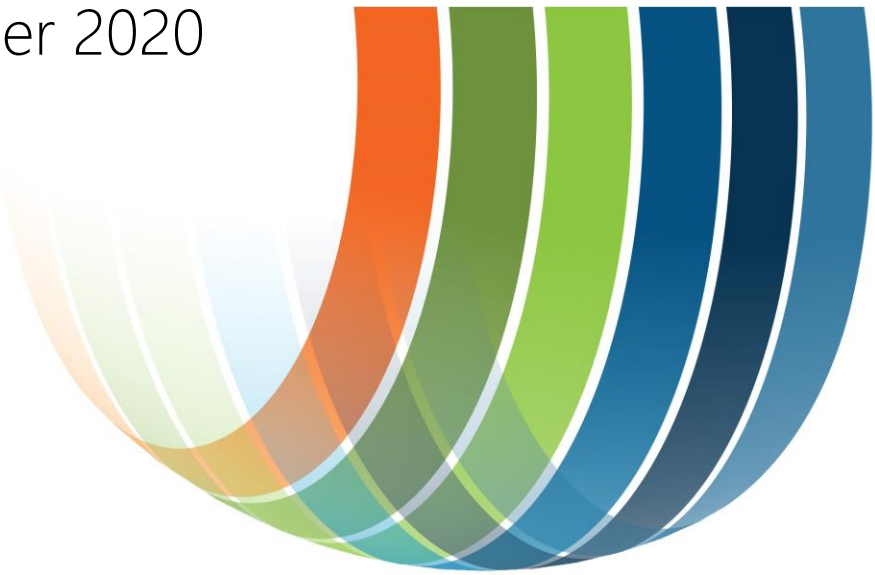
Population Projections 2018-2051

Kaipara District Council

October 2020



Infometrics

Economics put simply

Authorship

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Executive summary

Infometrics was commissioned to produce projections of resident population and household numbers for the Kaipara District. These projections cover the period 2018 to 2051 for a single medium-high growth scenario.

The population and household projections are driven by the demographic processes of ageing, births, deaths and net migration. Infometrics' projections of net migration into Kaipara district are informed by forecasts of employment in the district – this means that the final population projections are driven by economic as well as demographic factors.

The population of Kaipara District has grown strongly over the past 15 years, and growth has been particularly strong in the past five years, reaching a population of 24,100 in 2019. As a consequence of COVID-19, population growth is projected to slow over 2020 and 2021 with softer international net migration and a decline in employment. Population growth is projected to pick up from 2022 onwards, with the district growing steadily to reach a population of 32,600 in 2051.

Kaipara District's population is projected to age rapidly over the next 30 years, with the number of residents aged 65 years and over growing from 5,600 in 2019 to 12,200 in 2051. The population 15 to 64 years of age is projected to grow slightly, and the population under the of 15 is projected remain steady. The ageing population of the district, combined with trends of greater life expectancy and smaller families, means that the average household size of the district is projected to ease from 2.37 to 2.14 over the projection period. The effect of this is to spread the same population over a greater number of households. Accordingly, household numbers are projected to grow faster than the population, from 10,000 in 2019 to 14,600 in 2051.

Historically, the majority of Kaipara's population and household growth has taken place in the Mangawhai area. This pattern is expected to continue in future, particularly as further improvements to State Highway One reduce travel times into Auckland, thus improving the attractiveness of Mangawhai for commuting workers. The population in Kaiwaka and Maungaturoto is expected to grow strongly as these towns are expected to gain from reduced travel times into Auckland, as well as local employment growth. The Dargaville area is projected to grow steadily, with lesser growth in the Kaipara Coastal area. Population in Ruawai-Matakohe, Otamatea and Maungaru areas is expected to ease slightly, however the number of households is still expected to increase in these areas due to decreasing household sizes.

Introduction

Infometrics has been commissioned by Kaipara District Council (KDC) to produce projections of resident population by age, and households to support their long-term planning. At the request of KDC, these projections are for a single medium-high growth scenario. These projections cover the period 2018 to 2051, and provide a breakdown of population and households at a sub-district level. Sub-district analysis uses Statistical Area 2 (SA2) areas – these are defined by Stats NZ and break the district into ten areas.

This report contains a summary of high-level findings regarding projected population and household growth in Kaipara District. It is accompanied by a pivot table spreadsheet which provides significant detail, and which allows for a high level of flexibility in the analysis of these projections.

The projections of population growth in the Kaipara District form the cornerstone of this report. The derivation of these population projections, as well as the projections of household numbers, are driven by the demographic processes of ageing, births, deaths and net migration. Furthermore, projections of net migration are partially driven by projected employment growth. This means that the final population projections are driven to a significant extent by economic as well as demographic factors.

The report also includes an Appendix describing in detail the methodology employed in producing these projections.

