	3	3	3	4	6
			Commercial	0	20	20	20	20	20
			Manufacturing	176	176	176	176	176	176
			Dairying	0	0	0	0	0	0
			Sheep and Beef	1	1	1	1	1	1
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	2	0	0	0	0	0
			Indigenous	2	2	2	2	2	2

	529000	Swarbrick	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	102	92	79	78	78	78
			Resid. - Med-High Dens	17	26	39	40	40	40
			Commercial	0	3	3	3	3	3
			Manufacturing	4	4	4	4	4	4
			Dairying	0	0	0	0	0	0
			Sheep and Beef	0	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	1	1	1	1	1	1

	529100	Hamilton Lake	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	117	117	116	111	104	98
			Resid. - Med-High Dens	4	4	5	10	17	23
			Commercial	0	4	4	4	4	4
			Manufacturing	55	57	57	57	57	57
			Dairying	0	0	0	0	0	0
			Sheep and Beef	2	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	13	13	13	13	13	13

	529200	Melville	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	138	139	139	139	139	139
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	4	4	4	4	4
			Manufacturing	5	5	5	5	5	5
			Dairying	1	1	1	1	1	1
			Sheep and Beef	0	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	5	4	4	4	4	4

	529300	Glenview	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	1	1	1	1	1	1
			Resid. - Low Dens	164	176	176	176	176	176
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	3	3	3	3	3
			Manufacturing	0	0	0	0	0	0
			Dairying	2	2	2	1	1	1
			Sheep and Beef	1	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	22					

Hamilton CC 529401 Queenwood

Land use type	2013	2021	2031	2041	2051	2061	Trend line
Resid. - Lifestyle	0	0	0	0	0	0	
Resid. - Low Dens	117	120	121	121	121	121	
Resid. - Med-High Dens	0	0	0	0	0	0	
Commercial	0	0	0	0	0	0	
Manufacturing	0	0	0	0	0	0	
Dairying	0	0	0	0	0	0	
Sheep and Beef	0	2	1	1	1	1	
other Agriculture	0	0	0	0	0	0	
Cropping	0	0	0	0	0	0	
Forestry	1	0	0	0	0	0	
Indigenous	12	12	12	12	12	12	

529402 Chedworth

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	0	0	0	0	0	0
Resid. - Low Dens	110	115	115	115	115	115
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	7	7	7	7	7
Manufacturing	0	0	0	0	0	0
Dairying	0	0	0	0	0	0
Sheep and Beef	0	0	0	0	0	0
other Agriculture	0	0	0	0	0	0
Cropping	0	0	0	0	0	0
Forestry	0	0	0	0	0	0
Indigenous	26	20	20	20	20	20

529501 Porritt

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	0	0	0	0	0	0
Resid. - Low Dens	59	60	63	63	63	63
Resid. - Med-High Dens	1	1	2	2	2	2
Commercial	0	10	10	10	10	10
Manufacturing	0	0	0	0	0	0
Dairying	3	2	0	0	0	0
Sheep and Beef	3	2	0	0	0	0
other Agriculture	0	0	0	0	0	0
Cropping	0	0	0	0	0	0
Forestry	0	0	0	0	0	0
Indigenous	3	3	3	3	3	3

529502 Insoll

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	0	0	0	0	0	0
Resid. - Low Dens	71	71	71	71	71	71
Resid. - Med-High Dens	1	1	1	1	1	1
Commercial	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Dairying	0	0	0	0	0	0
Sheep and Beef	0	0	0	0	0	0
other Agriculture	0	0	0	0	0	0
Cropping	0	0	0	0	0	0
Forestry	0	0	0	0	0	0
Indigenous	0	0	0	0	0	0

529503 Fairview Downs

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	0	0	0	0	0	0
Resid. - Low Dens	94	97	98	98	98	98
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Dairying	4	1	0	0	0	0
Sheep and Beef	1	0	0	0	0	0
other Agriculture	0	0	0	0	0	0
Cropping	0	0	0	0	0	0
Forestry	0	0	0	0	0	0
Indigenous	0	0	0	0	0	0

529600 Chartwell

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	0	0	0	0	0	0
Resid. - Low Dens	90	92	92	92	92	92
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Dairying	0	0	0	0	0	0
Sheep and Beef	2	0	0	0	0	0
other Agriculture	0	0	0	0	0	0
Cropping	0	0	0	0	0	0
Forestry	0	0	0	0	0	0
Indigenous	13	12	11	11	11	11

Hamilton CC	529700	Hamilton Central	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	0	0	0	0	0	0	
			Resid. - Low Dens	38	37	26	20	20	19	
			Resid. - Med-High Dens	12	14	26	32	33	34	
			Commercial	0	82	82	82	81	81	
			Manufacturing	10	10	10	10	10	10	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	8	2	0	0	0	0	
			Indigenous	1	1	1	1	1	1	
	529800	Clarkin	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	0	0	0	0	0	0	
			Resid. - Low Dens	99	99	99	99	99	99	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	6	6	6	6	6	6	
	529900	Claudelands	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	0	0	0	0	0	0	
			Resid. - Low Dens	64	64	65	65	65	65	
			Resid. - Med-High Dens	6	2	1	1	1	1	
			Commercial	0	4	4	4	4	4	
			Manufacturing	1	1	1	1	1	1	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	8	8	8	8	8	8	
	530000	Enderley	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	0	0	0	0	0	0	
			Resid. - Low Dens	116	119	119	114	110	105	
			Resid. - Med-High Dens	1	1	1	6	10	15	
			Commercial	0	4	4	4	4	4	
			Manufacturing	3	3	3	3	3	3	
			Dairying	3	0	0	0	0	0	
			Sheep and Beef	2	2	2	2	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	1	0	0	0	0	0	
	530100	Peachgrove	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	0	0	0	0	0	0	
			Resid. - Low Dens	68	68	68	67	67	67	
			Resid. - Med-High Dens	12	11	9	10	10	10	
			Commercial	0	5	7	7	7	7	
			Manufacturing	1	4	4	4	4	4	
			Dairying	3	0	0	0	0	0	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	6	6	6	6	6	6	
	530200	Hamilton East	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	0	0	0	0	0	0	
			Resid. - Low Dens	80	77	72	65	61	58	
			Resid. - Med-High Dens	6	8	13	21	25	27	
			Commercial	0	4	4	4	4	4	
			Manufacturing	1	1	1	1	1	1	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	2	2	2	2	2	2	

Hamilton CC

530300 Naylor

Land use type	2013	2021	2031	2041	2051	2061	Trend line
Resid. - Lifestyle	0	0	0	0	0	0	
Resid. - Low Dens	122	119	111	108	108	108	
Resid. - Med-High Dens	3	6	13	16	16	16	
Commercial	0	0	0	0	0	0	
Manufacturing	1	1	1	1	1	1	
Dairying	0	0	0	0	0	0	
Sheep and Beef	0	0	0	0	0	0	
other Agriculture	0	0	0	0	0	0	
Cropping	0	0	0	0	0	0	
Forestry	0	0	0	0	0	0	
Indigenous	9	9	9	9	9	9	

530400 Bader

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	0	0	0	0	0	0
Resid. - Low Dens	107	109	107	105	105	105
Resid. - Med-High Dens	6	9	12	14	14	14
Commercial	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Dairying	7	4	4	4	4	4
Sheep and Beef	0	0	0	0	0	0
other Agriculture	0	0	0	0	0	0
Cropping	1	1	0	0	0	0
Forestry	0	0	0	0	0	0
Indigenous	22	20	20	20	20	20

530500 University

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	0	0	0	0	0	0
Resid. - Low Dens	76	67	55	48	48	48
Resid. - Med-High Dens	10	21	33	40	41	41
Commercial	0	4	4	4	4	4
Manufacturing	12	12	12	12	12	12
Dairying	3	2	2	2	1	1
Sheep and Beef	0	0	0	0	0	0
other Agriculture	0	0	0	0	0	0
Cropping	0	0	0	0	0	0
Forestry	0	0	0	0	0	0
Indigenous	0	0	0	0	0	0

530600 Silverdale

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	1	1	1	1	0	0
Resid. - Low Dens	74	75	78	78	78	77
Resid. - Med-High Dens	0	0	0	0	0	1
Commercial	0	2	2	2	3	3
Manufacturing	1	1	1	1	1	1
Dairying	4	6	2	2	2	2
Sheep and Beef	0	0	0	0	0	0
other Agriculture	0	0	0	0	0	0
Cropping	0	0	0	0	0	0
Forestry	0	0	0	0	0	0
Indigenous	5	0	0	0	0	0

530700 Hillcrest West

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	0	0	0	0	0	0
Resid. - Low Dens	100	100	100	98	97	97
Resid. - Med-High Dens	3	3	2	4	5	5
Commercial	0	0	1	1	1	1
Manufacturing	0	0	0	0	0	0
Dairying	0	0	0	0	0	0
Sheep and Beef	0	0	0	0	0	0
other Agriculture	0	0	0	0	0	0
Cropping	0	0	0	0	0	0
Forestry	0	0	0	0	0	0
Indigenous	0	0	0	0	0	0

530800 Riverlea

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	0	0	0	0	0	0
Resid. - Low Dens	79	82	85	85	85	85
Resid. - Med-High Dens	1	0	0	0	0	0
Commercial	0	3	3	3	3	3
Manufacturing	21	25	25	25	25	25
Dairying	4	2	2	2	2	2
Sheep and Beef	0	3	0	0	0	0
other Agriculture	0	0	0	0	0	0
Cropping	0	0	0	0	0	0
Forestry	0	0	0	0	0	0
Indigenous	35	31	31	31	31	31

Waipa DC	AU2013	AU2013_NAM	Land use type	2013	2021	2031	2041	2051	2061	Trend line
	526603	Te Pahu	Resid. - Lifestyle	380	386	399	408	413	416	
			Resid. - Low Dens	0	0	0	0	0	1	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	4965	5561	5867	6064	6225	6366	
			Sheep and Beef	5718	5598	5357	5165	5007	4872	
			other Agriculture	0	15	21	21	21	21	
			Cropping	3	3	3	3	3	3	
			Forestry	624	587	571	556	549	539	
			Indigenous	4001	3553	3484	3484	3484	3484	
	527133	Hautapu	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	792	797	807	816	816	816	
			Resid. - Low Dens	2	36	186	235	235	235	
			Resid. - Med-High Dens	0	0	5	6	6	6	
			Commercial	0	2	2	2	2	2	
			Manufacturing	36	76	115	127	142	157	
			Dairying	2860	2949	2949	2892	2924	2946	
			Sheep and Beef	660	488	245	179	127	90	
			other Agriculture	315	305	277	270	269	266	
			Cropping	59	58	57	57	57	57	
			Forestry	18	9	8	6	5	5	
			Indigenous	33	29	29	29	29	29	
	527134	Swayne	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	2	4	4	4	4	4	
			Resid. - Low Dens	62	99	102	103	104	104	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	5	2	1	1	0	0	
			Sheep and Beef	17	0	0	0	0	0	
			other Agriculture	22	3	1	1	1	1	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	
	527501	Cambridge North	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	1	2	2	2	2	2	
			Resid. - Low Dens	115	119	119	120	120	121	
			Resid. - Med-High Dens	1	1	1	1	1	1	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	48	48	48	48	47	46	
			Sheep and Beef	2	0	0	0	0	0	
			other Agriculture	3	1	1	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	
	527502	Cambridge West	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	14	14	14	15	15	14	
			Resid. - Low Dens	106	109	115	126	127	129	
			Resid. - Med-High Dens	3	3	3	7	8	9	
			Commercial	0	0	0	0	0	0	
			Manufacturing	1	1	1	1	1	1	
			Dairying	50	50	48	41	39	37	
			Sheep and Beef	6	5	2	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	4	0	0	0	0	0	
	527503	Cambridge Central	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	16	20	22	23	23	23	
			Resid. - Low Dens	22	24	25	26	26	27	
			Resid. - Med-High Dens	3	4	4	4	4	4	
			Commercial	0	10	10	10	10	10	
			Manufacturing	27	27	27	27	27	27	
			Dairying	20	25	25	25	26	28	
			Sheep and Beef	1	1	1	1	1	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	4	2	1	0	0	0	
			Indigenous	80	70	68	68	68	65	

