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Urban land prices – a progress report

Building attractive and inclusive cities

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Urban land prices – a progress report

Building attractive and inclusive cities

Housing affordability is a significant challenge for New Zealand, especially in our cities. Since 2000, average house prices have quadrupled in Auckland and tripled in other large, fast-growing cities, including Christchurch, Wellington, Hamilton, and Tauranga. Average rents have more than doubled in these cities. Wages haven't kept up with rising housing prices, meaning that New Zealanders, especially those on low incomes, are spending an increasing share of their incomes on housing. More recently, we've seen house prices fall in many places as interest rates have risen, but that has done little to improve the affordability of our cities.

We face increasing demand for housing in our main cities, but construction of houses hasn't kept up with the increasing demand for housing. While we can't easily control population growth, we can control our response to it. If it was easier to build houses, supply could keep up with growing demand, and we would see lower house prices.

There might be several reasons why homebuilding doesn't keep up with growing demand – such as restrictive planning rules, lack of infrastructure to support growth, or lack of capacity in the construction industry. Over the past few years, a series of changes, such as the 2020 National Policy Statement on Urban Development, have made it easier to build housing in our main urban centres. This means it's theoretically possible to build more houses. However, for a house to be built, it takes more than being allowed, it also needs to be serviced by infrastructure, like local roads and water.

In this economic research note we look at differences between urban and rural land values in six urban areas (Auckland, Hamilton, Tauranga, Wellington, Queenstown and Christchurch) at two points in time – 2010/11 and 2020/21.

We care about differences in the price of land across rural-urban zoning boundaries because they tells us what impacts planning rules and infrastructure availability have on housing affordability. *When we look at the difference* it should allow for a 'like for like' comparison of the impact of planning rules and infrastructure, while holding everything else constant. And *when this difference is rising over time* it suggests that demand for urban housing is increasing faster than planning and infrastructure supply is responding.

So, after a decade of significant increases in urban housing demand, and significant reforms, where do we stand? And how much more work remains to be done?

These findings do not reflect the impact of the 2020 National Policy Statement on Urban Development and the 2021 Medium Density Residential Standards, which are expected to reduce pressure on urban land prices but which were not fully implemented by councils until after the end of our analysis period. Nor do they reflect broader changes to New Zealand's housing markets resulting from the COVID-19 pandemic. Periodic monitoring of rural-urban land value differentials can help us understand how ongoing changes to urban planning policy and infrastructure supply are affecting urban housing markets.

What's holding us back from building?

Urban planning policies that limit the height and number of homes that can be built in cities and in new subdivisions are a key part of the housing affordability story. But housing affordability is also an infrastructure issue. Infrastructure networks – water, transport, energy, and telecommunications – are the foundation for urban home-building. It's difficult to build unless the right infrastructure is in place.

Over the last decade, we've made significant progress on addressing problems with urban planning policies. At the local level, this includes new district plans that open up housing supply in Auckland, Christchurch, and several other cities. At the national level, the impacts of the 2020 National Policy Statement on Urban

Development and the 2021 Medium Density Residential Standards are only just starting to be felt. If we get it right, resource management reform will offer broader benefits.

As the New Zealand Infrastructure Strategy outlines, however, infrastructure for urban development is still a challenge. For example, congestion on urban roads remains a problem and water networks are often constrained and in need of repair and renewal.

What does the rural-urban boundary have to do with it?

The rural-urban boundary marks the edge of an urban area. On the urban side of the line, land is zoned for urban use – lot sizes are small and if you buy one, it's usually ready for you to build a house on it. On the rural side of the boundary, land is zoned for rural use – lot sizes are big and if you buy one, you can't really subdivide it to build houses because a) planning rules don't let you and b) there isn't the infrastructure needed to support growth (such as roads and water services).

We care about the difference in the price of land on either side of the boundary because it tells us what impacts planning rules and infrastructure availability have on housing affordability. The underlying concept is that if we compare the price of adjacent properties – it should allow for a 'like for like' comparison of the impact of zoning rules and infrastructure, while holding everything else constant. If there are large differences in property values at the boundary, it may indicate that there is insufficient development capacity for urban uses. This is an established measure that the Productivity Commission and the Ministry for Housing and Urban Development (MHUD) have previously used to analyse urban land markets.