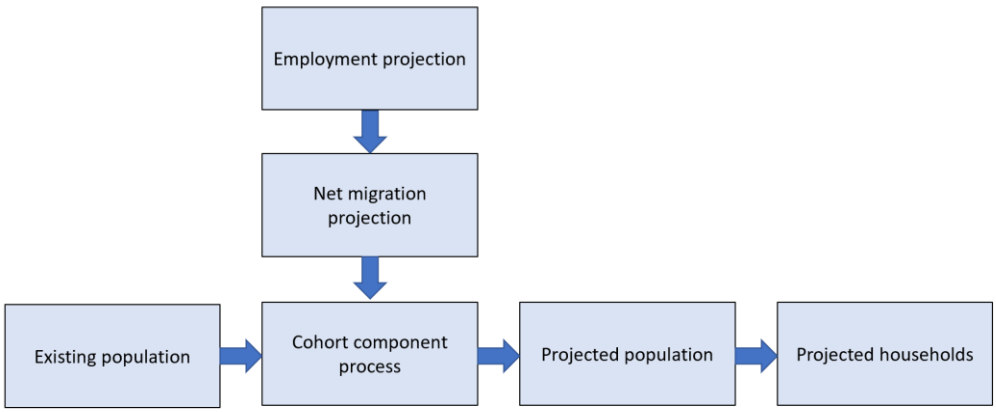
Our Approach

This section describes in broad terms the approach adopted in the production of these projections. It is intended for a non-technical audience. The Appendix contains a detailed description of the methodology and is intended primarily for a technical audience.

Infometrics takes a unique approach to projecting population, by firstly projecting employment growth, which in turn informs projected volumes of net migration. Consequently, these population projections are essentially informed by the economic prospects of the district.

Having derived these employment and net migration projections, a conventional cohort component approach is employed to project population and household numbers. This process is summarised in Figure 1 below.

Figure 1



The distribution of population and households within the district was informed by discussions with council staff, council consultants, analysis of the district's spatial plans and significant private plan changes.

Employment

Employment is forecast by using a combination of two approaches across the short and long term.

Short term employment forecasts are derived for a five-year time horizon and are driven by an econometric model which uses a mix of top-down and bottom-up approaches. This recognises that individual industries and regions will need to compete with each other in the future, to secure labour and skills from a workforce that is forecast to grow at a diminishing rate.

Employment growth in export-focused industries is projected by making use of a national model, which reflects the broad economic conditions within New Zealand. Service and construction industries are projected based on recent local economic and population trends.

Long term employment forecasts, covering a 30-year time horizon, require a different approach – one based far more on structural changes to the economy, driven by factors such as technological change (including automation), industry productivity, demographics, evolving demand for different products and services, New Zealand's international competitiveness, and climate change mitigation actions. This involves projecting changes to a range of variables, including amongst others, macroeconomic factors such as national interest rates and environmental factors such as carbon prices.

The long-term employment forecasts applied in the Infometrics Population Projection Model draw heavily on the ESSAM (Energy Substitution, Social Accounting Matrix) general equilibrium model of the New Zealand economy, developed by Infometrics' Chief Economist Dr. Adolf Stroombergen.

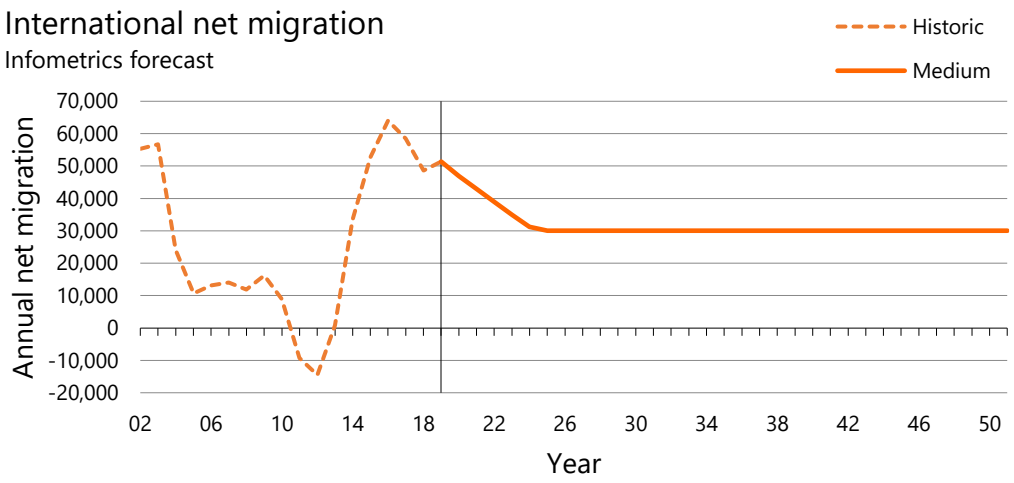
Migration

Long-term international net migration to New Zealand is forecast by considering a wide range of factors affecting the New Zealand and global economies.

In the near term, COVID-19 is the most significant influence on international net migration. We expect that heavily reduced international flight schedules, restrictions on international movements, and a general reluctance to migrate will drive net migration to negligible levels for 2020 and 2021. As global travel slowly resumes and the New Zealand economy recovers, net migration is expected to slowly return to our long term forecast level of 30,000 people per annum from 2025 onwards.

While recent historic inward net migration levels in excess of 60,000 people per annum are unlikely to be sustained in the long term, given projections of steady employment growth and an ageing population, we expect sustained positive net migration well into the future, particularly with the aid of favourable work visa conditions.