Waipa DC	527504	Leamington West	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	7	13	15	15	15	15	
			Resid. - Low Dens	138	151	157	173	181	183	
			Resid. - Med-High Dens	9	9	9	9	9	9	
			Commercial	0	3	3	3	3	3	
			Manufacturing	16	26	28	28	28	28	
			Dairying	93	77	71	66	59	57	
			Sheep and Beef	17	4	3	3	3	3	
			other Agriculture	1	1	0	0	0	0	
			Cropping	2	1	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	18	17	17	17	17	17	
	527505	Leamington East	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	21	22	22	24	24	24	
			Resid. - Low Dens	163	164	167	168	169	169	
			Resid. - Med-High Dens	2	2	2	2	2	2	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	1	1	1	1	
			Dairying	63	62	59	58	57	57	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	2	2	2	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	6	6	5	5	5	5	
	527600	Ohaupo	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	40	54	69	76	77	78	
			Resid. - Low Dens	13	13	13	13	13	15	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	4	4	4	4	4	
			Manufacturing	0	0	0	0	0	0	
			Dairying	112	104	92	85	84	81	
			Sheep and Beef	11	5	2	2	2	1	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	2	1	1	1	1	1	
	527700	Kihikihi	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	39	41	41	41	41	41	
			Resid. - Low Dens	96	103	107	107	107	107	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	1	1	1	1	1	
			Manufacturing	6	8	8	8	8	10	
			Dairying	33	33	32	32	32	31	
			Sheep and Beef	6	0	0	0	0	0	
			other Agriculture	4	4	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	3	2	2	2	2	2	
	527914	Ngahinapouri	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	731	731	734	735	734	734	
			Resid. - Low Dens	80	81	81	81	81	81	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	1	
			Manufacturing	6	6	6	6	6	6	
			Dairying	8800	8975	9121	9256	9372	9471	
			Sheep and Beef	2944	2796	2636	2462	2315	2194	
			other Agriculture	319	319	319	319	315	312	
			Cropping	20	19	19	19	19	19	
			Forestry	45	31	26	24	24	23	
			Indigenous	128	92	92	92	92	92	
	527915	Lake Cameron	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	401	437	511	573	589	595	
			Resid. - Low Dens	14	14	16	20	22	34	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	6	12	22	33	38	43	
			Dairying	2206	2218	2195	2160	2151	2150	
			Sheep and Beef	544	499	415	356	331	304	
			other Agriculture	118	118	118	118	118	117	
			Cropping	72	71	68	64	64	62	
			Forestry	2	2	2	2	2	2	
			Indigenous	35	28	28	28	28	28	

Waipa DC	527921	Te Rore	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	64	64	67	73	74	74	
			Resid. - Low Dens	0	0	0	0	0	1	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	3314	3513	3565	3581	3595	3612	
			Sheep and Beef	308	164	110	88	74	56	
			other Agriculture	4	4	4	4	3	3	
			Cropping	0	0	0	0	0	0	
			Forestry	17	7	7	6	6	6	
			Indigenous	64	19	19	19	19	19	

	527922	Pirongia	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	177	205	234	245	250	250
			Resid. - Low Dens	34	34	38	47	48	48
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	1	1	1	1	1	1
			Dairying	2292	2438	2472	2478	2473	2477
			Sheep and Beef	250	96	31	5	5	4
			other Agriculture	5	5	5	5	5	5
			Cropping	14	14	12	12	11	8
			Forestry	4	1	0	0	0	0
			Indigenous	46	29	29	29	29	29

	527923	Pokuru	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	85	85	85	85	85	85
			Resid. - Low Dens	0	0	0	0	0	0
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	4725	5085	5178	5249	5268	5273
			Sheep and Beef	541	196	104	35	20	16
			other Agriculture	6	6	6	6	6	6
			Cropping	19	19	19	18	14	13
			Forestry	16	3	1	0	0	0
			Indigenous	241	235	235	235	235	235

	527924	Lake Ngaroto	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	105	108	109	113	113	113
			Resid. - Low Dens	6	21	69	74	95	95
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	9	9	9	9	9
			Manufacturing	3	10	11	13	14	19
			Dairying	3251	3469	3424	3412	3390	3385
			Sheep and Beef	204	20	16	16	16	16
			other Agriculture	20	20	20	20	20	19
			Cropping	0	0	0	0	0	0
			Forestry	15	0	0	0	0	0
			Indigenous	18	16	16	16	16	16

	527925	Tokanui	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	36	36	40	41	41	41
			Resid. - Low Dens	2	2	2	2	2	2
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	2051	2136	2144	2151	2161	2192
			Sheep and Beef	72	13	9	9	9	9
			other Agriculture	3	3	3	3	3	3
			Cropping	131	131	131	125	115	84
			Forestry	21	10	2	0	0	0
			Indigenous	18	13	13	13	13	13

	527931	Pukerimu	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	175	175	176	177	177	177
			Resid. - Low Dens	3	23	60	172	183	183
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	1	1	1	2
			Dairying	813	866	895	886	904	920
			Sheep and Beef	255	187	113	87	68	51
			other Agriculture	405	408	403	356	349	346
			Cropping	67	35	35	35	35	35
			Forestry	8	12	5	3	3	3
			Indigenous	113	104	104	103	103	103

Waipa DC	527932	Kaipaki	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	354	362	372	378	385	389	
			Resid. - Low Dens	2	2	2	3	6	13	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	3668	3795	3902	3956	4024	4061	
			Sheep and Beef	810	696	580	519	442	399	
			other Agriculture	122	122	122	122	122	121	
			Cropping	110	109	109	108	107	103	
			Forestry	5	2	2	2	2	2	
			Indigenous	58	52	52	52	52	52	
	527934	Rotoorangi	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	430	430	443	478	496	502	
			Resid. - Low Dens	2	2	2	2	2	2	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	15109	16814	17913	18570	19041	19443	
			Sheep and Beef	5700	4079	2992	2317	1848	1465	
			other Agriculture	385	393	393	388	386	386	
			Cropping	240	239	239	237	228	215	
			Forestry	249	190	158	146	136	126	
			Indigenous	779	735	734	733	733	733	
	527935	Te Rahu	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	272	295	342	371	379	384	
			Resid. - Low Dens	7	14	14	20	20	22	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	1	4	8	8	8	9	
			Dairying	2731	2925	2953	2937	2933	2929	
			Sheep and Beef	382	133	51	26	19	15	
			other Agriculture	72	73	73	73	71	69	
			Cropping	8	8	7	7	7	7	
			Forestry	5	1	0	0	0	0	
			Indigenous	39	36	36	36	36	36	
	527936	Kihikihi Flat	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	163	216	264	278	282	288	
			Resid. - Low Dens	17	44	68	70	86	86	
			Resid. - Med-High Dens	0	3	3	3	3	3	
			Commercial	0	4	4	4	4	4	
			Manufacturing	2	6	12	14	14	20	
			Dairying	1000	1193	1188	1187	1189	1191	
			Sheep and Beef	438	160	86	73	62	62	
			other Agriculture	35	32	32	32	32	32	
			Cropping	103	103	102	98	88	74	
			Forestry	3	2	2	1	1	1	
			Indigenous	10	7	7	7	7	7	
	527937	Allen Road	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	63	63	63	63	63	63	
			Resid. - Low Dens	0	1	1	1	1	1	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	1	1	1	
			Dairying	894	985	989	992	1002	1010	
			Sheep and Beef	93	3	0	0	0	0	
			other Agriculture	15	15	15	15	15	15	
			Cropping	76	76	75	71	61	53	
			Forestry	0	0	0	0	0	0	
			Indigenous	2	0	0	0	0	0	
	528000	Rotongata	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	86	86	90	91	91	91	
			Resid. - Low Dens	1	1	1	1	1	1	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	12317	14803	16238	16863	17193	17441	
			Sheep and Beef	4942	2678	1290	715	434	222	
			other Agriculture	108	115	118	118	117	117	
			Cropping	5	5	5	5	5	5	
			Forestry	842	740	690	640	591	555	
			Indigenous	2577	2454	2450	2450	2450	2450	

Waipa DC	531001	Te Awamutu West	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	5	8	8	8	8	8	
			Resid. - Low Dens	49	57	58	58	58	58	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	1	1	1	1	1	
			Manufacturing	17	21	21	21	21	22	
			Dairying	14	2	2	2	2	1	
			Sheep and Beef	3	1	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	

	531002	Te Awamutu Central	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	1	3	3	4	4	4
			Resid. - Low Dens	134	136	136	140	146	146
			Resid. - Med-High Dens	5	5	5	5	5	5
			Commercial	0	5	5	5	5	5
			Manufacturing	11	11	12	12	12	13
			Dairying	7	12	11	7	1	1
			Sheep and Beef	9	1	1	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

	531003	Te Awamutu East	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	28	31	34	37	37	37
			Resid. - Low Dens	116	135	142	144	145	145
			Resid. - Med-High Dens	4	4	4	4	4	4
			Commercial	0	3	3	3	3	3
			Manufacturing	31	32	32	34	35	38
			Dairying	93	102	105	103	101	98
			Sheep and Beef	42	17	3	0	0	0
			other Agriculture	2	1	1	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

	531004	Te Awamutu South	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	8	11	11	11	12	12
			Resid. - Low Dens	116	120	120	121	122	122
			Resid. - Med-High Dens	2	2	2	2	2	2
			Commercial	0	13	13	14	14	14
			Manufacturing	4	4	5	5	6	6
			Dairying	6	6	6	3	0	0
			Sheep and Beef	8	1	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

	535241	Karapiro	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	529	543	578	626	641	645
			Resid. - Low Dens	13	13	13	15	16	16
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	1	1	1	1	1
			Manufacturing	0	0	0	0	0	0
			Dairying	10182	12725	14899	16398	17488	18510
			Sheep and Beef	13745	11742	9607	8097	7003	5976
			other Agriculture	320	369	367	367	366	364
			Cropping	101	99	99	98	98	98
			Forestry	715	547	464	419	391	355
			Indigenous	3077	2704	2698	2694	2690	2687

South Waikat	AU2013	AU2013_NAM	Land use type	2013	2021	2031	2041	2051	2061
	535100	Tirau	Resid. - Lifestyle	14	14	14	14	14	14
			Resid. - Low Dens	37	37	37	35	35	33
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	2	2	2	2	2
			Manufacturing	6	7	7	7	7	7
			Dairying	3	5	6	7	7	5
			Sheep and Beef	6	3	2	2	2	2
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	1	1	1
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

South Waikat 535211 Mangakaretu

Land use type	2013	2021	2031	2041	2051	2061	Trend line
Resid. - Lifestyle	59	59	59	58	57	56	
Resid. - Low Dens	1	1	1	1	1	1	
Resid. - Med-High Dens	0	0	0	0	0	0	
Commercial	0	1	1	1	1	1	
Manufacturing	0	0	0	0	0	0	
Dairying	883	937	957	959	960	961	
Sheep and Beef	69	17	0	0	0	0	
other Agriculture	1	1	0	0	0	0	
Cropping	0	0	0	0	0	0	
Forestry	4	2	0	0	0	0	
Indigenous	0	0	0	0	0	0	

535212 Kinleith

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	79	79	79	79	76	75
Resid. - Low Dens	3	3	3	3	3	2
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Manufacturing	255	255	256	256	256	256
Dairying	1128	1177	1207	1228	1246	1280
Sheep and Beef	169	128	99	78	63	33
other Agriculture	13	8	8	8	8	8
Cropping	0	0	0	0	0	0
Forestry	177	175	172	171	171	168
Indigenous	0	0	0	0	0	0

535232 Tapapa

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	188	188	187	186	184	173
Resid. - Low Dens	2	2	1	1	1	1
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	1	1	1	1	1
Manufacturing	0	0	0	0	0	0
Dairying	10778	11867	12526	12784	12948	13077
Sheep and Beef	4618	3880	3355	3116	2977	2873
other Agriculture	67	55	51	49	49	49
Cropping	141	143	147	142	131	124
Forestry	9403	9360	9331	9325	9313	9307
Indigenous	11378	11087	10990	10984	10984	10983

535250 Arapuni

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	348	346	344	329	309	296
Resid. - Low Dens	25	24	24	19	15	13
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Manufacturing	12	12	12	12	13	15
Dairying	23398	27560	28827	29146	29224	29257
Sheep and Beef	5073	1549	407	164	127	122
other Agriculture	14	5	5	4	4	1
Cropping	18	18	18	18	18	18
Forestry	650	365	260	205	186	175
Indigenous	859	531	513	513	513	513

535261 Lichfield

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	218	218	218	215	210	204
Resid. - Low Dens	0	0	0	0	0	0
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Manufacturing	18	18	21	21	22	22
Dairying	14160	15108	15721	16236	16673	17017
Sheep and Beef	1447	1158	1054	978	907	865
other Agriculture	89	58	28	6	2	2
Cropping	0	0	0	0	0	0
Forestry	14602	14057	13577	13163	12806	12508
Indigenous	1930	1869	1867	1867	1867	1867

