LEARNING LESSONS FROM THE SUBURB WITH THE HIGHEST CYCLE COMMUTING RATES IN NEW ZEALAND

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WORKING WITH THE BECKENHAM NEIGHBOURHOOD ASSOCIATION

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EXECUTIVE SUMMARY

- Beckenham is a suburb in south Christchurch encompassed by the Ōpāwaho Heathcote River.
- New Zealand's 2018 census found that Beckenham was the suburb with the highest rate of residents who commute by bicycle, at 15.2%.
- This report seeks to answer the question, "What factors influence the high rates of cycling in Beckenham, and are they transferable to other areas?"
- A literature review focused on five sub-themes relating to cycling behaviour: gender and ethnicity, socio-economic status, filtered permeability, green space and political affiliation.
- Both qualitative and quantitative methods were used to collect data, including a community survey and multiple focus groups. Secondary data from the city council and the 2018 Census were obtained, with further statistical data analysis.
- Proximity to the CBD was identified as a key factor in Beckenham's high cycle commuting rates, along with flat topography.
- Although Beckenham has no cycling infrastructure within the suburb, the roads are wide and leafy, and speeds are low, which encourages cycling.
- People living inside the Beckenham river loop felt safer cycling than those living outside, an example of filtered permeability.
- More people living in Beckenham go out of their way to cycle near green and blue spaces. The proximity of Beckenham to the Port Hills for recreational cycling was also mentioned in focus groups.
- Survey results showed that men were more likely to cycle five times a week than women, while women were more likely to cycle two to four times a week.

- Beckenham is a relatively affluent suburb, with a strong sense of community. Residents exhibit a preference for eco-friendly transport.
- One limitation of this study was the lack of research on cargo bikes, as their ownership was prevalent in Beckenham, as mentioned in the focus groups.
- From these results, one feature that is transferable to other suburbs is filtered permeability, which can be retrofitted into existing built environments.

INTRODUCTION

Cycling as a mode of transport is economically efficient, emits much lower amounts of CO^2 than non-active transport modes and promotes meaningful health benefits (Handy et al., 2014). Therefore, it is in local communities' best interests to encourage more people to cycle rather than drive. New Zealand's 2018 census found that Beckenham was the suburb with the highest rate of residents who commute by bicycle, at 15.2% (StatsNZ, 2018). This result is considerably higher than the next highest suburb, Maitai in Nelson, which has a cycle commuting rate of 14.1% (StatsNZ, 2018). This raises the question of why specifically, Beckenham overperforms on this metric. This research project is done in partnership with Dave Kelly, chair of the Beckenham Neighbourhood Association, to answer the research question: "What factors influence the high rates of cycling in Beckenham, and are they transferable to other areas?". Answering this question will provide a foundation from which strategies to encourage cycling uptake in other areas could be built upon. This report covers background literature, the methods utilised, the resulting findings and the conclusions reached from those findings. It also discusses the limitations present in the research process. Further detail on the research undertaken can be found in the appendices attached.

LITERATURE REVIEW

Relevant literature was critically reviewed for this report, to provide background information and explore existing results on cycle commuting. The review was split into 5 sub-themes.

GREEN SPACE

The relationship between green spaces and cycling rates is influenced by various factors. Wang et al. (2016) suggest that green spaces create a pleasant environment for cycling, encouraging people to cycle more often. Additionally, green spaces provide a safe and separate area for cycling, making people feel more comfortable and confident (Fraser & Lock, 2010). These spaces are associated with increased physical activity levels, health benefits (Adamu et al., 2023), and a positive correlation with the overall health and physical activity of communities (Mäki-Opas et al., 2016). However, the impact of green space on cycling may also be influenced by underlying factors such as personal preferences, safety, infrastructure, and social dynamics (Hogendorf et al., 2020).

RIVER LOOPS

Another aspect in our study is the Beckenham loop, where the Ōpāwaho Heathcote River surrounds most of the suburb. Natural boundaries, like meandering rivers, can foster a sense of connection within communities (Banwell, 2017), leading to higher community participation. Stroope (2021) found that communities with high participation tend to have more people cycling. The Ōpāwaho Heathcote River may also serve as a permeable filter for traffic, with fewer car crossings than cyclist connections (Aldred & Croft, 2019). This suggests that Beckenham may have a higher prevalence of cyclists due to increased road accessibility outside the river.

