

Monitoring Research Quarterly, MRQ is produced by Auckland Council's Research, Investigations and Monitoring Unit, RIMU.

Each edition of the newsletter contains reports of RIMU's current work including information about recent publications, research, facts and trends about Auckland. RIMU publications are available on the Auckland Council and Knowledge Auckland websites.

Growth and change in Auckland

Statistics New Zealand has released results from the 2013 New Zealand Census of Population and Dwellings held on 5 March. They confirm that Auckland continues to grow and change, and that Auckland is now a multi-cultural centre.

At the 2013 census there were 1,415,550 usual residents in Auckland, an increase of 110,592 people since the 2006 census. This represents an 8.5 per cent change between 2006 and 2013. Auckland is the fastest growing region in the country, and just over half (51.6%) of New Zealand's population growth between 2006 and 2013 occurred in Auckland.

In line with the rest of the country, however, the rapid rate of population growth seen in Auckland between 2001 and 2006 appears to have slowed. The decline in population growth is largely due to migration as the impact of the Global Financial Crisis took effect. People moved overseas in greater numbers during that time, particularly to Australia, and fewer migrants settled in New Zealand.

Auckland's ethnic and cultural diversity continued to grow however, and there was

a substantial increase in the number of Aucklanders who were in the broad Asian category. This was driven by large increases in residents who identify as Chinese, Indian and Filipino. As Figure 1 shows, almost one in four Aucklanders are now Asian, an increase from 18.9 per cent in 2006, while the proportions of Maori and Pacific peoples remains relatively unchanged.

Other highlights from the 2013 census results include:

- nearly 40 per cent of Auckland's population were born overseas (note that 27 per cent of that group had lived in New Zealand for 20 years or longer)
- the median income for people aged 15 years and over was \$29,600
- almost a quarter of people aged 15 years and over had a university degree or equivalent in 2013, compared with 19.9 per cent in 2006
- Auckland's rate of home ownership has fallen to 61.5 per cent - making it the region with the second lowest rate of home ownership after Gisborne.

More data will be released throughout 2014 and available on the Statistics New Zealand website. In addition, the Research, Investigations and Monitoring Unit is working closely with Statistics New Zealand to bring the results from the 2013 census to Auckland Council. If you have queries about the census or you are considering purchasing customised data, please contact RIMU first. Send your queries to census@aucklandcouncil.govt.nz

Figure 1: Proportion of Aucklanders within each ethnic category, 2006 and 2013 census



Note: People could choose more than one ethnic identity, so categories are not mutually exclusive

MELAA = Middle Eastern, Latin American and African.

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2013 census results for Auckland

All local board areas experienced growth in the number of usual residents and in the number of dwellings in the seven years between the 2006 and 2013 census (see Table 1). There was particularly high growth in the following local board areas:

- Waitemata increased by 14,208 people
- Howick 13,620
- Upper Harbour 10,797
- Henderson-Massey 8898
- Hibiscus and Bays 7974

These five areas also had relatively high growth in the number of occupied dwellings.

Almost two-thirds (61.5%) of the growth in occupied dwellings in Auckland during that period was in stand-alone houses, and over a third (37.7%) was in two or more flats and apartments joined together. The Waitemata Local Board area experienced the largest increase of flats and apartments, mostly due to construction of apartment buildings in the city centre – an extra 5382.

The 2013 census also counted 33,300 unoccupied dwellings – almost the same amount as in 2006. This includes dwellings where residents were away and empty dwellings, but not dwellings under construction (of which there were 2820 counted in 2013).

The table also shows data for two priority areas in the Auckland Plan – the Southern Initiative area and the City Centre. The Southern Initiative includes Māngere-Ōtāhuhu, Ōtara-Papatoetoe, Manurewa and Papakura local board areas, and is characterised by relative socio-economic disadvantage. Both of these areas are home to high proportions of Auckland's children and young people – an important priority in the Auckland Plan. Twenty five percent of Auckland's children aged 0 to 14 live in the Southern Initiative area.

	Population *		Occupied dwellings **	
	2006	2013	2006	2013
Albert-Eden	90,978	94,695	31,482	32,118
Devonport-Takapuna	52,653	55,470	19,905	20,568
Franklin	58,602	65,322	20,250	23,088
Great Barrier	894	939	486	507
Henderson-Massey	98,787	107,685	31,968	34,584
Hibiscus and Bays	81,858	89,832	30,120	32,979
Howick	113,505	127,125	37,245	41,124
Kaipātiki	79,131	82,494	27,753	28,548
Māngere-Ötāhuhu	68,151	70,959	16,734	17,526
Manurewa	77,190	82,242	21,825	22,752
Maungakiekie-Tāmaki	66,375	70,005	22,959	24,030
Orākei	74,520	79,536	28,140	29,241
Ōtara-Papatoetoe	72,324	75,660	19,344	20,094
Papakura	41,559	45,633	13,749	14,964
Puketāpapa	50,805	52,938	16,236	16,779
Rodney	49,359	54,879	17,772	20,286
Upper Harbour	42,873	53,670	14,247	17,193
Waiheke	7,797	8,340	3,564	3,831
Waitākere Ranges	45,498	48,396	15,735	16,710
Waitematā	62,928	77,136	27,168	32,484
Whau	69,171	72,594	23,016	24,039
Southern Initiative	259,224	274,494	71,652	75,336
City Centre***	17,937	26,307	8,955	12,609
Total Auckland	1,304,958	1,415,550	439,701	473,451
New Zealand	4.027.947	4,242,048	1.478.709	1.570.695