535262 Wawa

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	86	86	86	86	85	82
Resid. - Low Dens	0	0	0	0	0	0
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Manufacturing	7	7	7	7	7	7
Dairying	16548	17464	17884	18170	18313	18446
Sheep and Beef	720	421	240	153	145	144
other Agriculture	1	1	1	1	1	1
Cropping	57	64	65	65	65	65
Forestry	51543	51277	51039	50835	50692	50550
Indigenous	5764	5593	5589	5585	5585	5585

South Waikat	535310	Paraonui	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	7	7	7	7	7	7	
			Resid. - Low Dens	70	70	70	69	65	59	
			Resid. - Med-High Dens	1	1	1	1	1	1	
			Commercial	0	0	0	0	0	0	
			Manufacturing	1	1	1	1	1	1	
			Dairying	105	105	105	107	109	113	
			Sheep and Beef	0	0	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	0	
			Indigenous	0	0	0	0	0	0	

	535320	Parkdale	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	32	32	32	32	32	32
			Resid. - Low Dens	23	24	24	24	24	24
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	3	3	3	3	3	3
			Dairying	38	44	52	53	53	53
			Sheep and Beef	17	10	2	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

	535330	Matarawa	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	42	42	42	42	42	42
			Resid. - Low Dens	75	75	75	73	69	66
			Resid. - Med-High Dens	1	1	1	1	1	1
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	16	27	33	34	35	35
			Sheep and Beef	18	7	1	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	1	2
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

	535340	Stanley Park	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	1	1	1	1	1	1
			Resid. - Low Dens	102	102	102	102	100	99
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	3	3	3	3	3	3
			Dairying	0	0	0	0	0	0
			Sheep and Beef	0	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

	535350	Tokorpa Central	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	5	5	5	5	5	5
			Resid. - Low Dens	37	37	37	37	37	37
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	13	13	13	13	13
			Manufacturing	26	26	26	26	26	26
			Dairying	4	4	4	4	4	5
			Sheep and Beef	1	1	1	1	1	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

	535360	Aotea	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	118	118	118	116	112	109
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	110	112	112	112	115	117
			Sheep and Beef	2	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

South Waikat	535370	Strathmore	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	0	0	1	1	1	1	
			Resid. - Low Dens	98	97	97	97	97	96	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	1	1	1	1	1	1	
			Dairying	17	18	18	18	18	18	
			Sheep and Beef	1	1	0	0	0	0	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	0	0	0	0	0	1	
			Indigenous	0	0	0	0	0	0	

	535380	Amisfield	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	47	47	47	47	47	47
			Resid. - Low Dens	1	1	1	1	1	1
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	2	2	2	2	2
			Manufacturing	54	55	55	55	55	59
			Dairying	2	2	2	2	2	2
			Sheep and Beef	1	1	1	1	1	1
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	7	6	6	6	6	2
			Indigenous	0	0	0	0	0	0

	535600	Putaruru	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	39	39	39	39	39	39
			Resid. - Low Dens	181	181	180	179	176	172
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	10	10	10	10	10
			Manufacturing	43	43	43	43	43	43
			Dairying	58	68	79	85	89	93
			Sheep and Beef	32	24	12	7	5	4
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	0	0	0	0	0	0

Otorohanga L	AU2013	AU2013_NAM	Land use type	2013	2021	2031	2041	2051	2061
	531100	Kawhia Community	Resid. - Lifestyle	3	4	4	4	4	4
			Resid. - Low Dens	45	46	47	47	46	45
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	1	1	1	1	1
			Manufacturing	1	1	1	1	1	1
			Dairying	0	2	1	1	1	1
			Sheep and Beef	9	9	9	9	8	8
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	1
			Forestry	0	0	0	0	0	0
			Indigenous	1	1	1	1	1	1

	531200	Otorohanga	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	29	36	47	47	47	47
			Resid. - Low Dens	125	129	136	137	137	135
			Resid. - Med-High Dens	3	3	3	3	3	3
			Commercial	0	8	8	8	8	8
			Manufacturing	24	24	24	24	24	24
			Dairying	71	70	68	68	67	68
			Sheep and Beef	33	29	18	18	18	18
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	11	4	0	0	0	0
			Indigenous	1	1	0	0	0	0

	531301	Otorohanga Rural West	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	577	577	579	576	566	551
			Resid. - Low Dens	14	14	14	13	11	9
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	2	2	2	2	2	2
			Dairying	10008	11310	12176	12740	13217	13681
			Sheep and Beef	33675	33601	32883	32346	31909	31490
			other Agriculture	12	38	54	57	56	55
			Cropping	0	75	141	148	150	156
			Forestry	4042	4193	4147	4122	4104	4088
			Indigenous	24051	22943	22823	22819	22803	22783

Otorohanga D	531303	Te Kawa	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	69	69	70	70	69	67	
			Resid. - Low Dens	1	2	2	2	2	2	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	5076	5219	5265	5287	5297	5312	
			Sheep and Beef	260	133	89	67	57	44	
			other Agriculture	0	0	0	0	0	0	
			Cropping	7	7	7	7	6	4	
			Forestry	15	2	0	0	0	0	
			Indigenous	2	2	2	2	2	2	

	531304	Otorohanga Rural East	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	680	680	686	685	671	650
			Resid. - Low Dens	7	7	11	11	11	10
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	44927	49088	52551	55451	57124	58285
			Sheep and Beef	32887	30404	27652	25484	23970	22874
			other Agriculture	11	23	35	41	41	41
			Cropping	77	80	84	82	78	76
			Forestry	3284	3163	3102	3053	3020	2979
			Indigenous	37686	36175	35501	34813	34701	34696

Waitomo	AU2013	AU2013_NAM	Land use type	2013	2021	2031	2041	2051	2061
	531500	Piopio	Resid. - Lifestyle	33	33	33	33	33	33
			Resid. - Low Dens	18	17	16	16	14	14
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	4	4	4	4	4
			Manufacturing	5	5	5	5	5	5
			Dairying	39	41	42	42	43	43
			Sheep and Beef	51	51	50	50	50	50
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	1	1
			Indigenous	1	1	1	1	1	1

	531600	Taharoa	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	12	11	9	7	3	3
			Resid. - Low Dens	14	10	9	6	4	3
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	23	177	199	210	214	225
			Sheep and Beef	1208	1751	1744	1738	1736	1723
			other Agriculture	0	0	0	0	0	0
			Cropping	0	6	25	40	44	45
			Forestry	1057	1234	1234	1234	1234	1232
			Indigenous	3212	3034	3022	3020	3020	3020

	531710	Mahoenui	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	37	33	32	31	31	30
			Resid. - Low Dens	22	18	18	18	17	16
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	1363	1634	1755	1876	1969	2088
			Sheep and Beef	24736	25190	25162	25142	25121	25107
			other Agriculture	0	0	0	0	0	0
			Cropping	0	21	47	57	57	57
			Forestry	2914	2982	2974	2971	2966	2966
			Indigenous	43287	42552	42468	42371	42305	42202

	531720	Marokopa	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	350	336	329	319	310	292
			Resid. - Low Dens	12	4	3	2	1	0
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	27	26	26	25	19
			Manufacturing	5	5	5	5	5	5
			Dairying	10398	10711	10838	10866	10892	10938
			Sheep and Beef	61824	62542	62528	62514	62505	62501
			other Agriculture	130	155	167	180	176	162
			Cropping	19	23	37	46	46	49
			Forestry	4504	4604	4594	4588	4587	4582
			Indigenous	44809	43782	43676	43662	43661	43661

Waitomo	531731	Waipa Valley	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	250	248	248	246	242	238	
			Resid. - Low Dens	3	3	3	3	3	3	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	5	5	5	5	5	
			Manufacturing	22	22	25	27	31	35	
			Dairying	6172	6372	6397	6416	6425	6433	
			Sheep and Beef	28043	28345	28337	28329	28323	28321	
			other Agriculture	0	2	5	6	6	5	
			Cropping	0	17	20	20	20	20	
			Forestry	3515	3587	3579	3567	3563	3558	
			Indigenous	9372	8805	8790	8789	8789	8789	

	531800	Mokauiti	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	84	80	79	77	72	69
			Resid. - Low Dens	13	12	12	12	12	12
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	1	1	2	2	2	2
			Dairying	6167	6275	6337	6344	6349	6366
			Sheep and Beef	48157	48624	48619	48615	48619	48606
			other Agriculture	0	0	2	2	0	0
			Cropping	0	46	64	66	66	66
			Forestry	5743	5835	5832	5830	5829	5828
			Indigenous	22480	21759	21702	21701	21700	21700

	532000	Te Kuiti	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	85	84	84	84	84	84
			Resid. - Low Dens	186	182	182	182	182	178
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	19	19	19	19	19
			Manufacturing	38	40	43	43	43	44
			Dairying	10	10	8	8	8	8
			Sheep and Beef	96	103	98	94	90	93
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	5	5	5	5	5	5
			Indigenous	11	10	10	10	10	10

Taupo DC	AU2013	AU2013_NAM	Land use type	2013	2021	2031	2041	2051	2061
	532200	Omori	Resid. - Lifestyle	13	14	15	15	15	15
			Resid. - Low Dens	92	94	94	94	92	90
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	3	3	3	3	3
			Manufacturing	0	0	0	0	0	0
			Dairying	2	2	2	2	2	2
			Sheep and Beef	46	48	47	47	47	47
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	3	7	6	6	7	11
			Indigenous	136	136	136	136	136	136

	532502	Kurafau	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	223	224	226	227	224	203
			Resid. - Low Dens	19	19	19	19	19	17
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	2879	3013	3013	3013	3013	3013
			Sheep and Beef	16746	17079	17105	17104	17104	17104
			other Agriculture	0	2	3	3	3	1
			Cropping	10	12	18	45	47	61
			Forestry	7287	7499	7505	7505	7506	7516
			Indigenous	17781	17134	17099	17097	17097	17097

	540900	Mangakino	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	2	5	7	8	8	8
			Resid. - Low Dens	70	72	74	74	74	74
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	4	4	4	4	4
			Manufacturing	3	3	3	3	3	3
			Dairying	38	140	149	148	148	148
			Sheep and Beef	100	13	0	0	0	0
			other Agriculture	1	1	1	1	1	1
			Cropping	0	0	0	0	0	0
			Forestry	0	6	6	6	6	6
			Indigenous	11	9	9	9	9	9

Taupo DC	541000	Turangi	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	4	4	4	4	4	4	
			Resid. - Low Dens	194	197	203	206	199	185	
			Resid. - Med-High Dens	4	4	4	4	4	3	
			Commercial	0	23	23	23	23	23	
			Manufacturing	43	43	43	43	43	46	
			Dairying	0	0	0	0	0	0	
			Sheep and Beef	56	63	61	61	63	65	
			other Agriculture	1	1	1	1	1	0	
			Cropping	0	0	0	0	0	2	
			Forestry	44	126	122	119	125	132	
			Indigenous	274	270	270	270	270	270	

	541311	Acacia Bay	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	233	235	236	236	236	235
			Resid. - Low Dens	66	67	68	68	68	67
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	1	1	1	1	1
			Manufacturing	0	0	0	0	0	0
			Dairying	0	0	0	0	0	0
			Sheep and Beef	246	248	245	243	243	243
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	24	36	35	35	35	35
			Indigenous	97	95	94	94	94	94

	541312	Wairakei-Aratiatia	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	49	51	53	54	54	54
			Resid. - Low Dens	16	18	18	18	18	18
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	4	4	4	4	4
			Manufacturing	96	96	96	96	96	98
			Dairying	650	758	792	798	802	808
			Sheep and Beef	2912	2938	2932	2927	2923	2916
			other Agriculture	0	0	0	0	0	0
			Cropping	317	316	316	316	316	316
			Forestry	1498	1532	1535	1534	1533	1532
			Indigenous	497	338	305	305	305	305

	541313	Maunganamu	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	140	143	149	152	152	152
			Resid. - Low Dens	8	14	16	16	16	16
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	1	1	2	2	2	2
			Dairying	218	218	218	218	218	218
			Sheep and Beef	1096	1104	1098	1096	1096	1096
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	264	273	269	267	267	267
			Indigenous	76	75	75	75	75	75

	541315	Taupo East	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	5	6	6	6	6	6
			Resid. - Low Dens	1	1	2	2	2	2
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	17	17	17	17	17	17
			Dairying	8	8	8	8	8	8
			Sheep and Beef	436	441	441	441	441	441
			other Agriculture	5	5	5	5	5	5
			Cropping	0	0	0	0	0	0
			Forestry	66	64	64	64	64	64
			Indigenous	27	25	25	25	25	25