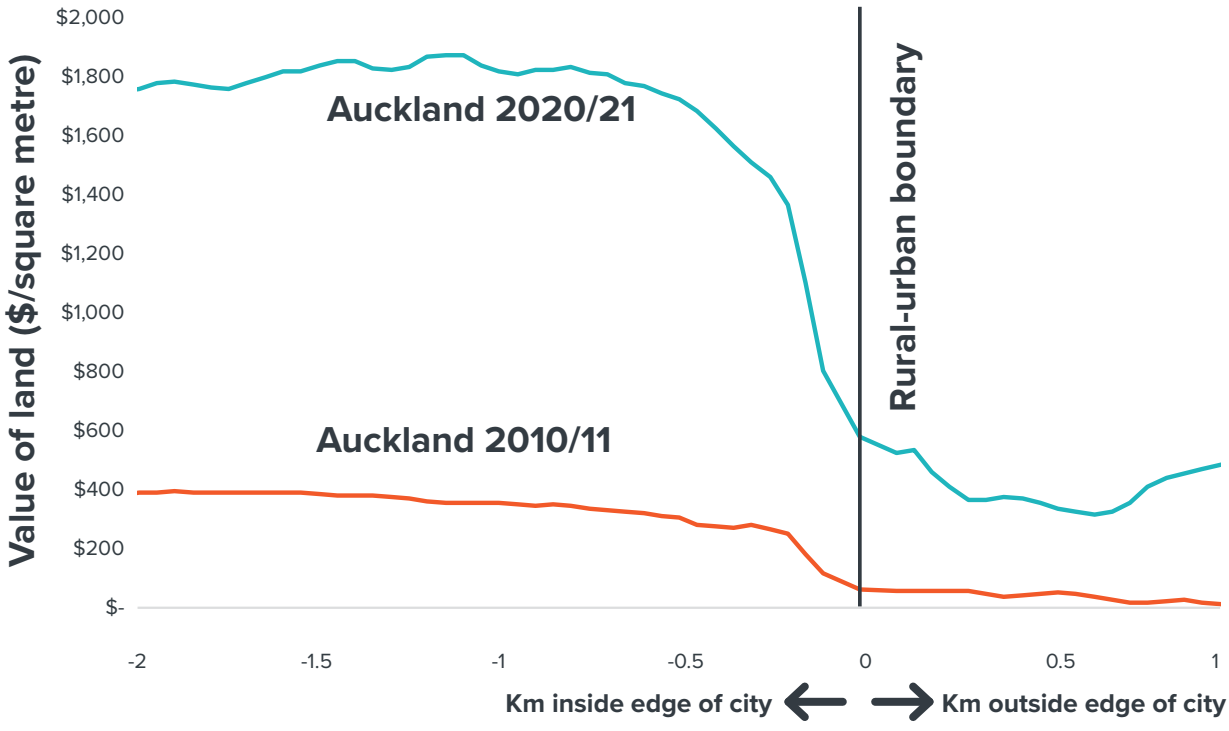
Charting urban land prices

We commissioned an update of MHUD's 2017 analysis of urban land prices for six urban areas – Auckland, Christchurch, Wellington, Hamilton, Tauranga, and Queenstown. Unlike previous studies, which took a 'snapshot' of prices at a point in time, we looked at changes between 2010/11 and 2020/21 (or the nearest available valuation years), allowing us to understand how we're tracking.

Figure 1 shows the distribution of urban and rural land values in Auckland, broken down by distance from the edge of the city. Over the decade, land values on both sides of the rural-urban boundary increased, but the increase was greater on the urban side. As a result, the 'jump' in values across the boundary has gotten much steeper over time.

Figure 1: Rising urban land values in Auckland

Nominal land values near the edge of Auckland, 2010/11 and 2020/21



The cost of subdividing and servicing residential sections

There are costs to convert land from rural to urban use, and these costs have also been rising over time. Earthworks, surveying and planning, and development contributions for council infrastructure are getting more expensive.

These comparisons of urban and rural land values adjust for these land development costs, and accounts for the fact that they have risen over time. The average cost, across New Zealand, to subdivide and service an urban residential section is estimated to have risen from around $110,000 in 2010 to around $150,000 in 2021.[1] Costs are likely to be higher in some places.

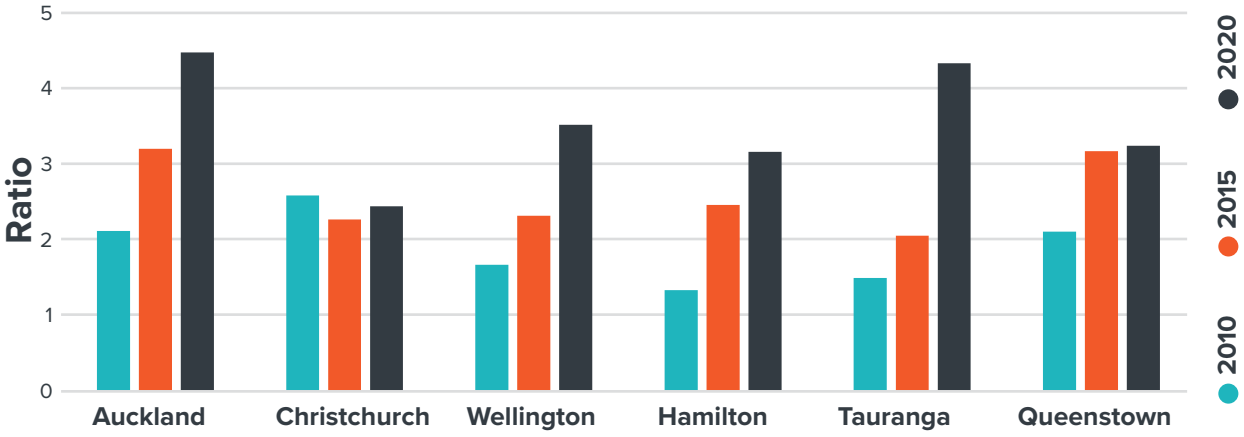
Different cities, different paths

Figure 2 uses parcel-level land values inside and outside rural-urban zoning boundaries to estimate the ratio of urban land values to nearby rural land values in six cities. For instance, in 2010/11, Auckland's urban land values were 2.1 times higher than the value of adjacent rural land. By 2020/21, this ratio had risen to 4.4.[2]

Of the six cities we looked at, all but Christchurch experienced similar increases in the relative value of urban land. Wellington's ratio went from 1.6 to 3.5, Hamilton's went from 1.3 to 3.1, Tauranga's ratio rose from 1.5 to 4.3, and Queenstown's ratio rose from 2.1 to 3.2. Christchurch's ratio dropped from 2.5 in 2010/11 to 2.4 in 2020/21.

Figure 2: The rise of urban land values... but not everywhere

Ratio of land values inside the urban boundary relative to outside the boundary



Notes: 2010 estimates are based 2009-2011 valuation data, and likewise for 2015 and 2020. 2015 estimates are drawn from previous MBIE/MHUD analysis, based on the urban zoning boundaries that existed at the time.

Figure 3 shows what these differences mean in dollar terms. In Auckland, urban-zoned land is now valued at a premium of nearly $1,300 per square metre relative to nearby rural-zoned land, up from a premium of less than $200 per square metre a decade before. For a 500 square metre residential section, that's a cost of over $600,000.

The price premium for urban-zoned land varies around the country. It's also quite high in Tauranga – nearly $1,100 per square metre. Wellington, Hamilton, and Queenstown have settled at lower – but still quite costly – levels between $400 and $500 per square metre. Christchurch now has the lowest price premium – around $200 per square metre.

