Are the House Price Caps Applied to Kāinga Ora's First Home Grants Fair for First Home Buyers in New Zealand?

Tamarah Gillman, Megha Lalwani, Mary Anne Naidoo and Courtney Russ

Contribution Statement

TG, ML, MN and CR jointly conceived of the presented idea.

TG developed the business problem with input from CR, ML and MN.

TG established the plan of action with input from MN.

CR sourced the data in consultation with TG, ML and MN. CR developed and ran the web scraper used to collect data. CR cleaned and processed the collected data.

ML queried the data with input from MN and CR. CR prepared the visualisations.

CR and TG collaboratively developed the recommendations with input from MN.

CR developed the conclusion with input from TG and ML.

1. Business Problem

New Zealand has an obsession with home ownership that dates back as early as the 1850s and the arrival of the first Pākehā settlers, many of whom "had emigrated with the promise of land ownership" which "was imagined as a form of independence from the perceived oppression of a selfish and entrenched rentier class" back in Britain (Moyle, 2018). Home ownership's reputation as "a ticket to long-term financial security" in New Zealand stems from the fact that historically, owning property has proven to be an excellent way to build stable wealth in the form of equity. For Kiwi parents, this has made the family home an ideal investment for their hard-earned money, as well as a safe and secure place to raise their children (Tutty, 2022).

Buying a first home has therefore become an essential rite of passage for young Kiwis and a sign of reaching adulthood. Unfortunately, however, it is a goal that seems to be increasingly slipping out of reach for most first home buyers. The term 'Generation Rent' was coined in 2011 to describe young adults aged 18-39, who have been almost entirely priced out of housing markets across the globe (Pettinger, 2022). In New Zealand, Generation Rent accounts for approximately 1.5 million people, or 29.4% of the nation's population (Financial Services Council [FSC], 2021a).

A recent survey conducted by the FSC (2021a) found that just 40% of Kiwis in Generation Rent own their home, and this number is expected to dwindle in the coming years. Furthermore, 82% of survey respondents "believe that the dream of home ownership is now unattainable for the average Kiwi" (FSC, 2021b), while 85% of respondents still consider buying property to be "a ticket to long-term financial security" (Tutty, 2022). The disparity between these two statistics illustrates the frustration felt by many young Kiwis belonging to Generation Rent, including the authors of this paper.

FSC's CEO, Richard Klipin, has described Generation Rent's barriers to entry into the New Zealand housing market as "a combination of increasing house prices, ability to save for a deposit and availability of property in areas where people want to live" (FSC, 2021a). Despite these barriers, 55% of Generation Renters surveyed by the FSC said they "are actively working towards buying their own home in the next five years" (FSC, 2021a). The concern, however, is whether or not they'll be able to catch up to rising house prices. Consumer NZ's Sentiment Tracker study (n.d.) found that 56% of those who are actively saving for a house deposit and belong to Generation Rent, feel that they will not be able to catch up.

Dwindling home ownership rates and housing market accessibility should be of major concern to New Zealand's government, given that the positive benefits of home ownership are so wide-reaching. For example, a study of over 300,000 Finnish people found that even when adjusting for household income, occupational class and education levels, renter mortality rates were higher than those of owner-occupiers; and concluded that "home ownership may indicate material living standards and cumulative wealth that cannot sufficiently be captured by conventional socioeconomic indicators" (Laaksonen et al., 2008). This is supported by earlier research which suggested that home ownership would lead the household to invest in the property and "produce a higher-quality home environment" (Haurin et al., 2003).

The study by Haurin et al. (2003) focused particularly on the impact of home ownership on children in the household; and found that children living in owned homes achieved 9% better in mathematics and 7% better in reading. Children's behavioural problems were also up to 3% lower for those living in owned homes. Another study published the same year also found that "home ownership among low-income families may provide a means for improving the emotional and behavioural functioning of disadvantaged children" (Boyle, 2003). In a New Zealand study, home owners reported having "significantly higher levels of social capital than those who do not own their own home. Specifically, they have higher trust in others, participate more in local activities, and have a more positive sense of community." (Roskruge et al., 2011).

With home ownership impacting so many household wellbeing outcomes, it is in any government's best interest to provide support options to help residents purchase homes of their own. Accordingly, the New Zealand government has seven initiatives in place, six of which are administered by Kāinga

Ora (previously called Housing New Zealand). The seventh initiative is administered through a first home buyer's Kiwisaver provider. Kiwisaver is New Zealand's retirement savings scheme, but the use of Kiwisaver funds towards a first home deposit has unfortunately become normalised since law changes in 2015, which opened up the opportunity to help people reach the minimum home deposit threshold more easily (McClay & Smith, 2015).

The six initiatives administered by Kāinga Ora provide a range of options for first home buyers, either in terms of financial assistance or alternative ownership structures. Each has its own eligibility criteria and some include restrictions on the types of properties that can be purchased with help from the initiative (Kāinga Ora, n.d.-b). Of the six initiatives, the First Home Grant is the only one with a restriction on the price you may pay for your home (Kāinga Ora, n.d.-a).

Which house price cap first home buyers will face is dependent on the Territorial Authority region they are purchasing a home in, and whether the home is considered new or existing. New homes are those issued a building code compliance certificate less than 12 months before applying for the grant, vacant sections to be built on, house and land packages or apartments purchased off the plans. Caps for existing homes apply to all other properties (Kāinga Ora, n.d.-a). In most cases, caps for new homes are higher than caps for existing homes, and the intention is to encourage first home buyers to choose new homes that are built to better standards.

The regional house price caps were most recently reviewed in May 2023, at which time no changes were made. Across New Zealand, the caps vary by up to $475,000 (Kāinga Ora, 2023). In our view, this does not create a fair playing field for New Zealand's first home buyers. Instead, it creates a scenario where some buyers have tougher hoops to jump through than others, based on where they choose, or in some cases need, to live. It reduces accessibility to a housing market that is already incredibly difficult for people, in particular Generation Rent, to access, due to rising house prices. On this basis, we believe that the house price caps for First Home Grants are unfair, and should be thoroughly reviewed with adjustments to the caps being a potential outcome in mind.

2. Plan of Action

We intend to investigate the fairness of the regional house price caps applied to the First Home Grant initiative, administered by Kāinga Ora, for first home buyers in New Zealand. We will assess whether the current house price caps are appropriate for each region, in light of first home buyer needs and housing market activities.

As the regional house price caps for First Home Grants vary by up to $475,000 across New Zealand (Kāinga Ora, 2023), we expect the relative fairness of the caps to also be region-specific. Therefore, we plan to take a case study approach to this investigation and will only review the house price caps for the Auckland and Hamilton regions at this time. This will allow us to conduct a thorough assessment of the fairness of the house price caps for at least two regions, while keeping within the parameters of this assignment.

We initially chose to focus our investigation on Auckland, as it is New Zealand's largest city in terms of both population and land area (100% Pure New Zealand, n.d.). It was also the first place in New Zealand to reach a median house price of $1,000,000 in October 2020 (Bell, 2020). As a comparison point, we then agreed to include Hamilton also. We chose Hamilton as it is Auckland's closest neighbouring city and the two are often compared to each other in the media.

In order to conduct our investigation, we will need to collect data relating to residential properties in Auckland and Hamilton. For each property, we will ideally gather the following information:

1. Location e.g. street address or suburb
2. Building features e.g. number of bedrooms, number of bathrooms, age of home, floor area
3. Site features e.g. parking spaces, lot size
4. Financial values e.g. council rateable values, estimated sales prices

This data will allow us to compare residential properties in Auckland and Hamilton to the relevant First Home Grant house price caps, and assess whether each property is likely to be eligible for use of the grant or not. We can then determine the proportion of properties in each city that are eligible for use of the grant, and whether the number of eligible properties is sufficient. Furthermore, we will also be able to determine what a 'typical' eligible property might look like for each location, and identify suburbs within each city that may be more first home buyer-friendly.

We are aware that it may be difficult to find a comprehensive source of sales price estimates due to the subjective nature of market values. In such case, we plan to utilize council rateable values as a suitable alternative for this data, given that the calculation method of rateable values effectively benchmarks properties against other similar properties nearby (MoneyHub, 2023).

The specific questions we would like to answer are as follows:

1. What is the median house price in each city?
2. How many properties meet the eligibility criteria for the First Home Grant?
3. What proportion of eligible properties are apartments?
4. How many bedrooms, bathrooms and parking spaces, and how much floor area could a first home buyer expect an eligible property to have, on average?
5. Do those characteristics meet the needs of first home buyers?
6. Which city suburbs have the lowest median house prices?

By answering these questions, we will be able to make recommendations to the New Zealand government, specifically Kāinga Ora, regarding the fairness of the First Home Grant house price caps for first home buyers and whether any remedial actions should be taken. While we appreciate that any forward effects of our research are not likely to be immediate, our hope is to create a fairer playing field for New Zealand's first home buyers in the long-term, with improved accessibility to the First Home Grant initiative and the housing market in general.