Table 1: Population and occupied dwellings in Auckland, 2006 and 2013

Recent research activities

RIMU's scientists, researchers, technical specialists and analysts have assisted with many Auckland Council projects over recent months including:

- published new reports including Auckland's Economic Development Strategy targets and intermediate outcomes: a baseline report 2012 (TR2013/036), Auckland's elite and prime land: similar messages and continued trade-offs 54 years later (TR2013/050), Auckland retail economic evidence base (TR2013/046), Children and young people first: analysis of engagement with children and young people for the Auckland Plan (TR2013/048), Industry snapshot for Auckland: creative sector (TR2013/028) and "We all get along": social cohesion in three Auckland suburbs (TR2013/052)
- hosted a presentation by Professors Karen Witten and Robin Kearns: Kids in the City
- research economist Susan Fairgray presented at the Designers Institute of New Zealand Form Forum: Retail Futures conference. Susan talked about her work for the Proposed Auckland Unitary Plan, on the retail economic evidence base for Auckland
- deployed a marine water quality buoy that measures water temperature, salinity, dissolved oxygen, turbidity and chlorophyll. The data is online via the council's GIS viewer
- placed shellfish rigs in the Waitemata Harbour for the Sentinel Shellfish Programme. The programme monitors metals, organics, PCBs, organochlorines in harbour marine life
- recruited science students from Auckland and Waikato universities to help with environmental monitoring and data collection over summer
- completed field work for the Long-term Soil Monitoring Programme, including collecting soil samples at 40 sites across Auckland
- judging at the NIWA secondary school science fair and talking about science careers at Murray's Bay Intermediate School
- stream ecologists, Dr Martin Neale and Peter Hancock advised on the ecological outcomes of the stream daylighting project for streams in La Rosa Reserve
- the Capacity for Growth Study 2012 won the SOLGM Building Organisational Capability award 2013.

The reports noted here are available on the <u>Auckland Council</u> or <u>Knowledge Auckland</u> websites.

- * Usually resident population
- ** Includes private and non-private occupied dwellings

*** As defined by the three census area units Auckland Central East, Auckland Central West and Auckland Harbourside.

For further information on Auckland-related census data please send your queries to census@aucklandcouncil.govt.nz



Auckland's creative sector



Auckland's creative sector comprises 9000 businesses with 18,000 employees generating \$1.8 billion each year of GDP. That's 2.3 per cent of Auckland's total GDP and 2.8 per cent of its employment.

Creative industries generate and exploit intellectual property originating in individual creativity, skill and talent. They range from music and the arts to screen and digital content, publishing and design services such as architecture and advertising. The sector provides a platform for knowledge and technology intensive activities, and has important links to ICT, professional services, manufacturing and construction. It also adds to the local quality of life and attracts tourists, innovative skilled migrants and knowledge workers. RIMU recently published a snapshot of the creative sector providing data and analysis to inform council's involvement in economic development and offering input to arts and culture strategy and policy making.

Half of the country's creative sector employment is concentrated in Auckland, as compared to 'only' a third of the economy as a whole. Within Auckland, the sector is concentrated around the CBD and fringes, with more than half of its employment (57%) in just one local board, the Waitemata Local Board.

Creative businesses are small. On average, they have two employees each, as compared to four for other sectors. In addition, an unusually high proportion of the creative sector's workforce are self-employed or contractors rather than employees (37%, compared with 12% for other sectors). The largest creative sub sector is design services, which provides 38 per cent of the creative sector's employment. The second largest is publishing (18%, previously the largest) which has lost 5000 jobs since 2000. The fastest employment growth is in digital media: 8 per cent a year since 2000, and doubling every nine years; TV also had healthy growth, driven by Sky TV.

GDP per worker is 40 per cent lower than other sectors, but varies greatly between the different creative sub sectors. The highest is TV at \$163,000 of GDP per worker each year (film and video is only half that at \$82,000). Not surprisingly perhaps, the lowest are performing arts \$81,000 and visual arts \$69,000.