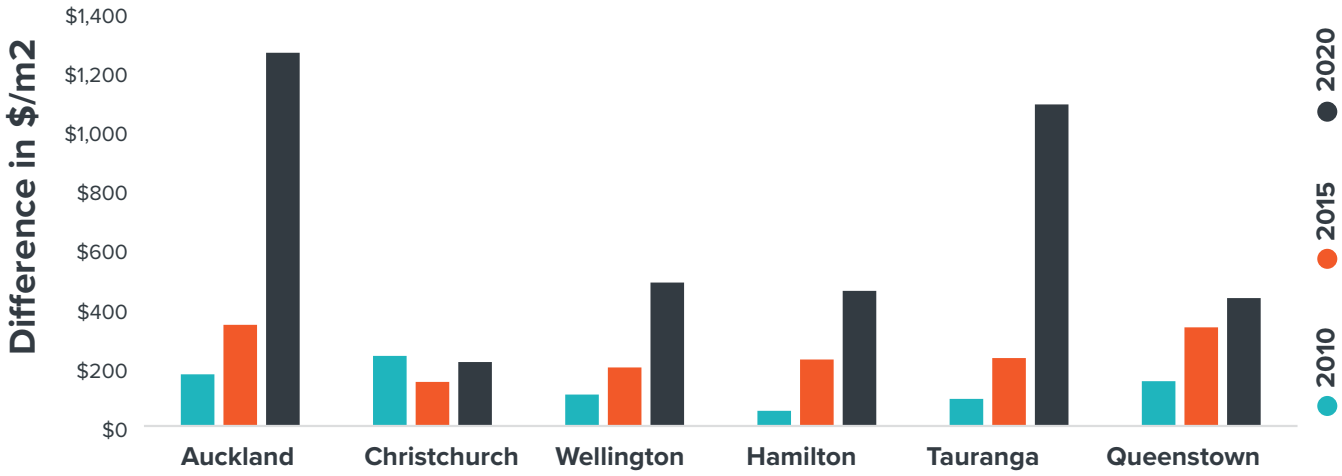
The findings show that urban land value trends in Christchurch are following a different path than the other five main urban centres (Auckland, Wellington, Hamilton, Tauranga and Queenstown). While the reasons for this weren't examined specifically, this is likely due to the impacts of the Canterbury earthquakes and subsequent rebuilding.

[1] https://www.aucklandcouncil.govt.nz/about-auckland-council/business-in-auckland/Reports/does-the-rub-impose-a-price-premium-on-land-inside-it-20-Feb-2020.pdf

[2] Due to availability of historical zoning data, 2010/11 analysis was based on 2020/21 zoning boundaries. Land cover data from Statistics New Zealand suggests that urban zoning boundaries shifted incrementally over this distance in all six cities. Sensitivity testing suggests that adjusting for this has a small impact on the results.

Figure 3: The price premium of urban-zoned land in New Zealand cities

Difference in land values across rural-urban zoning boundaries, adjusting for land development costs



Notes: 2010 estimates are based 2009-2011 valuation data, and likewise for 2015 and 2020. 2015 estimates are drawn from previous MBIE/MHUD analysis, based on the urban zoning boundaries that existed at the time.

The task in front of us

Over the last decade, New Zealand has made significant progress towards addressing our challenges with housing supply and urban development. Policies like the Auckland Unitary Plan and National Policy Statement on Urban Development are real steps forward.

However, our findings show that we have a lot more work to do to get urban planning and infrastructure right. It's a similar story to the findings in our March 2022 Research Insights paper – urban planning policies and infrastructure both have an important role to play in solving our housing challenges.[3] The findings in the current study give us more detail on how these issues vary across the country and where we face the most serious challenges. Urban land prices have risen fastest in Auckland and Tauranga, reflecting the challenges those cities face with infrastructure supply.

This problem is unlikely to solve itself. Fortunately, there are options to make it easier to provide the infrastructure needed to support growth. For example, regional spatial planning can allow us to identify the infrastructure that might be needed to support future growth and protect and acquire corridors of land and sites for future infrastructure. This can ensure that land is available to provide infrastructure in the future, while also allowing for flexibility in how and when that infrastructure will be developed.

There are also non-built infrastructure options, such as variable pricing to spread demand between peak and off-peak periods. Non-built solutions might include congestion charging on busy roads, lower off-peak electricity prices, or off-peak discounts for public transport fares. There may also be energy and water efficiency standards that manage demand on these networks, and planning initiatives like transit-oriented development that reduce the need to travel. Where non-built options are viable, they allow infrastructure challenges to be addressed in a cost-effective, and low-carbon way.

The housing affordability challenge will take a concerted effort to solve. However, by ensuring that we plan for and put in place the appropriate infrastructure options, we can help address our housing affordability challenges, build attractive and inclusive cities, and help deliver on our net-zero carbon emissions commitments.

[3] https://www.tewaihanga.govt.nz/strategy/infrastructure-reports/te-waihanga-research-insights-march-2022/

Attachment A: Updating the NZLVM model

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Memorandum

To:	Peter Nunns	**Of:**	Te Waihanga, New Zealand Infrastructure Commission
From:	Shane Martin	**Date:**	2 September 2022
Project:	NZLVM Update (NZ3145)		
Subject:	Update to the New Zealand Land Valuation Model		

1 Introduction

In 2017, MRCagney (MRC) developed the New Zealand Land Valuation Model (NZLVM). The National Policy Statement on Urban Development Capacity (NPS-UDC), predecessor to 2020's National Policy Statement on Urban Development (NPS-UD), used the NZLVM to examine the price differences between rural and urban[1] land and industrial and non-industrial[2] land in cities across the country. Since these reports were published, much has changed in New Zealand:

- The country's population has grown by more than 8%.
- Auckland has radically changed how it zones its land.
- The Covid-19 pandemic triggered government responses that led to historic low interest rates and massive house/land price gains between 2020 and 2022.

MRC has updated NZLVM and is providing the outputs to Te Waihanga (New Zealand Infrastructure Commission). As part of the update, MRC is also providing this technical memo which contains three parts. First, is very high-level description of the NZLVM and a selection of findings from this update. This section is non-exhaustive and touches on just a few notable model results. Second, is a relatively short refresher of the NZLVM methodology (available, in-full, in the reports linked in the footnotes). This section follows the results section as it is somewhat technical. The memo then concludes with a summary and possible next steps.

2 Update Description and Findings

The updated NZLVM differs from the version previously published in two main ways:

- Land value differentials for urban/rural land and industrial/non-industrial land were estimated for two time periods (2010, 2021) rather than one.
- The cities examined are slightly different than previously and align with the five Tier 1 cities and local authorities defined by the NPS-UD, plus Queenstown.