3. Data

3.1. Data Scraping

Property data for Auckland and Hamilton was scraped from Trade Me's Property Insights tool (Trade Me, n.d.-a) by way of the XML sitemap (Trade Me, n.d.-b). The main XML sitemap contains multiple sub-sitemaps with URLs for each property, which were used for the Sitemap.xml link selectors. Regular expressions were used to select URLs containing "/Auckland" or "/Hamilton" only. Six scrapers were created to run simultaneously, using the different XML sub-sitemaps as shown in Table 1 below.

Table 1

XML sub-sitemaps assigned to scrapers

Scraper No.	XML Sub-sitemaps
1	1-5
2	6-10
3	11-15
4	16-20
5	21-25
6	26-30

The selector graph shown in Figure 1 was repeated in each of the six scrapers. For each XML element visited by the scrapers, 16 selectors extracted a range of property data. These are described in Table 2. Full sitemaps for each scraper are available in the Appendix.

Figure 1

Selector graph used in scrapers
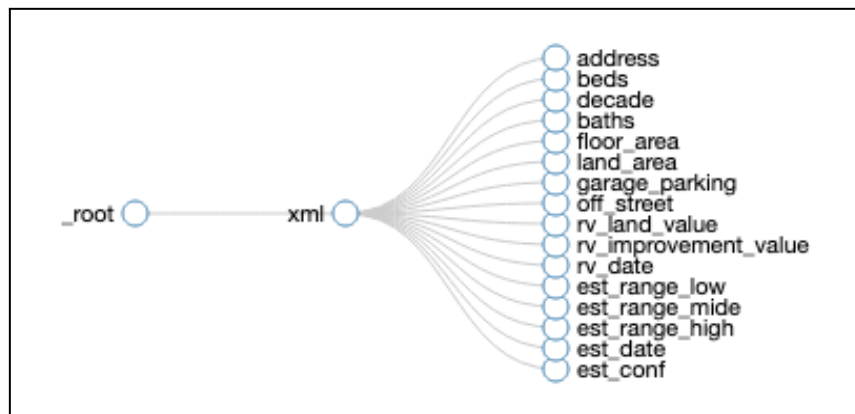
After approximately 36 hours of scraping the browser windows running the scrapers crashed, having scraped more than 45,000 rows of data. The property URLs within the sub-sitemaps did not appear to follow any particular order and running the six scrapers simultaneously had ensured that links were selected from multiple XML sub-sitemaps. On this basis, it was decided that the scraped data would provide an adequately-sized, diverse sample of properties for our research.

Table 2

Descriptions of data extracted by scraper selectors

Selector	Data Description
address	Full address of property
beds	Number of bedrooms
decade	Decade of construction
baths	Number of bathrooms
floor_area	Property floor area in m^2
land_area	Property land area in m^2
garage_parking	Number of garage parking spaces
off_street	Number of off-street parking spaces
rv_land_value	Rateable value for land only
rv_improvement_value	Rateable value for improvements only
rv_date	Date of last collected rateable values
est_range_low	Low estimated sale price range
est_range_mid	Medium estimated sale price range
est_range_high	High estimated sale price range
est_date	Date of last sale price estimates
est_conf	Confidence of estimated sale price ranges

3.2. Data Cleaning

Collectively, the six scrapers produced 45,798 rows of data for properties in Auckland and Hamilton.

The first cleaning step, illustrated in Figure 2 below, resolved the following data issues:

1. Some URLs listed in the XML sitemaps redirected to the Trade Me Property homepage, giving rows of entirely null values. This error was checked manually; it occurred even when trying to access the web addresses in-browser, therefore it was not a scraper problem. 1,995 rows were removed.
2. Rows with missing council data for any column or null values for beds, decade, baths, off street parking and rateable values were excluded, as were non-Auckland and non-Hamilton suburbs that had been picked up. 1,300 rows were removed.
3. The columns containing Trade Me's estimated sales price ranges were also removed, as too many rows contained null values for the data to be useful.

In total, 42,503 rows of data remained after the first cleaning step. Approximately 3% of rows were excluded.

A second cleaning step, illustrated in Figure 3 below, was used to prepare the data for visualization. This step involved the following changes:

1. Addresses were split into Street Address, Suburb and City.
2. Land Rateable Values and Improvement Rateable Values were summed to give Total Rateable Values.
3. A column for Grant Eligibility was added; the eligibility for Auckland properties was Total Rateable Value ≤ \$875,000 and for Hamilton properties was Total Rateable Value ≤ \$650,000.
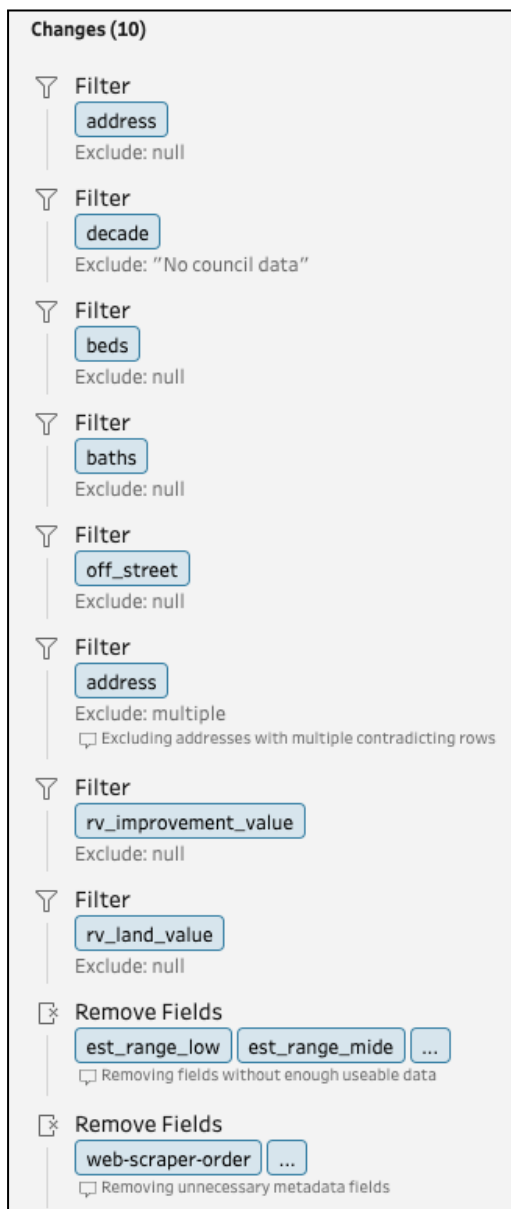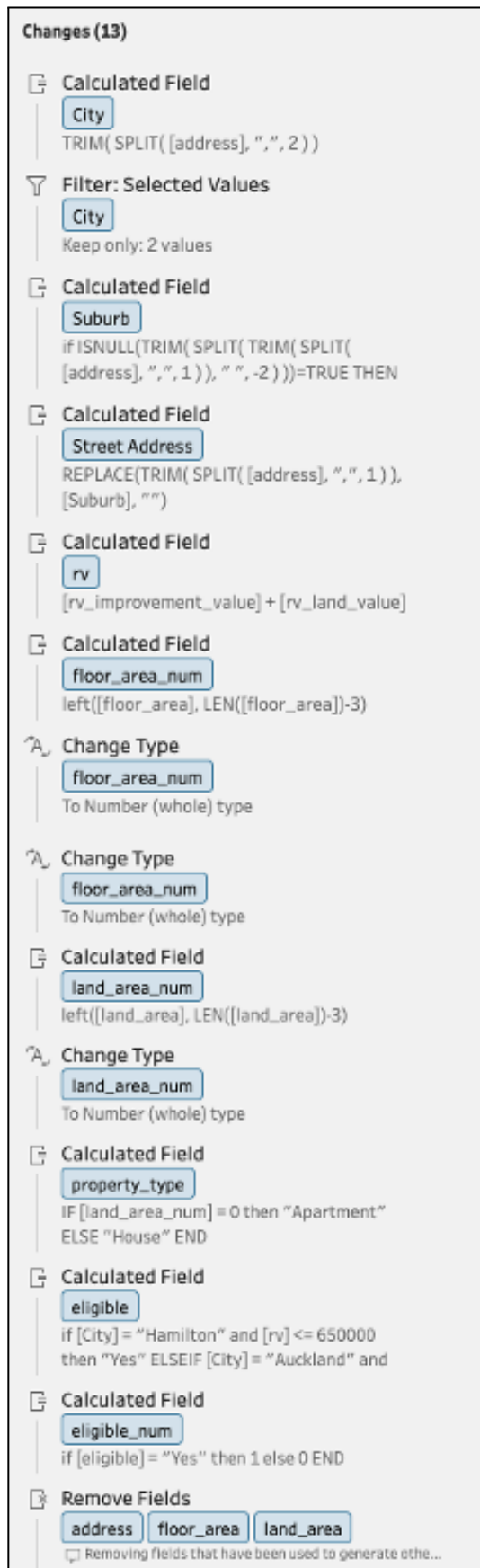
Figure 2

First Clean Step

Changes (10)

▽ Filter
  address
  Exclude: null

▽ Filter
  decade
  Exclude: "No council data"

▽ Filter
  beds
  Exclude: null

▽ Filter
  baths
  Exclude: null

▽ Filter
  off_street
  Exclude: null

▽ Filter
  address
  Exclude: multiple
  ⊡ Excluding addresses with multiple contradicting rows