Chart 1



Migration is apportioned to territorial authorities using a mix of two approaches. Firstly, historic migration trends are applied to forecast the volume of non-employment-driven migration, such as people moving into the district for retirement or out of the district for study. Secondly, forecast labour market shortfalls are used to forecast the volume of employment-driven migration, such as people moving to take up employment opportunities. Employment-driven migration is also adjusted slightly to account for commuting patterns between districts – for example, strong commuting patterns from the Mangawhai and other Southern settlements into Auckland, aiding by ongoing improvements in the State Highway One. For both employment-driven and non-employment-driven migration, StatsNZ's projected age and sex profile of migrants to a particular district is assumed.

Existing Population

At present, the starting point for the population projection is the StatsNZ Estimated Resident Population (ERP) for 2018, which is based off the 2013 Census. Using this data, the Model projects the existing population using a conventional cohort component method. Under this approach, the starting population is grouped into cohorts consisting of five-year age groups distinguished by gender. The model draws on StatsNZ's analysis of historic and anticipated trends in births and deaths in each age and gender group, to inform changes to each throughout the projection period.

Birth and death rates are driven by a combination of factors – primarily the age structure of the population, and age-specific birth and death rates. Projected age-specific birth and death rates are sourced from StatsNZ. In the case of births, StatsNZ projects a decline in birth rates for mothers under the age of 35, and a slight increase in birth rates for mothers aged 35 years and older. StatsNZ also projects a steadily declining mortality rate across most age groups, as life expectancy increases due to lifestyle changes and advances in medical care.

Households

Projections regarding household numbers also follow a cohort component approach, involving the analysis of living arrangements for each age and gender cohort, and converting these figures into household numbers. This approach makes use of projected living arrangement type rates (LATR), which are produced by StatsNZ based on analysis of historic trends. LATRs indicate the proportion of each cohort in each living arrangement type – for example, 22% of 20-24-year old males in 2018 lived in an 'other multi-person household' (i.e. flatting) arrangement. To derive the number of households in the district, the number of individuals living in each household type is divided by the average size of each household type.

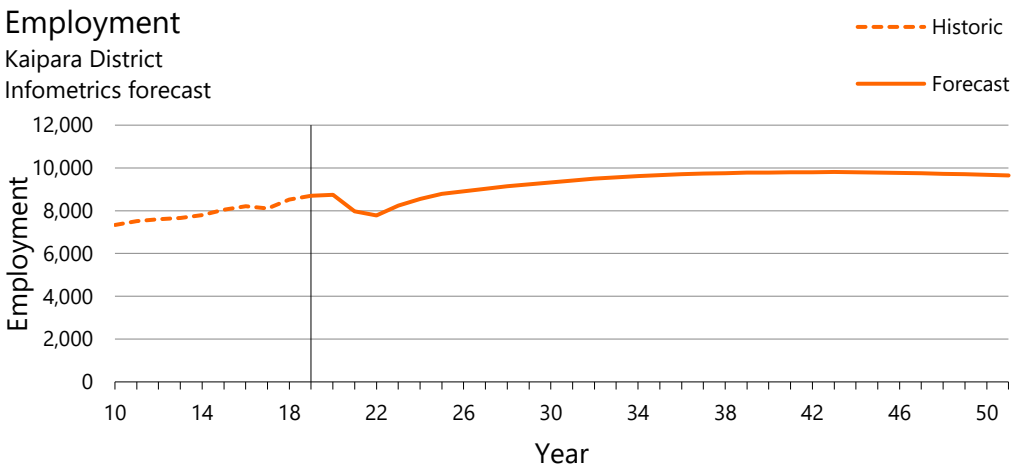
Findings

Employment

Employment in Kaipara District grew steadily over the past decade, at nearly 2% per annum. Employment growth is expected to turn negative in 2020 and 2021 because of COVID-19 and the resultant economic shock. Strong employment growth is expected for the remainder of the 2020's as the district recovers from the economic shock and returns to its prior growth path.

During the 2030s, more stringent environmental regulation is expected to result in higher carbon prices and greater regulation related to freshwater quality. Coupled with greater uptake of automation technology across the economy, this is expected to reduce the rate of employment growth, particularly in agriculture.