At a high level, the NZLVM attempts to estimate the value of land just inside the boundary[3] between rural and urban (or industrial and non-industrial) land. After adjusting these values to account for the fact that land in different areas is near different amenities and has different levels of infrastructure servicing, the results are compared. If urban land is significantly more costly than rural land, even after these adjustments, it could

[1] https://www.hud.govt.nz/documents/national-policy-statement-on-urban-development-capacity-price-efficiency-indicators-technical-report-rural-urban-differentials/

[2] https://www.hud.govt.nz/documents/national-policy-statement-on-urban-development-capacity-price-efficiency-indicators-technical-report-industrial-zone-differentials/

[3] It should be noted that these boundaries are not legal and/or administrative boundaries like Auckland's Rural-Urban Boundary (RUB) defined in the Auckland Unitary Plan. Instead, these are boundaries calculated by where urban-type zonings end and rural-type zonings begin.

indicate that there is an artificial scarcity of developable land. A high differential is not concrete evidence that there is a regulatory issue but is a signal that this should be investigated further.

2.1 Summary statistics

Table 1 shows the average Capital Value (CV) and the average Land Value (LV) per square metre for each of the six study areas in both 2010 and 2021. Some simple patterns emerge. Tauranga has seen the largest (by far) increase in both CV and land value per square metre. By 2021, the average CV in the Tauranga area was nearly two and a half times what it was in 2010 and the average LV per square metre was nearly four and a half times higher.

Table 1 Average capital value and land value per m^2 across study areas

Area	Measurement	2010	2021	% change
Auckland	Average CV	$619,680	$1,235,627	99%
	Average LV per m^2	$542	$1,762	225%
Christchurch	Average CV	$413,317	$578,819	40%
	Average LV per m^2	$471	$444	-6%
Hamilton	Average CV	$397,467	$710,171	79%
	Average LV per m^2	$211	$648	207%
Queenstown	Average CV	$770,085	$1,444,231	88%
	Average LV per m^2	$399	$880	121%
Tauranga	Average CV	$466,268	$1,140,387	145%
	Average LV per m^2	$339	$1,504	343%
Wellington	Average CV	$449,360	$755,032	68%
	Average LV per m^2	$359	$913	154%

In comparison, the average CV in the Christchurch study area increased by only 40% and the average land value per square metre decreased by 6%, making it the only area studied where land values went down over time. However, Christchurch is something of a special case given the destruction and recovery from the 2011 Canterbury earthquakes.

2.2 Urban/rural results for 2010 timeframe

Figure 1 shows the pattern of land values for our six cities in the 2010 timeframe. The boundary is located at distance zero; negative distances indicate properties inside the boundary and positive distances indicate properties outside the boundary. A few patterns are straightforward to identify:

- On average, in every city, land inside the boundary between urban and rural properties is much more valuable than land outside the boundary.
    - Even after controlling for geography and amenities, urban land is still much more valuable.
- Rural land is more valuable the closer it is to the boundary between urban and rural.
    - This is likely because this land is more likely to become urban in the future.

The most notable pattern for the NZLVM study is that there is a step-change in land value at the urban/rural boundary. Even after accounting for the cost that developers pay to local councils for infrastructure provision, the value of the land just inside the boundary is several times that just outside the boundary. This could be for several reasons:

- Regulatory restrictions (e.g., zoning, urban growth boundaries)
    - Regulations may artificially inflate the price of land in urban areas by restricting the amount of land available for development to less than what the market desires.
- The *cost* of infrastructure provision (which is accounted for) does not reflect the *value* of the infrastructure (which may not be accounted for).
- Something else altogether, or a combination of several things.

Getting to the heart of how much each of the possible causes contributes to this differential exists is a main research area in the field of urban economics and an area for future investigation.

2.3 Urban/rural results for the 2021 timeframe

Figure 1Figure 2 shows the patterns of land values in the 2021 timeframe. There are some comparisons to the 2010 results that are worth noting:

- Christchurch, Hamilton, Queenstown, Tauranga, and Wellington have very similar patterns as in 2010.
    - For Hamilton, Queenstown, Tauranga, and Wellington, the distribution of land values is similar but at much higher price levels.
    - For Christchurch, the distribution of land values is similar, and the price level is nearly identical (actually, *slightly* lower) for most properties.
        - However, for properties furthest inside the boundary between urban and rural, the price level seems to have fallen significantly. Where in 2010, these properties had a value per square metre centred on $500, in 2021, these properties now have a value per square metre centred on approximately $350.
- In Auckland, the pattern has changed dramatically
    - Likely because of the adoption of the Auckland Unitary Plan and the Rural-Urban Boundary (RUB) in late 2016.
    - The jump in land values right at the boundary between land with urban zoning and land with rural zoning is more pronounced than it was previously.
    - It also appears that land values in the 2000 metre band inside the boundary have increased more than any other area.

