

Population, Labour Force, Economic Output and Employment Projections for the South Waikato

**A research report to assist in the ‘Refreshing of the South Waikato
Economic Development Strategy’ for the South Waikato District
Council and the South Waikato Economic Development Trust**

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Cover:

This Koru carving can be viewed on the Arapuni walkway from the Arapuni Dam to Jones landing.

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FOREWORD

Since its establishment just over 40 years ago, the University of Waikato has viewed itself as a regional asset: a resource that is available to serve local communities. The University's commitment to engage with the region is strongly supported by staff in the Department of Societies and Cultures. As a multi-subject department that is home to staff from a range of social science disciplines, Societies and Cultures has the capacity to put together quality research teams that can respond quickly and competently to requests for top quality research.

This report is part of a broader suite of strategic planning documents being prepared by the South Waikato District Council and the South Waikato Economic Development Trust as these agencies 'refresh' their regional economic development strategy. This report is another excellent example of the University's ability and willingness to work productively with regional partners. Within a very short timeframe, the researchers have worked very closely with the South Waikato District Council and the South Waikato Economic Development Trust in order to help refresh those agencies' 2002 economic development strategy, published under the title *Securing Our Future*.

This study also demonstrates the value that can be added when researchers work collaboratively across the University. The report would not have been possible without the significant contribution of our colleague from the Department of Economics, Associate Professor Warren Hughes. I also want to acknowledge the key role played by Paul O'Neil who contributed substantially to the research and also effectively managed the project in order to ensure that it was completed within tight deadlines. Arunachalam Dharmalingam and Bill Cochrane are important members of several of the Department's research teams. They brought to this study not only their professional expertise but also many valuable insights and understandings gleaned from other recent studies.

Finally, I want to express the Department's appreciation of the collaborative spirit with which members and staff of the South Waikato District Council and the South Waikato Economic Development Trust worked with the research team, in particular those people who participated in the economic development meetings and those who took time to talk to Warren and Paul. This has been a very positive experience for all those involved. The Department looks forward with enthusiasm to further opportunities to work with these and other regional agencies.

Michael Law
Chairperson
Department of Societies and Cultures

Executive Summary

Population

The population for the South Waikato is projected to decline further from a level of 24,100 in 2001 to just under 23,000 in 2011. Population is then projected to gradually increase to reach a total of 25,000 by 2026. This is a 3.3 per cent increase in population over this 25 year period. Associated with this increase is an increase in the median age of the population and a decrease in the child population. The number of old people (greater than 64 years) is projected to double over this period. In the working age-groups, the younger working adult population (16-39 years) is projected to first decrease in numbers and per cent until 2011, and will then increase. This is in contrast to the older working age population (40-64 years) whose number and per cent are expected to increase until 2011 and thereafter decrease.

These projections differ from the projections carried out by Statistics New Zealand. Statistics New Zealand project a continued decline in the South Waikato population from 24,100 in 2001 to 18,950 in 2026, a decline of 22 per cent, according to the preferred medium-term projection series.

In our projections, account is taken of the proactive initiatives such as the economic development strategy by agents in the South Waikato to address population decline. These initiatives affect one of the key drivers of population dynamics – net migration. We make some assumptions therefore that these initiatives will have some impact on net migration. Another key driver of population dynamics is the fertility level. We develop projections based on the fertility level observed for the most recent period for South Waikato. Population projections were unable to be done according to ethnicity because the data is not available. This projection can be done should the data become available.

Labour Market Projections

Labour force projections are developed from the population projections. Two scenarios are developed: one assuming unchanged labour force participation rates, the other assuming labour force participation rates increasing over the projection period.

Under the assumption of unchanged labour force participation rates, South Waikato's labour force is projected to grow by under two per cent from 11,476 to 11,624, between 2001 and 2026, with a three per cent growth in the male labour force but a small percentage decline in the female labour force. The percentage of the labour force over 55 years of age is by 2026 projected under this scenario to increase by around seven per cent to comprise over 20 per cent of the labour force.

Under the most optimistic assumption of a five per cent increase labour force participation rates by both age and gender, South Waikato's labour force is projected to grow by nearly 10 per cent in the 2001-2026 period from 11,474 to 12, 612, with the male labour force projected to increase by around one per cent more than the female labour force.

Increased labour force participation can therefore mitigate to some extent declines in the size of South Waikato's labour force due to population ageing.

Economic and Employment Projections

Our model of the South Waikato District Council regional economy was used to estimate sector significance, profitability and employment and to examine the impact of certain strategic initiatives proposed within the region.

In prior discussions with South Waikato Development Trust and District Council staff, six strategic developments were identified. These were:

- Conversion of forestry land into dairy farming
- Expanding the soft drink and water sector
- Establishing a transport hub
- Expanding waste treatment capability
- Expanding the engineering sectors
- Developing the tourism sectors

The potential significance of these strategic developments to the region are confirmed by the economic analysis of the regional economic model. *Dairy Farming* has the highest direct Value Added per dollar of output at \$0.541 and the third highest forward linked Value Added per dollar of output. The *Road Freight* and *Waste & Sewerage* sectors show high multipliers for output, employment and value-added. Expanding these sectors will generate significant follow-on activity in the South Waikato for all three economic indicators of Output, Employment and Value Added.

The labour intensive *Tourism* sectors are by far the highest direct employers per dollar of output. Typically, much part-time and seasonal employment will be generated in the SWDC economy if *Tourism* can be developed to a significant level.

Economic analysis focused upon the conversion of forestry land into dairy. Proposals to significantly increase the amount of land converted to dairy over the next five years without reducing wood yield were estimated to add \$143m, around 8.7 per cent, to the regional economy and about 440 full-time equivalent jobs, an increase of about 5 per cent.

The labour force, as projected, will need to grow under the increased participation rate scenario for there to be sufficient labour available to meet the labour needs of dairy land expansion.

Time and a number of uncertainties concerning the details of the other strategic initiatives precluded a more detailed analysis of these initiatives. However, assuming a 30 per cent increase in the output from each of these initiatives, over the next five years, together with the dairy conversion, the growth in regional output is expected to grow by about \$239m, a 12 per cent increase over the next five years. Employment is expected to increase in total by about 817 full-time equivalents. The projected growth in the labour force will be insufficient to meet this labour demand if labour force participation rates do not increase.

The overall conclusion from this analysis is that relatively small initiatives in terms of annual sector Output growth have the capability of making a noticeable improvement in growth measures for the SWDC economy.

There are a number of opportunities and challenges in securing the benefits from these initiatives. Expansion of the *Soft Drink & Water* sector will be a commercial decision. To encourage this development may require incentives linked to increased exports out of the region and possibly overseas.

The Waste Treatment and Transport Hub/Inland Port developments may require some Central Government funding on a significant scale. This can be credibly justified based on national gains for environmental enhancement in other regions together with reduced road congestion in the Hamilton, Auckland, Tauranga triangle. Reducing road congestion would follow with more rail use north of the SWDC region out of the Transport Hub/Inland Port substituting for truck transport. Furthermore, there could be significant gains in reducing road congestion south of the SWDC region.

The *Wholesale Trade* and *Retail Trade* sectors show backward and forward linkages to most initiatives. Most initiatives proposed for the SWDC involve sectors already of significance to the region employing many regional workers. As a result, the Consumption linkages are quite strong and the *Wholesale* and *Retail Trade* sectors show the appropriate flow-on gains. Of more interest are the Industrial linkages and these show links that the region already possesses and could develop further. For example, a Transport Hub/Inland Port would obviously be used by the forward linked sectors such as *Dairy Processing* which is also a sector that would involve expansion under the Dairy Conversions initiative. *Other Industrial Machinery* is backward linked to the Hub while another initiative proposes to expand this sector. These are but two synergies arising out of the proposed initiatives.

Because of the strong linkages between many sectors, clearly there is scope for the region to develop a “cluster” of related industries or sectors that, if established, would encourage “best practice” methodologies and further development into related fields. While other regions such as Taupo D.C. or Tauranga D.C. may discourage this type of industrial development, a nearby region such as SWDC may be able to provide such valuable services at a “safe” distance and for appropriate rewards in terms of Employment and Value Added.

Introduction

In 2002, agencies in the South Waikato, in particular the South Waikato Economic Development Trust, produced the document 'Securing Our Future' as a blueprint to guide collective strategy towards economic development in the region. At the end of 2005, these agencies wish to 'refresh' this strategy. This report aims to aid this process by providing population predictions and economic analyses of the South Waikato 'economy' so as to present an understanding the impact economic and demographic change could have on the South Waikato Region. This report is part of a broader suite of strategic planning documents being prepared by the South Waikato District Council and the South Waikato Economic Development Trust as these agencies 'refresh' their regional economic development strategy.

The researchers for this report have examined a number of reports and documents commissioned by agencies in South Waikato since 'Securing Our Future' was produced. We come to the view that the agencies are extremely well informed when it comes to descriptions of the economic and structural characteristics of the South Waikato. The agencies have also commissioned a number of feasibility studies into a number of economic opportunities identified in 'Securing Our Future'. The agencies thus know their district well, know what the economic and demographic trends are telling them, and have explored some areas of possible economic development.

Rather than focus upon descriptive characteristics of the South Waikato and thus producing little added-value to what is known, this report takes a more strategic focus. That is, the economic analysis of this study takes the current economic descriptions of South Waikato economy, but utilise these in a 'model' of the South Waikato Economy which incorporate what is known about the linkages between various sectors. This model can then be asked 'what if' questions, particularly questions such as: 'what are the output and employment effects if twenty per cent of the area currently in forestry is converted into dairying?' In this way, this report hopes to add to the strategic deliberations which South Waikato Agencies will engage in with their 'refreshing' of the document 'Securing Our Future'.

The key issue for this analysis is to identify the 'what if' questions that will be useful to the needs of the 'refresh' exercise. The methodology used was an 'expert panel' of the researchers and staff of the South Waikato agencies to combine their knowledge and out of this to identify the strategic areas to focus analysis upon. The areas identified were:

- Dairy conversions/deforestation
- Water
- Tourism
- Engineering
- Freight-hub
- Waste recycling.

The body of this report comprises the analysis of the impact change in each of these areas is expected to have on the South Waikato economic 'output' and employment. The approach taken, based on analysis of the reports and documents commissioned by South Waikato Agencies in recent times, supplemented where necessary with local opinion, is to rationalise

a percentage increase in output from the economic sector in question and examine the output and employment effects.

Demographic change is one area where the researchers feel that current descriptive statistics may not accurately reflect what is actually occurring in the South Waikato region. This report begins with an analysis of demographic change to improve the accuracy of currently available statistics. Some of the demographic projections are then utilised in section two to calculate projections for labour market supply.

Population Future for South Waikato

Statistics New Zealand is the major source of data for current and projected population size, growth and structure for New Zealand regions and districts. According to its latest figures, of the 74 territorial authorities (TAs) only 33 are projected to experience an increase in population sizes between 2001 and 2006. Over one-half of the territorial authorities in New Zealand are likely to experience absolute decrease in their population numbers.

South Waikato is one such territorial authority projected to decline in its population size by about 22 per cent between 2001 and 2026 - from 24,200 in 2001 to 18,950 according to the preferred medium projection series. This decline results from decreasing number of births, increasing number of deaths and high level of net out-migration during the projection period. But the major contributing factor to the projected population decline in south Waikato is net out-migration.

Statistics New Zealand considers and analyses historical trends, government policy, information provided by local planners and policy makers and other relevant information in formulating assumptions about future fertility, mortality and migration for sub-national population projections. However, we believe that consideration of short-term and long-term historical trends in fertility, mortality and migration provides more weight in the formulation of projection assumptions than other factors.

One of the major purposes of population projection is to explore and thus provide advance indication to planners and policy makers of possible future population scenarios if the underlying projection assumptions were to hold. Planners, policy makers and local politicians can thus address the underlying causes of, for instance, population decline so as to reach a desired population future. Given that South Waikato has been experiencing substantial net out-migration over the last 10-20 years and that the Statistics New Zealand population projection for South Waikato has consistently showed a substantial future decline, the local government has proactively introduced many initiatives to reverse the projected trend in population. The many worthwhile economic initiatives, plans, projects and programmes that the South Waikato local government, agencies, and business sector have launched in the recent past include: converting *Forestry* operations into *Dairy Farming*, expanding the *Soft Drink & Water* sector, expanding and further developing *Tourism*, establishing a Transport Hub/Inland Port, and establishing a major Waste Treatment operation. We believe that South Waikato is likely to experience a small net gain in its population by 2026 if these programmes and economic initiatives were successful in achieving their aims and goals.

A careful consideration of the proactive initiatives of the South Waikato local government and local business lead us to make the following assumptions about fertility, mortality and net migration. We assume two series of fertility. In the first series the fertility level (total fertility rate) will remain at 2.83 (observed for the most recent period for South Waikato) during the projection period 2001-2026. Under the second series, the total fertility rate is assumed to decline gradually to reach about 2.53 births by 2026. We also make two series of net migration assumptions. In the first series, we assume that during 2001-2006 South Waikato would experience a net loss of about 3200 people, the same figure as during 1996-2001. But during 2006-2011, the net loss is assumed to be only 1600 (one half of the numbers for 2001-2006), and in the next five years it is assumed to be reduced further to a

net loss of only 800. From 2016, it is assumed that the net loss is nil. The second series on migration is given in Table 1. The major difference between the two series is that in the second series the net loss is assumed to be less than that observed during 1996-2001. For mortality we take only one series. This is consistent with the Statistics New Zealand medium assumption about future mortality.