Chart 2

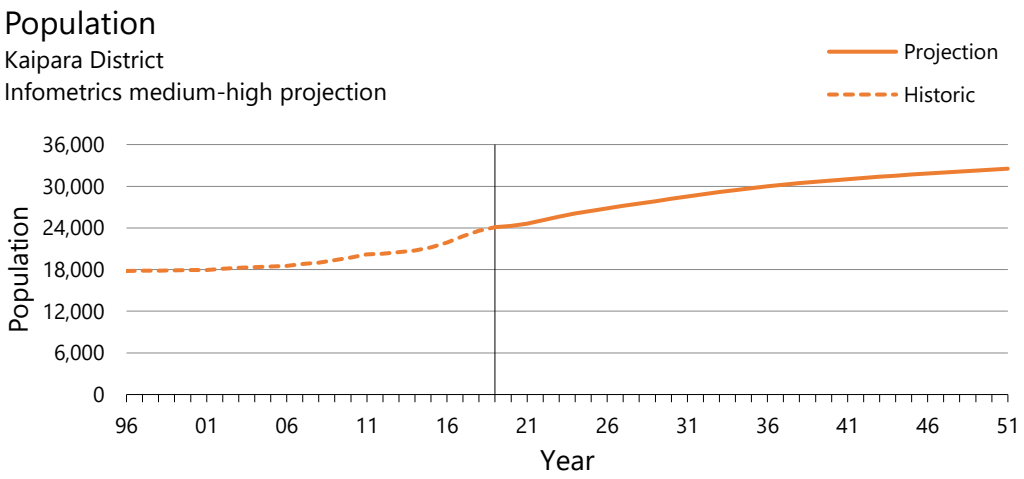


Population

The population of Kaipara District has grown strongly over the past 15 years, and growth has been particularly strong in the past five years as a result of strong international net migration and growing housing pressures in Auckland. This has seen Kaipara's population grow to 24,100 in 2019.

Population growth is expected to slow down over 2020 and 2021 as a result of COVID-19. From 2022 onwards, population growth is projected to resume at a steady rate, albeit slightly slower than what was experienced in the past five years. Kaipara's population is expected to continue growing out to 2051, although the rate of growth gently eases over that period, to reach a population of 32,600.

Chart 7



Sub-District Population

Projected population growth is distributed within Kaipara District in consideration of historic trends, district and spatial planning, and provision for infrastructure.

Historically, most of Kaipara's population growth has taken place in the Mangawhai area. This pattern is expected to continue in future, particularly as further improvements to State Highway One reduce travel times into Auckland, thus improving the attractiveness of Mangawhai for commuting workers. This will see the Mangawhai SA2 grow by 1,770 people by 2051, Mangawhai Heads SA2 by 2,490, and Mangawhai Rural SA2 by 2,920. It should be noted that the Mangawhai Rural SA2 area is expected to include urban development, as it incorporates the expected urban expansion of both Mangawhai Village and Mangawhai Heads.

Improved travel times into Auckland are also expected to improve the attractiveness of Kaiwaka and Maungaturoto. Furthermore, there are prospects for local employment growth in these centres which will further drive population growth. Maungaturoto's population is expected to grow by 270 by 2051, and Kaiwaka by 440. These projections assume that there will be limited provision of water and wastewater infrastructure in these towns. However, if water and waste water infrastructure was developed further, then these two towns may grow more quickly than projected.

The population in the Dargaville urban area is expected to continue growing steadily, prompted by steady employment growth in Dargaville, as well as the neighbouring rural area prompted by the Kaipara Kai initiative. Population growth in the Dargaville urban area predominantly takes place in the Dargaville SA2. However, if growth in Dargaville is stronger than projected, the Dargaville urban area may expand to include parts of the Kaipara Coastal SA2. Kaipara Coastal's projected growth reflects the growth of settlements such as Baylys Beach and Te Kopuru. The population of Dargaville SA2 is expected to grow by 1,090 by 2051, Kaipara Coastal by 90.

Population in Ruawai-Matakohe, Otamatea and Maungaru SA2 areas is expected to ease slightly by 2051. These three areas have experienced relatively weak population growth historically, and Ruawai-Matakohe and Otamatea contain settlements vulnerable to sea level rise. Despite a slight decline in population, the number of households is still

expected to increase in these areas due to decreasing household sizes – this is discussed in more detail in the Households section.

Table 1

Sub-District Population

Infometrics medium-high projection

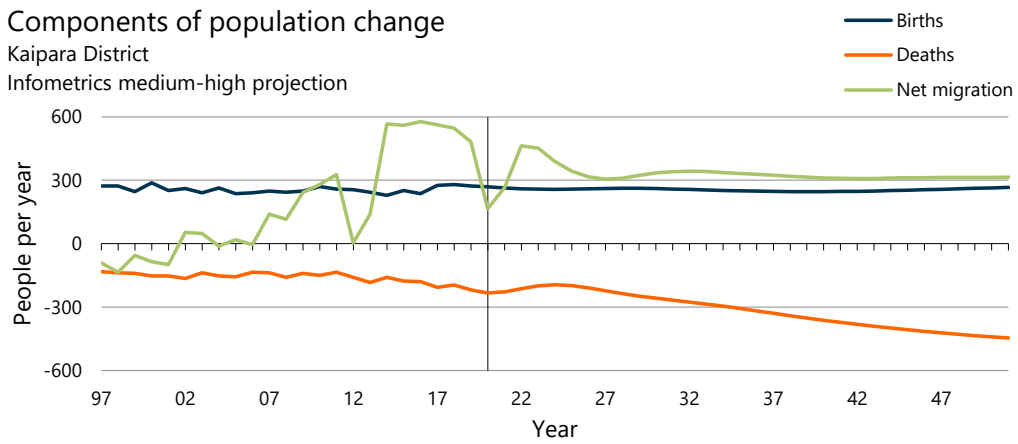
Statistical Area 2	2019	2051	Change 2019-2051
Dargaville	5,077	6,169	1,092
Kaipara Coastal	3,776	3,862	86
Maungaru	1,865	1,607	-258
Ruawai-Matakohe	2,520	2,418	-102
Otamatea	1,785	1,541	-244
Maungaturoto	1,318	1,582	265
Kaiwaka	2,217	2,654	438
Mangawhai	1,060	2,828	1,768
Mangawhai Heads	2,184	4,675	2,490
Mangawhai Rural	2,298	5,215	2,917
Total	**24,100**	**32,552**	**8,452**