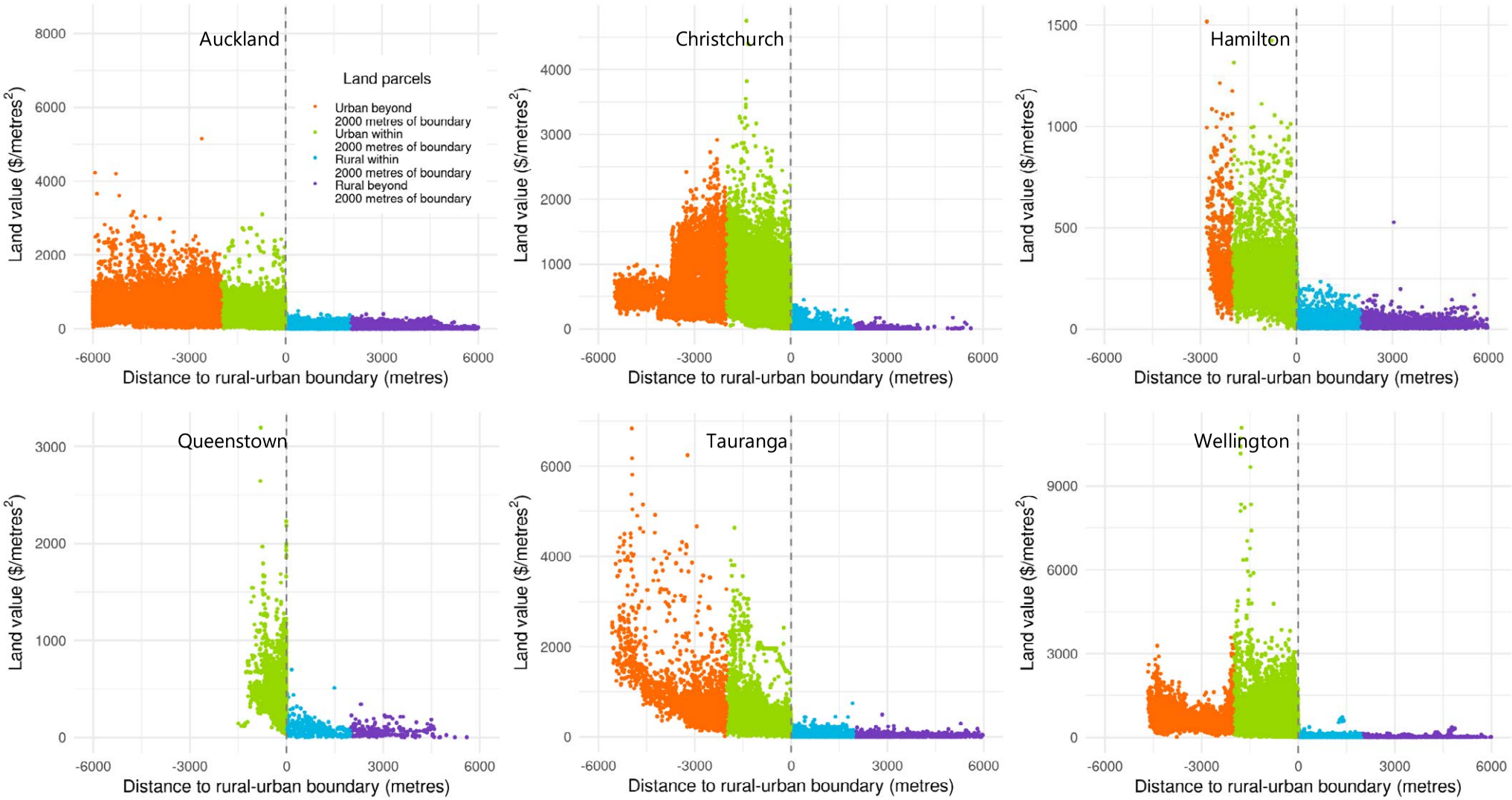

Figure 1 Urban/rural land differentials, 2010

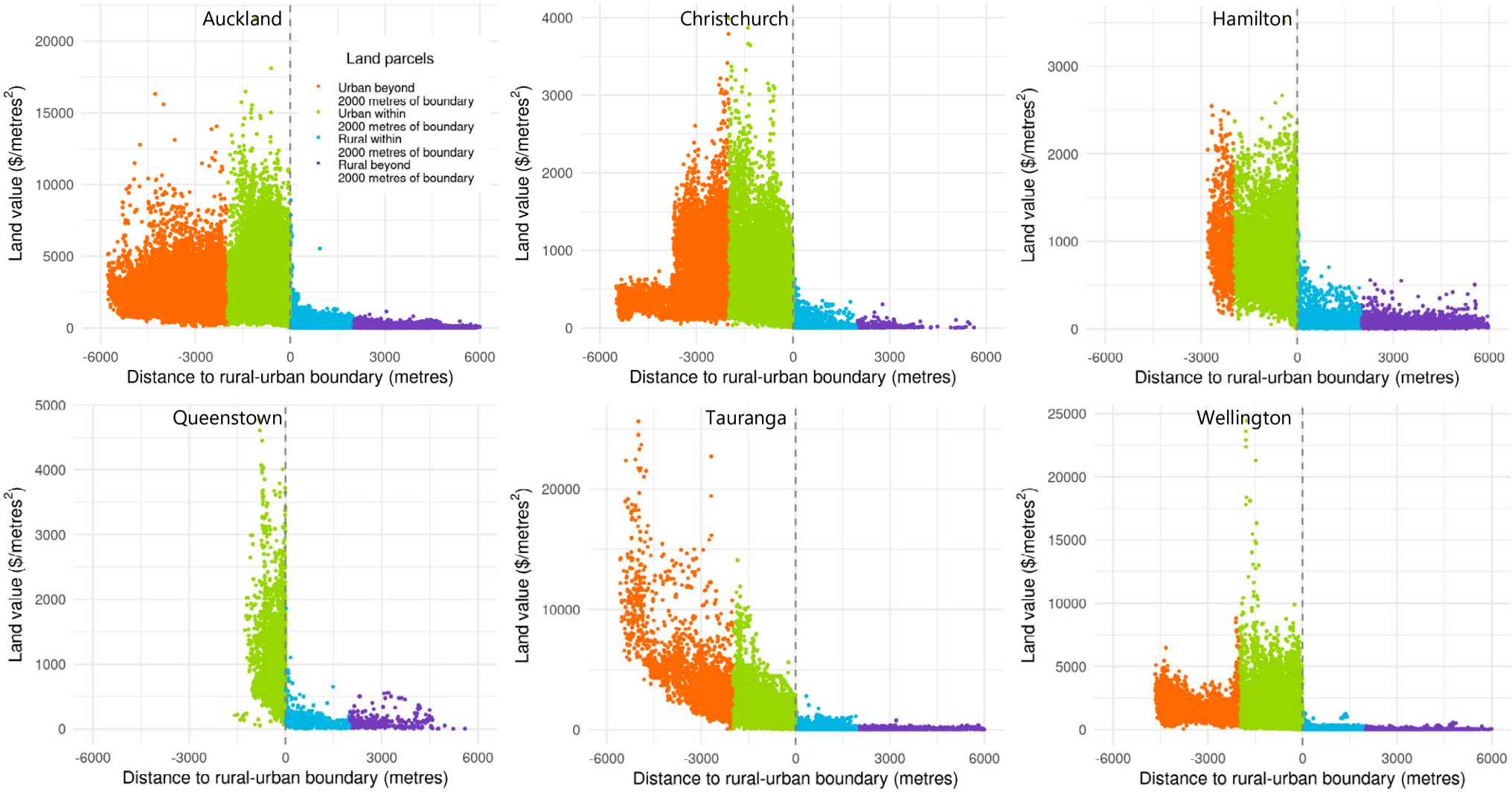

Figure 2 Urban/rural land differentials, 2021

2.4 Comparison of 2010 to 2021 urban/rural results

For technical reasons (see Section 3.7) the urban/rural differential is likely to be underestimated in 2010. However, seeing how the patterns have changed through time can still be indicative of overall trends.