Population projection for South Waikato was carried out by 5 year age groups and by gender. We were unable to do this by ethnicity as mortality and migration data were not available by ethnicity. We can do the projection by ethnicity if the relevant data becomes available in the near future.

Table 1: Projection assumptions on fertility, mortality and net migration, 2001 - 2026

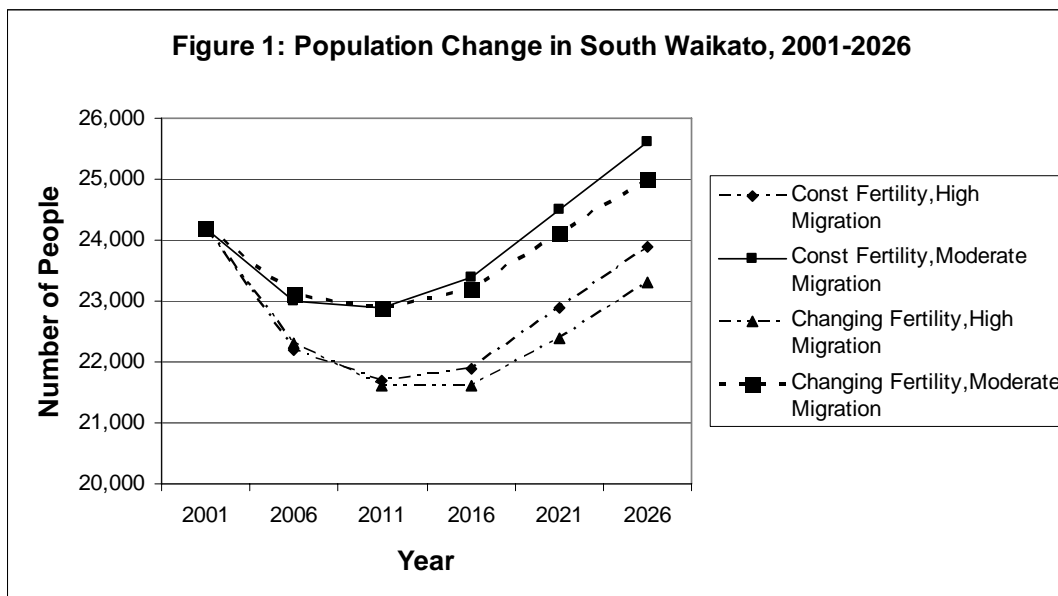
Year	Fertility		Migration		Life expectancy (in years)	
	Constant	Changing	High	Moderate	Male	Female
2001	2.67	2.67	-3,130	-3,130	73.0	78.4
2006	2.83	2.85	-3,200	-2,500	75.6	80.3
2011	2.83	2.72	-1,600	-1,200	76.9	81.5
2016	2.83	2.58	-800	-600	78.0	82.4
2021	2.83	2.54	0	0	79.0	83.2
2026	2.83	2.54	0	0	79.7	83.8

Population Size and Growth

Figure 1 provides four possible pathways of future population change in the South Waikato. The four scenarios are obtained by a combination of constant and changing fertility on the one hand and high and moderate levels of net migration loss on the other. Two of the four pathways give a small increase in the population size of the South Waikato by 2026: moderate loss in net migration with either constant or decreasing fertility during the projection period. Overall, the difference in the projected population sizes in 2026 between the least optimistic and most optimistic is about 1,700. We believe that the future fertility pattern in the South Waikato is likely to follow the declining trend of New Zealand. And thus we use the series that assumes changing fertility and moderate migration loss as the preferred option for discussion here.

The population of the South Waikato is projected to decline further from 24,200 in 2001 to 22,900 in 2011. However, after 2011 the population is projected increase to 24,100 by 2021 and to 25,000 by 2026. This means that, according to our preferred series, the South Waikato population size will increase by 3.3 per cent between 2001 and 2026.

In 2001, 50 per cent of the South Waikato population was aged under 32 years. By 2026, the population will be older than today. In 2011, the median age of the population is likely to be around 36 years and by 2026 it would reach 38 years. Still, as shown in Figure 1 in Appendix A, the South Waikato population is younger than the population of Waikato Region and New Zealand. The median age of Waikato region and New Zealand would be 40.9 years and 41.1 years respectively.



Children under 15 years

The number of children aged below 15 years was 7,000 in 2001—about 29 per cent of the population (see Appendix A Figure 2). This is projected to decrease by about 7 percentage points to 5,430. This results from the decreasing fertility assumed for the projection period and also a small decline in the number of women in the reproductive age groups. Compared to the Waikato region and New Zealand, the population of South Waikato is youthful: the per cent aged under 15 years was 24 for the Waikato region and 23 for New Zealand in 2001. The corresponding percentages in 2026 are 17 per cent for New Zealand, 18 per cent for the Waikato region and 22 per cent in South Waikato.

Old people aged 65+ years

The population of South Waikato is projected to experience the doubling of its older population. In 2001, the 65+ year old population was just 9.6 per cent (2,340). This is likely to double to 18.6 per cent or 4640 (see Appendix A Figure 5). This has important policy implications for the South Waikato, as an increasing proportion of older population is likely to lead to increased demand for health and social services. Compared to again the Waikato region and New Zealand, the South Waikato is ageing slowly.

Working age population 15-64 years

We examine the working age population in two broad groups—young adults (15-39) and older adults (40-64). These population projections are presented in Figures 3 and 4, Appendix A. The young adult population size is projected to decline from about 33 per cent (8,090) in 2001 to 30 per cent (6,920) in 2011 before it increases again to reach 32 per cent (7,700) in 2021 and beyond. On the other hand, the older working adults (40-64) are projected to increase in their numbers from 28 per cent (6,840) in 2001 to 32 per cent (7,300) in 2011, and then the numbers gradually decline to reach 28 per cent (7,040) in 2026.

Summary

Using the scenarios approach, we have projected the population of South Waikato for the next 25 years (2001 is the base year). Our assumptions are based on not just the historical patterns in fertility, mortality and, more importantly, net migration. We have given special considerations to the local economic and social initiatives that have been proposed, planned or undertaken with a view to improve the overall well-being of the South Waikato Population, including reversing the trend in population decline in the district. It is a truism but important to note that the projected figures are realistic only to the extent that the assumptions underlying them are realistic. As input data on fertility and migration are not available by ethnicity, we could not project the population by ethnicity. It might be noted that the higher than average fertility level in the south Waikato is mainly due to the substantial presence of the high fertility Maori and Pacific Island peoples in the district.

Our preferred projection series assumes a gradual decline in fertility during the projection period to reach about 2.5 births per woman in 2026; it also assumes that during 2001-2006 the net migration loss is only 2,500 (compared to a loss of 3,200) during the previous 5 year period; the net migration loss is then reduced to 1,200, to 600 and to zero in the subsequent 5-year projection periods.

According to our preferred projection series, the population of South Waikato is expected to decline further from a level of 24,100 in 2001 to just under 23,000 in 2011. It is projected then to gradually increase to reach a total of 25,000. This is equivalent to an increase of 3.3 per cent. Associated with this is the increase in the median age of the population and decrease in the child population. An important outcome is the doubling of the number of old people in the South Waikato between 2001 and 2026. In the working ages, the younger working adults (15-39 years) will first decrease in numbers and percentages until 2011 and then will increase. The older working age adults move in the opposite direction. Their numbers and percentages are expected to increase until 2011, and thereafter will decrease. Detailed results for the 'preferred projections are included in Appendix Table A1.

Labour Force Projections

The labour force consists of those people aged 15 years and over, the working age population, who regularly work for one or more hours per week for financial gain, or work without pay in a family business, or are unemployed and actively seeking part-time or full-time work (Statistics New Zealand, 2005a). Hence the labour force is a measure of the amount of labour available to the economy. It should be noted that the concept of the labour force used here is broader than that frequently used in that it includes those aged over 64, whereas commonly the working age population is defined as those aged 15-64. This broader definition is consistent with Statistics New Zealand's usage in the household labour force survey (Statistics New Zealand, 2005b) .

The labour force projections here are based on the preferred population projections derived in the preceding section and are made by applying a set of assumptions about the future level of labour market participation to that population. Labour force projections for several plausible scenarios are derived. These projections are essentially supply side in nature. That is, they attempt to project the supply of labour as opposed to the employment component of economic projections which project the demand for labour on the basis of a projected industry structure.¹

Scenario 1

Scenario 1 assumes that the age and gender specific labour force participation rates for the South Waikato, current at the time of the 2001 census, remain unchanged for the 2001-2026 period. The 2001 age and gender specific rates from the census are shown in Table 2 along with the rates for New Zealand as a whole. Appendix Table B1 shows the results for this scenario.

Overall, under this scenario, the absolute size of the labour force increases by a modest 1.3 per cent from 11476 to 11621. However for the two genders the male labour force grows by some three per cent while the female decreases by a negligible 0.7 per cent.

Overall participation rates for scenario 1 are reported in Table 3. While this scenario has held age and gender specific rates constant over time compositional effects for the labour force as a whole result in changing overall labour force participation rates. From Table 3 it can be seen that for both genders and the population as a whole labour force participation is projected to decline with the overall rate projected to fall by around seven per cent. Again considering Table 3 the percentage of the labour force aged 55 years and over is projected to increase by around 7.5 percentage points to over a fifth of the labour force.

1 For further, and more in depth discussion, of the issues surrounding the general topic of labour market participation the reader is referred to the papers arising from the Treasury's workshop on 'Labour Force Participation and Economic Growth' (2005) and the preceding workshop on productivity (2004).

Table 2: Age and Gender Specific Labour Force Participation Rates: South Waikato District Council and New Zealand 2001.

Age Group	Gender	New Zealand South Waikato District	
15-19 Years	Male	59.0	65.9
15-19 Years	Female	57.6	54.4
15-19 Years	Total	58.3	60.8
20-24 Years	Male	80.6	87.7
20-24 Years	Female	71.8	61.3
20-24 Years	Total	76.1	75.1
25-29 Years	Male	88.0	90.0
25-29 Years	Female	73.2	64.8
25-29 Years	Total	80.2	76.6
30-34 Years	Male	89.8	90.1
30-34 Years	Female	70.6	66.7
30-34 Years	Total	79.6	77.6
35-39 Years	Male	90.2	90.4
35-39 Years	Female	74.1	72.5
35-39 Years	Total	81.8	81.1
40-44 Years	Male	90.6	89.5
40-44 Years	Female	80.0	74.6
40-44 Years	Total	85.1	82.0
45-49 Years	Male	90.3	89.8
45-49 Years	Female	82.1	78.8
45-49 Years	Total	86.1	84.4
50-54 Years	Male	88.6	86.5
50-54 Years	Female	78.1	70.7
50-54 Years	Total	83.3	78.4
55-59 Years	Male	82.4	84.0
55-59 Years	Female	65.7	58.9
55-59 Years	Total	74.0	71.1
60-64 Years	Male	65.0	59.5
60-64 Years	Female	42.1	39.1
60-64 Years	Total	53.3	49.8
65 Years and Over	Male	17.5	19.2
65 Years and Over	Female	7.0	8.9
65 Years and Over	Total	11.6	14.0
Total	Male	73.8	75.1
Total	Female	60.1	57.8
Total	Total	66.7	66.4

Source: Census of Population and Dwellings 200

Table 3: Scenario 1 – Labour Force Participation

	Male					
	2001	2006	2011	2016	2021	2026
Labour force participation rate (%)	75.3	73.3	72.0	71.2	70.2	69.0
Percent Labour Force 55 years+	15.8	17.5	18.9	20.8	22.2	22.6
	Female					
Labour force participation rate (%)	57.8	56.3	54.8	53.2	51.7	50.2
Per cent Labour Force 55 years+	12.7	14.1	15.6	17.8	19.6	20.6
	Total					
Labour force participation rate (%)	66.4	64.7	63.4	62.1	60.7	59.4
Per cent Labour Force 55 years+	14.4	16.1	17.5	19.7	21.2	22.0

Scenarios 2 and 3

Scenarios 2 and 3 draw their inspiration from the work of Bryant *et al.* (Bryant *et al.* 2004) on the relationship between labour force participation and the gross domestic product (GDP). Bryant *et al.* point to the fact that while overall levels of labour market participation are not dissimilar to the OECD median the participation rates of New Zealand women aged 25-34 are relatively low. Bryant *et al.* then develop a scenario in which the labour market participation rates of women in this age group were set to a level based on the average rate for the five OECD countries with the highest rates while leaving the rates for males and other age groups unchanged. This resulted in an 11 percentage point rise in the labour force participation of women aged 25-34. In our scenario 2 we will assume that the government implements various policy changes to promote participation in the labour force by females aged 25-34 with the result that over the period 2001-2021 the labour force participation rate for women in this age group increases by 11 percentage points.² The results are reported in Table 4 and Appendix Table B2. Under the assumptions of scenario 2 the labour force of the South Waikato is projected to grow by nearly three per cent between 2001 and 2026, over twice the projected increase for scenario 1. In addition, the overall participation rate, as would be expected based on the assumptions, increases slightly while the proportion of the labour force over 55 decreases by a modest amount.

Scenario 3 assumes a more dramatic change in labour market participation with rates for all age groups and genders increasing by five percentage points over the 2001-2016 period. These results are shown in Table 5 and Appendix Table B3.