	541316	Wharewaka	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	3	5	8	8	8
			Resid. - Low Dens	37	41	46	61	61	61
			Resid. - Med-High Dens	0	0	0	0	0	0
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	77	76	72	55	55	55
			Sheep and Beef	134	132	129	128	128	128
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	15	18	18	18	18	18
			Indigenous	0	0	0	0	0	0

Taupo DC

541317 Rangatira Park

Land use type	2013	2021	2031	2041	2051	2061	Trend line
Resid. - Lifestyle	28	28	28	29	29	29	
Resid. - Low Dens	39	43	43	43	43	43	
Resid. - Med-High Dens	0	0	0	0	0	0	
Commercial	0	0	0	0	0	0	
Manufacturing	8	8	8	8	8	9	
Dairying	9	9	9	9	9	8	
Sheep and Beef	2	18	18	17	17	17	
other Agriculture	0	0	0	0	0	0	
Cropping	0	0	0	0	0	0	
Forestry	0	0	0	0	0	0	
Indigenous	58	57	57	57	57	57	

541318 Rangatira

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	13	18	22	23	23	23
Resid. - Low Dens	2	4	4	4	4	4
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Dairying	4	4	4	4	4	4
Sheep and Beef	310	303	299	298	298	298
other Agriculture	0	0	0	0	0	0
Cropping	1	1	1	1	1	1
Forestry	35	35	35	35	35	35
Indigenous	4	4	4	4	4	4

541319 Lakewood

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	2	6	9	11	11	11
Resid. - Low Dens	63	76	93	98	98	98
Resid. - Med-High Dens	0	1	1	1	1	1
Commercial	0	1	1	1	1	1
Manufacturing	0	0	0	0	0	0
Dairying	19	18	15	13	13	13
Sheep and Beef	83	88	86	85	85	85
other Agriculture	0	0	0	0	0	0
Cropping	0	0	0	0	0	0
Forestry	38	55	40	36	36	36
Indigenous	13	13	13	13	13	13

541320 Marotiri

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	420	420	422	422	421	415
Resid. - Low Dens	11	11	11	11	11	11
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	1	1	1	1	1
Manufacturing	0	0	0	0	0	0
Dairying	26066	28119	29089	29735	30290	30777
Sheep and Beef	23175	22777	22139	21587	21113	20706
other Agriculture	69	67	80	80	69	44
Cropping	0	4	10	15	15	15
Forestry	12411	12627	12551	12520	12492	12467
Indigenous	37531	35677	35406	35339	35290	35245

541333 Kinloch

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	6	6	6	6	6	6
Resid. - Low Dens	84	95	100	101	101	101
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	1	1	1	1	1
Manufacturing	0	0	0	0	0	0
Dairying	2	2	2	2	2	2
Sheep and Beef	296	299	299	299	299	299
other Agriculture	0	0	1	1	1	1
Cropping	0	0	0	0	0	0
Forestry	18	26	21	20	20	20
Indigenous	76	76	75	75	75	75

541334 Tatua

Land use type	2013	2021	2031	2041	2051	2061
Resid. - Lifestyle	119	122	128	134	134	133
Resid. - Low Dens	10	10	10	10	10	10
Resid. - Med-High Dens	0	0	0	0	0	0
Commercial	0	0	0	0	0	0
Manufacturing	0	0	0	0	0	0
Dairying	5829	6020	6107	6156	6221	6287
Sheep and Beef	1287	1268	1228	1197	1168	1142
other Agriculture	18	21	21	22	22	22
Cropping	0	0	0	0	0	1
Forestry	13765	13730	13676	13652	13617	13576
Indigenous	1055	930	930	929	929	929

Taupo DC	541335	Oruanui	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	2114	2141	2168	2181	2153	2134	
			Resid. - Low Dens	7	10	16	19	19	18	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	2	2	2	2	2	
			Manufacturing	0	0	0	0	0	0	
			Dairying	12675	12906	13078	13212	13329	13440	
			Sheep and Beef	16016	15943	15823	15724	15661	15598	
			other Agriculture	99	109	113	115	115	115	
			Cropping	0	0	0	0	0	0	
			Forestry	9006	9050	8966	8909	8876	8842	
			Indigenous	4152	3983	3972	3969	3969	3969	
	541344	Broadlands	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	402	407	413	414	414	413	
			Resid. - Low Dens	11	11	11	11	11	11	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	7	7	7	7	7	7	
			Dairying	11822	11844	11939	12012	12099	12175	
			Sheep and Beef	4560	4541	4471	4412	4340	4287	
			other Agriculture	79	88	89	89	89	89	
			Cropping	99	126	179	216	216	216	
			Forestry	42905	43167	43159	43149	43134	43112	
			Indigenous	3599	3215	3191	3180	3180	3180	
	541345	Waitahanui	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	19	20	20	20	20	18	
			Resid. - Low Dens	36	39	40	41	39	32	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	1	1	1	1	1	
			Manufacturing	0	0	0	0	0	0	
			Dairying	36	36	36	36	36	36	
			Sheep and Beef	115	142	141	140	141	147	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	2	7	
			Forestry	678	729	729	729	729	729	
			Indigenous	446	437	437	437	437	435	
	541346	Tongariro	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	75	75	77	78	75	60	
			Resid. - Low Dens	52	54	55	56	55	52	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	32	50	50	50	50	50	
			Sheep and Beef	2250	2376	2379	2378	2378	2379	
			other Agriculture	0	0	0	1	1	0	
			Cropping	0	0	0	0	0	2	
			Forestry	24412	25957	26183	26246	26266	26281	
			Indigenous	23914	22664	22432	22367	22351	22350	
	541347	Motuoapa	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	0	0	1	2	2	2	
			Resid. - Low Dens	41	46	51	51	48	46	
			Resid. - Med-High Dens	0	1	2	3	3	3	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	1	1	1	1	1	1	
			Sheep and Beef	10	12	11	11	13	14	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	5	15	9	8	9	10	
			Indigenous	218	218	218	218	218	218	
	541348	Tokaanu	Land use type	2013	2021	2031	2041	2051	2061	
			Resid. - Lifestyle	37	38	38	38	33	21	
			Resid. - Low Dens	5	5	5	5	4	1	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	1	1	1	1	1	
			Manufacturing	0	0	0	0	0	0	
			Dairying	12	12	12	12	12	12	
			Sheep and Beef	299	349	349	349	349	351	
			other Agriculture	0	0	0	0	0	0	
			Cropping	22	22	21	21	24	26	
			Forestry	51	141	142	142	144	155	
			Indigenous	2618	2611	2611	2611	2611	2611	

Taupo DC	541501	Rangipo	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	15	15	15	15	15	15	
			Resid. - Low Dens	0	0	0	0	0	0	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	57	152	160	160	161	162	
			Sheep and Beef	3773	3822	3819	3818	3818	3817	
			other Agriculture	0	2	5	5	4	2	
			Cropping	0	5	16	19	19	21	
			Forestry	11859	12697	12706	12706	12706	12706	
			Indigenous	74515	73840	73821	73820	73820	73820	

	541710	Nukuhau	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	1	1	1	1	1
			Resid. - Low Dens	65	68	69	69	69	69
			Resid. - Med-High Dens	2	2	2	2	2	2
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	0	0	0	0	0	0
			Sheep and Beef	1	1	1	1	1	1
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	1	0	0	0	0
			Indigenous	6	6	6	6	6	6

	541720	Taupo Central	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	123	124	124	124	124	124
			Resid. - Med-High Dens	14	14	14	14	14	14
			Commercial	0	15	15	15	15	15
			Manufacturing	11	11	11	11	11	11
			Dairying	0	0	0	0	0	0
			Sheep and Beef	1	0	0	0	0	0
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	0	0	0	0	0	0
			Indigenous	4	4	4	4	4	4

	541730	Tauhara	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	9	17	17	17	17
			Resid. - Low Dens	147	147	148	148	149	149
			Resid. - Med-High Dens	1	1	1	1	1	1
			Commercial	0	16	15	15	14	14
			Manufacturing	65	65	65	65	65	65
			Dairying	2	1	1	1	1	1
			Sheep and Beef	38	38	36	36	36	36
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	60	54	48	48	45	45
			Indigenous	36	36	36	36	36	36

	541740	Hilltop	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	1	2	2	2	2	2
			Resid. - Low Dens	165	168	168	168	168	168
			Resid. - Med-High Dens	4	4	4	4	4	4
			Commercial	0	17	17	17	17	17
			Manufacturing	1	1	1	1	1	1
			Dairying	2	2	2	2	2	2
			Sheep and Beef	5	7	6	6	6	6
			other Agriculture	0	0	0	0	0	0
			Cropping	1	0	0	0	0	0
			Forestry	3	2	2	2	2	2
			Indigenous	26	26	26	26	26	26

	541750	Waipahihi	Land use type	2013	2021	2031	2041	2051	2061
			Resid. - Lifestyle	0	0	0	0	0	0
			Resid. - Low Dens	102	116	123	124	124	124
			Resid. - Med-High Dens	5	5	5	5	5	5
			Commercial	0	0	0	0	0	0
			Manufacturing	0	0	0	0	0	0
			Dairying	45	43	39	38	38	38
			Sheep and Beef	2	3	3	3	3	3
			other Agriculture	0	0	0	0	0	0
			Cropping	0	0	0	0	0	0
			Forestry	4	8	6	6	6	6
			Indigenous	49	44	44	44	44	44

Taupo DC	541760	Richmond Heights	Land use type	2013	2021	2031	2041	2051	2061	Trend line
			Resid. - Lifestyle	0	1	2	2	2	2	
			Resid. - Low Dens	102	117	155	169	169	169	
			Resid. - Med-High Dens	0	0	0	0	0	0	
			Commercial	0	0	0	0	0	0	
			Manufacturing	0	0	0	0	0	0	
			Dairying	42	34	11	4	4	4	
			Sheep and Beef	1	6	1	1	1	1	
			other Agriculture	0	0	0	0	0	0	
			Cropping	0	0	0	0	0	0	
			Forestry	6	20	8	1	1	1	
			Indigenous	2	1	1	1	1	1	

Appendix 2: Population Estimates (2006, 2013) and Projections (2021-2061) by CAU.

TA/CAU	2006	2013	2021	2031	2041	2051	2061
Thames-Coromandel District							
Coromandel	1520	1580	1740	1917	1925	1809	1648
Hikuai	3340	3340	3487	3531	3372	3044	2590
Moanataiari	2540	2530	2531	2543	2525	2442	2274
Parawai	4390	4460	4463	4509	4474	4311	4014
Pauanui Beach	760	780	1069	1098	1072	868	621
Tairua	1300	1280	1277	1318	1221	1083	883
Te Puru-Thornton Bay	960	880	880	906	889	853	789
Te Rerenga	4300	4300	4456	4612	4614	3929	2895
Whangamata	3640	3630	3622	3643	3587	3322	2875
Whitianga	3880	4550	4802	5188	5156	4871	4395
Hauraki District							
Hauraki Plains	2610	2610	2567	2485	2426	2241	2078
Kaiaua	690	820	949	1026	1019	981	900
Kerepehi	530	450	453	458	456	428	365
Ngatea	1190	1290	1277	1300	1292	1197	913
Ohinemuri	3240	3250	3159	3195	3081	2876	2594
Paeroa	4080	4070	4385	4751	4754	4513	4153
Turua	1370	1380	1366	1372	1302	985	784
Waihi	4600	4730	4791	4932	4890	4589	4159
Waikato District							
Buckland South	820	890	951	1007	1047	1079	1108
Eureka	1890	2290	2342	2425	2654	2732	2804
Gordonton	980	1200	1228	1256	1288	1321	1350
Horotiu	820	800	831	845	867	887	903
Huntly East	4050	4310	5271	5508	5963	6176	6333
Huntly West	3060	3010	3366	3602	3822	3863	3915
Kainui	2510	2910	3154	3563	4078	4519	4812
Mangatawhiri	1420	1600	1782	2023	2292	3191	4992
Maramarua	980	1060	1103	1251	1717	1800	1884
Matangi	1840	2250	2267	2345	2440	2499	2542
Meremere	480	490	746	821	825	830	840
Ngaruawahia	5300	5440	5548	5619	5960	6389	6533
Onewhero	3890	4000	4110	4739	5426	5811	6077
Opuawhanga	230	240	257	292	343	353	372
Otaua	2230	2370	2442	2597	2730	2824	2883
Pokeno	1760	1860	3811	8513	10009	11170	11787
Pukeoware	240	240	252	268	272	284	296
Raglan	2720	2870	4000	4607	4641	4691	4714
Redoubt	200	210	226	406	500	528	612
Rotowaro	0	0	0	0	0	0	0
Tamahere-Tauwhare	4750	5910	6128	6506	7220	7388	7570
Taupiri Community	470	440	572	626	654	667	677
Te Akau	990	970	1019	1123	1602	1859	1902
Te Kauwhata	1240	1540	2639	3946	4398	4514	4540
Te Kowhai	1310	1570	1582	1621	1672	1695	1728
Te Uku	1710	1990	2550	2880	3533	4465	5341
Tuakau	3640	4400	4763	4844	4966	5009	5052
Waerenga	1830	2670	2947	4138	4393	4488	4568
Waikato Western Hills	3920	4160	4680	5459	8385	10445	11950
Whatawhata	2120	2600	2709	2943	3147	3432	3587
Whitikahu	2110	2220	2239	2403	3210	3314	3362
Matamata-Piako District							
Hinuera	910	950	767	580	440	333	252
TA/CAU	**2006**	**2013**	**2021**	**2031**	**2041**	**2051**	**2061**