▽ Filter
  rv_improvement_value
  Exclude: null

▽ Filter
  rv_land_value
  Exclude: null

⊡ Remove Fields
  est_range_low   est_range_mide   ...
  ⊡ Removing fields without enough useable data

⊡ Remove Fields
  web-scraper-order   ...
  ⊡ Removing unnecessary metadata fields

Figure 3

Second Clean Step

Changes (13)

⊟ Calculated Field
  City
  TRIM(SPLIT([address], ",", 2))

▽ Filter: Selected Values
  City
  Keep only: 2 values

⊟ Calculated Field
  Suburb
  if ISNULL(TRIM(SPLIT(TRIM(SPLIT(
  [address], ",", 1)), " ", -2)))=TRUE THEN

⊟ Calculated Field
  Street Address
  REPLACE(TRIM(SPLIT([address], ",", 1)),
  [Suburb], "")

⊟ Calculated Field
  rv
  [rv_improvement_value] + [rv_land_value]

⊟ Calculated Field
  floor_area_num
  left([floor_area], LEN([floor_area])-3)

ᴬ⌐ Change Type
  floor_area_num
  To Number (whole) type

ᴬ⌐ Change Type
  floor_area_num
  To Number (whole) type

⊟ Calculated Field
  land_area_num
  left([land_area], LEN([land_area])-3)

ᴬ⌐ Change Type
  land_area_num
  To Number (whole) type

⊟ Calculated Field
  property_type
  IF [land_area_num] = 0 then "Apartment"
  ELSE "House" END

⊟ Calculated Field
  eligible
  if [City] = "Hamilton" and [rv] <= 650000
  then "Yes" ELSEIF [City] = "Auckland" and

⊟ Calculated Field
  eligible_num
  if [eligible] = "Yes" then 1 else 0 END

⊡ Remove Fields
  address   floor_area   land_area
  ⊡ Removing fields that have been used to generate othe...

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4. Queries

4.1. Query 1

What is the median rateable value for properties in Auckland?

This question helps us to understand the general pricing trend in Auckland, which is known for its high house prices. Calculating the median rateable value provides an overview of the affordability challenge faced by first home buyers.

Figure 4

Query 1: SQL Query and Result

```
--Question 1
SELECT AVG(rv) as 'Median Rateable Value'
FROM (
    SELECT rv
    FROM trademe_cleaned_data_amended
    WHERE City = 'Auckland'
    ORDER BY rv
    LIMIT 2 - (SELECT COUNT(*) FROM trademe_cleaned_data_amended WHERE City = 'Auckland') % 2
    OFFSET (SELECT (COUNT(*)-1)/2 FROM trademe_cleaned_data_amended WHERE City = 'Auckland'))
```

Median Rateable Value
1500000.0

4.2. Query 2

What is the median rateable value for properties in Hamilton?

This question helps us to understand the general pricing trend in Hamilton which is a hub for students as it has the University campus and accomodation. Calculating the median rateable value provides an overview of the affordability challenge faced by first home buyers.

Figure 5

Query 2: SQL Query and Result

```
--Question 2
SELECT AVG(rv) as 'Median Rateable Value'
FROM (
    SELECT rv
    FROM trademe_cleaned_data_amended
    WHERE City = 'Hamilton'
    ORDER BY rv
    LIMIT 2 - (SELECT COUNT(*) FROM trademe_cleaned_data_amended WHERE City = 'Hamilton') % 2
    OFFSET (SELECT (COUNT(*)-1)/2 FROM trademe_cleaned_data_amended WHERE City = 'Hamilton'))
```

Median Rateable Value
940000.0

4.3. Query 3

How many properties meet the eligibility criteria for the First Home Grant in Auckland?

The First Home Grant is a government initiative to assist first home buyers. This question helps to determine the number of properties that qualify for the grant, which provides insights into the availability of affordable options for prospective buyers.

Figure 6

Query 3: SQL Query and Result

```sql
--Question 3
SELECT
    COUNT(*) AS "Eligible Properties Based On Data" ,
    ROUND((COUNT(*) * 100.0 / (SELECT COUNT(*) FROM trademe_cleaned_data_amended WHERE City = 'Auckland')), 1) AS "Percentage Of Eligible Properties Based On Data"
FROM
    trademe_cleaned_data_amended
WHERE
    rv <= 875000
AND
    City = 'Auckland'
```

Eligible Properties Based On Data	Percentage Of Eligible Properties Based On Data
3057	11.0

4.4. Query 4

How many properties meet the eligibility criteria for the First Home Grant in Hamilton?

The First Home Grant is a government initiative to assist first home buyers. This question helps to determine the number of properties that qualify for the grant, which provides insights into the availability of affordable options for prospective buyers.

Figure 7

Query 4: SQL Query and Result

```sql
--Question 4
SELECT
    COUNT(*) AS "Eligible Properties Based On Data",
    ROUND((COUNT(*) * 100.0 / (SELECT COUNT(*) FROM trademe_cleaned_data_amended WHERE City = 'Hamilton')), 1) AS "Percentage Of Eligible Properties Based On Data"
FROM
    trademe_cleaned_data_amended
WHERE
    rv <= 650000
AND
    City = 'Hamilton'
```

Eligible Properties Based On Data	Percentage Of Eligible Properties Based On Data
1083	7.4

4.5. Query 5

What is the average number of bedrooms, baths, garage and floor space for Eligible properties in Auckland?

Understanding the average number of bedrooms, baths, floor space and garage for Eligible Properties in Auckland can help a first home buyer what they should expect based on their budget. This helps the buyer to understand whether their budget includes the number of bedrooms and baths they want.

Figure 8

Query 5: SQL Query and Result

```sql
--Question 5
SELECT
    COUNT(*) AS "Eligible Properties Based On Data",
    ROUND((COUNT(*) * 100.0 / (SELECT COUNT(*) FROM trademe_cleaned_data_amended WHERE City = 'Auckland'))) AS "Percentage Of Eligible Properties Based On Data",
    CAST(AVG(floor_area_num) AS INT) AS "Average Floor Space",
    CAST(AVG(baths) AS INT) AS "Average Baths",
    CAST(AVG(beds) AS INT) AS "Average Bedrooms",
    Round(AVG(garage_parking)) AS "Average Garage Spots"
FROM
    trademe_cleaned_data_amended
WHERE
    City = 'Auckland'
AND
    rv <= 875000
```

Eligible Properties Based On Data	Percentage Of Eligible Properties Based On Data	Average Floor Space	Average Baths	Average Bedrooms	Average Garage Spots
3057	11.0	75	1	2	1.0

4.6. Query 6

What is the average number of bedrooms, baths, garage and floor space for Eligible properties in Hamilton?

Understanding the average number of bedrooms, baths, floor space and garage for Eligible Properties in Hamilton can help a first home buyer what they should expect based on their budget. This helps the buyer to understand whether their budget includes the number of bedrooms and baths they want.

Figure 9

Query 6: SQL Query and Result

```
--Question 6
SELECT
    COUNT(*) AS "Eligible Properties Based On Data",
    ROUND((COUNT(*) * 100.0 / (SELECT COUNT(*) FROM trademe_cleaned_data_amended WHERE City = 'Hamilton'))) AS "Percentage Of Eligible Properties Based On Data",
    CAST(AVG(floor_area_num) AS INT) AS "Average Floor Space",
    CAST(AVG(baths) AS INT) AS "Average Baths",
    CAST(AVG(beds) AS INT) AS "Average Bedrooms",
    Round(AVG(garage_parking)) AS "Average Garage Spots"
FROM
    trademe_cleaned_data_amended
WHERE
    City = 'Hamilton'
AND
    rv <= 650000
```

Eligible Properties Based On Data	Percentage Of Eligible Properties Based On Data	Average Floor Space	Average Baths	Average Bedrooms	Average Garage Spots
1083	7.0	88	1	2	1.0

4.7. Query 7

What are the top 10 suburbs for eligible properties on the basis of average number of beds?

Many first home buyers would like to know the best value suburbs. The most important condition would be about the beds that they would require. To get the best value suburbs, this query is really important.

Figure 10

Query 7: SQL Query and Result

```
74  --Question 7
75  SELECT
76      City,
77      Suburb,
78      ROUND(AVG(beds), 1) AS "Average Bedrooms"
79  FROM
80      trademe_cleaned_data_amended
81  WHERE
82      beds <= 3 AND rv < 650000
83  GROUP BY
84      Suburb
85  ORDER BY
86      "Average Bedrooms" DESC
87  LIMIT 10;
```

	City	Suburb	Average Bedrooms
1	Hamilton	Rototuna North	3.0
2	Auckland	Laingholm	3.0
3	Auckland	Greenhithe	2.8
4	Hamilton	Silverdale	2.7
5	Hamilton	Nawton	2.6
6	Hamilton	Pukete	2.5
7	Hamilton	Queenwood	2.3
8	Hamilton	Hillcrest	2.3
9	Hamilton	Hamilton East	2.3
10	Hamilton	Saint Andrews	2.2

4.8. Query 8

Which Auckland suburbs have the lowest median house prices?

This query helps identify the Auckland suburbs with the highest median house prices, providing insights into areas that may be more challenging for first home buyers.