Scenario 3 projects an increase in the South Waikato labour force of nearly 10 per cent over the 2001-2026 period. The decline in the overall labour force participation rate is considerably less under this scenario than the other two with the projected decline being around two percentage points, as opposed to seven percentage points under scenario 1 and six percentage points with scenario 2. While labour force participation is held at a higher level under this scenario, it should be noted that the proportion of older workers, those over 55, is slightly higher under this scenario due to the assumption of higher participation rates in the growing older age groups.

² Labour force participation rates for the intervening census years are calculated by linear interpolation.

Table 4: Scenario 2 – Labour Force Participation

	Male					
	2001	2006	2011	2016	2021	2026
Labour force participation rate (%)	75.3	73.3	72.0	71.2	70.2	69.0
Percent Labour Force 55 years+	15.8	17.5	18.9	20.8	22.2	22.6
	Female					
Labour force participation rate (%)	57.8	56.7	55.5	54.5	53.6	51.9
Per cent Labour Force 55 years+	12.7	14.0	15.4	17.4	18.9	19.9
	Total					
Labour force participation rate (%)	66.4	65.0	63.7	62.9	61.7	60.3
Per cent Labour Force 55 years+	14.5	15.9	17.4	19.3	20.7	21.4

Table 5: Scenario 3 – Labour Force Participation

	Male					
	2001	2006	2011	2016	2021	2026
Labour force participation rate (%)	75.3	75.0	75.4	76.2	75.2	74.0
Percent Labour Force 55 years+	15.8	17.7	19.5	21.7	23.1	23.7
	Female					
Labour force participation rate (%)	57.8	58.0	58.1	58.2	56.7	55.2
Per cent Labour Force 55 years+	12.7	14.5	16.6	19.3	21.3	22.5
	Total					
Labour force participation rate (%)	66.4	66.5	66.7	67.2	65.7	64.4
Per cent Labour Force 55 years+	14.5	16.3	18.2	20.7	22.3	23.2

This last scenario serves to illustrate the point that plausible increases in labour force participation rates can mitigate to some extent declines induced by population aging.

Strategic Development of the South Waikato District Council Region

Overview

Introduction

The core or export base of a regional economy such as the South Waikato District Council (SWDC) region typically accounts directly for around 20 per cent of total regional value added. Using the Table 7 average value added multiplier of 2.55 (see below) to account for all linkages to supporting sectors means that 20 per cent x 2.55 or over 50 per cent of the SWDC regional economy is in some way dependent on this core. If this core were lost to the region (eg. foot and mouth disease) and nothing replaced it, over 50 per cent of the SWDC economy would be at risk. To sustain growth in the SWDC economy therefore requires re-invigorating the core primary industries (farming, forestry, processing), initiating new industries, or a combination of both these strategies. The current 'Refresh' analysis considers how this might be achieved and estimates the regional gains from doing so.

Re-Invigorating the Core Industries

The mass, world-wide economy that has evolved since WW II required long production runs of standardised products with resulting economies of scale and low cost of inputs such as energy. Vertical integration was the preferred organisational form with firms controlling vital inputs, all spheres of the production process, and preferably securing long-term contracts with buyers of the products. This model is typified by Fonterra, the Kinleith and Kawerau plants and the Comalco smelter. Specifically for Fonterra this involves milk solids production, transformation of milk solids via mega-site processing and finally production and marketing of consumer products. While Fonterra does well in the first two segments, Nestle and Movenpick are two examples of how firms can maximise value added in the final segment.

Globalisation trends in recent years have built on the now routine production cost economies, but low cost production alone as practised by Fonterra, Carter Holt Harvey (CHH) etc. is no longer sufficient for profitable operations. Product differentiation through design, innovation, adaption and re-engineering now support niche marketing with outsourcing a vital part of this strategy. Firms that adapt survive while others falter. For example, in the car industry, GM currently flirts with bankruptcy while Toyota prospers. The Japanese were able to cost-effectively move to smaller production runs of slightly different cars outselling the standardised cars built on longer production runs by the Americans. In niche car production, Porsche is currently the poster-child of success in this segment.

In the NZ dairy industry, Open Country Cheese (OCC) is aiming to follow the Porsche model in world cheese production. Fonterra will hopefully evolve into a Toyota rather than a GM. However, whereas OCC sales are in the millions of dollars annually, Fonterra sales are in the billions of dollars. So even a large number of firms like OCC are years away from compensating for a poorly performing Fonterra in the context of the NZ economy.

There is, however, no escaping the world-wide forces of globalisation. This means profitable exporting to world markets is imperative and firms like Fonterra and CHH must succeed. If these large exporters struggle for profitability, their host regions like SWDC will also suffer.

Initiating New Industries

This report documents below the regional gains deriving from the development of some suggested new industries. The gains are only suggestive but indicate what can be expected from developing new industries from a small base over a five year horizon. Those industries that could be so developed remain open to confirmation and will necessitate further feasibility studies to investigate their viability. We first need to identify the region's resource base and any competitive advantages arising out of the base to identify those new industries that could be successful.

One tactic is industrial recruitment by persuading existing firms to relocate to the SWDC region, possibly using incentives of various types. This can be a high risk, high cost tactic. If a better deal comes along, recruited industries may relocate a second time out of the SWDC region. However, if the competitive advantage of a SWDC location is significant enough, the recruited industry may stay put despite inducements from other regions. Significant competitive advantage almost certainly means close linkages to suppliers or buyers, good logistics, secure energy and other inputs etc. This report documents such linkages for existing industries suggesting those areas where new businesses could find similar advantages.

The above analysis can be summarised as follows:

- Extend and defend the core industries such as dairying and forestry
- Encourage formation of emerging linked industries such as specialty cheese (or similar) factories, wood moulding, waste treatment etc.
- Create new options as in business services, engineering and other services related to existing core dairying and forestry

Conclusions

Competing successfully in globalised markets requires critical mass in production, marketing and financial services that towns, regions and even small countries like NZ have difficulty in achieving. Against such odds, NZ recently gained the hosting of the 2011 World Rugby Cup, but it was a hard sell and apparently a very close call. It is crucial for a rural region such as SWDC to sell products and services beyond its boundaries as in Hamilton, Auckland and overseas. Experience around the world has shown that rural regions are more likely to spawn small businesses. But without a national or global perspective, small businesses will not grow significantly and may be absorbed by urban neighbours. In Australia, for example, Qantas acquired a regional competitor Compass Airlines and immediately closed it down.

Rural regions must respect the implications of overall regional and national objectives and development. In the present case, the options open to the SWDC within the wider Waikato Regional Council and NZ economies may be constrained by Waikato and/or

national requirements. SWDC must recognise the linkages between its economy and that of Hamilton City Council (HCC). There is no point in trying to compete with HCC firms in some cases. However, opportunities may exist to promote outsourcing from environmentally constrained urban areas such as Hamilton and Tauranga in fields such as waste treatment, industrial on-the-job training, food supply, leisure activities etc.

The requirements for growth in rural regions can be summarised as follows:

- Quality education at all levels
- Workforce development and upskilling via organisations such as The Wananga
- Good infrastructure (roads, communications) and quality government
- Quality of life attributes such as health and fitness, emergency services, police, transport, child care and environmental standards (e.g. plant emissions)
- Adoption and promotion of modern technologies such as broadband, wireless etc. common in urban areas

Finally we note that gains in productivity for local industries can be achieved by reversing poor policies and emulating best practices from elsewhere. These strategies can produce major benefits but they are “one off” benefits. Continued productivity gains securing regional prosperity will only be achieved with:

- Continuing long-term comparative advantages with low costs for important inputs such as energy and transport
- An educated workforce capable of working with the latest technology and taking up opportunities for (industry supported ?) upskilling using facilities such as the Wananga, Wintec and the University of Waikato, with good recreation and leisure activities available nearby
- Continuing evolution and acceptance of possible re-organisation of core industries such as Fonterra, CHH etc. following world best practice procedures in all spheres of operation (note this could be possible outsourcing at the expense of a local workforce)

The analysis below documents the numerical gains the SWDC could realise by expanding existing industries and establishing new industries. Note that the nature of the proposed new industries is not critical to the analysis. Other new industries not mentioned here but starting from a similar sales base (eg. a 30 per cent expansion over five years from current output levels in the range of \$4 m to \$200 m) would show similar gains in employment, value added etc. for the SWDC region. Of course, the number of new initiatives that could be supported will of necessity be limited to a small number such as the six analysed here.

Economic Analysis of Strategic Initiatives

A 74-sector model of the SWDC regional economy was utilized to estimate sector profitability and the impact of strategic initiatives proposed for the District. A detailed review of this model is outlined in Appendix C. Employment, profitability, export and import percentages and other measures for each of the 74 sectors comprising the SWDC economy are summarised in Appendix D.

Strategic initiatives for the SWDC economy have been outlined on page 9 of this report. Briefly they involve converting *Forestry* operations into *Dairy Farming*, expanding the *Soft Drink & Water* sector, expanding and further developing *Tourism* (which involves the *Accommodation, Bars & Restaurants, Road Passenger* (tours), *Libraries & Museums* and *Other Sport & Recreation* sectors), expanding engineering sectors involving mainly the *Other Industrial Machinery* sector, establishing a Transport Hub/Inland Port involving mainly the *Road Freight* sector, and establishing a major Waste Treatment operation which involves the existing *Waste & Sewerage* sector. Note that designated sectors in our model are *italicised* for easy identification.

Table 6: Strategic sectors for the SWDC – year to September 2005

	Sales	Employment	Val Add	Exports	Imports
Sector	\$m	FTEs	Per FTE	% Sales	% Sales
<i>Dairy Farming</i>	195.54	879	\$120,262	18.5	15.3
<i>Forestry & Logging</i>	301.78	973	\$85,623	61.7	51.4
<i>Sawmills, Wood Products & Paper</i>	550.36	1490	\$115,403	85.0	21.3
<i>Soft Drink & Water</i>	40.78	45	\$342,444	98.6	33.3
<i>Road Freight</i>	45.35	205	\$98,195	0.0	17.5
<i>Metal Prod, Agric & Industrial Machinery</i>	114.08	587	\$72,112	67.3	31.9
<i>Waste & Sewerage</i>	3.76	12	\$155,000	17.6	10.4

Based on Revenue, Output or Sales together with Employment, the *Dairy Farming* sector is clearly the most important single sector of those listed in Table 6. Assuming a farm average of 1.5 to 2 FTEs (full-time equivalent employees) the Value Added per dairy farm is in the range of \$180,000 to \$240,000. Note that Value Added must cover the gross wage of an employee, the before-tax operating surplus of the farm unit and capital replacement or depreciation. For the modern dairy farm, depreciation is a significant component of farm operating costs. Note that some proportion of Value Added ends up as taxation paid to central government via PAYE, income tax, company tax, excise tax and GST. Most of the milk solids produced by dairy farms are processed within the SWDC region with exports out of the region at only 18.5 per cent of total sales. The most profitable sector in terms of Value Added per FTE within the SWDC economy currently is *Soft Drink & Water* where just under 99 per cent of output is exported out of the region. Apart from the wood based forestry sector, another big exporting sector group is *Metal Products, Agricultural Machinery* and *Other Industrial Machinery* (drilling equipment, pumps, food processing machinery, air conditioning equipment etc.) with about 67 per cent of output exported out of the region. Currently *Waste & Sewerage* is not a big employer in the region but is clearly a valuable

activity in terms of Value Added per FTE. Although it is big employer, *Road Freight* shows zero exports and the implication here is that this sector serves only business units within the SWDC region. This may signal an opportunity for SWDC to persuade large firms currently outside the region to re-locate in the District. This could involve expansion of the engineering/maintenance sectors and lower costs generally such as lower rates. *Forestry & Logging* shows the most reliance on out-of-region services with a high 51.4 per cent of imported inputs to sales. Note that some imports here could be services from *Scion* (previously the *Forest Research Institute*) based in Rotorua.

In determining the value of an activity in a regional economy, the figures such as those in Table 6 do not tell the complete story. A well-performing *Road Freight* sector for example can be extremely vital in making profitable other activities in other sectors that would otherwise leave the region if efficient logistical services were not available. Similarly, establishment of a port or airport in a region will encourage location of related sectors in that region diversifying employment alternatives for potential employees and offering more job security for the local workforce. This makes the region better able to withstand shocks to existing major industries such as, for example, wood processing and farming.

In the jargon of economics, we can estimate the backwards and forwards linkages for various activities to determine their true worth to a regional economy. Table 7 presents these backward and forward linkages. For example, *Dairy Farming* links backward to *Electricity Supply* and *Agricultural Services* for inputs but also links forwards to *Dairy Processing*, *Other Food Processing* since these sectors use milk solids in their production of goods. It can be seen that if *Dairy Farming* were to cease in the SWDC region, then food processing plants in the SWDC may eventually relocate to other regions with consequent SWDC employment losses in these sectors. Furthermore, unless *Dairy Farming* was replaced with a similar activity such as deer farming, employment may be cut back in sectors servicing *Dairy Farming* such as *Agricultural Services*, *Other Industrial Machinery* etc.