Table 2 shows the dollar difference between rural land 2000 metres outside the boundary and urban land 2000 metres inside the boundary. This difference is reported in dollar terms and a ratio. Auckland, Hamilton, Tauranga, and Wellington have each seen their urban/rural ratio more than double between 2010 and 2021. While 2010 may be underestimated, it is unlikely to be so underestimated that this does not represent a real increase.

Interestingly, in 2010, Christchurch had the largest dollar difference per square metre of land for all the cities analysed ($239) and the highest urban/rural ratio. This means that in 2010, urban land 2000 metres inside the urban/rural boundary cost $239 more per square metre than rural land outside the boundary, all else being equal. By 2021, this value was nearly the same, with a slightly lower differential of $218 – now the lowest for any of the cities analysed. And while this wasn't examined specifically, this is likely due to the destruction from the Canterbury earthquakes and the subsequent recovery.

Table 2 Urban/rural differentials, 2010 and 2021

	2010		2021	
	Urban/rural $/m^2	Ratio (Urban/Rural)	Urban/rural $/m^2	Ratio (Urban/Rural)
Auckland	$176	2.08	$1,274	4.40
Christchurch	$239	2.54	$218	2.40
Hamilton	$52	1.31	$461	3.11
Queenstown	$153	2.07	$437	3.19
Tauranga	$92	1.47	$1,097	4.26
Wellington	$107	1.64	$489	3.46

Auckland is a unique case because of its rural-urban boundary (RUB) that is a legally defined boundary between land that is urban or can become urban and land that is rural and will remain rural. Based on the methodology used to estimate the urban/rural differential, some of the land that the NZLVM identifies as rural land may be inside of the administratively set RUB. That is, the land is currently rural, but has been earmarked for future urban development. This signal sent to the market would increase the price of this (currently) rural land because of the promise of development and the associated delivery of infrastructure. In that way, it is possible that the current differential in Auckland is mis-estimated.

2.5 Industrial/non-industrial results

As with the previous study on the industrial/non-industrial differential, the results for 2021 indicate that, in general, industrial land is worth less than adjacent land zoned for other uses. Notable exceptions are:

- A few industrial areas in Christchurch where industrial land is more valuable than the adjacent rural land.
- Queenstown where most of the industrial land is more valuable than adjacent residential and rural land.
- One industrial area in Tauranga that is significantly more valuable than the adjacent rural land.

In these places, it could be that there is an under-provision of industrial land – particularly where it is adjacent to rural land.

An example of this for an industrial area in Christchurch is shown in Figure 3 where we observe (in the third panel of the chart) that industrial land is more valuable than the adjacent rural land, which could suggest an under-provision of land for industrial uses in this area.

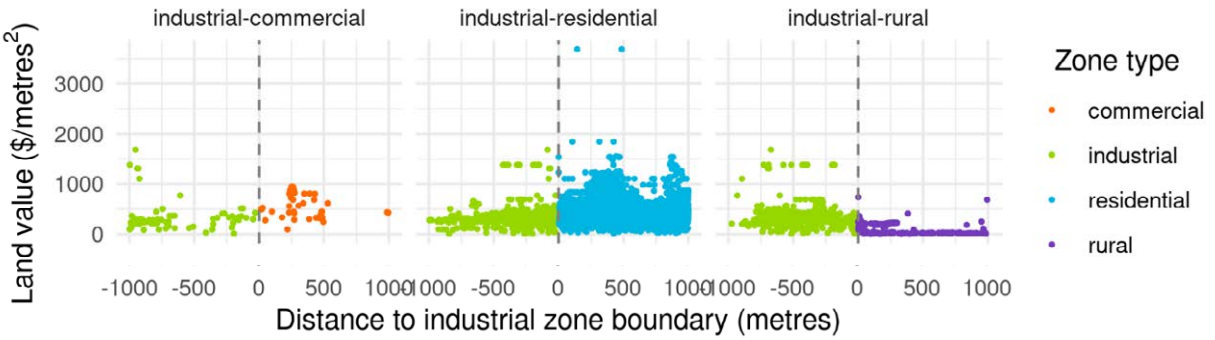

Figure 3 Industrial and non-industrial land value differences, Christchurch example, 2021

3 Methodology Overview and Changes

This section provides a review of the NZLVM methodology, which has been previously documented, and details the changes made for this update. In general, the methodology used was nearly identical to the previous version. The exceptions are some updated assumptions and adjustments that were made possible with additional data availability (particularly the cost of development contributions around the country in greenfield development areas). The process is described first for the urban/rural land analysis then for the industrial/non-industrial land.

3.1 Underlying data

The base data for analysis is the CoreLogic rating valuation data for each TA. Rating valuation data contains a wealth of information including:

- Total rateable values (capital value, or CV), land values (LV), and improvement values (IV).
- The location of the property.
- Various characteristics of the property, including existing buildings and other improvements on the site.
- The zoning that applied to the site on the valuation date.

The CoreLogic data, in its raw form, needs processing before being used for this type of analysis. This is because uniquely identifying a unit for rating purposes (which is why the dataset exists) is not necessarily the same as uniquely identifying parcels with land (which is the dataset needed). To process and clean the data, the following steps were taken:

- Remove sea and lake parcels.
- Choose a representative point from each parcel's polygon (close to its centroid) and find the unique SA1[4] that contains it, and assign that SA1 code to the parcel ID. Do the same for SA2.
- Assign a zone class (e.g., residential, commercial) for each uniquely identified rateable unit based on the rateable unit's zone code defined by CoreLogic and the TA zone rules.
- Clean the dataset of outlier data and fill in missing data.