GENDER AND ETHNICITY

In countries with low cycling rates, the intersection of gender and ethnicity poses significant barriers to cycling. Cycling is primarily favoured by affluent white men (Steinbach et al., 2011). Women face a "triple burden" concerning traffic danger, personal safety concerns, and additional responsibilities (Russell et al., 2021). For Māori women, these barriers are even more pronounced, encompassing bike access and cultural factors (Russell et al., 2021).

SOCIO-ECONOMIC STATUS

Socio-economic status plays a pivotal role in transport behaviour. Those of lower socio-economic status are more likely to use active transport modes due to limited access to motor vehicles (Marques et al., 2016; Brondeel et al., 2016). In disadvantaged neighbourhoods, factors influencing walkability differ, emphasising crime prevalence and safety perception (Freeman et al., 2012). Interestingly, racial minorities are less influenced by urban design regarding their transport choices than Caucasians (Freeman et al., 2012).

POLITICAL AFFILIATION

Cycling emerges as a politicised issue, with significant differences in political affiliation affecting cycling behaviour. Green party voting is associated with high rates of cycling commuting across multiple countries (Zahran et al., 2008; Horton, 2006; Tapp et al., 2016), while those who opt for green modes of transportation tend to vote for green parties at a higher rate than the general public (Prillwitz & Barr, 2011). Rérat and Ravalet (2023) also found a pronounced left-right political gradient regarding support for cycling. In conclusion,

political affiliation is a critical predictor of cycling rates, with a strong relationship between the two variables.

METHODS

Data for this project were collected from both quantitative and qualitative sources. The main source of primary data for this project came in the form of a community survey created in Qualtrics. A pilot study was conducted before the official launch of the survey to test it and identify any potential issues or areas for improvement. Adjustments were made based on the pilot phase, ensuring the survey's validity and reliability. Participants for the survey were recruited through the Beckenham Neighbourhood Association Facebook page. The survey received 94 responses from the Beckenham community and remained open for seven days.

Ethical considerations were also taken into account during the survey design. The questions were reviewed to avoid bias, sensitivity, or invasiveness, creating a safe and respectful environment for participants to provide input. Based on the survey results, individuals were invited to participate in a focus group to gather valuable insights and diverse perspectives. We actively recruited varied individuals for the focus group, allowing us to capture various opinions and experiences. The collected qualitative and quantitative responses from the survey enabled data analysis to identify factors that may influence cycling rates in Beckenham. Data from the survey was then analysed through cleaning, grouping, counting, and plotting.

This project used data from another survey, the Life in Christchurch Transport survey, run by the Christchurch City Council (CCC, 2022). Christchurch City Council regularly surveys its

residents on various topics, including transport. The Life in Christchurch Transport survey was most recently run in 2022. Responses to relevant questions were obtained for this project, including the breakdown of all respondents and a subset of Beckenham respondents.

Some of the questions used in the Life in Christchurch Transport survey were directly copied into the community survey created for this project. This allowed us to compare responses from both surveys directly. One issue to note is that the two samples may vary demographically and in the composition of cyclists versus non-cyclists. The community survey sample skewed younger and more female than the city council survey sample. The sample size of Beckenham residents for the Life in Christchurch Transport survey was 34, while the sample size of Christchurch residents was 4601.

Focus groups are an excellent method to get people to discuss and challenge each other and to find common ground or universal experiences in the group (Gomez & Jones, 2010). People were reached for the first focus group via the contact of our supervisor, and the snowball effect was used to gather people from there. For the subsequent focus groups, people indicated whether they would like to attend a focus group on our survey, and they were selected based on the available days.

We had three people in the first focus group. However, we aimed for six people in the subsequent focus groups, as four to twelve people are considered optimal (Gomez & Jones, 2010). Qualitative data was gathered from the focus groups through recordings and note-taking. Notes were taken for quotes, and sections of the recorded discussion were also quoted.

One of the primary quantitative sources for data was the 2018 New Zealand census, with data available online from Stats NZ. This included data for Beckenham and other suburbs in Christchurch City. Data from the 2018 census was used to create maps in ArcGIS Pro and run statistical analysis.

Maps were created in ArcGIS Pro using data from Stats NZ. A shapefile of the Christchurch area was downloaded and sorted by suburb before data was joined to the shapefile. Data used to create maps came in the form of cycle commuting rates for one map, median household income for another, and median house sales price for another.