Figure 11

Query 8: SQL Query and Result

```
89   --Question 8
90   SELECT
91       Suburb,
92       ROUND(AVG(rv), 2) AS "Median Relateable Value"
93   FROM
94       trademe_cleaned_data_amended
95   WHERE
96           City = 'Auckland'
97   GROUP BY
98           Suburb
99   ORDER BY
100      "Median Relateable Value" ASC
101  LIMIT 10;
```

	Suburb	Median Relateable Value
1	Auckland Central	510368.66
2	Onehunga	560000.0
3	Huia	837500.0
4	Ranui	888060.5
5	Otara	975518.87
6	Glen Eden	981849.71
7	Laingholm	1039580.15
8	East Tamaki	1087368.42
9	Bayview	1159106.12
10	Unsworth Heights	1167056.03

4.9. Query 9

Which Hamilton suburbs have the lowest median house prices?

This query helps identify the Hamilton suburbs with the highest median house prices, providing insights into areas that may be more challenging for first home buyers.

Figure 12

Query 9: SQL Query and Result

```
103  --Question 9
104  SELECT
105      Suburb,
106      ROUND(AVG(rv), 2) AS "Median Relateable Vaalue"
107  FROM
108      trademe_cleaned_data_amended
109  WHERE
110      City = 'Hamilton'
111  GROUP BY
112          Suburb
113  ORDER BY
114      "Median Relateable Value" ASC
115  LIMIT 10;
```

	Suburb	Median Relateable Vaalue
1	Burbush	1416250.0
2	Chartwell	1253125.0
3	Fitzroy	850000.0
4	Flagstaff	1212574.81
5	Forest Lake	871470.59
6	Grandview Heights	1004390.24
7	Hamilton East	770983.61
8	Hamilton Lake	979886.54
9	Harrowfield	1250515.15
10	Hillcrest	871606.54

4.10. Query 10

Determine the distribution of property types in Auckland.

This query helps in understanding the distribution of property types in the different suburbs in Hamilton. This is essential for prospective home buyers as they can assess the availability and variety of housing options based on different property types, also gives insights into the types of properties that are more commonly available in the market, helping first home buyers make informed decisions based on their preferences and requirements.

Figure 13

Query 10: SQL Query and Result

```
117  --Question 10
118  SELECT
119      City,
120      property_type AS "Property Type",
121      COUNT(*) AS "Property Count",
122      ROUND((COUNT(*) * 100.0 / (SELECT COUNT(*) FROM trademe_cleaned_data_amended WHERE City = 'Auckland')), 2) AS Percentage
123  FROM
124      trademe_cleaned_data_amended
125  WHERE
126      City = 'Auckland'
127  GROUP BY
128      property_type;
129
```

	City	Property Type	Property Count	Percentage
1	Auckland	Apartment	6826	24.46
2	Auckland	House	21079	75.54

4.11. Query 11

Determine the distribution of property types in Hamilton.

This query helps in understanding the distribution of property types in the different suburbs in Hamilton. This is essential for prospective home buyers as they can assess the availability and variety of housing options based on different property types, also gives insights into the types of properties that are more commonly available in the market, helping first home buyers make informed decisions based on their preferences and requirements.

Figure 14

Query 11: SQL Query and Result

```
130  --Question 11
131  SELECT
132      City,
133      property_type AS "Property Type",
134      COUNT(*) AS "Property Count",
135      ROUND((COUNT(*) * 100.0 / (SELECT COUNT(*) FROM trademe_cleaned_data_amended WHERE City = 'Hamilton')), 2) AS Percentage
136  FROM
137      trademe_cleaned_data_amended
138  WHERE
139      City = 'Hamilton'
140  GROUP BY
141      property_type;
142
```

	City	Property Type	Property Count	Percentage
1	Hamilton	Apartment	2403	16.5
2	Hamilton	House	12163	83.5
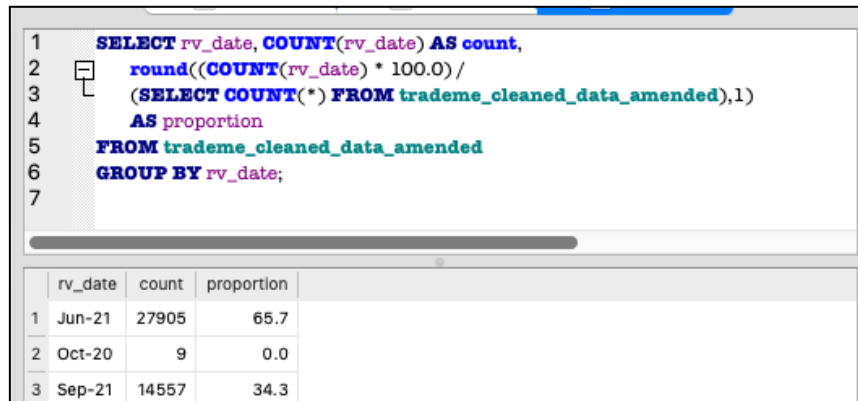
4.12. Query 12

Determine when the RV values were collected.

General property valuations are conducted every three years (*General property revaluation* 2022). If the values are older than this, they may not be up to date which would make our data less accurate.

Figure 15

Query 12: SQL Query and Result


```sql
SELECT rv_date, COUNT(rv_date) AS count,
    round((COUNT(rv_date) * 100.0)/
    (SELECT COUNT(*) FROM trademe_cleaned_data_amended),1)
    AS proportion
FROM trademe_cleaned_data_amended
GROUP BY rv_date;
```

	rv_date	count	proportion
1	Jun-21	27905	65.7
2	Oct-20	9	0.0
3	Sep-21	14557	34.3

5. Visualisations

5.1. Overall Property Statistics

Figure 16 shows that the Median RV of properties surveyed in Auckland was $1,500,000 while in Hamilton it was $940,000 for an overall median of $1,225,000. The Distribution of RV is also quite different between Hamilton and Auckland. Hamilton has a lower median, smaller interquartile range ($350,000 compared to Auckland's $550,000) and smaller overall range than Auckland.

Despite the median in Hamilton being lower, the proportion of properties with an RV eligible for a First Home Grant (7.44%) is actually lower than the proportion eligible in Auckland (10.96%) as shown in the visualisation Proportion of Properties Eligible, likely due to the lower price cap in Hamilton. Overall 7.95% of properties across both cities were eligible.

Figure 16

Property Statistics

5.2. Expected RV by Property Characteristics

The interactive Tableau dashboard used for the figures below is available on Tableau Public here.

Example 1: First home for a couple or small family

Using the interactive visualisation, we filtered for houses with 1 bathroom and 2-3 bedrooms as shown in Figure 17 - we would consider this to be a fairly standard type of property that a couple or small family might look for as a first home. This shows that the median price for this type of property is $980,000, with only about 17% of properties meeting these criteria would be eligible for purchase with a First Home Grant.

Figure 18 shows that in Hamilton the median RV for these properties is $790,000, lower than the Auckland median of $1,180,000, however because of the lower price cap in Hamilton, only 15% of properties would be eligible compared to 18% in Auckland, shown in Figure 19. It's also evident that there is a much wider range of property prices in Auckland, with the highest price of these properties being $16,000,000.

The average floor area for these properties is 122.2m^2 with minimal difference between Auckland and Hamilton. About 35% of these properties overall are apartments. In Hamilton, the proportion of apartments is 30%, lower than Auckland's 39% which is to be expected, given Auckland's larger number of apartments overall (*Why Auckland apartment living is increasing in popularity* 2017) and recent amendments to the Auckland Unitary Plan allowing for more medium and high density residential development (*Auckland Unitary Plan Operative* 2023).

Figure 17

Expected Rateable Value for 1 Bathroom, 2-3 Bedroom Properties
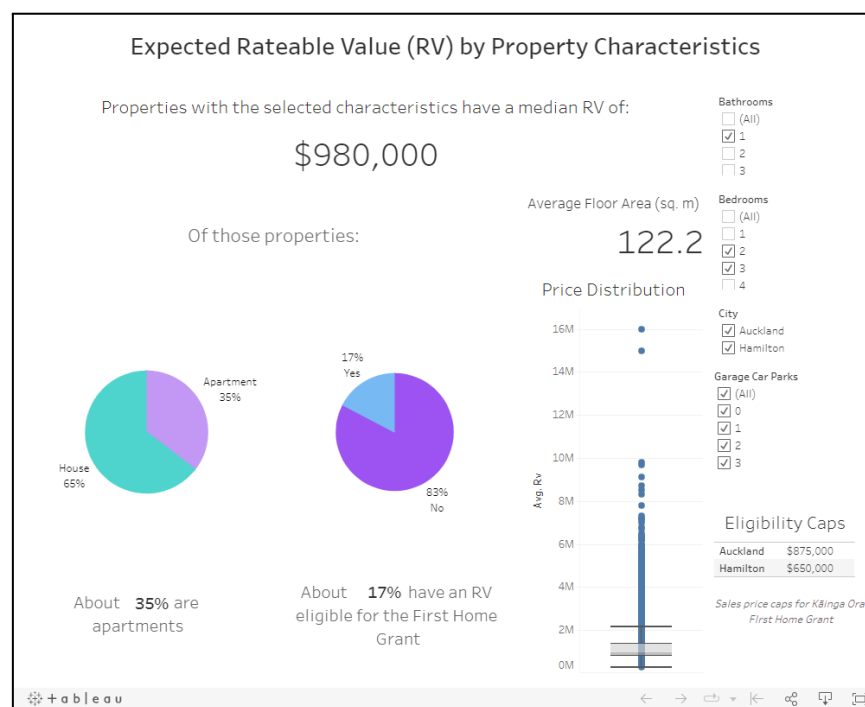
Figure 18