Components of population change

In demographic terms, population change consists of three principal components – births (fertility), deaths (mortality) and net migration. The difference between births and deaths is generally referred to as natural increase – in other words, the ability for a population to grow internally or 'naturally'. Historically, births have exceeded deaths in Kaipara, and this is projected to continue until 2031, beyond which deaths will exceed births. At this point, the district becomes reliant on migration to maintain the population and to grow.

Net migration into the district has displayed a broadly upward trend over the past twenty years, however it is expected to fall sharply in response to COVID-19. Net migration is expected to recover to a relatively high level by 2022, although this is still below recent peaks. Net migration is then projected to ease and settle at just above 300 people per year for the remainder of the projection.

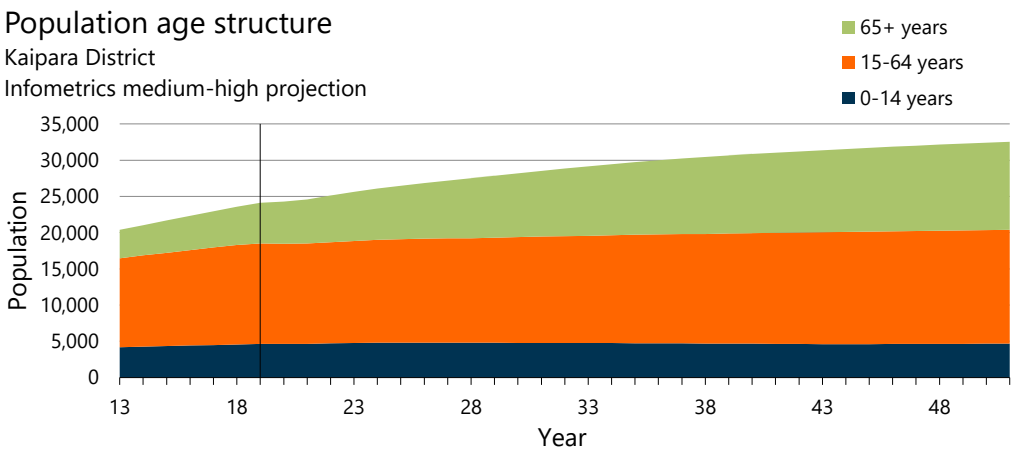
Chart 11



Age Structure

As is the case for the most areas in New Zealand, the population of Kaipara is projected to age significantly over the next 30 years. The number of youth (aged below 15 years), is projected to remain steady at around 4,600 people. Similarly, the population 15 to 64 years of age is only expected to grow slightly, from 13,900 in 2019 to 15,700 in 2051. The 65 years and older age group is the fastest growing age group, expanding from 5,600 in 2019 to 12,200 in 2051. The majority of this growth takes place in the next ten years as the relatively large 'baby boomer' cohort moves into the 65 years and older age group.

Chart 15



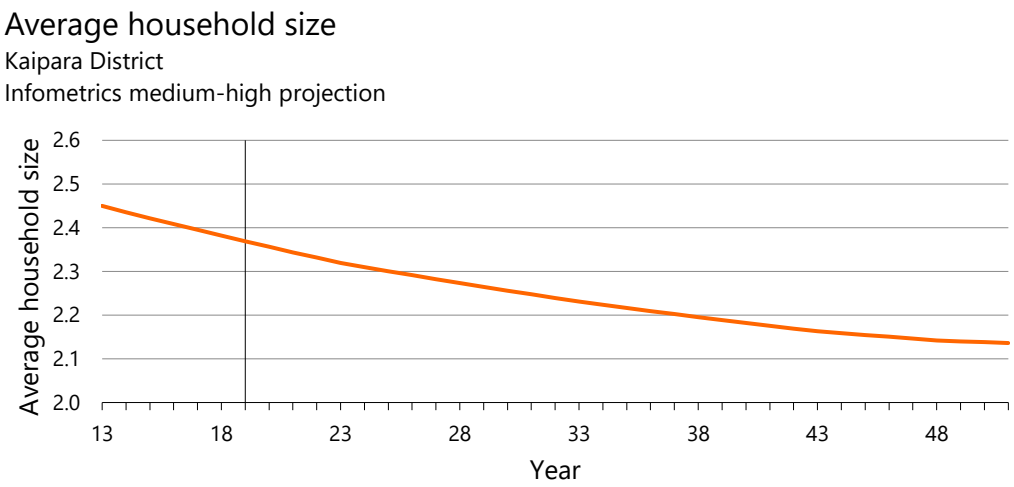
Households

A combination of factors is projected to drive down the average size of households in Kaipara. These factors include amongst others the changing age composition of the district's population, increasing life expectancy and societal trends.