Statistical data analysis was undertaken using summary statistics and multiple regression. Census data was subject to multiple regression to estimate the effect of various independent variables on the dependent variable of cycling rates for all suburbs in Christchurch City. These variables included median income, ethnicity, age, education, elevation above sea level, and distance to CBD.

RESULTS

The data shows that residents of Beckenham cycle more than the general population of Christchurch. This sheds light on the cycling culture in Beckenham and the prevalence of cycling in the suburb.

Figure B1 shows the comparison between Beckenham residents and the wider Christchurch population. It illustrates the proportion of Beckenham respondents who have cycled within the past 12 months, compared against the average for all Christchurch residents. The figure shows that individuals in Beckenham are nearly twice as likely to have cycled in the last year compared to the rest of Christchurch.

Using data from our community survey, we asked people whether they cycled less, about the same, or more after moving to Beckenham. Out of the residents living in Beckenham, we found 11.11% cycled less, 40.74% cycled about the same, and 48.15% (2dp) cycled more (Roling et al., 2023).

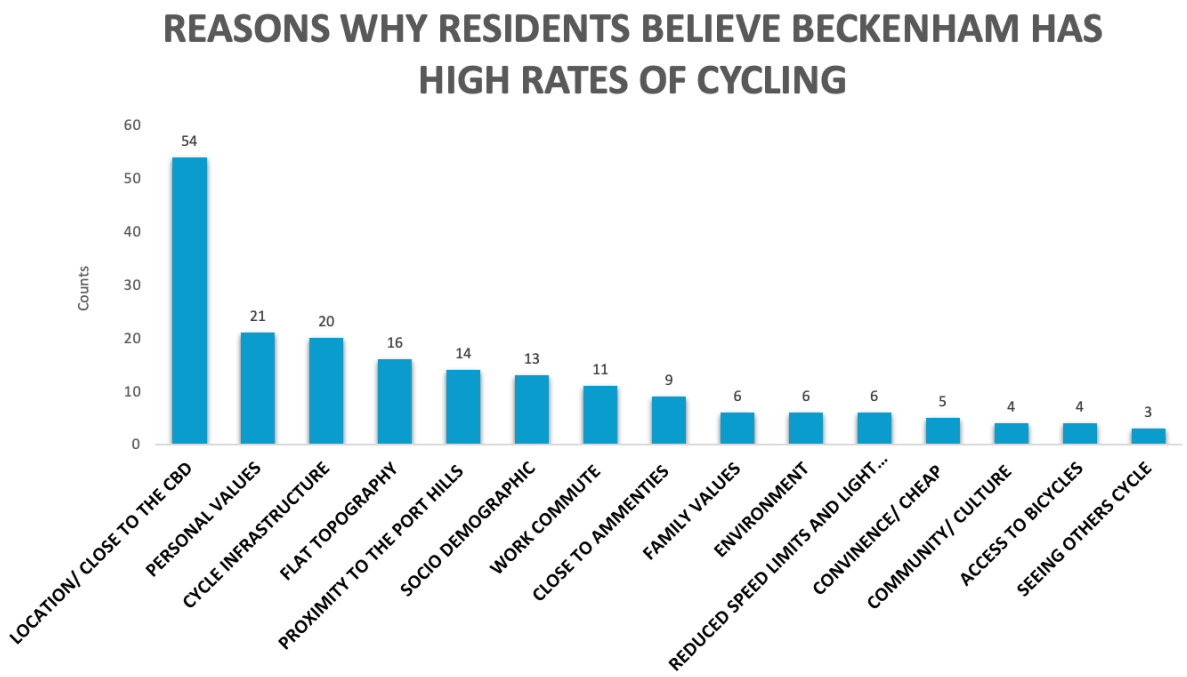

Figure 1: Graph that shows the results from the survey question "Why do you think Beckenham has high rates of cycling?".

In the survey we asked residents: "Why do you think Beckenham has high rates of cycling?" The results from this are shown in Figure 1. Proximity to the CBD emerged as the most significant factor for residents, as it allows for convenient and efficient travel. In addition to

proximity, personal values were shown to be an important factor. Many residents expressed their commitment to environmental consciousness, recognising cycling as an eco-friendly alternative to conventional transportation methods.

The presence of cycling infrastructure outside the suburb was identified as another crucial aspect contributing to Beckenham's high rates of cycling. The provision of dedicated cycling lanes, bike parking facilities, and other supportive infrastructure in the central city fosters a sense of safety among cyclists, encouraging more individuals to take to the roads on their bikes.