To examine the backward and forward linkages for the strategically important sectors of the SWDC economy, a \$10 m sales gain in these sectors is used to examine the full linkage implications for this economy. The \$10 m value is arbitrary but puts all sectors on the same base for comparison. Linkages have been estimated for the Revenue, Employment and Value Added impacts as these may all differ depending on the sectors involved. Note that linkages can be of two types. Industrial linkages show the importance of various inputs for production. Secondly, increased (decreased) employment in related sectors will also generate increased (decreased) household consumption as wages are expended in the SWDC economy. These are the Consumption linkages. Note that capital intensive sectors such as *Electricity Supply* are important for supplying energy inputs but do not generate much in the way of Consumption linkages since any changes in *Electricity Supply* may be easily accommodated with the existing workforce perhaps working more or less overtime. Consumption linkages by way of new families locating in the region are usually more valuable to the host region than increased wages via overtime which may “leak” out to surrounding regions (or overseas) due to more out-of-region expenditure on travel, entertainment etc.

Table 7: Full impacts for a nominal \$10 m increase in sector output

Sector	Direct Impact	Backward Linkage	Forward Linkage	Total Impact	Multiplier
Output Impacts					
<i>Dairy Farming</i>	10.00	5.64	8.85	24.49	2.45
<i>Forestry</i>	10.00	2.90	5.34	18.24	1.82
<i>Soft Drink & Water</i>	10.00	4.46	0.26	14.72	1.47
<i>Road Freight</i>	10.00	7.29	15.60	32.89	3.29
<i>Waste & Sewerage</i>	10.00	8.13	12.77	30.90	3.09
Tourism	10.00	6.30	12.68	28.98	2.90
Engineering (OIM)	10.00	5.65	1.70	17.35	1.74
Employment Impacts					
<i>Dairy Farming</i>	44.95	20.68	10.09	75.72	1.68
<i>Forestry</i>	4.22	14.43	18.68	37.33	8.45
<i>Soft Drink & Water</i>	11.03	15.12	1.57	27.72	2.51
<i>Road Freight</i>	45.20	34.85	44.65	124.70	2.76
<i>Waste & Sewerage</i>	31.92	31.67	50.39	113.98	3.57
Tourism	120.71	25.52	68.34	214.57	1.78
Engineering (OIM)	57.23	20.87	7.07	85.17	1.49
Value Added Impacts					
<i>Dairy Farming</i>	5.41	1.61	5.58	12.60	2.33
<i>Forestry</i>	1.42	1.05	2.77	5.24	3.69
<i>Soft Drink & Water</i>	3.78	1.25	0.13	5.16	1.37
<i>Road Freight</i>	4.44	2.70	7.93	15.07	3.39
<i>Waste & Sewerage</i>	4.95	3.24	8.26	16.45	3.32
Tourism	4.28	1.97	2.77	9.02	2.11
Engineering (OIM)	4.06	1.72	0.95	6.73	1.66

Tourism: \$2m into each of the 5 sectors *Accommodation, Bars & Restaurants, Road Passenger (tours), Libraries & Museums, Other Sport & Recreation*.

Engineering: Taken to be *Other Industrial Machinery* or OIM.

To illustrate the derivation of the above values let us suppose that *Dairy Farming* output increases by \$10 m in a given year. This might result from farm consolidations, bigger herds, exceptional growing conditions etc. This \$10 m is labelled the *direct impact* in Table 7 since it comes directly from the sector of the originating activity. Supplying sectors will then increase their output by \$5.64 m and the output of the using sectors (e.g. *Dairy Processing*) will increase by \$8.85 m for a total output impact of \$24.49 m (includes the initial \$10 m). The output multiplier is derived as 24.49/10 or 2.45. This means for every \$1 of *Dairy Farming* output another \$1.45 of output is created within the SWDC economy.

An increase of \$10 m in *Dairy Farming* output requires an increase of approximately 45 FTEs on the dairy farms, another 21 FTEs in the supplying sectors and another 10 FTEs in

forward linked sectors for a total Employment impact in the SWDC region of 76 FTEs. The Employment multiplier is therefore 76/45 or 1.68. Note that some of this extra employment may be serviced by existing employees working overtime. However, employees will have bigger incomes to spend and this flows through into the wider economy and predominantly the SWDC economy.

Finally, a \$10 m increase in *Dairy Farming* revenue implies Value Added increases totalling \$12.60 m in the SWDC economy. Note that the Value Added in the *Dairy Farming* sector at \$5.41 m is just surpassed by the processing sectors at \$5.58 m. Here the Value Added multiplier is a healthy 12.60/5.41 or 2.33. Every dollar of Value Added in the *Dairy Farming* sector generates another \$1.33 in the supplying (backward linked) or processing (forward linked) sectors. Note that to the extent processing of milk solids takes place in Hautapu, Reporoa or Edgecumbe and not Lichfield or elsewhere in the SWDC, the forward linkage values are lost to the SWDC region.

The results in Table 7 show that the high exporting sectors such as *Soft Drink & Water* and *Other Industrial Machinery* throw off very small forward linkages. Of course, this reflects the fact that up to 99 per cent of sales from these sectors is exported out of the region. Both sectors, however, show significant backward linkages.

Two caveats are in order with respect to the above analysis. A falling NZ dollar and/or higher world commodity prices will lift the NZ dollar Output value and Value Added from overseas exporting sectors such as *Dairy Farming* and *Dairy Processing* with no impact at all on employment in these sectors in the SWDC economy. Of course, one of the new strategic initiatives proposed here will lift the volume of dairy output over the existing output volume since it is proposed to increase the number of dairy farms and real employment gains in the farming and linked sectors will follow. Secondly, the technology and scale of the proposed expansion of the *Waste & Sewerage* sector may be entirely different from the existing technology and scale of this sector. Accordingly, the values presented here in some cases must be taken as indicative only. The proposed expansions in transport, engineering and waste processing will need to be evaluated more intensively before any decision could be made on their viability and profitability for the SWDC economy. The above analysis does, however, reveal the current backward and forward linkages for those sectors in which initiatives are proposed. It may be the case that in expanding the operations of the *Soft Drink & Water* sector, additional forward processing takes place in the region. For example, packing and printing of containers for water for export to foreign countries.

Some Conclusions from Table 7

Dairy Farming has the highest **direct** Value Added per dollar of output at \$0.541 and the third highest forward linked Value Added per dollar of output.

Road Freight and *Waste & Sewerage* sectors show high multipliers for all three impacts. Expanding these sectors will generate significant follow-on activity in the SWDC for all three economic indicators of Output, Employment and Value Added.

The labour intensive *Tourism* sectors are by far the highest **direct** employers per dollar of output. Typically, much part-time and seasonal employment will be generated in the SWDC economy if *Tourism* can be developed to a significant level.

Estimated Regional Accounting for the SWDC for the September 2005 Year

The current performance of the SWDC economy for the year ended September 2005 is summarised in Table 8 below. These estimates were derived using growth rates for the Waikato R.C. and NZ economies. These figures form the bases used below to derive annual percentage gains for the SWDC economy that result from the proposed new strategic initiatives.

Table 8: Gross Regional Product for the SWDC for the September 2005 year

EXPENDITURE in \$ millions		INCOME in \$ millions	
Household Expenditure	447.4	Net Household Income	305.0
Central Government Exp.	87.2	Savings, Super & Taxation	130.7
Local Government Exp.	21.9	Operating Surplus pre-tax	188.3
Gross Fixed Capital Formation	175.4	Depreciation	126.3
Stocks/Inventory	9.7	Product Tax	79.5
		Production Taxation	23.7
Gross Regional Expenditure	741.8	Subsidies (e.g. Employment)	-2.2
Plus Exports out-of-region	1278.1		
Less Imports into-region	-1168.7		
Gross Regional Product	851.2	Gross Regional Product	851.2

Note that Gross Regional Product (GRP) is the regional equivalent of NZ's Gross Domestic Product (GDP), the total value of all production by the NZ workforce. GRP is the total value of production by the SWDC regional workforce of 8544 FTEs leading to a Value Added per FTE of \$99,625. This significantly exceeds the current NZ average Value Added per FTE of \$87,518.

Total SWDC regional output for year to September 2005 comprises of Gross Regional Expenditure plus Exports out of region. This amounts to \$2019.9m (\$741.8m + 1278.1m). Note that regional exports of \$1278.1 m comprise 63 per cent of total regional output. This defines the SWDC region as an important exporting region for NZ and satisfies one of the conditions noted above for ongoing regional growth. It also helps to explain the above average Value Added per FTE for the SWDC economy.

FTEs estimated at September 2005:	8544
Employment Count as at February 2003:	7890
Employment Count as at February 2004:	7620
Growth Rate 2003-2004:	-3.42%

The Employment Count data covers only sectors 9 – 114 and excludes the first 8 Agricultural Sectors (see Appendix D). After allowing for these sectors and part-time/overtime factors, our best estimate of full-time equivalent employment is 8544.

The APR report of August 2004 estimated FTE employment for 2003 at 8935 FTEs and they projected this would fall to 8738 FTEs by 2007 (page iv). This represents an annual employment loss of 0.6 per cent pa. The most recent Employment Count data of *Statistics NZ* shows a greater loss, at least for the 106 non-agricultural sectors 9 -114. However, this 3.42 per cent loss in person count may be reduced by increased overtime in wood processing, construction etc. sectors that determine the FTE employment number. Although there is some difference in these estimated Employment levels, the analysis to follow is projecting growth rates from a base figure. The growth rates are to some extent independent of the base figure and would still be approximately correct from a higher or lower base figure. Comments on recent Employment growth for the individual sectors are outlined for all 74 sectors in Appendix Table D1.

Evaluating the Economic Gains of Proposed Initiatives

Conversion of Forestry Land to Dairy Farming

Communications with Carter Holt Harvey suggest that about 20,000 hectares of land will be taken out of *Forestry* over the next 5 - 10 years and will be made available for *Dairy Farming*. Due to improved wood genetics, longer life cycles and improved management generally, they do not expect any reduction in *Forestry* output. Accordingly, an extra 20,000 hectares into *Dairy Farming* will produce an approximate 30 per cent increase in *Dairy Farming* output with no loss in *Forestry* output. Gains for the SWDC economy can be estimated using the Output gain factor $0.3(195.54)/10$ or 5.8662 where 195.54 is derived from the Dairy Farming sector in Appendix Table D2 and in Table 6. Other relevant values are derived from those shown in Table 9. We will assume the 30 per cent Output increase occurs over the next 5 years implying about a 6 per cent increase in milk solids volume occurs every year.

	Output	Employ.	Value Added
Impact of 30% gain in <i>Dairy Farming</i> Output:	\$143.7 m	444.2	\$73.9 m

After full conversion of the 20,000 hectares (which may take some time) this initiative alone would add 5.2 per cent to current FTE employment and 8.7 per cent to current GRP. To the extent that milk solids are processed outside the SWDC region, these gains would be reduced. Fonterra has communicated to us that, due to automated processing, almost any feasible volume of increased mild solids out of the SWDC region could be processed at Lichfield and nearby plants. The implication here is that the forward linked Employment gains (59 out of the 444 total above) may not be as great as projected. Note that total dollar and FTE impacts above include all backward and forward linkages to related sectors.

Expanding the Soft Drink & Water Sector

For this initiative and those remaining, we have assumed a 30 per cent increase in Output over the corresponding September 2005 year estimated Output during the next five years. This involves roughly a 6 per cent Output increase over the preceding year for each of five years. Due to the linearity of the model used in this analysis, a 15 per cent increase would involve halving the impacts reported here.

	Output	Employ.	Value Added
Impact of 30% gain in <i>Soft Drink & Water</i> Output:	\$18.0 m	33.9	\$6.3m

Establishing a Transport Hub/Inland Port

	Output	Employ.	Value Added
Impact of 30% gain in <i>Road Freight</i> Output:	\$44.7 m	169.8	\$20.4m

Expanding Waste Treatment Capability

	Output	Employ.	Value Added
Impact of 30% gain in <i>Waste & Sewerage</i> Output:	\$3.6 m	12.9	\$1.8m

Expanding the Engineering Sectors

	Output	Employ.	Value Added
Impact of 30% gain in <i>Engineering</i> Output:	\$24.3 m	118.8	\$9.3m

Developing the Tourism Sectors

	Output	Employ.	Value Added
Impact of 30% gain in <i>Tourism</i> Output:	\$5.1 m	37.8	\$1.5m

We reiterate that if some of the six new strategic initiatives summarised above were replaced with other initiatives involving other sectors (apart from the Dairy Conversions which seem certain to proceed), similar gains in regional indicators as noted below would result.

Table 9: Output, Employment and Value-added estimates from SWDC initiatives

SWDC Initiative	Output \$ m	Employment FTEs	Value Added \$
Dairy Conversions	143.7	444.2	73.9
<i>Soft Drink & Water</i>	18.0	33.9	6.3
Transport Hub/Inland Port	44.7	169.8	20.4
Waste Treatment	3.6	12.9	1.8
Engineering	24.3	118.8	9.3
Tourism	5.1	37.8	1.5
Total All Initiatives	239.4	817.4	113.2
Percent of SWDC Economy	11.9%	9.6%	13.3%
Annual % Gain over 5 Years	2.3%	1.9%	2.5%

The conclusion from Table 9 is that if all initiatives were pursued and completed over a five year horizon, they would add 1.9 per cent to current annual employment growth and 2.5 per cent to GRP over each of the next five years. Some initiatives may not eventuate and others may show significantly higher growth rates. Furthermore, the technology associated with a major initiative in Waste Treatment for example, will almost certainly be significantly different from existing technology in this sector. For modern technology in Waste Treatment for example, automated plant may show a smaller Employment impact (per percentage Output increase) but a larger Value Added impact than estimated in Table 9. The Output, Employment and Value Added impacts estimated in Table 9 (for all but the Dairy Conversions) can only be regarded as indicative only. Furthermore, the scale of some initiatives is likely to be much larger than the nominal 30 per cent projected here especially for initiatives such as the Transport Hub/Inland Port and Waste Treatment with national implications. The expectation is that a major regional initiative in these sectors will attract some level of national funding and a bigger initial investment as compared to an incremental expansion of around 6 per cent p.a. in say Tourism.