- An ageing population leads to growth in households of couples without children or persons living alone (such as widows / widowers).
- Increasing life expectancy means that individuals are likely to spend longer periods in these household types.
- Societal trends include couples having fewer children (i.e. smaller families), increasing numbers of childless couples, and delayed childbearing.

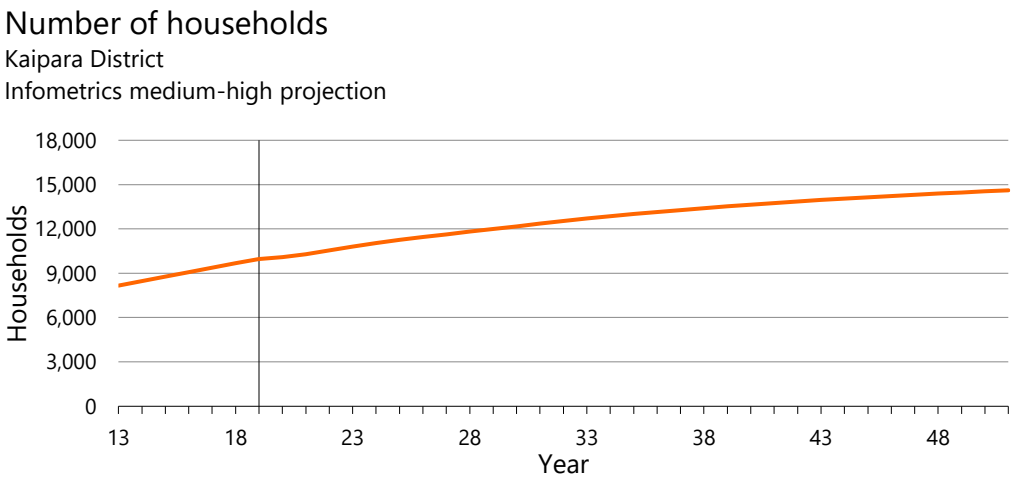
The combination of these trends implies that Kaipara's average household size will decrease from an estimated 2.37 individuals per household in 2019 to 2.14 individuals per household in 2051.

Chart 19



The combined effect of a growing population and decreasing average household size is strong growth in the number of households. The number of households in the district is projected to grow from 10,000 in 2019 to 14,600 in 2051.

Chart 3



Sub-District Households

In line with the districtwide household projections, household growth at a sub-district level is stronger than population growth, as decreasing average household sizes mean that more houses are required to house the same population. This means that in Ruawai-Matakohe, Otamatea and Maungaru, despite a decrease in population, the number of households is still projected to grow slightly.

Dargaville SA2 is projected to experience steady growth of 530 households. Kaipara Coastal SA2 is projected to grow by 180 households.

Households in Mangawhai are expected to grow strongly, by 840 in Mangawhai SA2, 1,090 in Mangawhai Heads SA2, and 1,290 in Mangawhai Rural SA2. Households in Maungaturoto and Kaiwaka are expected to grow by 270 and 330 respectively.

Table 2

Sub-District Households

Infometrics medium-high projection

Statistical Area 2	2019	2051	Change 2019-2051
Dargaville	2,056	2,584	528
Kaipara Coastal	1,530	1,710	181
Maungaru	748	771	24
Ruawai-Matakohe	1,049	1,121	72
Otamatea	732	750	18
Maungaturoto	502	771	269
Kaiwaka	875	1,203	329
Mangawhai	472	1,310	838
Mangawhai Heads	1,000	2,091	1,090
Mangawhai Rural	999	2,291	1,292
Total	**9,962**	**14,602**	**4,640**

Appendix – Detailed Methodology

This Appendix describes in detail the methodology employed in the projections. It is intended for use by client representatives possessing a relatively high degree of technical expertise in economic, statistical and demographic analysis.

Employment

Short-Term Projections (Five-Year Time Horizon)

As an initial step, Infometrics develops forecasts of employment at a national level, broken down by 54 industry classifications. Using econometric techniques, we develop approximately 50 separate statistical models for forecasting employment in each industry. These models draw on historic trends, patterns and relationships, and project these into the future.

Using machine learning, the models are ranked according to their track record of forecasting future employment in a particular industry, with the forecasting ability of each model measured against historical data. As an example, data from 2000 to 2016 is applied within each model to forecast employment to 2019, with these forecasts then being compared to actual historical data from the period 2017 to 2019. The model delivering the most accurate forecast is then applied to deliver a final forecast for each industry for a five-year time horizon. These industry forecasts are adjusted to ensure consistency with Infometrics' views of total employment growth over the forecast period.

As a second step, Infometrics develops industry forecasts by territorial authority and region which are consistent with our national forecasts. We use a similar technique to that described above, developing approximately 50 forecasting models for each combination of 485 ANZSIC industry codes and 66 territorial authorities. Slightly different techniques are used for the various industries in the regions, so as to account for different industry drivers.