The topography of the neighbourhood itself was acknowledged as a contributing factor. Beckenham's relatively flat terrain makes cycling a practical and enjoyable option for residents, without the challenges posed by steep inclines.

PROXIMITY TO CITY CENTRE

A key factor regarding high cycle commuting rates in Beckenham is its proximity to the central business district (CBD). Beckenham is around four kilometres away from the centre of Christchurch, meaning that the CBD is easily accessible. Both maps created in ArcGIS and a regression run in Excel highlighted proximity to the CBD as a key factor in Beckenham’s high cycle commuting rates.

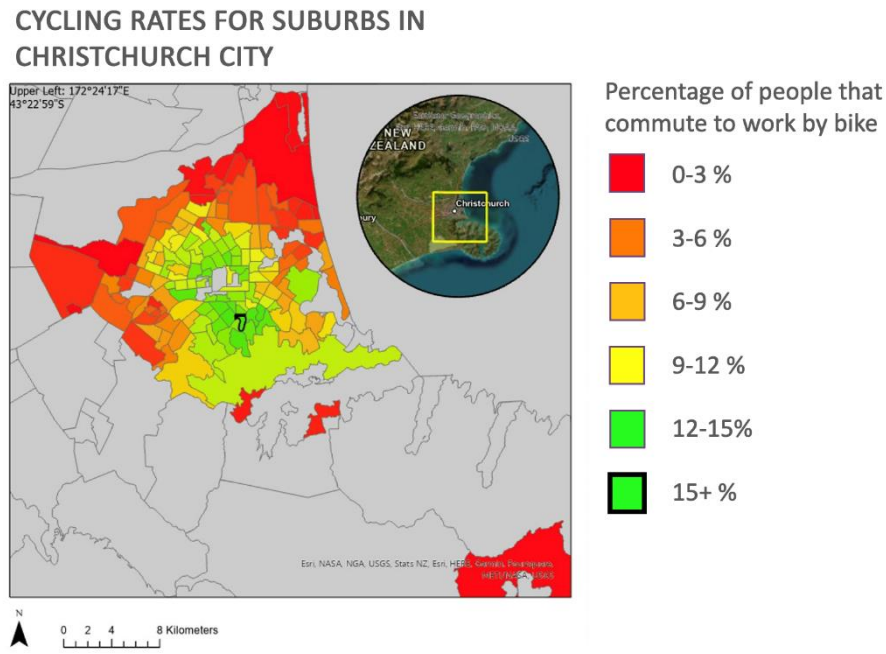

Figure 2: Map showing commuter cycling rates (in %) in Christchurch City, using data from the 2018 New Zealand census (StatsNZ, 2018).

The cycle map created in ArcGIS shows a clear pattern of increasing cycle commuting rates as the distance to CBD decreases, as shown in Figure 2. The suburbs with the highest cycle commuting rates are found in the South and North-West of Christchurch, with the highest values generally within a five-kilometre range of the CBD. The suburbs with the lowest rates are found to the West and North-East of Christchurch, at least five kilometres from the CBD.

A multiple regression analysis was run in Microsoft Excel to compare variables influencing commuter cycling rates for all suburbs in Christchurch City. This is shown in Figure B2. The variables in question were median income (2018 census), ethnicity (percentage European), age (percentage of people 29 or younger), education (percentage with a bachelor's degree or higher), elevation above sea level (in metres), and distance to CBD (in km). With a coefficient value of -0.2036 and a p-value of 1.38 x 10^-9, proximity to CBD was the only variable in the regression that returned a statistically significant result.

INFRASTRUCTURE

Throughout the investigation, Beckenham's level of cycle-friendly infrastructure was a key feature, indicating how the area is hospitable to cyclists. Although there are not any separated cycleways and shared paths within Beckenham, there are many cycleways in close vicinity, which links residents to essential facilities. Despite this, the lack of infrastructure for cyclists down Colombo St towards the CBD has been criticised (McDonald, 2023).

Other than cycle infrastructure, the wideness of Beckenham's roads and the decreased speed limits compared to other suburbs are also factors that make cycling more inclusive. As mentioned by one focus group participant:

"It feels quite safe as a place to cycle. The roads are quite wide, the speeds are low, and there are lots of kids and families around" - (Focus Group 3, 2023)

These features contrast with other suburbs, which have narrow streets and speed limits of 50km/h. As seen in Figure B3, when asked in the community survey whether they would go out of their way to use a separate cycleway when travelling by bike, most respondents answered yes. This is because separated cycleways make people feel safer when cycling, as they do not have to spend as much time worrying about other road users as they would while using a painted cycle lane.