Matamata North	2680	3030	3148	3262	3315	3318	3324
Matamata South	3750	4340	4533	5551	6132	6172	6278
Morrinsville East	4150	4610	4987	5285	5646	5752	5757
Morrinsville West	2620	2700	2939	3078	3165	3168	3180
Okauia	1960	2050	2088	2139	2276	2343	2490
Springdale	2550	2560	2578	2651	2722	2763	2833
Tahuroa	2590	2770	2863	3303	3569	3691	3735
Te Aroha	3850	4060	4600	4839	4860	4860	4959
Te Poi	840	840	845	861	861	880	885
Waharoa	530	490	505	530	533	536	537
Waihou-Walton	4450	4190	4252	4316	4325	4295	4283
Waitoa	320	320	329	343	361	368	369
Hamilton City							
Bader	3920	4250	4801	5252	5657	5908	6172
Beerescourt	3220	3350	3570	3720	3899	4078	4256
Bryant	5930	5930	6210	6460	6745	7042	7338
Brymer	2380	2790	3082	3207	3330	3530	3663
Burbush	210	180	383	1310	1856	2263	2470
Chartwell	2440	2650	2847	2979	3113	3252	3391
Chedworth	3670	3690	4002	4146	4314	4489	4663
Clarkin	3130	3230	3337	3470	3614	3764	3913
Claudelands	2480	2560	2251	2262	2363	2468	2574
Crawshaw	2960	2980	3071	3159	3264	3376	3486
Dinsdale North	3900	4340	4509	4667	4851	5044	5235
Dinsdale South	4160	4140	4346	4564	4760	5037	5231
Enderley	4060	4430	4650	4804	5431	6064	6791
Fairview Downs	3480	3540	3740	3911	4054	4204	4353
Flagstaff	3900	4050	4717	4827	5065	5312	5559
Frankton Junction	1750	1880	1761	1831	1910	2085	2346
Glenview	5280	5450	6052	6272	6545	6812	7078
Grandview	3110	3340	3433	3539	3665	3797	3929
Hamilton Central	2820	3110	3442	4619	5338	5749	6126
Hamilton East	3820	4090	4376	4936	5780	6381	6906
Hamilton Lake	4030	4340	4494	4754	5395	6247	7109
Hillcrest West	3730	3850	3972	3997	4299	4618	4800
Horsham Downs	2680	5150	8146	10009	11745	12186	12485
Huntington	3980	8350	9843	10470	10887	11319	11747
Insoll	2690	2700	2781	2875	2984	3099	3213
Maeroa	3740	3850	3990	4135	4294	4462	4628
Melville	4960	5030	5225	5398	5602	5815	6026
Nawton	4600	4760	4929	5102	5304	5516	5725
Naylor	4380	4580	4943	5756	6246	6528	6801
Newstead	180	230	980	4981	8551	11227	12098
Peachgrove	2940	3410	3475	3400	3622	3789	3989
Peacocke	470	560	2164	8613	12369	14869	17303
Porritt	1760	1850	2003	2286	2388	2495	2613
Pukete	2490	2420	2541	2644	2762	2885	3008
Pukete West	2180	2140	2221	2297	2386	2479	2608
Queenwood	3120	3210	3454	3647	3822	4003	4184
Riverlea	2630	2740	2808	3027	3151	3281	3409
Rotokauri	190	180	1118	3416	8323	11777	12265
Rototuna	3300	3390	3502	3631	3781	3937	4093
Silverdale	2630	2750	2886	3097	3219	3337	3555
Swarbrick	4240	4730	5601	6954	7385	7773	8160
Sylvester	180	2200	6040	7764	8136	8472	8812
Te Rapa	230	350	484	873	1200	1363	1391
Te Rapa North	170	150	129	108	91	68	51
Temple View	1400	1270	1377	1995	2487	4116	4882
University	5220	6010	7067	8305	9177	9646	10002
TA/CAU	**2006**	**2013**	**2021**	**2031**	**2041**	**2051**	**2061**

Waipa District							
Allen Road	160	220	245	248	242	234	227
Cambridge Central	810	790	924	975	1006	1013	1043
Cambridge North	2990	3140	3296	3355	3406	3428	3473
Cambridge West	2640	2820	2947	3159	3753	3875	4015
Hautapu	1660	1990	2692	6798	8162	8132	8100
Kaipaki	940	1020	1056	1094	1146	1227	1437
Karapiro	2520	2760	2825	2913	3073	3126	3131
Kihikihi	2030	2060	2272	2413	2436	2447	2453
Kihikihi Flat	710	820	1829	2550	2668	3095	3080
Lake Cameron	1080	1230	1315	1489	1681	1800	2097
Lake Ngaroto	530	580	930	2181	2337	2892	2883
Leamington East	3850	3990	4090	4240	4307	4355	4378
Leamington West	3100	3680	4034	4264	4710	4942	5016
Ngahinapouri	2030	2210	2249	2292	2311	2334	2343
Ohaupo	430	530	572	616	638	643	701
Pirongia	1370	1480	1567	1760	2028	2074	2083
Pokuru	470	550	554	562	565	563	565
Pukerimu	410	480	1001	1969	4906	5222	5246
Rotongata	850	860	840	838	839	839	841
Rotoorangi	1750	2010	2019	2063	2146	2178	2184
Swayne	240	1530	2506	2629	2669	2703	2718
Te Awamutu Central	3240	3450	3554	3617	3761	3937	3953
Te Awamutu East	2590	2900	3428	3672	3750	3791	3796
Te Awamutu South	3030	3040	3186	3244	3307	3352	3370
Te Awamutu West	1260	1370	1575	1628	1643	1651	1653
Te Pahu	1220	1330	1385	1437	1472	1488	1527
Te Rahu	900	940	1147	1265	1498	1523	1590
Te Rore	430	440	448	460	477	482	510
Tokanui	450	460	468	485	486	479	451
Otorohanga District							
Kawhia Community	400	350	363	378	361	302	217
Otorohanga	2660	2650	2675	2813	2732	2511	2194
Otorohanga Rural East	4100	4180	4266	4488	4541	4419	4178
Otorohanga Rural West	1720	1930	1986	2036	1990	1870	1691
Te Kawa	430	480	482	475	464	448	423
South Waikato District							
Amisfield	160	160	185	183	182	180	177
Aotea	3240	3150	3067	3033	2872	2606	2346
Arapuni	2190	2310	2451	2487	2302	2105	1963
Kinleith	240	250	240	242	233	207	157
Lichfield	990	1040	1035	1039	1018	998	969
Mangakaretu	220	240	444	440	437	432	426
Matarawa	2080	1980	1927	1906	1790	1587	1403
Paraonui	1830	1820	1771	1751	1649	1457	1228
Parkdale	730	700	706	699	679	633	583
Putaruru	3840	3940	3834	3781	3572	3221	2832
Stanley Park	2120	2140	2082	2057	1953	1764	1573
Strathmore	2470	2180	2097	2075	1975	1816	1620
Tapapa	1060	1050	1074	1081	1071	1042	992
Tirau	750	720	704	695	612	555	452
Tokoroa Central	830	760	739	730	692	631	564
Wawa	480	740	729	726	664	587	478
Waitomo District							
Mahoenui	490	420	362	344	316	268	218
Marokopa	1600	1610	1381	1315	1229	1112	972
Mokauiti	1210	1070	1042	1010	953	882	809
Piopio	480	420	409	376	344	284	245
Taharoa	230	240	177	144	99	66	41
TA/CAU	**2006**	**2013**	**2021**	**2031**	**2041**	**2051**	**2061**

Te Kuiti	4580	4430	4485	4302	3991	3623	3127
Waipa Valley	1010	1100	1095	1065	1017	958	882
Taupo District							
Acacia Bay	1270	1510	1526	1569	1583	1549	1466
Broadlands	540	680	686	706	727	719	694
Hilltop	3700	3730	3770	3773	3762	3681	3524
Kinloch	340	520	704	784	798	761	687
Kuratau	280	290	334	336	336	319	264
Lakewood	1270	1500	1778	2063	2141	2095	2006
Mangakino	1060	790	827	862	861	832	774
Marotiri	1440	1650	1767	1839	1872	1871	1825
Maunganamu	210	430	526	575	585	575	553
Motuoapa	230	250	388	528	557	487	416
Nukuhau	1560	1600	1643	1662	1657	1622	1556
Omori	230	200	278	278	277	216	158
Oruanui	2020	2380	2480	2675	2802	2787	2705
Rangatira	90	80	117	121	121	119	114
Rangatira Park	640	730	796	795	794	775	741
Rangipo	250	100	108	111	111	109	105
Richmond Heights	2210	2220	2461	3101	3324	3251	3104
Tatua	190	300	315	331	338	335	324
Tauhara	4470	4350	4349	4369	4358	4323	4173
Taupo Central	3740	3780	3784	3797	3783	3706	3560
Taupo East	10	10	11	26	26	26	24
Tokaanu	200	200	201	200	200	174	165
Tongariro	450	530	564	582	623	578	474
Turangi	3370	3140	3184	3286	3327	3108	2689
Waipahihi	1800	1980	2206	2320	2329	2269	2155
Wairakei-Aratiatia	700	640	682	685	684	683	669
Waitahanui	470	440	490	507	522	458	336
Wharewaka	470	510	565	651	904	880	830
Rotorua District							
Arahiwi	150	180	285	272	262	246	226
Golden Springs	1330	1410	1381	1377	1348	1246	1107
Ngakuru	1750	1770	1788	1897	1874	1713	1475
Reporoa	500	470	467	460	444	405	366

Appendix 3: Households estimates (2013) and projections (2021-2061) by CAU.

TA/CAU	2013	2021	2031	2041	2051	2061
Thames-Coromandel District						
Coromandel	650	776	921	960	924	853
Hikuai	1293	1464	1598	1584	1464	1262
Moanataiari	1188	1289	1395	1438	1424	1344
Parawai	1816	1971	2146	2210	2181	2058
Pauanui Beach	355	528	584	592	491	355
Tairua	568	615	684	658	597	494
Te Puru-Thornton Bay	403	437	485	494	485	455
Te Rerenga	1804	2028	2262	2349	2048	1529
Whangamata	1579	1709	1852	1893	1795	1574
Whitianga	1873	2145	2497	2575	2492	2278
Hauraki District						
Hauraki Plains	932	1009	1062	1096	1044	992
Kaiaua	331	421	495	520	516	485
Kerepehi	162	180	198	208	202	176
Ngatea	532	580	642	675	644	503
Ohinemuri	1281	1370	1508	1537	1479	1366
Paeroa	1651	1957	2307	2440	2387	2251
Turua	484	527	576	578	451	368
Waihi	2005	2236	2503	2623	2538	2357
Waikato District						
Buckland South	295	340	387	412	433	451
Eureka	752	832	924	1036	1086	1131
Gordonton	343	379	416	437	457	474
Horotiu	280	314	343	360	375	388
Huntly East	1543	2040	2287	2537	2678	2786
Huntly West	908	1098	1261	1371	1412	1452
Kainui	944	1107	1341	1573	1776	1919
Mangatawhiri	544	655	798	927	1315	2087
Maramarua	373	419	511	718	767	814
Matangi	737	803	891	950	991	1023
Meremere	150	247	292	301	309	317
Ngaruawahia	1724	1900	2065	2244	2451	2543
Onewhero	1405	1560	1931	2265	2471	2622
Opuawhanga	81	94	115	138	145	155
Otaua	812	905	1032	1112	1172	1214
Pokeno	617	1366	3274	3944	4484	4801
Pukeoware	87	99	113	117	125	132
Raglan	1146	1727	2134	2203	2268	2313
Redoubt	72	84	162	204	220	259
Rotowaro	0	0	0	0	0	0
Tamahere-Tauwhare	1880	2107	2401	2730	2846	2958
Taupiri Community	162	228	268	287	298	307
Te Akau	349	396	468	685	810	841
Te Kauwhata	553	1025	1645	1878	1964	2005
Te Kowhai	550	600	659	697	719	744
Te Uku	683	946	1146	1441	1855	2252
Tuakau	1447	1693	1848	1941	1994	2041
Waerenga	668	797	1200	1306	1359	1404
Waikato Western Hills	1441	1752	2193	3452	4380	5085
Whatawhata	833	939	1094	1199	1332	1412
Whitikahu	710	774	891	1220	1283	1321
Matamata-Piako District						
Hinuera	337	285	224	173	132	101
Matamata North	1264	1374	1484	1536	1551	1562