Note that the projected Employment growth at just under 2 per cent annually is smaller than the associated Output and GRP growth rates. The sectors selected for the new strategic initiatives are all currently valuable exporting sectors (or linked to them) for the region generating high levels of Value Added per FTE leading to faster growth in the dollar impacts than in Employment.

The overall conclusion from Table 9 and Appendix Table D2 is that relatively small initiatives in terms of annual sector output growth have the capability of making a noticeable improvement in growth measures for the SWDC economy. For example, a 1.9 per cent increase in Employment resulting from these initiatives will bring an extra 160 FTE jobs to the region each year for five years leading to an estimated 817 extra jobs in total.

Expansion of the *Soft Drink & Water* sector will be a commercial decision. To encourage this development may require incentives linked to increased exports out of the region and possibly overseas. It would be important to link any incentives to increased production over and above that which would have occurred in any case.

The Waste Treatment and Transport Hub/Inland Port developments may require some Central Government funding on a significant scale. This can be credibly justified based on national gains for environmental enhancement (helping maintain NZ's clean, green image) in other regions together with reduced road congestion in the Hamilton, Auckland, Tauranga triangle. Reducing road congestion would follow with more rail use north of the SWDC region out of the Transport Hub/Inland Port substituting for truck transport. Furthermore, there could be significant gains in reducing road congestion south of the SWDC region. Again, any such gains will need to be verified before committing to this initiative.

Recall that the backward linked sectors provide inputs into the Initiative sectors while the forward linked sectors use the goods and services provided by the Initiative sectors. Table 10 shows the major backwards and forwards linking sectors with each strategic initiative.

We see that the *Wholesale Trade* and *Retail Trade* sectors show backward and forward linkages to most initiatives. The initiatives proposed here for the SWDC involve sectors already of significance to the region employing many regional workers. As a result, the

Consumption linkages are quite strong and the *Wholesale* and *Retail Trade* sectors show the appropriate flow-on gains. Of more interest are the Industrial linkages and these show links that the region already possesses and could develop further. For example, a Transport Hub/Inland Port would obviously be used by the forward linked sectors such as *Dairy Processing* which is also a sector that would involve expansion under the Dairy Conversions initiative. *Other Industrial Machinery* is backward linked to the Hub while another initiative proposes to expand this sector and engineering generally. These are but two synergies arising out of the proposed initiatives.

The linked sectors in Table 10 show a lot of repetition. They include *Dairy Processing*, *Meat Processing*, *Paper & Products*, *Structural & Fabricated Metal Products*, *Road Freight*, *Sawmills*, *Basic Metal Manufacturing* etc. which appear for several Initiatives. Clearly there is scope for the region to develop a “cluster” of related industries or sectors that, if established, would encourage “best practice” methodologies and further development into related fields. While other regions such as Taupo D.C. or Tauranga D.C. may discourage this type of industrial development, a nearby region such as SWDC may be able to provide such valuable services at a “safe” distance and for appropriate rewards in terms of Employment and Value Added.

Table 10: Linking sectors for major backward and forward linkages

Initiative	Backward Linked Sectors	Forward Linked Sectors
Dairy Conversions <i>Dairy Farming, Dairy Processing</i>	<i>Other Hort, Sheep & Beef, Agric Services, Fertiliser, Wholesale & Retail Trade, Financial Services, Property Services</i>	<i>Dairy Processing, Paper & Products Wholesale & Retail Trade</i>
<i>Soft Drink & Water</i>	<i>Other Food Processing, Structural & Fab., Wholesale & Retail Trade, Road Freight, Scientific Research</i>	<i>Bars & Restaurants</i>
Transport Hub <i>Road Freight, Water Rail & Port Services</i>	<i>Other Industrial Machinery, Wholesale & Retail Trade, Communications, Property Services</i>	<i>Forestry, Sawmills, Paper & Prod. Meat & Dairy Processing</i>
Waste Treatment & Sewerage	<i>Other Mining & Quarrying, Structural & Fabricated Metal, Electrical Supply, Wholesale & Retail Trade, Property Services</i>	<i>Dairy Farming, Dairy Processing Sawmills, Wood Products, Other Industrial Chemicals, Local Govt. Services</i>
Engineering <i>Other Industrial Machinery</i>	<i>Basic Metal Manuf., Structural & Fab., Electrical Supply, Ancillary Services, Wholesale & Retail Trade, Property Services</i>	<i>Dairy Farming & Processing, Paper & Products, Sawmills, Structural & Fabricated Metal</i>
Tourism <i>Accommodation, Bars & Rest., Other Sport & Rec. etc.</i>	<i>Meat & Dairy Processing, Bakery, Electrical Supply, Wholesale & Retail Trade, Financial Services, Property Services.</i>	<i>Dairy Farming & Processing, Sawmills, Paper & Products, Local Govt., Primary & Secondary Education, Road Freight</i>

Waste Treatment and Transport Hub/Inland Ports are clearly not regarded as “desirable activities” by some regions more orientated towards tourist developments. However, Waste Treatment for example is a fact in a modern society and a valuable activity that must be undertaken somewhere. The central location of the SWDC region close to large exporting plants and rail links make the region an ideal site for a major national initiative in this sector. If waste could be trucked or railed in from other regions, the SWDC would be providing a valuable service to these regions and to the NZ economy generally. Furthermore, demand for these services would be steady and not subject to the normal fluctuations resulting from exchange rate movements, tourism seasonality etc.

Note that no construction impacts have been estimated in the above analysis. The impacts documented above are on-going annual impacts after all necessary construction has been put in place. For annual incremental construction impacts consistent with a 6 per cent annual increase in sector capacity, construction impacts would be significant but not spectacular. For significant one-off capacity increases, as could be the case with a Transport Hub/Inland Port or Waste Treatment plant, the construction impacts would be very significant over the construction period of say 18 months to 2 years for SWDC business units associated with the developments.

Appendix A

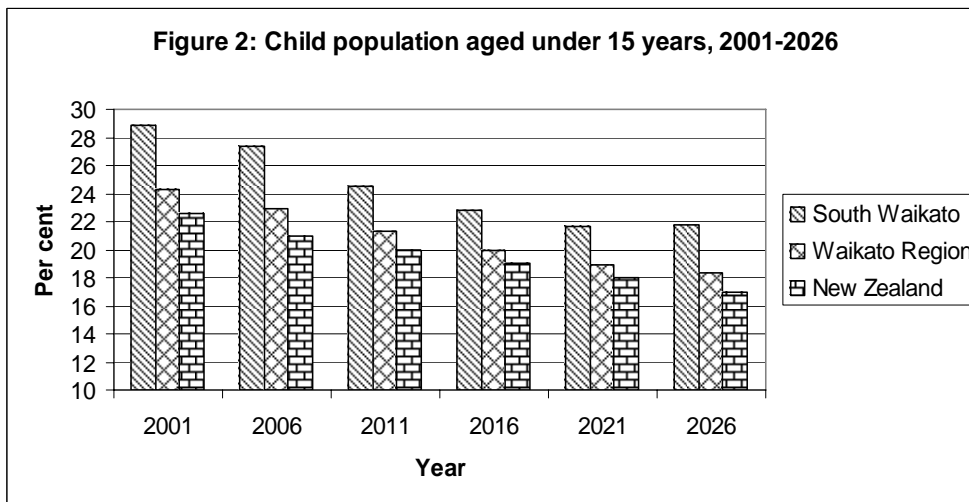
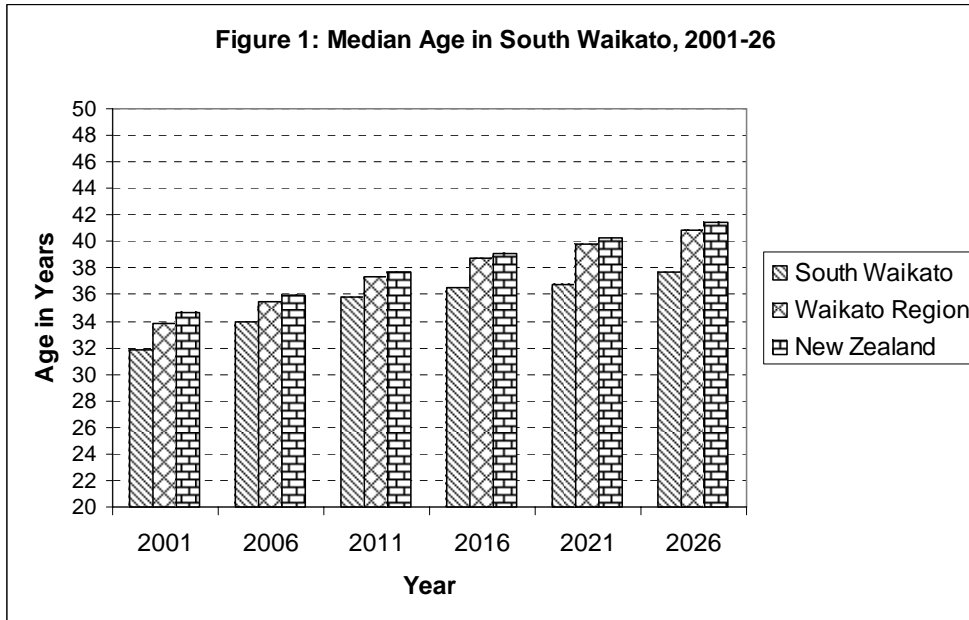


Figure 3: Young adult working age population (15-39 years), 2001-2026

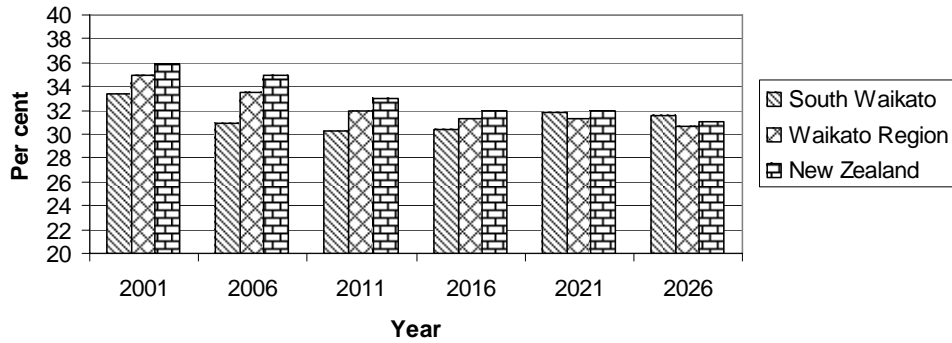


Figure 4: Older adult working age population (40-64 years), 2001-2026

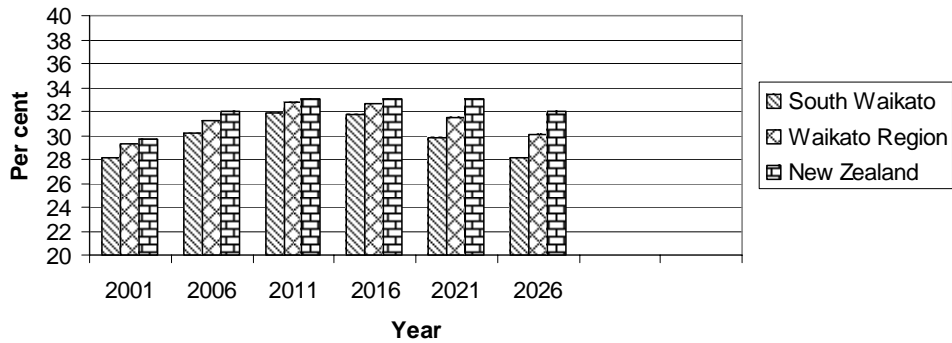


Figure 5: Old age population (65+ years), 2001-2026

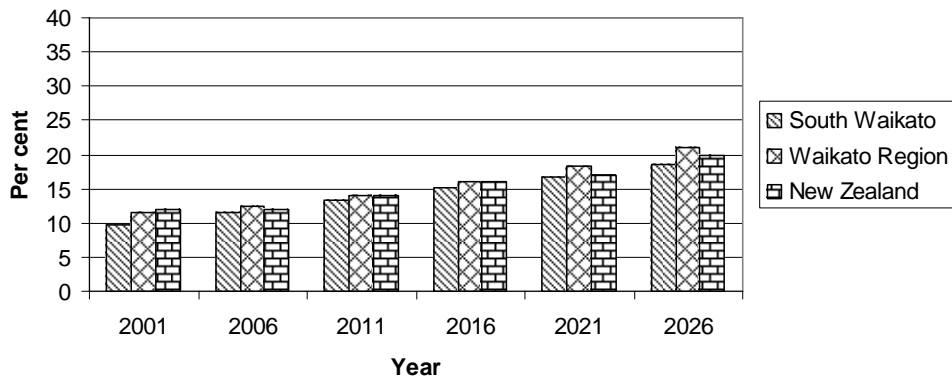


Table A1

SOUTH WAIKATO DISTRICT 'Preferred Projection': Projected Population by Age and Sex at 30 June, 2001 (Base) to 2026