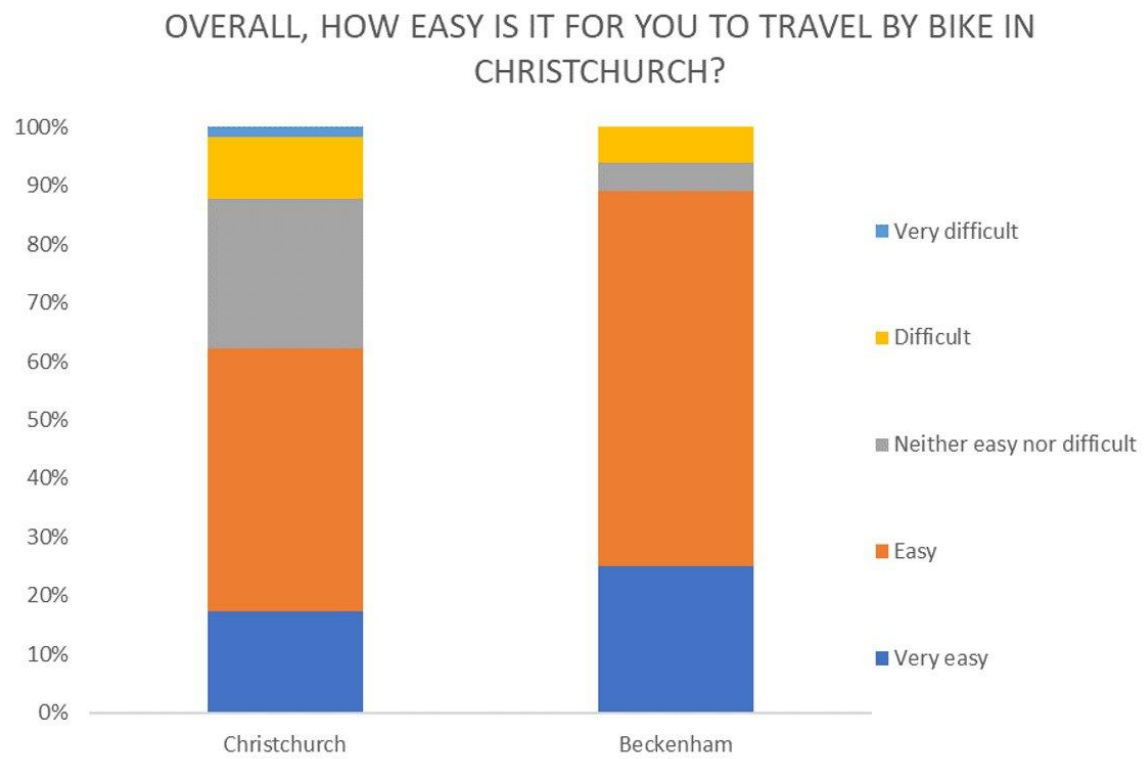

Figure 3: Stacked bar graph comparing Beckenham and Christchurch responses to the question: "Overall, how easy is it for you to travel by bike in Christchurch?", using data from the community survey (Beckenham data), and the Life in Christchurch Transport survey (Christchurch data).

The effect of Beckenham's nearby cycle infrastructure can also be seen in how easy residents believe cycling is in the area, as shown in Figure 3. Respondents to the Beckenham community survey were more likely to say it was "easy" or "very easy" to travel by bike in Christchurch, compared to Christchurch residents, who answered the same question in the Life in Christchurch Transport survey.

SAFETY

How safe people perceive themselves to be is a key factor in cycling rates in Beckenham.

Figure 4: Stacked bar chart of the percentage of Beckenham residents living both outside and inside the loop who felt varying levels of safety cycling in Christchurch, using data from our community survey.

As shown in green in Figure 4, the percentage of people living inside the loop felt safer than those who lived outside the loop. Safety is an essential factor in influencing whether people cycle. Physical and social factors can impact traffic congestion and how safe people perceive themselves to be when cycling in Beckenham.