Expected Rateable value for 1 Bathroom, 2-3 Bedroom Properties in Auckland
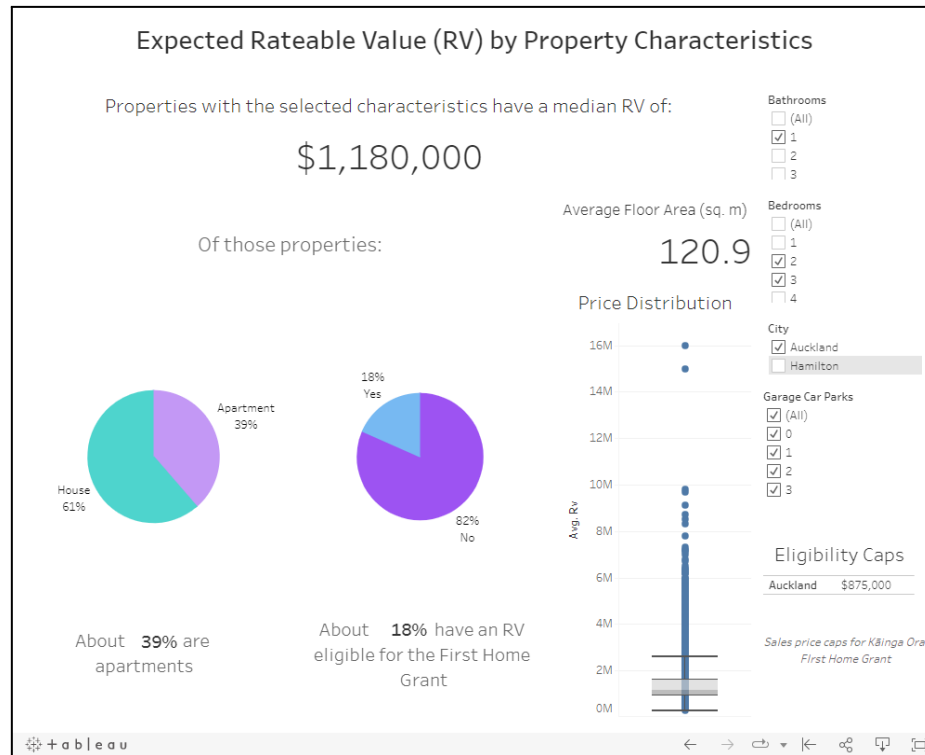
Figure 19

Expected Rateable value for 1 Bathroom, 2-3 Bedroom Properties in Hamilton
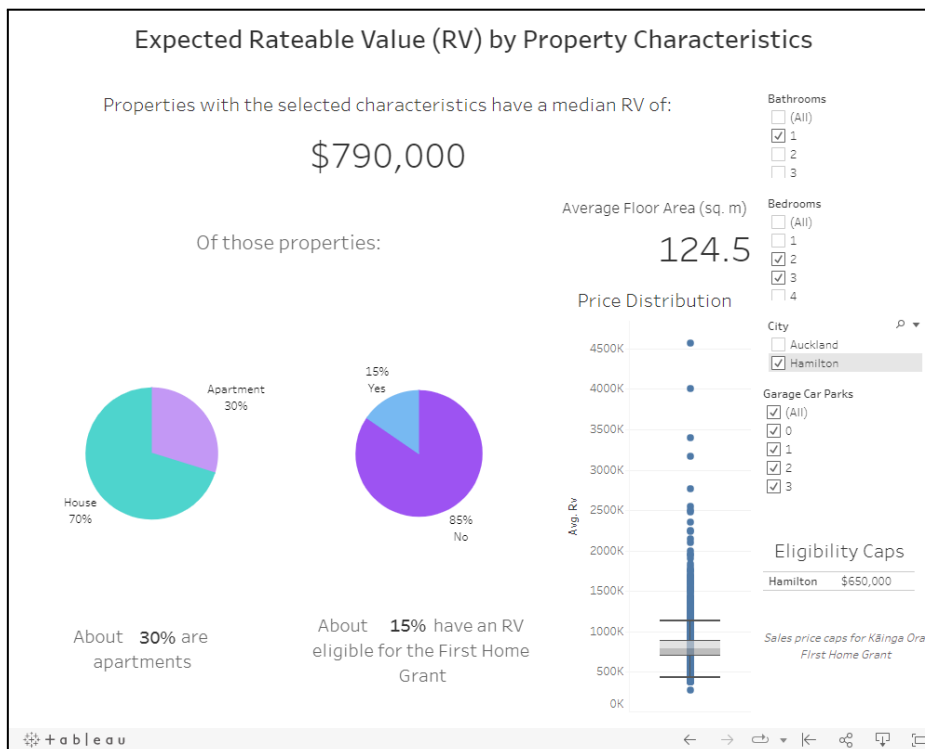
Example 2: Family of 4

According to the National Occupancy Standard, 2022, a family with one or two parents and either a. three children or b. two children of different genders, a minimum of three bedrooms would be required in order to avoid household crowding.

We used the interactive dashboard to look for three bedroom houses in Figure 20, and found that the overall median RV is median of $1,100,000. Figure 21 shows that the median is $1,375,000 in Auckland while in Hamilton it's $830,000 (Figure 22). Despite this large difference in median RV, the proportion eligible for the First Home Grant is similar at 8% and 7% in Auckland and Hamilton respectively.

Figure 20

Expected RV for Properties with 3 Bedrooms
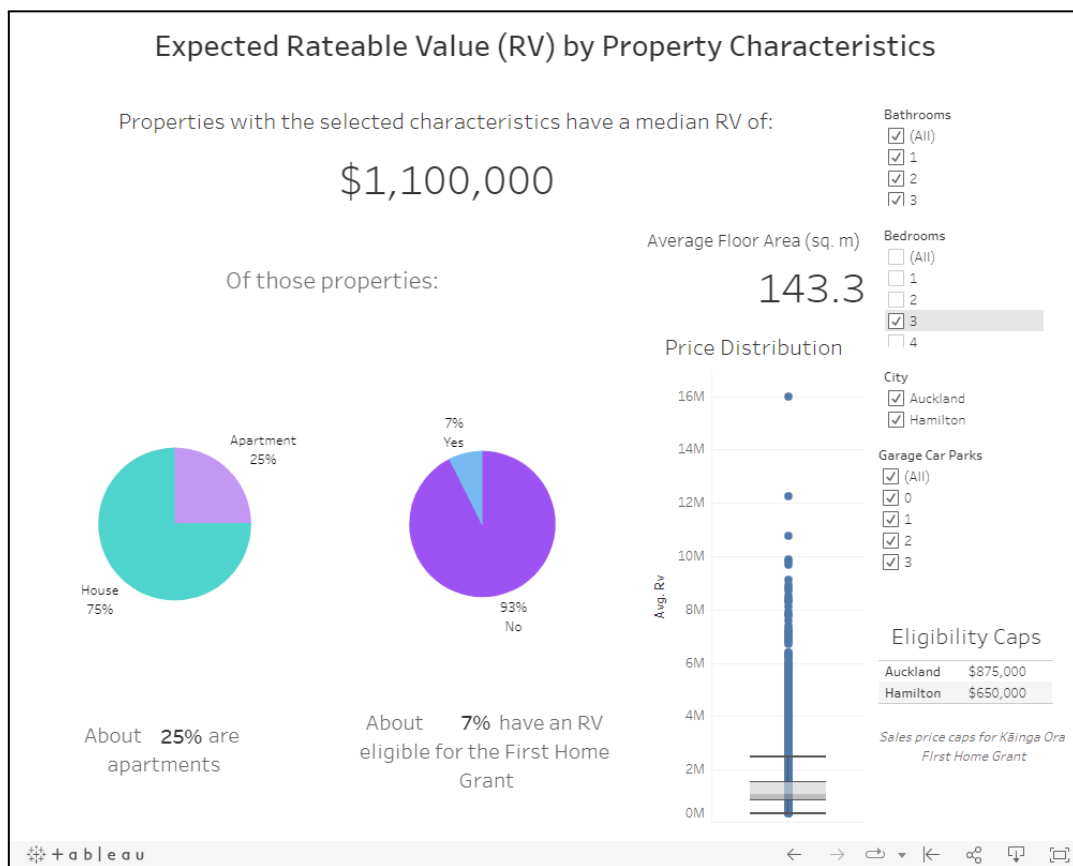
Figure 21