Projected Population by Age and Sex at 30 June, 2001 (Base) to 2026

Series 4: Assuming Changing Fertility, Medium Mortality and Medium Migration

Year at 30 June	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69	70-74	75-79	80-84	85+	All Ages
<i>Total</i>																			
2001	2,220	2,440	2,340	1,710	1,300	1,480	1,760	1,840	1,760	1,550	1,350	1,150	1,030	820	680	470	240	130	24,200
2006	2,000	2,090	2,240	1,880	1,240	1,060	1,320	1,630	1,710	1,630	1,390	1,210	1,020	910	700	550	340	160	23,100
2011	1,740	1,930	1,950	1,840	1,540	1,210	1,030	1,300	1,610	1,680	1,570	1,310	1,120	930	810	600	430	290	22,900
2016	1,710	1,730	1,830	1,600	1,570	1,580	1,230	1,060	1,320	1,620	1,650	1,510	1,240	1,050	850	710	480	420	23,200
2021	1,840	1,710	1,680	1,570	1,400	1,720	1,670	1,310	1,120	1,370	1,620	1,620	1,450	1,180	970	760	580	530	24,100
2026	1,930	1,840	1,660	1,410	1,370	1,560	1,810	1,740	1,360	1,160	1,370	1,590	1,560	1,380	1,090	870	630	670	25,000
<i>Projected Change 2001-2026:</i>																			
<i>Number</i>	-290	-600	-680	-300	70	80	50	-100	-400	-390	20	440	530	560	410	400	390	540	800
<i>Percent</i>	-13	-25	-29	-18	5	5	3	-5	-23	-25	2	38	52	68	60	85	163	415	3
<i>Male</i>																			
2001	1,150	1,280	1,150	900	680	720	840	900	860	770	690	580	540	420	340	240	100	40	12,200
2006	1,020	1,090	1,180	950	670	540	630	770	840	800	700	610	510	470	350	260	170	60	11,600
2011	890	990	1,020	1,010	770	620	510	620	760	830	770	660	560	460	410	290	190	120	11,500
2016	870	890	950	870	870	760	620	520	630	770	820	750	620	520	410	340	220	170	11,600
2021	940	880	870	840	770	920	790	650	550	650	780	800	710	580	470	350	270	220	12,000
2026	990	950	860	760	740	820	940	820	680	580	660	760	770	670	530	410	280	280	12,500
<i>Projected Change 2001-2026:</i>																			
<i>Number</i>	-160	-330	-290	-140	60	100	100	-80	-180	-190	-30	180	230	250	190	170	180	240	300
<i>Percent</i>	-14	-26	-25	-16	9	14	12	-9	-21	-25	-4	31	43	60	56	71	180	600	3
<i>Female</i>																			
2001	1,070	1,160	1,190	800	620	760	920	940	900	770	660	570	490	390	340	230	140	90	12,000
2006	980	1,000	1,060	940	580	520	690	860	870	830	690	590	510	440	340	290	170	110	11,500
2011	850	930	930	840	770	590	520	680	850	860	790	650	560	480	400	310	240	160	11,400
2016	830	830	890	730	710	820	610	540	700	850	830	760	620	530	440	370	260	240	11,600
2021	900	830	810	720	630	810	870	650	570	710	850	820	740	590	490	410	310	310	12,000
2026	940	890	800	650	630	730	870	910	680	590	710	830	790	710	560	460	350	390	12,500
<i>Projected Change 2001-2026:</i>																			
<i>Number</i>	-130	-270	-390	-150	10	-30	-50	-30	-220	-180	50	260	300	320	220	230	210	300	500
<i>Percent</i>	-12	-23	-33	-19	2	-4	-5	-3	-24	-23	8	46	61	82	65	100	150	333	4

Appendix B

Table B1: Scenario 1 – Results

		Working age population						LFPR	Labour Force					
		2001	2006	2011	2016	2021	2026		2001	2006	2011	2016	2021	2026
15-19 Years	Male	900	950	1010	870	840	760	65.9	593	626	666	574	554	501
15-19 Years	Female	800	940	840	730	720	650	54.4	435	512	457	397	392	354
15-19 Years	Total	1710	1880	1840	1600	1570	1410	60.8	1040	1143	1119	973	955	857
20-24 Years	Male	680	670	770	870	770	740	87.7	597	588	676	763	676	649
20-24 Years	Female	620	580	770	710	630	630	61.3	380	355	472	435	386	386
20-24 Years	Total	1300	1240	1540	1570	1400	1370	75.1	977	932	1157	1180	1052	1029
25-29 Years	Male	720	540	620	760	920	820	90.0	648	486	558	684	828	738
25-29 Years	Female	760	520	590	820	810	730	64.8	493	337	383	532	525	473
25-29 Years	Total	1480	1060	1210	1580	1720	1560	76.6	1134	812	927	1211	1318	1196
30-34 Years	Male	840	630	510	620	790	940	90.1	757	568	460	559	712	847
30-34 Years	Female	920	690	520	610	870	870	66.7	613	460	347	407	580	580
30-34 Years	Total	1760	1320	1030	1230	1670	1810	77.6	1365	1024	799	954	1295	1404
35-39 Years	Male	900	770	620	520	650	820	90.4	813	696	560	470	587	741
35-39 Years	Female	940	860	680	540	650	910	72.5	681	623	493	391	471	660
35-39 Years	Total	1840	1630	1300	1060	1310	1740	81.1	1493	1323	1055	860	1063	1412
40-44 Years	Male	860	840	760	630	550	680	89.5	769	752	680	564	492	608
40-44 Years	Female	900	870	850	700	570	680	74.6	671	649	634	522	425	507
40-44 Years	Total	1760	1710	1610	1320	1120	1360	82.0	1444	1403	1320	1083	919	1115
45-49 Years	Male	770	800	830	770	650	580	89.8	691	718	745	691	583	521
45-49 Years	Female	770	830	860	850	710	590	78.8	607	654	678	670	560	465
45-49 Years	Total	1550	1630	1680	1620	1370	1160	84.4	1308	1375	1417	1367	1156	979
50-54 Years	Male	690	700	770	820	780	660	86.5	597	606	666	709	675	571
50-54 Years	Female	660	690	790	830	850	710	70.7	467	488	559	587	601	502
50-54 Years	Total	1350	1390	1570	1650	1620	1370	78.4	1058	1090	1231	1293	1270	1074
55-59 Years	Male	580	610	660	750	800	760	84.0	487	512	554	630	672	638
55-59 Years	Female	570	590	650	760	820	830	58.9	336	347	383	448	483	489
55-59 Years	Total	1150	1210	1310	1510	1620	1590	71.1	817	860	931	1073	1151	1130
60-64 Years	Male	540	510	560	620	710	770	59.5	321	304	333	369	423	458
60-64 Years	Female	490	510	560	620	740	790	39.1	191	199	219	242	289	309
60-64 Years	Total	1030	1020	1120	1240	1450	1560	49.8	513	508	558	618	723	778
65 Years and Over	Male	1140	1310	1470	1660	1890	2170	19.2	219	251	282	318	362	416
65 Years and Over	Female	1190	1350	1590	1840	2110	2470	8.9	106	120	142	164	188	220
65 Years and Over	Total	2340	2660	3060	3510	4020	4640	14.0	327	372	428	490	562	648
Total	Male	8620	8330	8580	8890	9350	9700	N/A	6493	6106	6180	6331	6564	6690
Total	Female	8620	8430	8700	9010	9480	9860	N/A	4981	4746	4765	4795	4900	4945
Total	Total	17270	16750	17270	17890	18870	19570	N/A	11476	10840	10942	11101	11463	11621

Table B2: Scenario 2 – Results

Age	Gender	2001	2006	2011	2016	2021	2026
15-19 Years	Male	593	626	666	574	554	501
15-19 Years	Female	435	512	457	397	392	354
15-19 Years	Total	1029	1138	1123	971	946	855
20-24 Years	Male	597	588	676	763	676	649
20-24 Years	Female	380	355	472	435	386	386
20-24 Years	Total	977	943	1148	1199	1062	1035
25-29 Years	Male	648	486	558	684	828	738
25-29 Years	Female	493	351	415	599	614	553
25-29 Years	Total	1141	838	973	1283	1442	1292
30-34 Years	Male	757	568	460	559	712	847
30-34 Years	Female	613	479	375	457	676	676
30-34 Years	Total	1370	1047	835	1016	1388	1523
35-39 Years	Male	813	696	560	470	587	741
35-39 Years	Female	681	623	493	391	471	660
35-39 Years	Total	1495	1319	1053	861	1058	1401
40-44 Years	Male	769	752	680	564	492	608
40-44 Years	Female	671	649	634	522	425	507
40-44 Years	Total	1440	1400	1314	1086	917	1115
45-49 Years	Male	691	718	745	691	583	521
45-49 Years	Female	607	654	678	670	560	465
45-49 Years	Total	1298	1372	1423	1361	1143	986
50-54 Years	Male	597	606	666	709	675	571
50-54 Years	Female	467	488	559	587	601	502
50-54 Years	Total	1064	1094	1225	1296	1276	1073
55-59 Years	Male	487	512	554	630	672	638
55-59 Years	Female	336	347	383	448	483	489
55-59 Years	Total	823	860	937	1078	1155	1127
60-64 Years	Male	321	304	333	369	423	458
60-64 Years	Female	191	199	219	242	289	309
60-64 Years	Total	513	503	552	611	712	767
65 Years and Over	Male	219	251	282	318	362	416
65 Years and Over	Female	106	120	142	164	188	220
65 Years and Over	Total	325	371	424	482	550	636
Total	male	6493	6106	6180	6331	6564	6690
Total	female	4981	4779	4826	4913	5085	5121
Total	total	11474	10885	11007	11245	11650	11810

Table B3: Scenario 3 – Results

Age	Gender	2001	2006	2011	2016	2021	2026
15-19 Years	Male	593	642	700	617	596	539
15-19 Years	Female	435	527	485	434	428	386
15-19 Years	Total	1029	1170	1185	1051	1024	925
20-24 Years	Male	597	599	701	807	714	686
20-24 Years	Female	380	365	498	471	418	418
20-24 Years	Total	977	964	1199	1278	1132	1104
25-29 Years	Male	648	495	579	722	874	779
25-29 Years	Female	493	346	402	573	566	510
25-29 Years	Total	1141	841	981	1295	1440	1289
30-34 Years	Male	757	578	477	590	751	894
30-34 Years	Female	613	471	364	437	624	624
30-34 Years	Total	1370	1050	841	1027	1375	1518
35-39 Years	Male	813	709	581	496	620	782
35-39 Years	Female	681	638	516	418	504	705
35-39 Years	Total	1495	1346	1096	914	1123	1487
40-44 Years	Male	769	766	705	595	520	642
40-44 Years	Female	671	663	662	557	453	541
40-44 Years	Total	1440	1429	1367	1152	973	1183
45-49 Years	Male	691	731	773	730	616	550
45-49 Years	Female	607	668	707	713	595	495
45-49 Years	Total	1298	1400	1479	1442	1211	1044
50-54 Years	Male	597	617	692	750	714	604
50-54 Years	Female	467	500	585	629	644	538
50-54 Years	Total	1064	1117	1277	1379	1358	1142
55-59 Years	Male	487	523	576	668	712	676
55-59 Years	Female	336	357	404	486	524	530
55-59 Years	Total	823	880	981	1153	1236	1207
60-64 Years	Male	321	312	352	400	458	497
60-64 Years	Female	191	208	237	273	326	348
60-64 Years	Total	513	520	589	673	784	845
65 Years and Over	Male	219	273	331	401	457	524
65 Years and Over	Female	106	143	195	256	294	344
65 Years and Over	Total	325	416	526	657	750	868
Total	male	6493	6245	6466	6776	7032	7175
Total	female	4981	4886	5055	5246	5374	5438
Total	total	11474	11131	11521	12022	12406	12612

Appendix C

The 114-sector model of the South Waikato D.C. economy

This review provides a brief technical description of the 114-sector Input/Output Model used to generate the general equilibrium economic impact (resulting impacts after **all** reactions to initiating events, industry developments etc. are included) for the South Waikato District Council (SWDC) economy.

The economic model of the SWDC economy was constructed from data originating with *Statistics NZ*. The NZ and all regional economies were categorised into 114 sectors. These comprise the basic farming sectors such as *Dairy Farming*, *Sheep & Beef Farming* as well as *Other Horticulture*, *Mixed Cropping*, *Fruit Growing* and *Services to Agriculture* sectors. There are 18 such primary sectors in the model up to *Oil & Gas Exploration*. Related follow-on sectors from these primary producers that are important for regional rural economies are *Meat Processing*, *Fruit & Vegetable Processing* and 3 sectors related to wood processing. Altogether there are 41 manufacturing sectors including the primary processing sectors above as well as *Agricultural Equipment*, *Other Chemical Products* etc. The 5 utility sectors for *Electricity*, *Gas* and *Water* include the production, distribution and supply of these goods and services. Construction is sub-divided into 4 sectors including *Ancillary Construction* (e.g. paving, swimming pools, roofing, electrical maintenance etc.). The model then uses 46 sectors covering activities such as *Wholesale Trade*, *Retail Trade*, *Accommodation*, 4 transportation sectors, 16 finance and business service sectors, central and local government services as well as separate sectors for *Education*, *Hospitals*, *Aged Accommodation* and *Gaming*. Descriptions of the activities in each of the 114 sectors are listed below. Where a sector description is not obvious, some of the activities covered in that sector are listed in the right-most column. Note that some sectors such as *Coal Mining*, *Oil & Gas Exploration* are non-operational in some regions and are therefore excluded from the models for some Districts. For the SWDC economy, 74 of the 114 sectors are operational and comprise the model for this region.