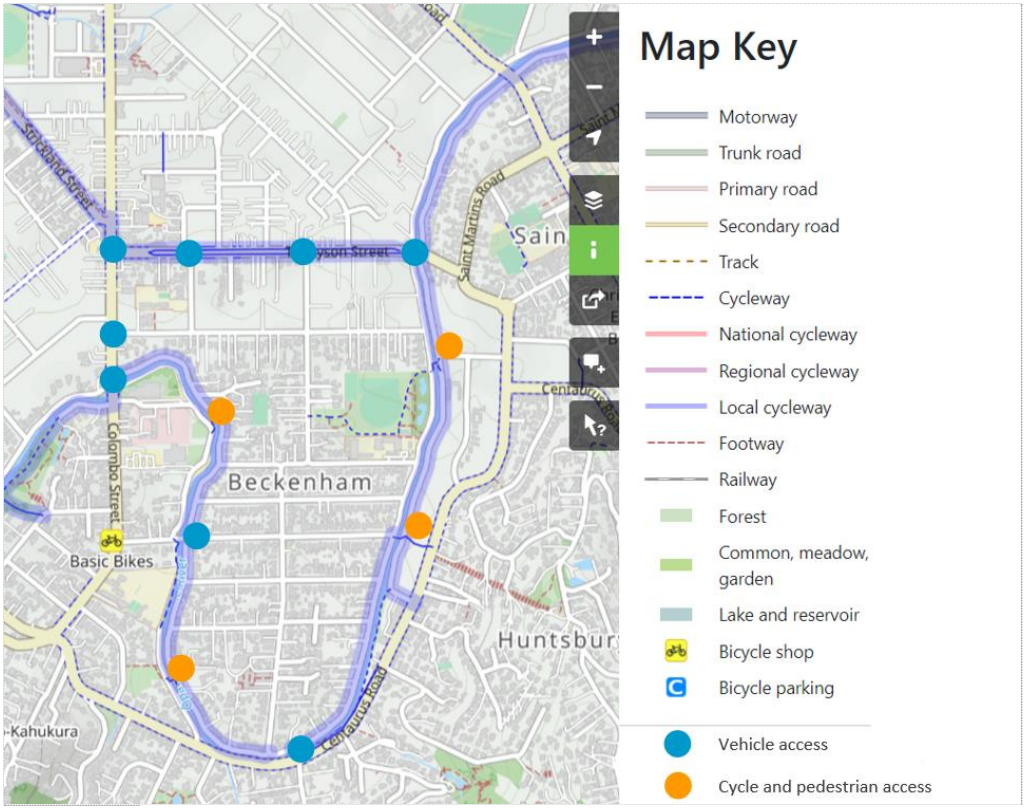

Figure 5: Map of Beckenham from openstreetmaps with dots representing places with vehicle access (in blue) and places with cycle and pedestrian access.

Figure 5 shows that there are multiple places where cars and cyclists can enter and exit the Beckenham loop from other suburbs. The blue dots on this map represent vehicles' access points, with the majority being at the far end of the river loop near Tennyson Street. The yellow dots on this map represent the access points only cyclists and pedestrians have, all within the river loop's closed end. Cyclists can also use the blue vehicle access points. Therefore, cyclists have more access to get in or out of the Beckenham loop than cars, especially when crossing the river. Therefore, the traffic is influenced by filtered permeability, with a more connected grid for cyclists and less access to cars. This can cause less traffic congestion within the loop and more people choosing to cycle due to convenience. A statement by a male participant during the second focus group supported this concept that the river loop was causing filtered permeability:

"The river loop sort of separates Beckenham from the other suburbs because there's basically zero through traffic in Beckenham, which does benefit cycling." - (Focus Group 2, 2023)

In addition to filtered permeability from the river loop, results from the focus groups show the community within Beckenham is an important contributor to how safe people feel cycling in the suburb. As mentioned by a male participant in focus group three:

"I think we have a really great community. You are always going to bump into people you know here, so you have more awareness when you are driving." - (Focus Group 3, 2023)

This quote indicates that the people within Beckenham are more cautious of others sharing the streets when driving because they know the people in the area.

ENVIRONMENT

Beckenham's surrounding environment has been identified as one of the key factors contributing to the suburb's high rates of cycle commuting. In one of the focus groups, the effect of the river loop on the intensity of Beckenham's traffic was highlighted as something that mitigated apprehensiveness about choosing to cycle.