Matamata South	1661	1815	2317	2608	2647	2707
Morrinsville East	1778	2013	2223	2420	2486	2502
TA/CAU	**2013**	**2021**	**2031**	**2041**	**2051**	**2061**
Morrinsville West	981	1117	1220	1278	1290	1301
Okauia	725	773	825	894	929	992
Springdale	894	942	1009	1056	1081	1114
Tahuroa	951	1028	1236	1361	1420	1444
Te Aroha	1667	1976	2167	2217	2236	2294
Te Poi	286	301	320	326	336	339
Waharoa	147	159	174	178	181	182
Waihou-Walton	1474	1566	1656	1691	1694	1698
Waitoa	120	129	141	151	155	156
Hamilton City						
Bader	1438	1750	2049	2304	2471	2623
Beerescourt	1246	1430	1595	1745	1874	1987
Bryant	2130	2403	2675	2916	3126	3311
Brymer	854	1017	1132	1228	1336	1409
Burbush	57	131	480	709	888	985
Chartwell	903	1045	1170	1276	1369	1451
Chedworth	1222	1427	1582	1719	1836	1939
Clarkin	1095	1219	1356	1475	1577	1666
Claudelands	1041	986	1060	1157	1240	1314
Crawshaw	909	1009	1110	1198	1272	1335
Dinsdale North	1423	1593	1764	1915	2044	2156
Dinsdale South	1405	1589	1786	1944	2113	2230
Enderley	1513	1711	1892	2233	2560	2914
Fairview Downs	1113	1267	1418	1534	1634	1719
Flagstaff	1480	1857	2034	2228	2399	2552
Frankton Junction	728	735	818	890	998	1141
Glenview	1871	2239	2483	2705	2891	3052
Grandview	1083	1199	1323	1431	1522	1600
Hamilton Central	1318	1571	2256	2723	3010	3260
Hamilton East	1330	1533	1850	2262	2564	2820
Hamilton Lake	1528	1705	1930	2287	2719	3145
Hillcrest West	1188	1321	1422	1597	1762	1861
Horsham Downs	1495	2548	3350	4105	4373	4553
Huntington	2560	3251	3701	4018	4289	4524
Insoll	749	831	919	997	1062	1120
Maeroa	1399	1562	1732	1878	2004	2112
Melville	1616	1808	1999	2166	2308	2431
Nawton	1634	1822	2019	2191	2339	2468
Naylor	1742	2025	2524	2860	3068	3249
Newstead	81	373	2028	3635	4900	5367
Peachgrove	1279	1404	1470	1635	1756	1879
Peacocke	214	889	3787	5679	7009	8290
Porritt	593	691	844	921	988	1051
Pukete	818	926	1031	1124	1206	1277
Pukete West	677	757	838	908	969	1036
Queenwood	1155	1339	1513	1656	1781	1892
Riverlea	957	1056	1219	1324	1416	1495
Rotokauri	57	383	1250	3182	4622	4892
Rototuna	1128	1255	1393	1515	1619	1711
Silverdale	885	1000	1148	1246	1326	1436
Swarbrick	1766	2253	2993	3319	3587	3827
Sylvester	620	1833	2521	2759	2950	3118
Te Rapa	223	332	640	919	1071	1112
Te Rapa North	45	42	38	33	25	19
Temple View	319	372	577	752	1277	1540
University	1631	2065	2598	2997	3235	3409
Waipa District						
Allen Road	72	88	97	99	98	96

Cambridge Central	346	442	510	550	565	588
Cambridge North	1140	1308	1457	1544	1584	1623
TA/CAU	**2013**	**2021**	**2031**	**2041**	**2051**	**2061**
Cambridge West	1189	1357	1592	1975	2077	2177
Hautapu	641	947	2618	3282	3331	3357
Kaipaki	355	401	455	498	543	644
Karapiro	939	1050	1185	1305	1353	1371
Kihikihi	728	877	1020	1075	1100	1116
Kihikihi Flat	292	711	1085	1186	1402	1411
Lake Cameron	400	467	579	683	745	878
Lake Ngaroto	202	353	907	1014	1279	1290
Leamington East	1486	1664	1889	2004	2064	2099
Leamington West	1345	1610	1863	2149	2298	2359
Ngahinapouri	737	820	914	962	991	1006
Ohaupo	187	220	259	280	288	318
Pirongia	515	595	732	880	917	932
Pokuru	187	205	228	239	243	247
Pukerimu	162	370	797	2073	2248	2285
Rotongata	292	312	340	355	362	367
Rotoorangi	683	749	838	911	942	955
Swayne	439	786	903	957	987	1004
Te Awamutu Central	1372	1544	1720	1868	1992	2023
Te Awamutu East	1110	1434	1681	1793	1846	1870
Te Awamutu South	1179	1350	1505	1602	1654	1682
Te Awamutu West	475	597	676	712	729	738
Te Pahu	463	527	599	641	659	684
Te Rahu	331	441	533	658	682	721
Te Rore	156	174	196	212	218	233
Tokanui	147	164	186	195	195	186
Otorohanga District						
Kawhia Community	153	174	197	199	175	131
Otorohanga	1008	1116	1269	1306	1262	1148
Otorohanga Rural East	1290	1444	1644	1763	1803	1775
Otorohanga Rural West	707	798	885	916	905	853
Te Kawa	153	169	180	186	189	186
South Waikato District						
Amisfield	60	75	80	83	85	86
Aotea	1040	1100	1163	1157	1087	999
Arapuni	818	942	1022	994	942	896
Kinleith	90	94	101	102	94	73
Lichfield	370	400	429	441	448	444
Mangakaretu	87	175	186	194	198	199
Matarawa	743	785	830	819	752	679
Paraonui	686	724	766	758	693	596
Parkdale	256	280	296	302	292	274
Putaruru	1518	1604	1692	1679	1568	1407
Stanley Park	773	816	862	860	805	732
Strathmore	743	776	821	821	782	712
Tapapa	370	411	442	460	464	451
Tirau	295	313	330	305	287	239
Tokoroa Central	289	305	322	321	303	276
Wawa	271	290	308	296	271	225
Waitomo District						
Mahoenui	163	151	155	149	131	109
Marokopa	593	548	560	549	515	462
Mokauiti	393	412	429	425	408	384
Piopio	166	175	172	165	141	125
Taharoa	85	67	59	43	29	19
Te Kuiti	1592	1735	1787	1739	1638	1449
Waipa Valley	375	402	420	421	411	388

Taupo District						
TA/CAU	**2013**	**2021**	**2031**	**2041**	**2051**	**2061**
Acacia Bay	575	621	685	716	718	689
Broadlands	215	232	256	273	276	271
Hilltop	1435	1549	1663	1719	1724	1674
Kinloch	200	289	345	364	356	326
Kuratau	115	142	153	158	154	129
Lakewood	599	759	945	1016	1019	990
Mangakino	315	352	394	407	403	381
Marotiri	557	637	711	751	769	761
Maunganamu	151	198	232	245	246	240
Motuoapa	106	176	257	281	252	218
Nukuhau	612	670	728	752	755	734
Omori	94	139	150	155	123	92
Oruanui	830	923	1068	1160	1182	1164
Rangatira	36	57	63	65	66	64
Rangatira Park	294	342	366	379	380	368
Rangipo	30	35	39	40	40	39
Richmond Heights	790	935	1265	1405	1409	1364
Tatua	100	112	126	134	136	133
Tauhara	1580	1687	1819	1881	1912	1872
Taupo Central	1493	1596	1718	1774	1781	1736
Taupo East	3	4	9	9	9	9
Tokaanu	73	78	83	86	77	74
Tongariro	127	144	160	178	169	140
Turangi	1184	1282	1419	1490	1426	1251
Waipahihi	769	915	1032	1074	1073	1033
Wairakei-Aratiatia	209	238	256	265	271	270
Waitahanui	167	198	220	235	211	157
Wharewaka	254	301	372	536	534	511
Rotorua District						
Arahiwi	59	107	115	117	113	105
Golden Springs	515	576	647	665	631	571
Ngakuru	667	769	919	953	895	785
Reporoa	178	202	224	227	213	196

Appendix 4: Labour force projections (2021-2061) by CAU.

TA/CAU	2021	2031	2041	2051	2061
Thames-Coromandel District					
Coromandel	907	1054	1018	913	784
Hikuai	1817	1941	1784	1536	1232
Moanataiari	1319	1398	1336	1232	1082
Parawai	2326	2479	2367	2176	1910
Pauanui Beach	557	604	567	438	295
Tairua	666	724	646	547	420
Te Puru-Thornton Bay	459	498	470	430	375
Te Rerenga	2322	2536	2441	1983	1377
Whangamata	1888	2003	1898	1677	1367
Whitianga	2503	2852	2728	2459	2091
Hauraki District					
Hauraki Plains	1348	1394	1334	1214	1071
Kaiaua	498	576	560	532	464
Kerepehi	238	257	251	232	188
Ngatea	671	730	711	649	471
Ohinemuri	1659	1793	1695	1559	1337
Paeroa	2303	2666	2615	2446	2142
Turua	717	770	716	534	404
Waihi	2516	2767	2689	2487	2144
Waikato District					
Buckland South	544	607	625	647	662
Eureka	1339	1462	1584	1638	1676
Gordonton	702	757	769	792	807
Horotiu	475	509	517	532	540
Huntly East	3014	3320	3559	3704	3785
Huntly West	1925	2171	2282	2317	2340
Kainui	1803	2148	2434	2710	2876
Mangatawhiri	1019	1219	1368	1913	2983
Maramarua	631	754	1025	1079	1126
Matangi	1296	1413	1456	1499	1519
Meremere	426	495	493	498	502
Ngaruawahia	3172	3387	3557	3831	3905
Onewhero	2350	2857	3239	3484	3632
Opuawhanga	147	176	205	212	222
Otaua	1396	1566	1630	1693	1723
Pokeno	2179	5132	5975	6698	7045
Pukeoware	144	161	162	170	177
Raglan	2287	2777	2770	2813	2818
Redoubt	129	245	298	316	366
Rotowaro	0	0	0	0	0
Tamahere-Tauwhare	3504	3922	4310	4430	4524
Taupiri Community	327	377	390	400	404
Te Akau	583	677	956	1115	1137
Te Kauwhata	1509	2378	2625	2707	2713
Te Kowhai	905	977	998	1016	1033
Te Uku	1458	1736	2109	2677	3192
Tuakau	2724	2920	2964	3003	3019
Waerenga	1685	2494	2622	2691	2730
Waikato Western Hills	2676	3291	5005	6263	7142
Whatawhata	1549	1774	1878	2058	2144
Whitikahu	1280	1448	1916	1987	2009
Matamata-Piako District					
Hinuera	427	337	252	192	145
Matamata North	1753	1897	1900	1912	1911
Matamata South	2524	3228	3514	3557	3610
TA/CAU	**2021**	**2031**	**2041**	**2051**	**2061**