[4] SA1 and SA2 are units of geography defined by Stats NZ. "Statistical area 1 (SA1) and statistical area 2 (SA2) geographies are aggregations of meshblocks optimised to be of similar population sizes to enable the release of low-level data. They are non-administrative areas that are in-between meshblocks and territorial authorities in size. Statistical areas either define or aggregate to define urban rural areas, territorial authorities, and regional councils. The statistical geographies are defined by the Statistical standard for geographic areas 2018, which replaced the New Zealand Standard Areas Classification 1992."

- Keep only the records with SA1 and SA2 codes assigned in the previous steps.
- For records that have the same unique rateable unit ID, keep only the records with the latest valuation date.
- Fill NA land areas for properties that have a single parent property, such as units in a commercial building. Do this by taking the parent property's land area and dividing it evenly among the children.
- Keep only the records with positive land area.
- Keep only the records with 0 < LV <= CV.
- For records with the same unique rateable unit ID and valuation date (e.g., parent recreational properties), keep only one.
- Drop records with land values ($/m^2) below the 0.005 percentile and records above the 0.995 percentile.
- Fill NA zone classes with "unknown".
- Fill NA building floor areas with 0.

The resulting dataset is used to estimate land value differentials for Auckland, Christchurch, Hamilton, Queenstown, Tauranga, and Wellington.

3.2 Identifying the zoning boundaries

CoreLogic data includes information on zoning as at the most recent valuation date which provides an indication of the location of urban and rural zones at that date. Identification of zoning boundaries involved the following steps:

- Identification of all parcels within approximately 10 kilometres of the edge of the extended urban area, which may include parcels in multiple territorial authorities (TAs). This is referred to as the "study area" in this report. These are not the same as the legal/administrative boundaries such as Auckland's RUB.
- Identification of the broad zoning code associated with each property centroid in the CoreLogic dataset (e.g., residential, industrial, commercial, rural).
- Rural residential and lifestyle zones were generally classified as rural zones, as they are expected to have a significantly lower density and level of infrastructure servicing relative to urban residential zones. Future urban zones were generally classified as rural in the CoreLogic data, unless they had already been through a plan change process.
- Some zoning categories were classified as 'other' zones and filled in with the zoning from nearby parcels. This was necessary to address issues such as small parks or reserves within the city that may otherwise be classified as rural land, as well as road parcels.
- Contiguous areas of urban or rural land were merged to identify the overall extent of urban and rural zoning.
- Boundaries between rural and urban zones were defined, excluding locations where zoning bordered on coastlines or inland water bodies.

3.3 Defining the unit of analysis

Data for each rating valuation unit was used as this enables the most precise estimate of the impact of zoning boundaries on land values. The data was also filtered to focus on two specific types of residential properties:

- Detached dwellings, which comprise most residential properties in urban areas in New Zealand.
- Lifestyle blocks / rural residential properties, which are common on the fringes of most cities, and which typically coexist with farms and rural uses.

To ensure a comparison of "like for like", the analysis includes only these types of urban and rural residential properties.

3.4 Standardising land values

Different TAs do their rating valuations at different times. This could potentially lead to inaccurate estimates of urban/rural land value differentials for urban areas that cross over multiple TAs, or where the urban zoned area closely follows the edge of the TA boundary (e.g., Hamilton). This was addressed by adjusting land values to a consistent date using the sales price to appraisal ratio (SPAR) index at a TA level.

3.5 Removing the impact of geography, subdivision costs and other factors

Zoning is only one of many factors that affects the value of urban land. Other factors that may influence land values include:

- Proximity of sites to amenities and employment opportunities.
- Geographic constraints.
- Characteristics of sites (e.g., slope).
- Availability of infrastructure to serve development on the site.
- Improvements to land ranging from subdivision consents to earthworks.

A comparison of urban land to rural land without accounting for these other factors is likely to be misleading. For instance, urban-zoned land also tends to have better access to employment opportunities than land that is far away from the edge of the city. Making a comparison without accounting for this would not be meaningful.

To account for these differences between urban and rural land described above, an econometric model was developed that removes the impact of geographic characteristics and three other factors: a proxy for local amenities; proximity to water bodies; and proximity to the town centre. This produced a set of "raw" urban/rural differentials (both ratios and dollar differences) between urban and rural land. These raw values were then adjusted by national average subdivision costs (including development contributions) of approximately $150,000 per residential section, which account for the costs of converting rural land into urban land.

3.6 Methodology for industrial and non-industrial land

In general, the methodology for estimating the industrial/non-industrial land differentials is quite similar to the urban/rural methodologies described in sections 3.1 through 3.5.

One of the main differences is that land value differentials were estimated on a zone-by-zone basis, rather than averaging differentials across all zones in the city. This is because industrial land in different areas is surrounded by different types of non-industrial land. Consequently, a comparison between these areas would not be meaningful. Instead, up to three differentials were estimated for each individual industrial zone, dependent upon what other types of zones are adjacent. Depending on which comparison is relevant for a specific area, the differential between industrial land values and residential, commercial, and/or rural land values were estimated.

Also, because industrial zoned land tends not to be as widespread as residential land, the distance buffers used were significantly shorter than for residential. Rather than focussing the analysis to properties within 2000 metres of the boundary, as with residential, the industrial analysis instead focusses on properties within 250 metres of the boundary.

3.7 Difference between current and previous methodologies

There are a few differences between the methodologies used in this report and what was used in previous reports. First, is that the estimated cost to convert rural land to urban land has increased from approximately $95,000 to approximately $150,000. This is due to changes in the cost of land preparation (e.g., earthworks) and changes in development contributions.

Second, the cities examined are slightly different. For this update, the five cities identified by the NPS-UD as being "Tier 1" (Auckland, Christchurch, Hamilton, Tauranga, Wellington) plus Queenstown have been analysed. The previous studies looked at Auckland, Christchurch, Hamilton, New Plymouth, Tauranga, Queenstown, and Whangārei (for the urban/rural study) and Auckland, Christchurch, Hamilton, Tauranga, and Queenstown (for the industrial/non-industrial study).

Finally, this report calculates differentials for two snapshots in time. While the previous analyses focussed on land value differentials normalised to 2017 values, this analysis looks at differentials calculated for 2010 and for 2021. While the results for 2021 are robust, the results for 2010 should be treated as indicative. This is because historic zoning rules were unavailable (in a usable format), so 2021 zonings were applied to the 2010 data. For industrial land, this should be less of an issue. However, for residential land, applying 2021 zonings to the 2010 results is likely to *underestimate*[5] the 2010 urban/rural land value differentials. Thus, caution should be applied when considering the 2010 results.