Industry snapshot for Auckland: creative sector, TR2013/028 and other industry snapshots are available on the <u>Auckland</u> <u>Council</u> or <u>Knowledge Auckland</u> websites. For more information, please contact Ross Wilson, ross.wilson@aucklandcouncil.govt.nz

Auckland retail economic evidence base

The retail sector is a major driver of urban form and of how the city expands. The sector's location and distribution in Auckland has a large impact on travel and time efficiency for households and businesses. It also influences other patterns of land use, particularly those contributing to the vitality and viability of centres, which play an important social amenity role for the communities they serve, and as commercial centres for businesses.

Managing the location of retail areas is important to achieving the strategic land use and sustainable resource management objectives and policies of city plans and the Resource Management Act.

RIMU has constructed an Auckland retail economic evidence base to inform the Proposed Auckland Unitary Plan retail policy direction and other council work streams. Information about the evidence base is presented in the Auckland Council technical report, *Auckland retail economic evidence base*, TR2013/046. The report's important findings include:

- in 2012 there were \$18.3 billion of retail sales in Auckland stores. Households accounted for nearly three-quarters of sales, with the average household spending \$29,600 on retail in 2012. The remainder of sales were to tourists and businesses
- nearly 4 million m² of retail floor space was identified in Auckland, with more than 1.4 million m² as large format retail (LFR) identified from primary field research (see Figure 1). Approximately two-thirds of floor space is located within centres, with LFR making up nearly half of the floor space in metropolitan centres
- retail supply and demand are currently broadly in balance in Auckland. The sector has responded to changes in demand through time, including high levels and changes in the structure of retail supply over the medium term
- demand for retail floor space will grow significantly in Auckland over the next 20 years to meet the needs of the population.



Figure 1. Albany/Rosedale area large format retail floor space quantum by meshblock and building footprint, 2013

Auckland air pollution: measuring vehicle emissions

Vehicle emissions are the main source of air pollution in many cities. While exhaust emissions from vehicles have reduced substantially with reduction policies, advances in fuel efficiency and control technologies, non-exhaust emissions (such as re-suspended road dust, brake and tyre wear particles) have not reduced to the same extent and remain a significant contributor to air particulate matter.

Several techniques have been developed to measure exhaust emissions, notably laboratory chassis dynamometer testing and roadside remote sensing. However, quantifying non-exhaust discharges is more complicated as emissions are related to vehicle movements, road conditions and weather.

Auckland Council and GNS Science scientists propose an innovative approach to identifying the exhaust and the non-exhaust components of vehicle emissions, by using chemical markers found in the emissions. The new approach, known as the tracer component method (TCM), could improve estimates of the non-exhaust emissions. TCM was applied to Auckland by taking the concentration of black carbon as the lower limit of the exhaust component and the concentration of crustal elements as the lower limit of the non-exhaust component. The non-exhaust PM₁₀ components (tiny particles with a diameter of less than 10 micrometres, smaller than a human hair!) from TCM compared well with the results of the NZ Transport Agency's road tunnel PM₁₀ study and of the coarse particle dataset at Kingsland.

Our study showed that from 2006 to 2009, for $PM_{2.5}$ (particles with a diameter of less than 2.5 micrometres) the non-exhaust components and the ratios of non-exhaust to total vehicle components (NT ratio) were higher at Queen Street and Khyber Pass than at Takapuna and Penrose. For PM_{10} , non-exhaust components were also higher at Queen Street and Khyber Pass but the NT ratios were similar across all sites.

TCM estimated that the NT ratios were approximately 18.6 per cent and 30.2 per cent for $PM_{2.5}$ and PM_{10} respectively, higher than those in the inventory which did not include road dust or vehicle body wear. Based on the TCM results, Auckland vehicle emissions, as estimated in the Auckland emissions inventory, could increase by 11.3 per cent and 20.2 per cent respectively for $PM_{2.5}$ and PM_{10} for 2006, whereas for 2011 the increases would be 8.3 per cent and 14.8 per cent respectively for $PM_{2.5}$ and PM_{10} .

Separating exhaust and non-exhaust components from the source profile of vehicles provides useful information on the ratios of exhaust to non-exhaust emissions. As far as we know, no studies have been carried out for this purpose. TCM provides a simple, practical solution to the difficult problem of estimating non-exhaust emissions from vehicles. In particular, estimate uncertainty is greatly reduced by using a reliable major component of exhaust emissions — black carbon, to set an upper limit of non-exhaust components. TCM can be applied to improve a road traffic emissions inventory with a more realistic estimation of non-exhaust emissions.

This study represents a significant step forward in providing a better tool for road traffic pollution management in Auckland.



S Xie and P Davy, 2013. *Improving estimations of non-exhaust particulate emissions from vehicles*. Proceedings of the 21st International Clean Air and Environment Conference, 7 – 11 September 2013, Sydney. And, *Air Quality and Climate Change* journal, February 2014.

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