Morrinsville East	2777	3074	3235	3315	3310
Morrinsville West	1636	1790	1814	1826	1828
Okauia	1163	1244	1304	1350	1432
Springdale	1435	1542	1560	1592	1629
Tahuroa	1594	1921	2045	2127	2147
Te Aroha	2562	2814	2785	2801	2851
Te Poi	470	501	493	507	509
Waharoa	281	308	306	309	309
Waihou-Walton	2368	2510	2478	2475	2462
Waitoa	183	200	207	212	212
Hamilton City					
Bader	2688	3097	3310	3380	3447
Beerescourt	1999	2194	2281	2333	2377
Bryant	3477	3809	3946	4028	4099
Brymer	1726	1891	1949	2019	2046
Burbush	215	772	1086	1295	1379
Chartwell	1594	1756	1821	1860	1894
Chedworth	2240	2445	2524	2568	2604
Clarkin	1868	2046	2114	2153	2186
Claudelands	1260	1334	1383	1412	1438
Crawshaw	1719	1862	1910	1931	1947
Dinsdale North	2525	2752	2838	2885	2924
Dinsdale South	2433	2691	2785	2881	2922
Enderley	2603	2832	3178	3469	3794
Fairview Downs	2094	2306	2372	2405	2431
Flagstaff	2641	2846	2964	3039	3105
Frankton Junction	986	1080	1117	1193	1310
Glenview	3388	3698	3830	3897	3953
Grandview	1922	2087	2144	2172	2194
Hamilton Central	1927	2723	3123	3289	3422
Hamilton East	2450	2910	3382	3650	3858
Hamilton Lake	2516	2803	3157	3573	3971
Hillcrest West	2224	2357	2515	2642	2681
Horsham Downs	4560	5902	6872	6971	6974
Huntington	5511	6174	6370	6475	6562
Insoll	1557	1695	1746	1773	1795
Maeroa	2234	2438	2513	2552	2585
Melville	2925	3183	3277	3326	3366
Nawton	2759	3008	3104	3155	3198
Naylor	2768	3394	3654	3734	3799
Newstead	549	2937	5003	6422	6758
Peachgrove	1946	2005	2119	2168	2228
Peacocke	1211	5079	7237	8506	9665
Porritt	1121	1348	1397	1427	1459
Pukete	1423	1559	1616	1651	1680
Pukete West	1244	1355	1396	1418	1457
Queenwood	1934	2150	2236	2290	2337
Riverlea	1572	1785	1843	1877	1904
Rotokauri	626	2014	4870	6737	6851
Rototuna	1960	2141	2212	2252	2286
Silverdale	1616	1826	1883	1909	1986
Swarbrick	3136	4101	4321	4446	4558
Sylvester	3382	4578	4761	4846	4922
Te Rapa	271	515	702	780	777
Te Rapa North	72	64	53	39	28
Temple View	771	1176	1455	2354	2727
University	3956	4897	5370	5518	5587
Waipa District					
Allen Road	143	150	141	135	131
Cambridge Central	538	591	588	584	601
TA/CAU	**2021**	**2031**	**2041**	**2051**	**2061**

Cambridge North	1921	2034	1991	1976	2000
Cambridge West	1717	1915	2194	2233	2312
Hautapu	1569	4121	4771	4686	4664
Kaipaki	615	663	670	707	827
Karapiro	1646	1766	1797	1802	1803
Kihikihi	1324	1463	1424	1410	1412
Kihikihi Flat	1066	1546	1560	1784	1773
Lake Cameron	766	903	983	1037	1207
Lake Ngaroto	542	1322	1366	1667	1660
Leamington East	2383	2571	2518	2510	2521
Leamington West	2351	2585	2753	2848	2888
Ngahinapouri	1311	1390	1351	1345	1349
Ohaupo	334	373	373	370	404
Pirongia	913	1067	1186	1195	1199
Pokuru	323	341	330	324	325
Pukerimu	584	1194	2868	3009	3020
Rotongata	490	508	490	484	484
Rotoorangi	1176	1251	1255	1255	1257
Swayne	1460	1594	1560	1558	1565
Te Awamutu Central	2071	2193	2199	2269	2276
Te Awamutu East	1998	2226	2192	2185	2186
Te Awamutu South	1857	1967	1933	1932	1940
Te Awamutu West	918	987	960	951	952
Te Pahu	807	871	861	857	879
Te Rahu	669	767	876	878	916
Te Rore	261	279	279	278	294
Tokanui	273	294	284	276	260
Otorohanga District					
Kawhia Community	221	251	247	212	151
Otorohanga	1628	1866	1871	1765	1526
Otorohanga Rural East	2595	2978	3110	3107	2907
Otorohanga Rural West	1208	1351	1362	1314	1177
Te Kawa	293	315	318	315	294
South Waikato District					
Amisfield	96	101	101	100	96
Aotea	1595	1678	1593	1449	1273
Arapuni	1275	1376	1277	1171	1065
Kinleith	125	134	129	115	85
Lichfield	538	575	564	555	526
Mangakaretu	231	244	243	240	231
Matarawa	1002	1054	993	883	761
Paraonui	921	969	915	810	666
Parkdale	367	387	377	352	316
Putaruru	1994	2092	1982	1791	1536
Stanley Park	1083	1138	1084	981	853
Strathmore	1091	1148	1096	1010	879
Tapapa	558	598	594	579	538
Tirau	366	385	339	309	245
Tokoroa Central	384	404	384	351	306
Wawa	379	402	368	327	259
Waitomo District					
Mahoenui	213	221	209	180	145
Marokopa	815	843	814	749	647
Mokauiti	615	648	631	594	539
Piopio	242	241	228	191	163
Taharoa	104	92	66	44	28
Te Kuiti	2647	2759	2643	2440	2081
Waipa Valley	646	683	674	645	587
TA/CAU	**2021**	**2031**	**2041**	**2051**	**2061**

Taupo District					
Acacia Bay	859	931	915	876	819
Broadlands	386	419	420	406	388
Hilltop	2122	2238	2175	2082	1969
Kinloch	396	465	461	430	384
Kuratau	188	200	194	181	148
Lakewood	1000	1224	1238	1185	1121
Mangakino	466	512	498	470	433
Marotiri	995	1091	1082	1058	1020
Maunganamu	296	341	338	325	309
Motuoapa	218	314	322	276	232
Nukuhau	924	986	958	917	869
Omori	156	165	160	122	88
Oruanui	1396	1587	1620	1576	1512
Rangatira	66	72	70	67	64
Rangatira Park	448	472	459	438	414
Rangipo	61	66	64	62	59
Richmond Heights	1385	1840	1922	1838	1735
Tatua	177	196	196	189	181
Tauhara	2447	2592	2520	2444	2332
Taupo Central	2129	2253	2187	2095	1990
Taupo East	6	16	15	14	13
Tokaanu	113	119	116	98	92
Tongariro	317	345	360	327	265
Turangi	1792	1950	1923	1758	1503
Waipahihi	1241	1376	1346	1283	1204
Wairakei-Aratiatia	384	406	396	386	374
Waitahanui	276	301	302	259	188
Wharewaka	318	386	523	497	464
Rotorua District					
Arahiwi	167	167	156	142	129
Golden Springs	811	849	801	720	632
Ngakuru	1050	1169	1114	990	842
Reporoa	274	284	264	234	208

Appendix 5: Economic estimates (2013) and projections (2021-2061) by CAU.

Employment and Value Added

TA/CAU	2013 Employment	2013 Value added	2014 Employment	2014 Value added	2021 Employment	2021 Value added	2031 Employment	2031 Value added	2041 Employment	2041 Value added	2051 Employment	2051 Value added	2061 Employment	2061 Value added
Thames-Coromandel District														
Coromandel	604	32	609	33	641	37	687	42	708	45	710	48	705	50
Hikuai	1420	106	1436	104	1515	117	1570	129	1592	139	1595	148	1590	157
Inlets-Thames-Coromandel District	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Islands-Thames-Coromandel District	1	0	1	0	1	0	1	0	1	0	1	0	1	0
Moanataiari	2220	119	2292	123	2295	130	2374	141	2418	151	2408	158	2386	165
Parawai	1296	74	1407	80	1416	84	1463	92	1480	98	1473	103	1445	106
Pauanui Beach	232	12	213	11	240	13	245	14	248	15	234	15	215	14
Tairua	424	21	430	21	437	23	451	25	447	26	435	26	414	26
Te Puru-Thornton Bay	86	5	83	5	86	5	91	6	92	6	92	6	91	6
Te Rerenga	1451	82	1463	84	1587	95	1689	108	1765	120	1767	127	1746	133
Whangamata	1355	73	1497	81	1499	86	1519	91	1524	96	1494	99	1440	101
Whitianga	1982	102	2070	105	2096	113	2196	125	2239	134	2233	141	2192	145
Hauraki District														
Hauraki Plains	981	66	1067	70	1017	73	1021	78	1033	83	1010	87	974	91
Kaiaua	179	11	183	11	258	16	294	19	350	24	438	33	430	35
Kerepehi	65	4	79	5	78	5	82	6	86	6	90	7	91	7
Ngatea	382	21	380	21	385	22	400	24	406	26	404	27	386	28
Ohinemuri	1195	102	1422	123	1467	135	1527	151	1584	166	1617	179	1625	190
Paeroa	2060	111	2038	112	2246	128	2404	144	2447	153	2437	160	2388	165
Turua	265	17	263	18	255	18	278	20	291	21	298	22	307	24
Waihi	1854	117	1748	109	1802	118	1865	129	1894	138	1875	144	1831	148

Waikato District														
Buckland South	417	17	401	17	516	21	626	25	702	29	766	33	844	38
Eureka	1980	86	2089	91	2395	107	2470	118	2593	131	2641	143	2705	156
Gordonton	300	16	321	18	302	18	305	19	312	21	317	22	317	23
Horotiu	846	71	790	66	1133	93	1284	109	1546	135	1790	161	2143	199
Huntly East	1650	124	1584	110	1697	128	1774	142	2045	170	2101	185	2111	197
Huntly West	687	179	675	167	739	195	815	227	874	256	920	284	964	311
Inlet-Raglan Harbour	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kainui	1000	63	1019	63	1008	68	1081	76	1192	87	1292	98	1330	106
Mangatawhiri	516	34	538	35	583	40	628	45	660	50	715	57	815	68
Maramarua	339	23	307	22	364	27	389	31	418	35	434	39	486	45
Matangi	439	22	517	25	489	26	524	29	527	31	552	34	536	35
Meremere	15	1	13	1	33	2	34	2	34	2	35	2	37	2
Ngaruawahia	1143	64	1146	63	1195	68	1280	76	1328	82	1364	88	1388	93
Onewhero	1010	51	1014	51	1058	58	1221	70	1304	80	1454	92	1495	101
Opuawhanga	132	7	134	7	299	20	379	26	535	40	656	51	688	56
Otaua	500	31	533	35	572	38	613	42	639	46	668	50	678	53
Pokeno	498	35	524	41	870	60	1664	115	2568	183	3453	259	3820	301
Pukeoware	86	3	79	3	85	3	90	4	90	4	88	4	85	4
Raglan	841	41	859	44	1012	55	1143	64	1165	69	1179	73	1186	77
Redoubt	187	12	185	12	196	13	237	16	268	18	281	20	305	22
Rotowaro	12	2	6	1	8	1	8	1	8	2	8	2	8	2
Tamahere-Tauwhare	1321	79	1384	78	1492	87	1573	96	1716	111	1777	122	1819	132
Taupiri Community	130	8	129	7	147	9	168	10	178	11	185	12	192	13
Te Akau	373	23	468	29	509	33	557	38	623	45	671	51	706	57
Te Kauwhata	438	26	455	26	588	34	813	48	888	55	913	60	918	63
Te Kowhai	259	16	271	16	269	17	280	19	302	21	308	23	327	25
Te Uku	517	32	554	33	616	38	683	45	745	52	819	60	886	69
Tuakau	650	43	712	46	750	51	783	57	800	62	805	66	808	71
Waerenga	1149	78	1143	77	1198	85	1268	96	1331	106	1345	113	1404	123
Waikato Western Hills	1132	81	885	71	1113	90	1203	102	1351	118	1498	136	1583	150
Whatawhata	329	20	341	22	376	25	404	28	428	31	452	35	492	40
Whitikahu	848	62	933	66	924	72	959	79	997	88	1001	95	988	101

TA/CAU	2013 Employment	2013 Value added	2014 Employment	2014 Value added	2021 Employment	2021 Value added	2031 Employment	2031 Value added	2041 Employment	2041 Value added	2051 Employment	2051 Value added	2061 Employment	2061 Value added
Matamata-Piako District														
Hinuera	621	40	614	38	664	42	683	44	693	47	683	49	673	51
Matamata North	1622	97	1451	91	1543	102	1647	115	1705	126	1752	136	1762	144
Matamata South	1782	110	1825	112	1876	122	2080	141	2205	157	2252	168	2295	179
Morrinsville East	1867	134	1913	142	2023	157	2119	173	2194	188	2242	202	2258	214
Morrinsville West	1388	86	1465	88	1615	103	1698	116	1748	128	1776	139	1796	150
Okauia	1130	79	1282	96	1311	105	1356	117	1414	129	1455	140	1495	152
Springdale	877	66	877	64	878	69	881	75	883	81	886	88	911	96
Tahuroa	854	63	941	68	955	76	1013	88	1045	98	1063	107	1072	116
Te Aroha	1404	76	1374	75	1483	84	1597	95	1643	102	1676	109	1710	117
Te Poi	318	22	325	21	273	21	264	23	243	23	231	24	222	25
Waharoa	75	8	66	7	69	7	76	8	79	9	82	10	85	11
Waihou-Walton	2925	267	2875	254	2873	272	2903	295	2920	317	2916	338	2913	360
Waitoa	1105	147	1121	142	1076	154	1130	173	1172	191	1200	208	1219	225
Hamilton City														
Bader	565	28	530	27	565	30	607	33	641	37	659	39	674	42
Beerescourt	661	36	681	39	723	43	753	47	775	51	792	55	805	59
Bryant	1069	61	1226	72	1285	78	1359	86	1419	93	1474	101	1522	108
Brymer	248	15	263	15	327	19	343	21	379	25	420	29	432	31
Burbush	182	14	200	15	319	24	746	63	961	86	1153	111	1387	141
Chartwell	801	63	799	64	834	69	871	75	899	80	929	87	955	93
Chedworth	1516	86	1488	85	1539	93	1550	100	1559	107	1563	114	1560	122
Clarkin	403	19	406	20	393	20	411	21	422	23	433	24	443	26
Claudelands	449	28	460	30	598	43	614	47	631	50	642	54	650	57
Crawshaw	119	7	107	6	116	7	123	8	127	8	132	9	137	9
Dinsdale North	416	24	419	24	435	25	456	28	474	30	489	32	501	35
Dinsdale South	539	31	531	30	689	41	794	51	808	55	831	60	834	64
Enderley	824	41	833	39	865	42	903	46	970	51	1046	57	1113	63
Fairview Downs	505	26	490	24	493	25	518	28	531	30	534	31	533	33
Flagstaff	346	21	422	26	552	35	693	46	731	50	757	54	777	58
Frankton Junction	9871	651	10263	660	11196	743	11904	830	12474	913	12999	997	13564	1089