Expected RV for Properties with 3 Bedrooms in Auckland
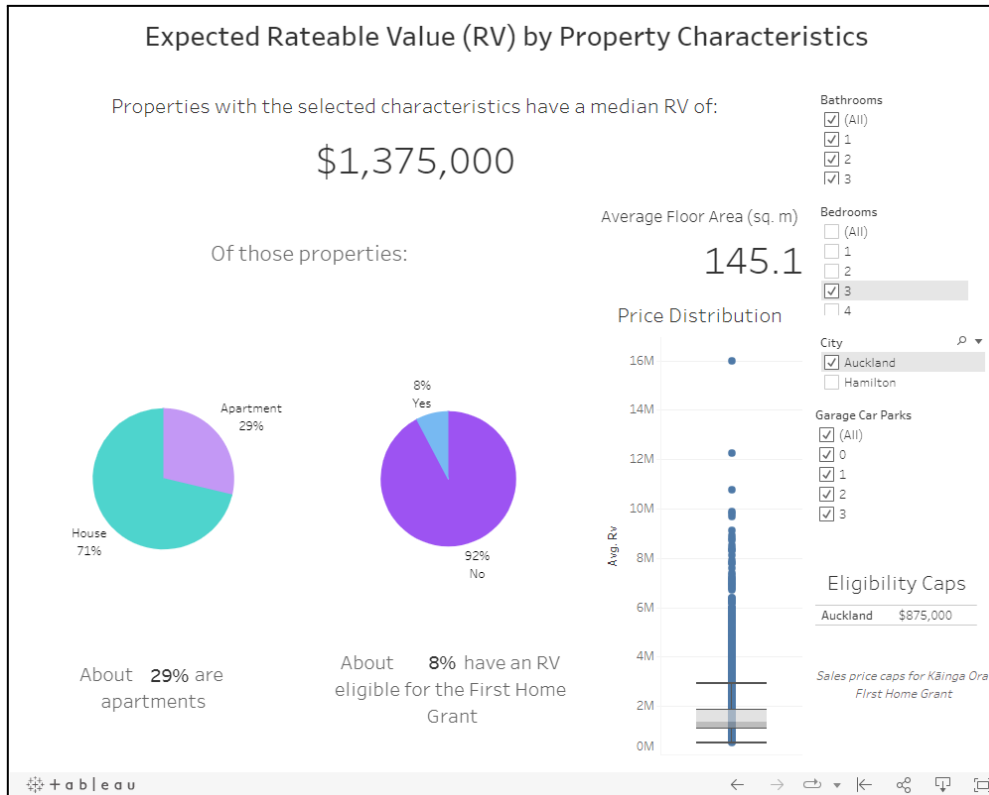
Figure 22

Expected RV for Properties with 3 Bedrooms in Hamilton
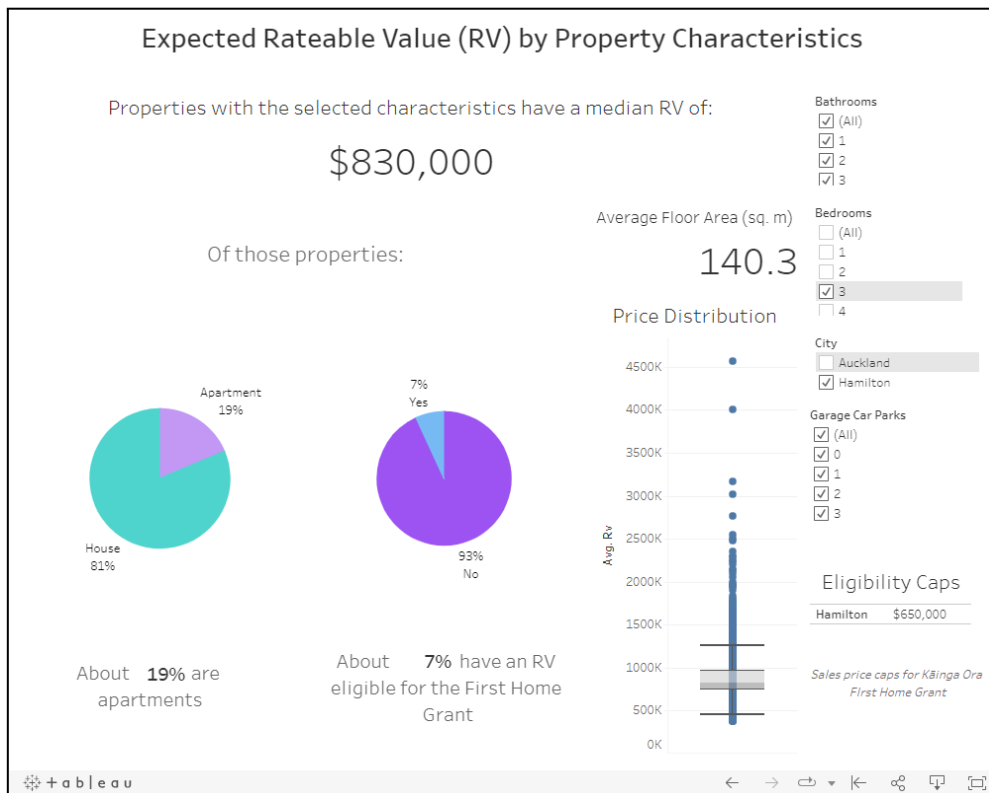
Example 3: Multigenerational Housing

Multigenerational households are increasing in New Zealand (Lysnar & Dupuis, 2015). A household with multiple children and/or multiple generations living together would require more space. As an example, we have filtered for 2 or 3 bathrooms and 4 or 5 bedrooms. We acknowledge that this is the absolute maximum number of people that could live in a five-bedroom property without it being considered crowded for statistical purposes; most home buyers prefer for their children to have a bedroom each (Bonker, 2006).

Figure 23 shows that across both cities, the median price of this kind of property is $1,475,000, with 0% being eligible for the First Home Grant. When broken down by city in Figures 24 and 25, we can see the median is significantly lower in Hamilton at $1,125,000 compared to Auckland's $1,750,000. There's only a minor difference in floor area with that in Auckland having approximately 4% larger than in Hamilton. Again Auckland has a much wider RV distribution than Hamilton.

Figure 23

Expected RV for Properties with 4-5 Bedrooms and 2-3 Bathrooms
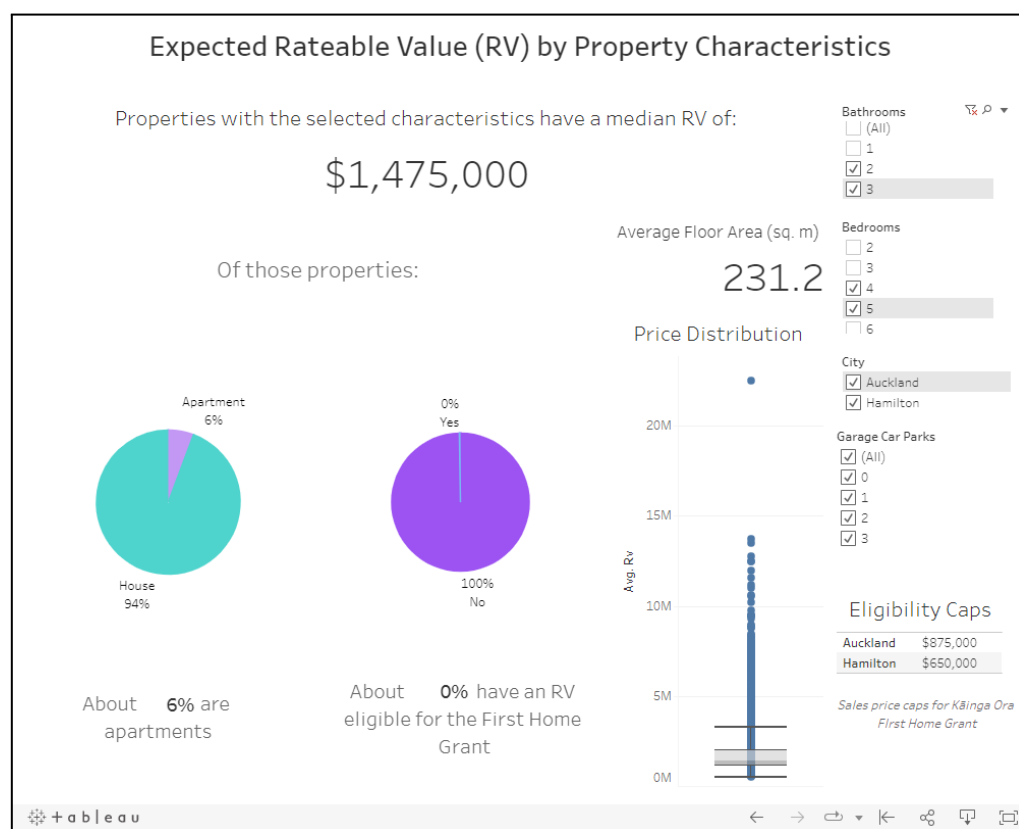
Figure 24