The future performance of the *agriculture, forestry, fishing, mining and manufacturing* sectors are influenced predominately by macroeconomic conditions, which are not specific to local regions or districts. For example, strong demand from China for forestry products is highly likely to benefit the forestry sector in all regions of New Zealand. As a result, the models we develop for these industries are driven by nationwide industry trends, and the extent to which these trends historically deviate from the national average. Using machine learning, we are able to select the model that most effectively tracks and predicts these components.

The regional forecasts for *service industries* (including trade, accommodation, education, health and professional services) are weighted more heavily towards local drivers including population growth, local economic conditions and visitor numbers.

Regional forecasts for the *construction* sector incorporate Infometrics' forecasts of construction work-put-in-place, drawn from Infometrics' Regional Construction Outlook. They also consider population growth as a driver for construction activity.

Once we have generated forecasts for each industry / territorial authority combination, we ensure they are mathematically consistent with our national level industry forecasts.

Long-Term Projections (Thirty-Year Time Horizon)

The methodology applied the short-term forecasts described above, draws heavily on a statistical approach to forecasting – focusing on historic trends, patterns and relationships and extending these into the future. This statistical approach however becomes less accurate with longer forecast horizons. Consequently, longer term employment projections rely on the ESSAM (Energy Substitution, Social Accounting Matrix) general equilibrium model of the New Zealand economy, developed by Infometrics' Chief Economist Dr. Adolf Stroombergen.

The ESSAM model considers the principal interdependencies of industries within the national economy, including flows of goods from one industry to another, the transfer of costs in one industry into cost and therefore prices in other industries. The model presents a scenario of the New Zealand economy for selected target years (generally 2030 and 2050), based on robust assumptions regarding various economic factors, including international commodity prices, population growth, carbon prices, technology adoption, levels of automation, changes in energy efficiency, and substitution between four energy sources (coal, oil, gas and electricity). The ESSAM model's estimates of employment by industry in 2030 and 2050 provide a benchmark for the long-term employment projections included in the Infometrics Population Projection Model.

Some of the key macro-economic assumptions used by the ESSAM model are as follows:

Table 3. ESSAM macro-economic assumptions and outputs

Indicator	2025-2030	2030-2050
Population	1.0%pa	1.0% pa
Labour force	0.7%pa	0.46%pa
GDP	2.9%pa	1.7%pa*
World trade	2.7%pa	2.5%pa
Oil price	US$110/bbl in 2030	US$110/bbl in 2050
Carbon price	NZ$100/tonne CO_2 in 2030	NZ$200/tonne CO_2 in 2050
Government consumption	2.1%pa	1.7% pa
Investment in dwellings	2.0%pa	1.0%pa
Public investment	3.0%pa	2.5%

* These are model results, not input assumptions.

Migration

The population projections draw on Infometrics' short- and long-term international migration forecasts.

In the short term, COVID-19 is the most significant influence on international net migration. We expect that heavily reduced international flight schedules, restrictions on international movements, and a general reluctance to migrate will drive net migration to around zero for 2020 and 2021. As global travel slowly resumes and the New Zealand economy recovers, net migration is expected to slowly return to our long-term forecast level of 30,000 people per annum from 2025 onwards.

Our long-term forecast considers a wide range of factors affecting both the global and the New Zealand economy. While recent historic inward net migration levels in excess of 60,000 individuals per annum are unlikely to be sustained in the long term, given projections of steady employment growth projected and an ageing population, we expect sustained positive net migration over the long term, particularly with the aid of favourable work visa conditions.

Migration is apportioned to territorial authorities using a mix of two approaches. Firstly, historic migration trends are applied to forecast the volume of non-employment-driven migration, such as people moving at retirement. Secondly, forecast labour market shortfalls are used to forecast the volume of employment-driven migration, such as people moving to take up employment opportunities. Employment-driven migration is also adjusted somewhat to account for commuting patterns between districts. For both employment-driven and non-employment-driven migration, StatsNZ's projected age and gender profile of migrants to the district is assumed.

Labour Market Shortfalls

Labour market shortfalls exist when employers' requirement for labour exceeds the number of workers available at current wage rates. When labour market shortfalls exist in an area, additional labour, and hence population, is attracted to that area.

Infometrics estimates future labour market shortfalls by separately considering the projected supply of labour and the projected demand for labour (as measured by employment) and comparing these two factors.

As the starting point for estimating labour supply, Infometrics makes use of StatsNZ's published population projections by 5-year age group and gender.

Labour force participation rates (LFPRs) by age and gender are projected based on StatsNZ's national labour force projections. In addition, historic LFPRs for each region are analysed to identify their deviation from the national average. This deviation is applied to the national LFPR by age, to project regional LFPR by age. Historic averages for the unemployment rate in each region are analysed and projected forward. Projected LFPR by age is applied to the StatsNZ population projection, and the projected unemployment rate is applied to this, in order to estimate labour supply.

This projection is undertaken for each region or territorial authority, enabling the balance between labour supply and demand (as measured by employment) to be assessed within each labour market area. In periods of insufficient labour supply within a territorial authority or broader regional labour market to meet projected labour demand, the area is projected to receive additional migration.