Glenview	509	27	545	29	664	36	688	40	722	43	737	46	750	49
Grandview	175	10	203	12	210	13	221	14	229	15	235	16	239	17
Hamilton Central	20136	1281	20580	1292	21836	1443	25032	1730	27088	1957	28285	2140	29355	2327
Hamilton East	3226	154	3089	145	3305	162	3503	178	3725	198	3853	213	3935	227
Hamilton Lake	7650	391	7975	400	7984	421	8440	467	9077	525	9733	588	10303	650
Horsham Downs	523	28	546	31	838	49	1896	111	2596	159	2915	188	3295	225
Huntington	1371	69	1312	68	1698	92	1806	103	1903	114	2021	126	2148	141
Insoll	301	14	303	14	298	14	310	16	316	17	318	18	318	19
Maeroa	694	38	674	38	762	44	821	50	862	55	898	59	928	64
Melville	727	38	830	43	841	45	862	49	876	53	889	56	900	60
Nawton	747	40	781	45	836	51	869	56	894	60	921	64	946	69
Naylor	734	38	784	40	821	44	906	50	959	56	989	60	1013	64
Newstead	858	43	927	48	3070	177	5086	324	7054	471	7948	558	8665	633
Peachgrove	1577	79	1525	75	1674	86	1820	97	1892	105	1944	112	1991	118
Peacocke	149	32	141	29	327	44	1167	97	1627	132	2348	184	3215	251
Porritt	368	17	422	19	687	32	731	36	751	38	770	41	788	43
Pukete	275	17	257	16	263	17	277	18	288	20	297	21	306	23
Pukete West	175	8	167	8	180	9	193	10	204	11	216	12	230	13
Queenwood	352	21	316	20	333	22	353	24	369	26	383	28	395	30
Rotokauri	2310	209	2364	209	2922	269	3718	347	4813	449	5569	537	5817	591
Rototuna	491	26	482	26	487	28	502	30	515	33	524	35	530	37
Silverdale	504	24	443	21	469	23	508	25	529	27	552	29	581	32
Swarbrick	797	42	820	43	888	48	1001	57	1044	62	1079	67	1109	72
Sylvester	133	8	174	11	577	36	1114	68	1284	83	1359	93	1482	107
Te Rapa	14185	999	15226	1082	16419	1239	18574	1459	20332	1666	21313	1831	21905	1977
Te Rapa North	723	132	828	138	920	162	1143	193	1345	223	1531	254	1627	278
Temple View	110	6	123	6	223	11	501	25	683	35	831	45	942	54
University	2836	126	2777	126	3024	140	3366	161	3578	176	3740	189	3874	202
Waipa District														
Allen Road	108	6	92	4	90	4	87	5	84	5	80	5	76	5
Cambridge Central	2691	159	2840	168	2980	188	3076	205	3137	222	3150	236	3177	252
Cambridge North	415	22	435	24	427	25	450	28	466	30	475	32	481	34
Cambridge West	571	31	594	32	603	35	631	39	677	43	690	46	715	50
Hautapu	1799	149	1897	152	2273	189	3075	253	3696	304	4055	341	4247	373
Kaipaki	345	17	347	18	332	18	341	20	343	22	355	24	374	26

TA/CAU	2013 Employment	2013 Value added	2014 Employment	2014 Value added	2021 Employment	2021 Value added	2031 Employment	2031 Value added	2041 Employment	2041 Value added	2051 Employment	2051 Value added	2061 Employment	2061 Value added
Karapiro	861	58	877	57	905	63	953	71	978	78	1001	84	999	90
Kihikihi	191	10	224	12	248	14	254	16	259	17	261	18	277	20
Kihikihi Flat	199	12	205	12	435	25	552	33	567	36	587	39	604	43
Lake Cameron	1215	72	1239	72	1218	76	1384	90	1544	104	1634	114	1776	128
Lake Ngaroto	329	44	295	40	392	50	474	62	533	71	579	80	608	88
Leamington East	392	20	381	20	351	20	389	24	398	25	403	27	405	28
Leamington West	837	54	866	56	993	69	1058	77	1094	85	1130	93	1155	100
Ngahinapouri	888	55	985	61	991	65	1068	72	1135	80	1158	86	1155	92
Ohaupo	139	7	132	6	133	6	140	7	143	8	142	8	146	9
Pirongia	291	18	290	17	271	17	288	19	296	21	301	22	294	23
Pokuru	191	13	195	14	183	14	176	15	170	16	163	16	159	17
Pukerimu	227	15	219	11	285	15	338	19	506	31	542	35	550	37
Rotongata	298	19	279	18	261	20	254	21	243	22	232	23	220	24
Rotoorangi	927	56	870	55	850	59	860	64	878	69	870	73	854	77
Swayne	285	15	311	15	395	20	418	22	427	23	436	25	443	26
Te Awamutu Central	1846	102	1834	103	1887	111	1949	120	1997	128	2044	137	2062	144
Te Awamutu East	1027	61	1140	66	1221	74	1292	83	1338	90	1368	97	1392	104
Te Awamutu South	2060	153	2146	149	2170	162	2265	179	2396	198	2466	215	2501	230
Te Awamutu West	267	24	265	23	367	32	391	36	409	39	422	43	433	46
Te Pahu	260	16	270	17	303	20	372	25	373	26	373	28	410	32
Te Rahu	554	25	624	29	744	37	834	46	877	52	890	56	917	62
Te Rore	113	9	122	8	109	9	109	9	105	10	103	10	96	10
Tokanui	142	8	146	9	125	8	128	9	128	10	126	10	110	10
Otorohanga District														
Inlets-Otorohanga District	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Kawhia	82	4	82	4	85	4	89	4	90	5	103	5	96	5

Community														
Otorohanga	1563	99	1700	108	1744	117	1804	127	1829	137	1822	144	1805	151
Otorohanga Rural East	1969	137	2002	137	2037	149	2114	166	2152	180	2155	193	2145	204
Otorohanga Rural West	541	38	577	40	552	43	576	49	583	54	587	58	589	63
Te Kawa	135	10	123	9	114	9	108	10	101	10	95	10	89	11
South Waikato District														
Amisfield	548	43	573	44	584	46	596	50	613	54	621	57	587	54
Aotea	193	11	201	12	186	12	187	13	194	14	200	15	205	15
Arapuni	685	52	776	63	775	70	745	74	715	78	678	82	651	85
Kinleith	871	111	892	120	914	144	857	161	775	168	701	179	625	191
Lichfield	840	86	930	90	900	98	867	106	798	111	766	118	752	127
Mangakaretu	190	11	192	11	235	14	235	15	233	15	232	16	231	17
Matarawa	302	14	294	14	287	14	292	15	298	16	296	16	295	16
Paraonui	111	6	111	7	111	7	113	7	113	8	114	8	115	8
Parkdale	52	4	60	4	65	5	70	6	74	6	76	7	77	7
Putaruru	1369	88	1386	87	1376	93	1410	101	1395	106	1362	110	1330	114
Stanley Park	166	8	121	6	115	6	118	7	117	7	127	8	131	8
Strathmore	257	12	269	12	258	12	262	13	256	13	244	13	230	13
Tapapa	427	28	467	31	468	34	463	36	465	39	460	41	459	44
Tirau	285	12	276	12	284	13	293	14	292	15	291	16	287	17
Tokoroa Central	1952	112	1972	113	1972	118	2029	128	2062	137	2045	143	2003	146
Wawa	449	55	487	71	480	79	494	90	509	99	520	109	532	118
Waitomo District														
Mahoenui	191	10	170	9	172	10	181	11	188	13	194	14	201	16
Marokopa	944	54	972	54	1000	58	1026	63	1051	69	1053	74	999	75
Mokauiti	440	28	471	29	479	31	510	36	520	39	539	43	549	48
Piopio	238	14	240	15	236	15	243	16	247	18	248	19	250	20
Taharoa	188	27	199	30	231	36	241	40	240	44	235	47	229	49
Te Kuiti	2194	174	2219	183	2287	201	2366	222	2396	239	2401	255	2368	269
Waipa Valley	775	64	734	60	752	65	782	71	812	78	835	85	854	92

TA/CAU	2013 Employment	2013 Value added	2014 Employment	2014 Value added	2021 Employment	2021 Value added	2031 Employment	2031 Value added	2041 Employment	2041 Value added	2051 Employment	2051 Value added	2061 Employment	2061 Value added
Taupo District														
Acacia Bay	249	14	250	15	259	16	275	18	287	19	292	21	294	22
Broadlands	177	15	172	16	157	17	159	19	165	21	160	23	158	25
Hilltop	1102	53	1155	58	1133	58	1161	63	1173	67	1171	70	1156	72
Inland Water-Lake Taupo	3	0	21	1	23	1	25	1	26	1	27	1	28	1
Kinloch	106	6	114	8	137	10	150	11	154	12	153	12	148	13
Kuratau	139	7	131	7	136	8	145	9	154	10	162	12	173	14
Lakewood	308	18	226	14	241	15	255	16	264	17	268	18	271	19
Mangakino	200	11	217	11	235	12	245	13	249	14	249	14	245	15
Marotiri	916	68	937	70	1029	84	1084	97	1111	109	1102	119	1090	128
Maunganamu	163	11	146	11	154	13	171	14	197	16	203	17	190	18
Motuoapa	28	2	29	2	36	2	44	3	47	3	45	3	42	3
Nukuhau	190	15	222	17	219	18	224	18	232	20	239	21	245	23
Omori	79	6	79	6	88	8	91	9	93	9	89	9	85	9
Oruanui	639	42	677	48	724	54	805	62	875	69	924	76	925	80
Rangatira	60	4	54	3	62	4	66	5	69	5	70	5	70	6
Rangatira Park	226	13	220	13	251	15	242	16	268	17	250	17	273	19
Rangipo	242	15	242	14	265	17	300	20	325	22	342	24	356	25
Richmond Heights	343	21	386	24	414	27	455	30	476	32	485	34	489	36
Tatua	173	11	194	11	209	13	226	15	232	16	241	18	241	19
Tauhara	1768	118	1787	124	1782	130	1810	140	1857	151	1886	161	1896	171
Taupo Central	5478	305	5502	327	5536	348	5634	377	5666	399	5600	416	5529	435
Taupo East	121	7	136	8	140	9	184	12	194	13	200	14	201	15
Tokaanu	129	26	120	24	126	28	135	33	143	37	146	41	151	44
Tongariro	177	12	200	12	197	13	199	14	205	15	200	15	190	15
Turangi	1231	83	1263	87	1287	93	1321	101	1340	109	1319	113	1274	114
Waipahihi	397	23	419	26	432	28	459	32	469	34	480	37	476	38
Wairakei-Aratiatia	1619	183	1714	196	1807	225	1866	254	1916	280	1957	305	1986	330
Waitahanui	25	2	34	2	33	2	35	2	37	3	38	3	38	3
Wharewaka	82	5	80	5	85	5	98	6	116	8	117	8	116	8

Rotorua District														
Arahiwi	61	4	70	5	68	5	68	6	67	6	66	6	65	7
Golden Springs	852	62	895	64	782	64	766	68	748	72	722	75	697	79
Ngakuru	596	40	634	43	601	46	599	50	574	53	550	55	532	58
Reporoa	531	54	519	46	476	50	490	55	500	60	506	64	523	70