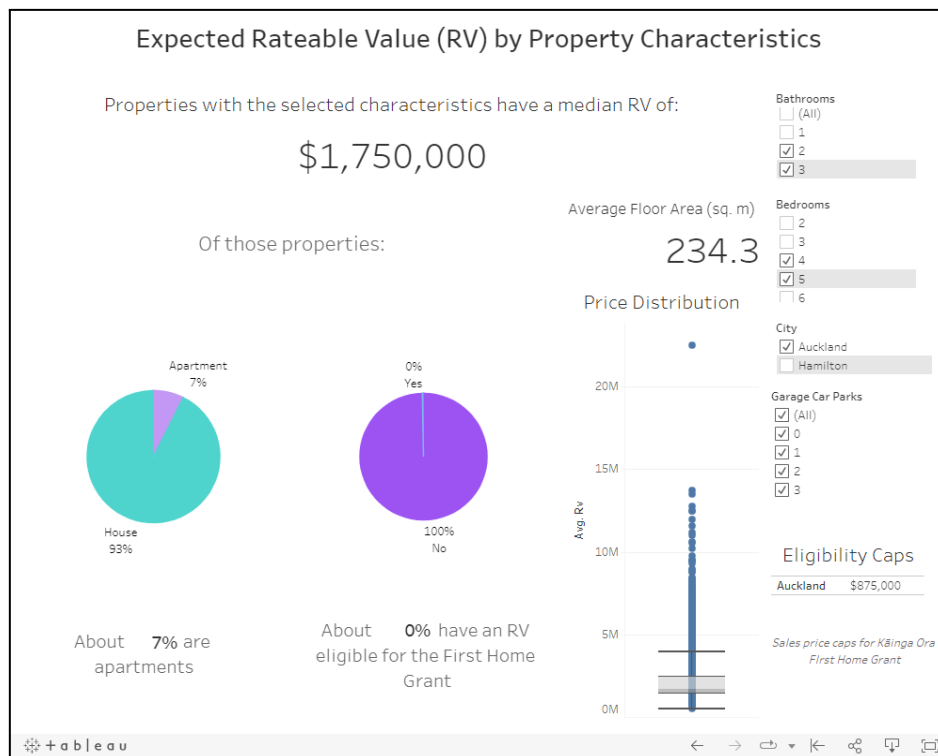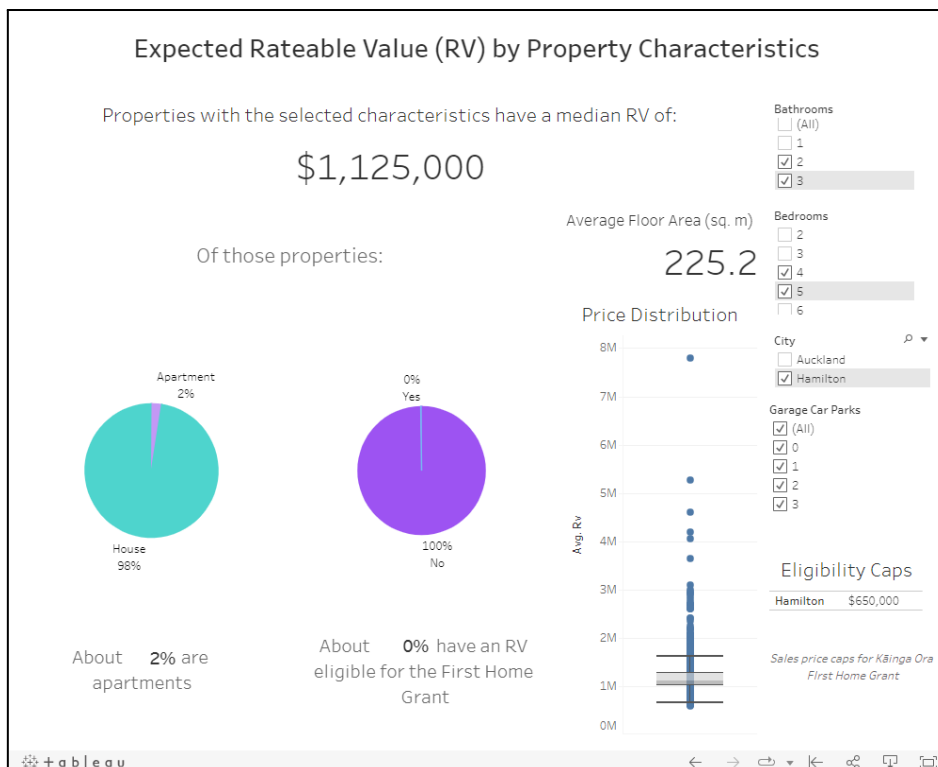*Expected RV for Properties with 4-5 Bedrooms and 2-3 Bathrooms in Auckland*

Figure 25

Expected RV for Properties with 4-5 Bedrooms and 2-3 Bathrooms in Hamilton
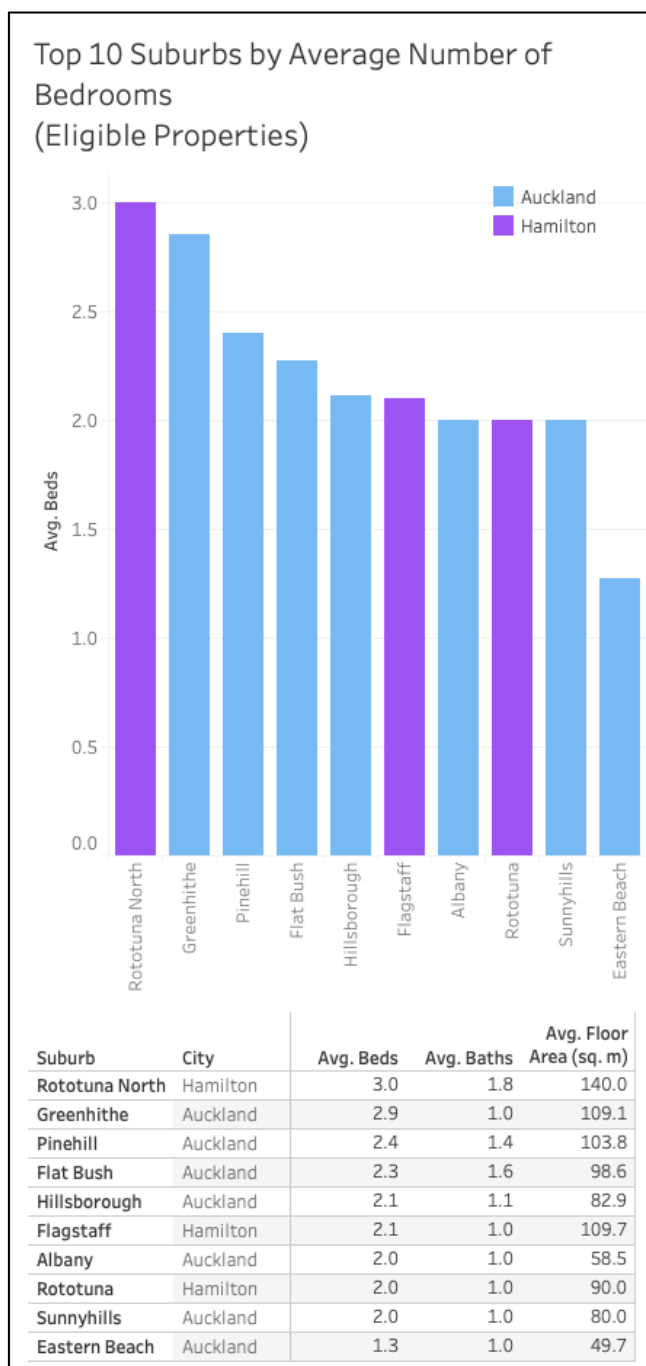
5.3. Suburbs

Figure 26 shows the 10 suburbs with the highest average number of bedrooms in eligible properties. Three of the 10 are in Hamilton and seven are in Auckland. Rototuna North in Hamilton and Greenhithe in Auckland are the only two suburbs with an average closer to 3 bedrooms than 2 with 3.0 and 2.9 bedrooms respectively.

Figure 26

Number of Bedrooms by Suburb

Suburb	City	Avg. Beds	Avg. Baths	Avg. Floor Area (sq. m)
Rototuna North	Hamilton	3.0	1.8	140.0
Greenhithe	Auckland	2.9	1.0	109.1
Pinehill	Auckland	2.4	1.4	103.8
Flat Bush	Auckland	2.3	1.6	98.6
Hillsborough	Auckland	2.1	1.1	82.9
Flagstaff	Hamilton	2.1	1.0	109.7
Albany	Auckland	2.0	1.0	58.5
Rototuna	Hamilton	2.0	1.0	90.0
Sunnyhills	Auckland	2.0	1.0	80.0
Eastern Beach	Auckland	1.3	1.0	49.7

6. Recommendations

According to the 2022-2026 Kāinga Ora Statement of Intent, "In the medium term, which encompasses the period of this Statement of Intent, Kāinga Ora contributes to affordable housing outcomes by developing land for affordable housing and administering home-ownership products. These play an important role in helping people across Aotearoa New Zealand to achieve the security and wellbeing of owning a home." Based on our data, the First Home Grant is not meeting that goal due to the relatively low limits on purchase price. Figure 16 shows that the median rateable values are far above the purchase price limit. In Hamilton, the median RV of $890,000 is over 40% higher than the purchase price limit of $650,000. In Auckland the situation is even more dire, with the median RV of $1,500,000 being more than 70% higher than the purchase price limit of $875,000.