4 Summary and Next Steps

The main finding of this update to the NZLVM is that urban/rural land differentials increased in five (Auckland, Hamilton, Queenstown, Tauranga, Wellington) of six cities across New Zealand between 2010 and 2021, with Christchurch being the lone exception. Even with some slight limitations to the modelling assumptions, this pattern is likely to be robust. These results indicate that land just inside the boundary of rural areas and urban areas of a city costs significantly more than would be expected, using land just outside the boundary as a comparator – even after accounting for amenities and infrastructure costs that add value to urban land.

Another result is that the differential between industrial and, particularly, rural land indicates that some cities may have an under-provision of industrial land. This varies across areas of cities but is something that could be examined further going forward.

Finally, Te Waihanga, the New Zealand Infrastructure Commission, has the full results of the NZLVM for each of the six cities and for both 2010 and 2021. As these results are further and more thoroughly examined, more noteworthy results may become clear. Te Waihanga is interested in determining what, how, and where infrastructure is needed. The results provided by the NZLVM, along with other research, can help reveal areas where land is too scarce, there is an under-provision of infrastructure, or where infrastructure is possibly improperly allocated.

[5] The differential for 2010 is likely to be underestimated since 2021 zonings will classify some land in 2010 as urban when it was still rural at the time. This means that the comparison will be between rural land and a mix of rural and urban land (i.e., land that was already urban in 2010 plus any land that become urban between 2010 and 2021). This is likely to be less consequential for industrial land differentials as these boundaries have changed less than residential land, and in TAs with less development taking place.

Attachment B: Updating NZLVM land development cost assumptions

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Re: Update to NZLVM land development cost figure

The New Zealand Land Valuation Model (NZLVM) uses an estimate of the cost for developers to develop a site sufficiently with infrastructure so that a dwelling can be built on it. In the previous versions of the NZLVM, this number is based on information from three sources – two of which were able to be fully replicated and updated. What follows is a short description of the methodology used to update these numbers.

Source data

At this point, the data used to estimate the cost of development is quite old (the first report was published in 2008) but is still the most thorough analysis available. There are two studies[1] from BRANZ that detail costs from 18 separate developments across Aotearoa. Using this information, and personal correspondence with The Subdivision Company, a previous version of this work found that the cost to add infrastructure was approximately $95,000. I was able to replicate this number using the original studies and the data from The Subdivision Company, which gives me confidence that the updates are done appropriately and correctly.

Updating the numbers

There are a couple of ways in which the figure of $95,000 can be updated.

Method1

The easiest and most straightforward would be to simply inflate the numbers from the previous version of the model to 2021 dollars using the Capital Goods Price Index (CGPI) from Stats NZ (Land Improvements). Using this simple inflation factor yields a figure of **$112,200**. In my opinion, this is the least preferable of the three methods discussed in this memo because the statutory costs of development (for example, development contributions (DCs), infrastructure growth charges, etc.) have not increased in price at the same rate as construction costs. Nevertheless, this could be used as a baseline figure for consistency with previous versions of the model.

Method 2

The next method that could be used to update the original data to 2021 dollars is to use the components of the cost figure, inflate them separately, then add on the average statutory cost that exists now. To do this, the cost of development was separated into statutory costs, professional fees, and total costs minus statutory costs and professional fees.

[1] These studies are SR196 and E626 done by BRANZ and available online.

Total costs minus statutory costs and professional fees were inflated using the CGPI for Land Improvements. Professional fees were inflated using the Producers Price Index (Outputs) for Professional, Scientific, and Technical Services. Adding these two figures gives a result of $110,800 per section before considering statutory fees.

The statutory fees issue is a complex one – particularly because they vary so much across the country and even within regions. However, given that the NZLVM is intended to look at land on either side of an urban growth boundary, it makes most sense to look at the DCs and other charges on greenfield land.

In Auckland, the cost of a greenfield DC in Drury has been set at $84,900 plus the Watercare Infrastructure Growth Charge of $15,900 (though it is higher in Drury, specifically), with a resulting total of $100,800. In Christchurch, in the growth areas to the west of the city, it seems that DCs are approximately $18,600. In Hamilton, greenfield DCs range from roughly $25,000 to $86,000 depending on location. In Queenstown, DCs range from approximately $20,000 to $29,000. In Hutt City, the DCs range from $15,000 to $21,000. In Porirua, they range from approximately $24,000 to $49,000.

All of this demonstrates that the price of greenfield DCs varies across the country and within regions themselves. At the high end, the total cost of development without statutory fees plus DCs in Auckland come out to $211,600. At the low end, the total is approximately $126,000. A mid-range estimate is likely to be in the range of approximately $150,000. Thus, the range is from $126,000 to $211,600, with a reasonably conservative point estimate of **$150,000**.

Method 3

Finally, we can take the same inflated baseline costs (minus statutory costs) from Method 2 and add on the total *value* of the bulk infrastructure that is (partially) funded by statutory costs. That is, by recognising that the value of a ready-to-build residential section is a separate issue from how much the developer paid to council for their share of bulk infrastructure, we do not inadvertently assign a subsidy to developers as a cost of urban growth boundaries.

Unfortunately, this data is difficult to come by. The only such information available to my knowledge is a study from Auckland Council on the impacts of the rural-urban boundary. This study, using data from the Future Urban Land Supply Strategy (FULSS) found that the full cost of bulk infrastructure (that is, infrastructure that will be provided by Auckland Council) was $115,200 per section in 2019 dollars. Inflating this to 2021 dollars and adding it to the base figure of $110,800, results in a value of preparation and infrastructure of **$236,200** per section.

Summary

This note gives a range of estimates for the dollars it takes to turn a piece of land into a developable residential section. It updates the figure of $95,000 in previous versions of the NZLVM. It is likely that the NZLVM requires a different figure for each area analysed as the costs vary so much across the country. That said, a figure of $150,000 is likely to be justified as an estimate of the national average for greenfield development.

Yours sincerely,

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