This comprehensive economic model is one of a class of so-called *general equilibrium* models and is described as an Input/Output model. Each of the 114 (or 74) sectors in the model quantifies the inputs it receives from all other sectors, such as *Gas*, in order to produce the goods or services sold in a given period (output level in dollars), usually a year. Also quantified are the total inputs of labour and capital goods (depreciation or capital replacement) needed to produce at that output level. The model was constructed for the September 2005 year and can provide detailed information concerning:

The structure of the SWDC economy as to the most important sectors in terms of employment, profitability, exports out of region etc.

The impact of a change originating in one sector (e.g. *Logging*) and its implications for other related sectors (*Paper & Products*) and the regional economy as a whole.

Consequences for regional employment and income flowing from major changes to the economy as a result of government policy (e.g. lower taxes, tariffs, free trade agreements etc.)

The implications for the regional environment of significant increases in the output level of any sector or group of sectors.

There are four economic impacts that can be analysed for the regional economy as follows:

- Total sales, revenue or output in dollars.
- Net household income after tax, superannuation and other saving in dollars.
- Value Added for the region (defined below) otherwise known as regional Gross Domestic Product (GDP) or Gross Regional Product (GRP).
- Employment in full-time equivalent persons (FTEs).

Although total sales or output best measures the dollar value of total economic activity in a region, it can be inflated by the value of large imports of products or services (e.g. sophisticated engineering design services) into a region like the SWDC from say Auckland or Sydney. While such sales figures measure total transaction value, the Value Added measure quantifies the economic value in dollars created within the SWDC region by the local workforce after allowing for any necessary imports of raw materials and other goods and services from outside the region. This is the measure of the addition to gross regional product (GRP) for the SWDC and ultimately to NZ's GDP, and best reflects the true gain to the regional economy. Total Value Added includes:

- Net after-tax wages and salaries to employees.
- Net after-tax operating surplus but before dividends and interest of business units.
- Capital replacement of plant and equipment used up in current production.
- PAYE, company tax, GST, excise and customs taxes, road user charges and all other taxes paid to central government.

Net after-tax wages and salaries (or household income) is the best measure of available household purchasing power. Strong growth or impact for this measure in a region signals improved prospects for the *Wholesale and Retail Trade* sectors, *Ancillary Construction* (e.g. house additions or renovations) and similar sectors.

A wealthy region or country may show acceptable outcomes for the three dollar measures above but may lack the industrial capacity to support good job growth in the region. Employment is therefore an important attribute of regional prosperity and this means economic development within the region is required to expand opportunities for a regional workforce. Such employment is measured in full-time equivalents (FTEs) since about 24 per cent of regional workforces are currently part-time employees. An important capital intensive facility such as a port or airport may itself need only a moderate workforce for efficient operation. However, through such a facility's linkages to other sectors, it can ensure profitability in those sectors and facilitate growth in employment in those sectors. For example, tourist related sectors such as *Accommodation, Road Transport* (tours) etc.

The so-called *general equilibrium* nature (includes **all** reactions to economic stimuli) of the 114-sector Input/Output model (74 sectors for the SWDC region) is designed to reflect the idea that employment in any one sector generates employment in other sectors of the economy/region being analysed. From employment, related benefits such as income, value added etc. follow. As employees in the initiating sector build houses, educate their families in the general course of living, they create demands for goods and services that must be satisfied by other sectors with their own employees. In turn, these employees create further demands in other sectors and so on and so on. In economic jargon, these successive rounds of impacts are labelled round-by-round effects with some activities down the line requiring yet further services and employment from the initiating sector. The resulting *general equilibrium* impacts (Output, Income and Value Added as well as Employment) are estimated by the Input/Output methodology and account for **all** rounds of economic activity.

Using accurate data from *Statistics NZ*, credible estimates of the economic importance of sectors like *Dairy Farming* for a regional economy like the SWDC can be derived. The household income created within this sector links forward into sectors such *Retail Trade*, *Other Sport & Recreation*, *Personal & Community Services* etc. The inputs required by *Dairy Farming* link backward into supplying sectors such as *Electricity Supply*, *Agricultural Machinery* and *Road Freight*. Operations of *Dairy Farming* also link forward into using sectors such as *Dairy Processing* (Lichfield) and *Other Food Processing*. The total of all such flow-on linkages can be estimated and in the case of *Dairy Farming* aggregate up to 29 per cent of the SWDC regional economy in terms of Value Added or GRP (regional GDP).

Table C1: Activities in the 114 sectors of a typical regional economy

1	Other Horticulture	Squash, nurseries, vegetables, floriculture
2	Apple & Pears	
3	Kiwifruit	
4	Other Fruit	Grapes, citrus, berries
5	Mixed Cropping	Wheat, maize, grains
6	Sheep & Beef Farming	
7	Dairy Farming	
8	Other Farming	Pigs, deer, horses, goats etc.
9	Services to Agriculture	Fencing, spraying
10	Forestry	Forest growing
11	Services to Forestry	
12	Logging	
13	Fishing	Ocean and fresh-water fish farming
14	Coal Mining	
15	Services to Mining	
16	Other Mining & Quarrying	
17	Oil & Gas Extraction	
18	Oil & Gas Exploration	
19	Meat Processing	
20	Poultry Processing	
21	Bacon Ham & Smallgoods	
22	Dairy Manufacturing	
23	Fruit & Veg, Oil & Cereal Processing	
24	Bakery & Confectionary	
25	Seafood Processing	
26	Other Food Manufacturing	Animal, bird feed
27	Soft Drink, Cordial, Water	
28	Beer, Wine & Tobacco	
29	Textile Manufacturing	Wool scouring, carpets
30	Clothing Manufacturing	
31	Footwear	
32	Other Leather Products	
33	Sawmilling & Timber Dressing	
34	Other Wood Products	Plywood
35	Paper & Paper Products	Newsprint, pulp, containers, paper bags
36	Printing & Services	
37	Publishing & Recorded Media	
38	Petroleum Refining	
39	Petroleum & Coal Products	
40	Fertilisers	
41	Other Industrial Chemicals	Gases, resins
42	Medicinal, Detergents & Cosmetics	
43	Other Chemical Products	Explosives, paints, pesticides
44	Rubber Manufacturing	
45	Plastic Products	
46	Glass & Ceramics	
47	Other Non-metallic, Mineral Products	Cement, lime, concrete pipes
48	Basic Metal Manufacturing	Iron, steel, tubing
49	Structural, Sheet & Fab Metal Prod	Aluminium, tools, wire, nuts & bolts
50	Motor Vehicles	
51	Ship Building	
52	Other Transport Equipment	Rail, aircraft and related equipment
53	Photographic & Scientific Equipment	
54	Electrical & Appliance Manufacturing	
55	Agricultural Equipment	
56	Other Industrial Machinery	Mining, food processing, pumps, air-conditioning
57	Prefabricated Buildings	
58	Furniture	
59	Other Manufacturing	Toys, jewellery
60	Electricity Generation	
61	Electricity Transmission	
62	Electricity Supply	
63	Gas Supply	

64	Water Supply	
65	Residential Building	
66	Non-Residential Building	
67	Non-Building Construction	
68	Ancillary Construction Services	Landscaping, bricklaying, roofing, electrical, plumbing
69	Wholesale Trade	
70	Retail Trade	
71	Accommodation	
72	Restaurants, Cafes, Bars & Clubs	
73	Road Freight	
74	Road Passenger	Buses, taxis, tours
75	Water & Rail Services	Includes operations of Ports, customs & shipping agents
76	Air Services, Transport & Storage	Airport operations, warehousing & storage
77	Communication Services	
78	Finance & Superannuation	
79	Insurance	
80	Services to Finance & Insurance	
81	Property Services	
82	Owner Occupied Housing	Rental value imputed to homeowners
83	Vehicle & Equipment Hiring	
84	Scientific Research	
85	Technical Services	Engineering, architects, quantity surveying
86	Computer Services	
87	Legal Services	
88	Accounting Services	
89	Advertising & Marketing Services	
90	Business, Admin. & Mngt. Services	
91	Employment & Security Services	
92	Pest & Cleaning Services	
93	Other Business Services	Packing services, mail-out services, debt collection
94	Central Government	
95	Defence	
96	Fire & Police	
97	Local Government	
98	Pre-School Education	
99	Primary & Secondary Education	
100	Post School Education	University, technical & further education
101	Other Education	Language schools
102	Hospitals	
103	Medical & Dental	
104	Veterinary Services	
105	Child Care	
106	Aged Accommodation	
107	Other Community Services	Residential care services
108	Movies, Radio & TV	
109	Libraries, Museums & Arts	
110	Horse & Dog Racing	
111	Gaming	Lotteries, casinos
112	Other Sport & Recreation	Stadiums, attractions, gardens, golf courses
113	Personal & Community Services	Videos, hairdressing, massage, funeral services
114	Waste, Sewer & Drainage	

Appendix D

Table D1:

SWDC 74- Sector model: Employment Gains and Losses by Sector
Using Employment Count Data 2003/2004

SECTOR	SWDC		SWDC	Growth	
	#	Emp Cnt 2003	Emp Cnt 2004	Rate Percent	
Other Horticulture	1	6	6	0.00%	Only Have 2004 Employment Count Data Available For Agricultural sectors
Apple & Pear	2	0	0		
Kiwifruit	3	0	0		
Other Fruit	4	3	3	0.00%	
Mixed Cropping	5	0	0		
Sheep & Beef	6	35	35	0.00%	
Dairy	7	570	570	0.00%	
Other Farming	8	80	80	0.00%	
Services to Ag, Hunting & Trapping	9	80	55	-31.25%	
Forestry	10	60	35	-41.67%	
Services to Forestry	11	180	190	5.56%	Sector restructuring
Logging	12	670	500	-25.37%	
Fishing	13	0	0		Fast growing from small base
Coal Mining	14	0	0		
Services to Mining	15	0	0		
Other Mining & Quarrying	16	9	15	66.67%	
Oil & Gas Extraction	17	0	0		
Oil & Gas Exploration	18	0	0		
Meat Processing	19	160	160	0.00%	
Poultry Processing	20	0	0		
Bacon, Ham & Smallgoods	21	0	0		
Dairy Manufacturing	22	210	210	0.00%	
Fruit & Veg, Oil & Fat, Cereal & Flour	23	9	9	0.00%	Fast growing from small base Very profitable sector
Bakery, Sugar & Confectionary	24	40	35	-12.50%	
Seafood Processing	25	0	0		
Other Food Manufacturing	26	6	9	50.00%	
Soft Drink, Cordial & Syrup	27	65	70	7.69%	
Beer, Wine, Spirit and Tobacco	28	0	0		
Textile Manufacturing	29	0	0		
Clothing Manufacturing	30	25	15	-40.00%	
Footwear Manufacturing	31	0	0		
Other Leather Products	32	0	0		
Log Sawmilling & Timber Dressing	33	600	600	0.00%	Large employment losses
Other Wood Products	34	280	280	0.00%	
Paper & Paper Products	35	630	630	0.00%	
Printing & Services	36	3	3	0.00%	
Publishing & Recorded Media	37	0	35	N/A	
Petroleum Refining	38	0	0		
Petroleum & Coal Products	39	0	0		
Fertilisers	40	0	0		
Other Industrial Chemicals	41	35	35	0.00%	
Medicinal, Detergent & Cosmetics	42	0	0		
Other Chemical Products	43	0	0		Needs investigation
Rubber Manufacturing	44	0	0		
Plastic Products	45	0	0		
Glass & Ceramics	46	3	3	0.00%	
Other Non-metallic, Mineral Products	47	18	25	38.89%	
Basic Metal Manufacturing	48	12	15	25.00%	
Structural, Sheet & Fabricated Metal Prod	49	230	270	17.39%	
Motor Vehicles	50	0	0		
Ship & Boat Building	51	0	0		
Other Transport Equipment	52	0	3	N/A	
Photographic & Scientific Equipment	53	0	3	N/A	Perhaps small business development
Electrical & Appliance Manufacturing	54	0	0		
Agricultural Equipment	55	18	15	-16.67%	Growth in strategic sector
Other Industrial Machinery & Equipment	56	220	240	9.09%	