This additional migration is apportioned to regions or territorial authorities based on their respective share of the national labour market shortfall. At the same time, however, additional migration may be constrained by the Infometrics' international net migration forecast, meaning that a particular region may not necessarily receive sufficient inward migration to entirely eliminate its labour market shortfall.

Similarly, the projected LFPR and unemployment rates are applied to the additional migration, reflecting the fact that it is rarely possible to import only workers – instead these workers often come with family members, who may not necessarily be economically active. Examples in this regard might include stay-at-home parents, children and aged dependents. Furthermore, in some instances, migrants may not immediately gain employment following their move.

Population

Population Base

As a rule, the appropriate population to use for Council Long Term Planning (LTP) purposes is the estimated resident population (ERP). This represents all individuals who permanently reside in an area and could be considered a 'maximum' population, as a percentage of these individual is likely to be away at any given point in time.

Consequently, the StatsNZ 2018 Estimated Resident Population (ERP) is considered as the basis for the population projections. This estimate is produced by StatsNZ with the most recent available Census (2013) data, and births, deaths and migration that has been recorded since. An ERP based on the 2018 Census is expected to be released during the course of 2020; following which this will form the basis of the projections.

Given that the majority of population projection parameters from StatsNZ are published for five-year intervals, our projection model also operates at five-year intervals, from 2018 to 2053. We then make use of a cubic-spine statistical process to interpolate population to single years. Once available, we will also incorporate the StatsNZ 2019 ERP into this process, to produce realistic projections incorporating the most recently available data.

Fertility

StatsNZ publishes regional age-specific fertility rates, for five-year age groups. This includes an open-bounded 45+ age group. We have however chosen to apply this only to the 45-49 year age group. This ensures that a growing population beyond the age of fertility does not artificially inflate the projection of births. The impact of this change is considered negligible, particularly given that between 2012 and 2014, there occurred an average of only eight births per annum to women aged 49 and over across New Zealand. Similarly, we ignore births to mothers under the age of 15, due to a lack of reliable data regarding fertility rates in this age group. Again, this is not statistically significant, as nationwide there were an average of only 21 births per annum recorded to mothers under the age of 15 between 2012 and 2014.

Throughout the projection period, we adopt StatsNZ's assumed gender ratio of 105.5 males per 100 females born – this is based on the historic average ratio at a national level. This phenomenon is commonly observed around the world, and is understood to be a function of slightly higher miscarriage rates for female children, rather than of selective abortion.

Mortality

Projected age- and gender-specific mortality rates by region or territorial authority, as calculated by StatsNZ, are applied to accurately project the number of deaths.

Sub-district distribution

Population distribution within a region or territorial authority is projected by considering historic settlement patterns and expectations of future residential development activity. Projections are produced for StatsNZ's Statistical Area 2 (SA2) areas. SA2 areas vary widely in geographic size, but are defined by StatsNZ to have similar populations – 1,000 to 3,000 residents.

Values for population and households at a SA2 level are projected using a full cohort component approach. Net migration is apportioned to each SA2 in consideration of:

- Historic trends in net migration for each SA2
- Capacity for growth as indicated by KDC's Spatial Plans and significant private plan changes.
- Feedback from KDC's officers and consultants

Households

Living Arrangement Types

The number of households at SA2 or district level is projected by applying Living Arrangement Type Rates (LATR) to the projected population. At present, StatsNZ projects LATR to 2038 from the 2013 Census figures across two scenarios – A and B. Scenario A assumes that LATR remain constant into the future at 2013 rates, while Scenario B projects a linear change to 2038, based on observed historic trends and future expectations. These trends include delayed childbearing (discussed under Fertility above), decreased rates of single parenting, and improvements in life expectancy which enable older individuals to live independently for longer periods[1]. We follow the StatsNZ recommendation to use Scenario B for projection purposes, as this is considered more realistic. This means that the LATR used in the projections transitions up to 2038, and then remain constant at 2038 rates up to 2053.

Applying LATR to the population provides an estimate of the number of people in each living arrangement type; this is then translated this into the number of households based on expected family structures – for example, couple households consisting of two individuals. For other multi-person households, we follow the standard StatsNZ assumptions, and assumes 2.6 persons per household. Projected population figures are accordingly divided by the number of households to project average household size.

As a rule, the projected household size calculated in these projections varies somewhat from the 2018 Census measures. This variance can arise for several reasons:

1) Census counts are randomly rounded to the nearest multiple of 3, or supressed entirely, so as to ensure confidentiality of Census respondents. Census outputs such as average household size are however based on actual data, meaning that it is impossible for third parties to precisely replicate these outputs.
2) LATR projections are developed at a national level, representing an average across New Zealand. As a result, local patterns will differ – this can for example be driven by differences in ethnic makeup, with some non-European ethnic groups exhibiting a greater propensity to form multi-generational households, leading to larger household sizes.
3) Household sizes are susceptible to change in the short term in response to non-demographic factors such as increasing housing costs.

[1] Full discussion available here http://archive.stats.govt.nz/browse_for_stats/population/estimates_and_projections/NationalFamilyAndHouseholdProjections_HOTP2013base/Data%20Quality.aspx#Livingarrangementtyperates