Figure 17 examines properties with 2 or 3 bedrooms and 1 bathroom, a combination that the authors would consider to be reasonable for a small nuclear family first home buyer, only 17% of properties would be eligible for the First Home Grant based on their RV. In Figure 23 we can see that properties with 2 or 3 bathrooms and 3 or 4 bedrooms that would be reasonable for a medium family or multi-generational household, just 1% would be eligible. When this is broken down by city in Figures 24 and 25, we can see that all of those eligible homes are in Auckland, as 0% of Hamilton properties with these characteristics meet the criteria.

An important factor to consider in whether the purchase price limit is reasonable is whether the properties that could be purchased with a First Home Grant are apartments or houses. According to Rodney & Akehurst (2015), a home being stand-alone was the second-most important feature considered by prospective Aucklander homebuyers, ahead of even security, number of bedrooms, or being near family and friends. 56% rated balcony/courtyard/outdoor dining space as being a very important consideration, and 41% rated having a lawn as being very important, indicating that many people would consider an apartment to be inadequate for their needs. In Figure 16 we can see that while on average apartments make up just 24% of properties in Auckland overall, they also make up 64% of the properties that are eligible for a First Home Grant. This trend is even more prevalent in Hamilton where just 16% of properties overall are apartments but 87% of properties eligible for the First Home Grant are apartments. Given that most New Zealanders prefer a standalone home, we suggest that the price cap needs to be increased to allow purchase of standalone homes. Alternatively there needs to be a shift in the acceptance of medium density housing among New Zealand first home buyers.

One of the most important factors buyers consider when looking for a residential property is the number of bedrooms (Eves & Kippes, 2010). In Figure 17 we can see that on average Auckland properties have 3.4 bedrooms while Hamilton properties have 3.5, but properties eligible for a First Home Grant have an average of 2.1 and 2.4 bedrooms in Auckland and Hamilton respectively. In New Zealand, the Canadian National Occupancy Standard is used to define the number of bedrooms required by a household (Baker et al., 2012). By this standard, couples can share a bedroom, as can two children of the same gender who are both under the age of 18 (*National Occupancy Standard*, 2022). Households are considered to be crowded if they require 1 more bedroom than they currently have to meet the Occupancy Standard, and severely crowded if they require 2 or more bedrooms. For example, a family consisting of two parents and two children of different genders would require a minimum of three bedrooms.

The number of multigenerational households in New Zealand is increasing for several reasons, including immigration from countries where multigenerational family living is a cultural norm, increased cost of education leading to children living with their parents until a later age, and high costs of living leading to elderly people living with their adult children (Lysnar & Dupuis, 2015). All of these scenarios require more bedrooms. For example, a family consisting of a grandparent, two parents, and three children would require 4-5 bedrooms to meet the occupancy standard. As shown in Figure 23 this is essentially impossible to purchase within the constraints of the purchase price limit. This suggests that in order for people to purchase a home that is large enough for their family, the price limit needs to be increased.

Two health conditions associated with household crowding in New Zealand are meningococcal disease (Baker et al., 2000) and acute rheumatic fever (Webb & Wilson, 2011). According to Baker et al. (2000), household density (number of adolescents and adults per room) is the strongest independent risk factor for development of meningococcal disease. Jaine et al. (2011) also determined that there is an association between crowding and acute rheumatic fever even when accounting for income level - this suggests that even if a family owns their home and not considered to be economically deprived, living in a house that is too small may still increase their risk of acute rheumatic fever, which frequently leads to rheumatic heart disease, a condition which "causes morbidity and impaired quality of life in young adults" (Webb & Wilson, 2011, p. 180) . Rates of rheumatic fever are much higher in New Zealand than in other developed nations and reducing its incidence is a national health priority (*Heart Foundation welcomes rheumatic fever funding announcement*, 2019). Rheumatic heart disease is estimated to have directly cost the New Zealand Government $12m/year from 2000-2007 and caused an average of 159 deaths/year, with the greatest burden borne by Māori and Pasifika communities (Milne et al., 2012). The effect of the purchase price limit on the size of home that can be purchased should be considered by the Government to ensure that the First Home Grant program is in line with Government health aims and Treaty of Waitangi obligations (Anderson & Spray, 2020).

We have used data from Hamilton and Auckland as a case study to assess whether further assessment of all regions of New Zealand is needed. Based on that data, properties in Auckland and Hamilton with an RV under the sale price limit to be eligible for a First Home Grant do not have characteristics suitable for New Zealand first home buyers, primarily due to a high proportion of eligible properties being apartments and not having an adequate number of bedrooms which could lead to household crowding. Thus, our primary recommendation is that the Government reassess the price caps across all regions of New Zealand and use that data to set limits that allow for purchases of homes that meet the needs of first home buyers and make the First Home Grant fit for purpose.

We suggest that the Government conduct a retrospective review of the properties purchased by first home buyers who made use of the First Home Grant, the demographics of their occupants, and the property characteristics compared to what the buyer had initially wanted. We suggest a similar study design to Rodney & Akehurst's 2015 paper which used phone contact and online surveys to get information about people's preferred housing type and the trade-offs people made, which was then used to analyse what features people considered the most important.

Secondarily, the Government could look at other ways of supporting first home buyers such as increasing eligibility for the First Home Loan which decreases the required deposit for a mortgage on a First Home.

Less tangibly, there may need to be an attitude shift away from requiring a house with a backyard to families finding medium density housing adequate. We acknowledge that a cultural change like this is much more difficult than a change to a purely financial policy and further research would be needed in this area.

7. Conclusion

In this project, we used data scraped from the Trade Me Property Insights tool to assess whether the First Home Grant price limits allow for purchase of homes that are fit for purpose. By querying and visualizing the RV of properties in Auckland and Hamilton we have concluded that in Auckland and Hamilton the properties with an RV under the sales price limit do not meet the needs of first home buyers and thus that the Government should review the price limits across New Zealand to ensure that first home buyers are able to purchase properties that are suitable for their needs.

In particular, the Government has a duty under the Treaty of Waitangi to ensure that a variety of homes are available so Māori can continue cultural traditions (*Taking into account the principles of the Treaty of Waitangi* 2020). This should be considered when assessing the range of housing eligible for purchase with the First Home Grant.

In addition to the retrospective study described in the Recommendations, the Canadian *National Occupancy Standard (2022)* could be used to measure the rates of household crowding in those properties. Additionally, data on rates of infectious diseases, particularly meningococcal disease and acute rheumatic fever in people living in properties purchased with the First Home Grant could be collected. Historically the literature has conflated crowding and poverty (Webb & Wilson, 2011) but New Zealand home owners require a reasonable income in order to get a mortgage (Edmunds, 2022). This means that the data could be used to dissect crowding from poverty as a risk factor for meningococcal disease and acute rheumatic fever, and establish if purchasing of smaller properties due to the purchase price limit is a risk factor.

As discussed in the Recommendations, Rodney & Akehurst (2015) found that a property being stand alone is the second most important factor for prospective home buyers. Auckland Council plans to increase the amount of medium density housing in urban and suburban areas in the next several years (*Auckland Unitary Plan Operative* 2023). Obviously, these are two incompatible goals which could lead to a mismatch between housing supply and demand. The Government could conduct research into the attitudes of prospective home buyers towards medium density housing and use that information to encourage purchase of medium density housing to move housing demand towards the current supply. This could be done in a variety of ways, for example a larger First Home Grant for people who purchase an apartment.

This research could open the door for other business problems to be solved. We have used the RV price to analyse the First Home Grant but this data could also be used in other ways, for example a real estate developer could use the data in Figure 26 to search for suburbs where they could buy lower cost properties. It could also be used by local authorities to find areas that could benefit from further development.

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Appendix: Sitemaps

Scraper 1

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Scraper 2

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deme.co.nz/property/insights/sitemaps/property-insights-sitemap-7.xml","https://www.trademe.co.nz/
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Scraper 3

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Scraper 4

{"_id":"trademe16-20","startUrl":["https://www.trademe.co.nz/property/insights/sitemaps/index-entries.xml"],"selectors":[{"id":"xml","parentSelectors":["_root"],"type":"SelectorSitemapXmlLink","sitemapXmlMinimumPriority":"0","sitemapXmlUrlRegex":"/Auckland/|/Hamilton/","sitemapXmlUrls":["https://www.trademe.co.nz/property/insights/sitemaps/property-insights-sitemap-16.xml","https://www.trademe.co.nz/property/insights/sitemaps/property-insights-sitemap-17.xml","https://www.trademe.co.nz/property/insights/sitemaps/property-insights-sitemap-18.xml","https://www.trademe.co.nz/property/insights/sitemaps/property-insights-sitemap-19.xml","https://www.trademe.co.nz/property/insights/sitemaps/property-insights-sitemap-20.xml"]},{"id":"address","parentSelectors":["xml"],"type":"SelectorText","selector":"h1.pi-quick-summary__property-address","multiple":false,"regex":""},{"id":"beds","parentSelectors":["xml"],"type":"SelectorText","selector":"tr:contains('Bedrooms')
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Scraper 5

{"_id":"trademe21-25","startUrl":["https://www.trademe.co.nz/property/insights/sitemaps/index-entries.xml"],"selectors":[{"id":"xml","parentSelectors":["_root"],"type":"SelectorSitemapXmlLink","sitem

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Scraper 6

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