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Prefabricated Buildings	57	0	0		
Furniture	58	6	3	-50.00%	Losses from a small base
Other Manufacturing	59	9	6	-33.33%	Losses from a small base
Electricity Generation	60				
Electricity Transmission	61				
Electricity Supply	62	30	30	0.00%	
Gas Supply	63	0	0		
Water Supply	64	0	0		
Residential Building	65	25	25	0.00%	
Non-Residential Building	66	140	25	-82.14%	Construction sectors
Non-Building Construction	67	60	55	-8.33%	losing capabilities
Ancillary Construction Services	68	260	226	-13.08%	
Wholesale Trade	69	110	100	-9.09%	
Retail Trade	70	1030	1000	-2.91%	Small loss but gain in # 113
Accommodation	71	75	90	20.00%	Growth in strategic sector
Restaurants, Cafes, Bars & Clubs	72	260	250	-3.85%	Small losses
Road Freight	73	230	200	-13.04%	Loss in strategic sector
Road Passenger	74	35	40	14.29%	
Water & Rail	75	12	12	0.00%	Strategic sector for Hub/Port initiative
Air Services, Transport & Storage	76	25	15	-40.00%	Large employment losses
Communication Services	77	20	25	25.00%	
Finance & Superannuation	78	65	65	0.00%	
Insurance	79	0	0		
Services to Finance & Insurance	80	3	0	-100.00%	Loss on small base
Property Services	81	46	51	10.87%	Encouraging growth
Owner Occupied Housing	82	0	0		
Vehicle & Equipment Hiring	83	50	45	-10.00%	
Scientific Research	84	0	0		
Technical Services	85	12	12	0.00%	
Computer Services	86	0	0		
Legal	87	25	25	0.00%	
Accounting	88	65	55	-15.38%	
Advertising & Marketing	89	0	0		
Business, Administrative & Management	90	35	35	0.00%	
Employment, Security & Investigative	91	9	20	122.22%	Growth in strategic sector
Pest & Cleaning Services	92	20	30	50.00%	Growth in strategic sector
Other Business Services	93	9	3	-66.67%	Loss on small base
Central Government	94	50	50	0.00%	
Defence	95	0	0		
Fire & Police	96	65	65	0.00%	
Local Government	97	85	90	5.88%	
Pre-School Education	98	140	180	28.57%	Large employment gains
Primary & Secondary Education	99	490	480	-2.04%	Slight loser
Post School Education	100	0	0		
Other Education	101	210	95	-54.76%	Large employment losses
Hospitals	102	90	95	5.56%	
Medical & Dental	103	150	240	60.00%	Large employment gains
Veterinary Services	104	55	50	-9.09%	Small loss in vital sector
Child Care	105	35	35	0.00%	
Aged Accommodation	106	75	70	-6.67%	
Other Community Services	107	20	20	0.00%	
Movies, Radio & TV	108	25	25	0.00%	
Libraries, Museums & Arts	109	25	25	0.00%	
Horse & Dog Racing	110	0	0		
Gaming	111	3	3	0.00%	
Other Sport & Recreation	112	60	65	8.33%	
Personal & Community Services	113	100	120	20.00%	Loss in Retail but gain in services?
Waste, Sewer & Drainage	114	15	12	-20.00%	Strategic sector Waste Treatment
		8616	8317	-3.47%	

Table D2: South Waikato Regional Model for tyhe year ended September 2005: 74 Sector analysis

	Sales \$m	Cost of Manufact. Inputs \$m	Cost of Regional Imports \$m	Value Added \$m	Net HH Inc. \$m	Gross Household Income \$m	FTEs #	Gross Salary Per FTE \$	Value Added Per FTE \$	Exports \$m	Exports to Sales Ratio %	Imports to Sales Ratio %
FARMING												
Other Horticulture	7.73	0.18	7.27	0.28	0.14	0.20	7	28571	40000	0.01	0.1	94.0
Other Fruit	0.52	0.02	0.47	0.03	0.01	0.01	1	14286	30000	0.01	1.9	90.4
Sheep & Beef	35.17	2.93	28.29	3.95	1.01	1.44	52	27747	75962	0.01	0.0	80.4
Dairy	195.54	59.88	29.95	105.71	42.27	60.39	879	68698	120262	36.20	18.5	15.3
Other Farming	10.27	3.65	2.18	4.44	1.08	1.54	131	11778	33893	1.58	15.4	21.2
Agric. Services & Hunting	14.36	3.03	7.19	4.14	2.25	3.21	64	50223	64688	0.01	0.1	50.1
Total Farming	263.59	69.69	75.35	118.55		66.80	1134	58907	104541	37.82	14.3	28.6
OTHER PRIMARY INDUSTRY												
Forestry	213.40	40.64	142.50	30.26	2.56	3.66	90	40635	336222	115.25	54.0	66.8
Services to Forestry	25.58	7.10	3.56	14.92	8.47	12.10	244	49590	61148	20.01	78.2	13.9
Logging	62.80	15.54	9.13	38.13	19.47	27.81	639	43528	59671	50.84	81.0	14.5
Other Mining & Quarrying	8.64	2.22	1.67	4.75	0.75	1.07	17	63025	279412	4.07	47.1	19.3
PRIMARY PROCESSING												
Meat Processing	71.78	46.48	6.91	18.39	5.62	8.03	146	54990	125959	60.81	84.7	9.6
Dairy Processing	245.59	189.07	20.89	35.63	10.18	14.54	208	69918	171298	227.99	92.8	8.5
Fruit & Veg	2.99	0.95	1.33	0.71	0.24	0.34	7	48980	101429	2.36	78.9	44.5
Bakery	10.40	3.06	4.70	2.64	1.28	1.83	32	57143	82500	4.64	44.6	45.2
Other Food Processing	3.42	1.14	1.31	0.97	0.36	0.51	10	51429	97000	0.09	2.6	38.3
Soft Drink & Water	40.78	11.83	13.54	15.41	2.25	3.21	45	71429	342444	40.2	98.6	33.2
MANUFACTURING												
Clothing	4.42	0.51	3.11	0.80	0.63	0.90	25	36000	32000	0.00	0.0	70.4
Sawmills	169.98	104.80	17.71	47.47	24.01	34.30	608	56414	78076	144.81	85.2	10.4
Wood Products	56.51	26.86	12.84	16.81	8.47	12.10	262	46183	64160	49.49	87.6	22.7
Paper & Products	323.87	129.66	86.54	107.67	33.65	48.07	620	77535	173661	278.68	86.0	26.7
Printing & Services	6.08	0.17	5.60	0.31	0.11	0.16	3	52381	103333	0.02	0.3	92.1
Publishing & Recording	8.71	1.95	2.27	4.49	1.39	1.99	34	58403	132059	2.61	30.0	26.1
Industrial Chemicals	21.87	6.51	9.48	5.88	1.94	2.77	38	72932	154737	19.30	88.2	43.3
Glass & Ceramics	0.88	0.22	0.44	0.22	0.12	0.17	3	57143	73333	0.01	1.1	50.0
Non-metallic Minerals	9.53	3.96	2.03	3.54	1.20	1.71	23	74534	153913	3.67	38.5	21.3
Basic Metal Products	6.08	2.39	2.32	1.37	0.76	1.09	15	72381	91333	0.06	1.0	38.2
Fabricated Metal Products	64.79	21.29	21.13	22.37	12.04	17.20	305	56393	73344	40.68	62.8	32.6
Agricultural Machinery	2.91	0.81	1.01	1.09	0.55	0.79	16	49107	68125	0.46	15.8	34.7
Industrial Machinery	46.48	13.34	14.27	18.87	9.22	13.17	266	49517	70940	35.70	76.8	30.7
Furniture	3.62	0.21	3.24	0.17	0.11	0.16	4	39286	42500	0.01	0.3	89.5
Other Manufacturing	1.07	0.28	0.40	0.39	0.26	0.37	9	41270	43333	0.12	11.2	37.4
UTILITIES												
Electricity Supply	38.18	19.18	10.26	8.74	1.55	2.21	29	76355	301379	0.02	0.1	26.9

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	Sales	Cost of Manufact.	Cost of Regional	Value Added	Net	Gross	Gross	Value	Exports	Imports		
	\$m	Inputs \$m	Imports \$m	\$m	HH Inc.	Household	FTEs	Per FTE	Per FTE	Exports	to Sales	to Sales
					\$m	Income \$m	#	\$	\$	\$m	Ratio %	Ratio %
TOURISM												
Wholesale Trade	72.51	7.84	54.14	10.53	3.74	5.34	96	55655	109688	0.01	0.0	74.7
Retail Trade	80.80	20.82	22.73	37.25	22.16	31.66	893	35450	41713	0.00	0.0	28.1
Accommodation	5.26	1.31	1.55	2.40	1.08	1.54	73	21135	32877	0.63	12.0	29.5
Cafes & Restaurants	12.61	4.59	3.86	4.16	2.37	3.39	176	19237	23636	2.77	22.0	30.6
Road Passenger & Tours	2.67	0.82	0.57	1.28	0.80	1.14	31	36866	41290	0.51	19.1	21.3
Movie, Radio & TV	5.17	1.18	1.85	2.14	1.11	1.59	20	79286	107000	2.46	47.6	35.8
Libraries & Arts	1.57	0.47	0.33	0.77	0.49	0.70	22	31818	35000	0.20	12.7	21.0
Casinos & Gaming	0.84	0.02	0.73	0.09	0.01	0.01	1	14286	90000	0.01	1.2	86.9
Sport & Recreation	7.15	2.52	1.88	2.75	1.10	1.57	49	32070	56122	1.49	20.8	26.3
Personal Services	10.36	1.45	6.17	2.74	1.94	2.77	98	28280	27959	0.01	0.1	59.6
EDUCATION												
Pre-School	6.87	1.33	0.74	4.80	3.35	4.79	134	35714	35821	5.30	77.1	10.8
Primary & Secondary	23.26	2.85	1.96	18.45	11.49	16.41	400	41036	46125	7.85	33.7	8.4
Other Education	5.21	1.44	1.02	2.75	1.92	2.74	85	32269	32353	2.81	53.9	19.6
CONSTRUCTION												
Residential Building	24.75	4.59	18.55	1.61	1.06	1.51	41	36934	39268	0.01	0.0	74.9
Non-Residential Building	13.24	8.71	2.38	2.15	1.30	1.86	30	61905	71667	0.22	1.7	18.0
Other Construction	21.87	8.12	8.13	5.62	2.37	3.39	54	62698	104074	0.00	0.0	37.2
Ancillary Services	38.57	12.33	11.32	14.92	8.41	12.01	285	42155	52351	7.87	20.4	29.3
TRANSPORT												
Road Freight	45.35	17.30	7.92	20.13	8.28	11.83	205	57700	98195	0.00	0.0	17.5
Port Services	2.94	0.50	0.73	1.71	0.57	0.81	9	90476	190000	0.92	31.3	24.8
Air Services	7.32	0.94	4.69	1.69	0.61	0.87	14	62245	120714	0.00	0.0	64.1
BUSINESS SERVICES												
Communications	17.26	0.87	13.83	2.56	0.79	1.13	17	66387	150588	0.01	0.1	80.1
Finance	24.79	2.16	15.09	7.54	2.51	3.59	52	68956	145000	3.02	12.2	60.9
Property Services	33.89	4.71	19.40	9.78	1.88	2.69	70	38367	139714	0.01	0.0	57.2
Equipment Hire	14.66	3.89	2.92	7.85	1.97	2.81	54	52116	145370	9.71	66.2	19.9
Technical Services	10.34	0.34	9.25	0.75	0.47	0.67	10	67143	75000	0.01	0.1	89.5
Legal Services	5.33	0.58	2.53	2.22	1.27	1.81	29	62562	76552	0.01	0.2	47.5
Accounting Services	7.50	1.06	2.22	4.22	2.59	3.70	59	62712	71525	0.02	0.3	29.6
Business Admin Services	7.36	1.12	4.43	1.81	0.87	1.24	33	37662	54848	0.02	0.3	60.2
Employment & Security	2.64	0.29	1.61	0.74	0.48	0.69	12	57143	61667	0.01	0.4	61.0
Pest & Cleaning Services	2.42	0.25	1.17	1.00	0.73	1.04	21	49660	47619	0.01	0.4	48.3
Other Business Services	5.04	0.11	4.79	0.14	0.07	0.10	3	33333	46667	0.01	0.2	95.0
GOVERNMENT SERVICES												
Central Government	18.24	2.21	12.96	3.07	1.83	2.61	45	58095	68222	0.02	0.1	71.1
Fire & Police	5.98	0.70	0.44	4.84	3.06	4.37	62	70507	78065	0.67	11.2	7.4
Local Government	27.39	10.70	5.61	11.08	4.85	6.93	100	36000	110800	2.68	9.8	20.5
Hospitals	19.04	1.20	12.11	5.73	3.69	5.27	78	67582	73462	0.01	0.1	63.6
Medical & Dental	19.47	4.30	2.82	12.35	6.01	8.59	204	42087	60539	8.53	43.8	14.5
Veterinary Services	4.15	0.96	0.57	2.62	1.56	2.23	46	48447	56957	2.13	51.3	13.7
Child Care	0.92	0.20	0.17	0.55	0.36	0.51	29	17734	18966	0.25	27.2	18.5
Aged Accommodation	2.72	0.66	0.54	1.52	0.93	1.33	48	27679	31667	0.00	0.0	19.9
Other Community Care	2.63	0.27	1.88	0.48	0.32	0.46	12	38095	40000	0.01	0.4	71.5
Waste & Sewerage	3.76	1.51	0.39	1.86	0.68	0.97	12	80952	155000	0.66	17.6	10.4
Owner Occupied Housing	68.70	11.17	6.39	51.14						0.05		
Quadrant 4			297.65	58.84						77.16		
Non-Producing Sectors			125.18									
South Waikato DC Totals	2406.5	868.25	1168.74	851.18	305.03	435.76	8544			1277.80		

Local Govt. FTEs at 100 and Gross Salary per FTE at \$36,000 from SWDC advice.

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