The community survey asked whether respondents were likely to go out of their way to cycle near or through green and blue spaces. Two-thirds of respondents answered yes, while the remainder said no. It could be assumed that Beckenham's relatively high level of green and blue space contributes to the area's higher cycling rates than neighbouring suburbs.

Beckenham also lies at the foot of the Port Hills, which provides many recreational cycling opportunities for residents. The proximity of the Port Hills and its effect on cycling uptake was a persistent theme in discussions with focus groups. One focus group participant suggested that the Hills being nearby meant that the Beckenham community were more competent cyclists compared to suburbs further away.

CYCLING TO WORK

As the original census data this project is based on focuses on commuter cycling rates, we needed to ask about cycling to work in both the focus groups and the survey.

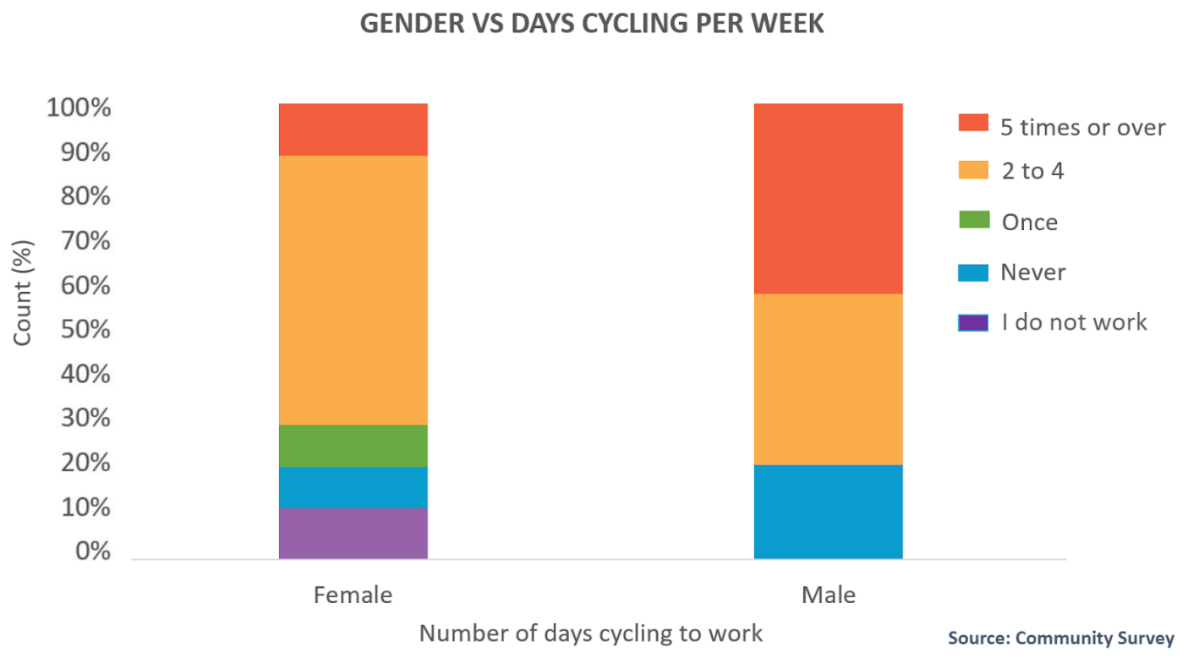

Figure 6: Graph showing the number of days cycled per week by men and women.

As seen in Figure 6, the cycle commuting habits of men and women differ. Women are more likely to cycle sometimes, while men are more likely to cycle daily to work. Most women who answered our survey cycle to work two to four times a week, while men were split between those who cycle two to four times per week and those who cycle five times or more. This was consistent with some of the focus group discussions we had around this topic.

In Focus Group 1, it was discussed how women are held to a higher standard of dress and presentation, that women's corporate clothing is less appropriate to cycle in, and that even if workplaces have showers, doing hair and makeup takes a long time and in general makes this option less accessible to corporate women. Additionally, it was mentioned that the women in the focus groups are less likely to cycle on bad weather days, and many women mentioned they would only bike if they had the e-bike as they did not want to get sweaty.

"My partner likes to get hot and sweaty; I don't like that so if I don't get the electric bike I won't go because I get hot. I used to work in a more corporate job with a higher standard of clothing" - (Focus Group 1, 2023)

Additionally, many interviewed people felt that their professional workplaces supported them in cycling. This may be due to the type of employment in which many people in Beckenham are employed (Stats NZ, 2018).

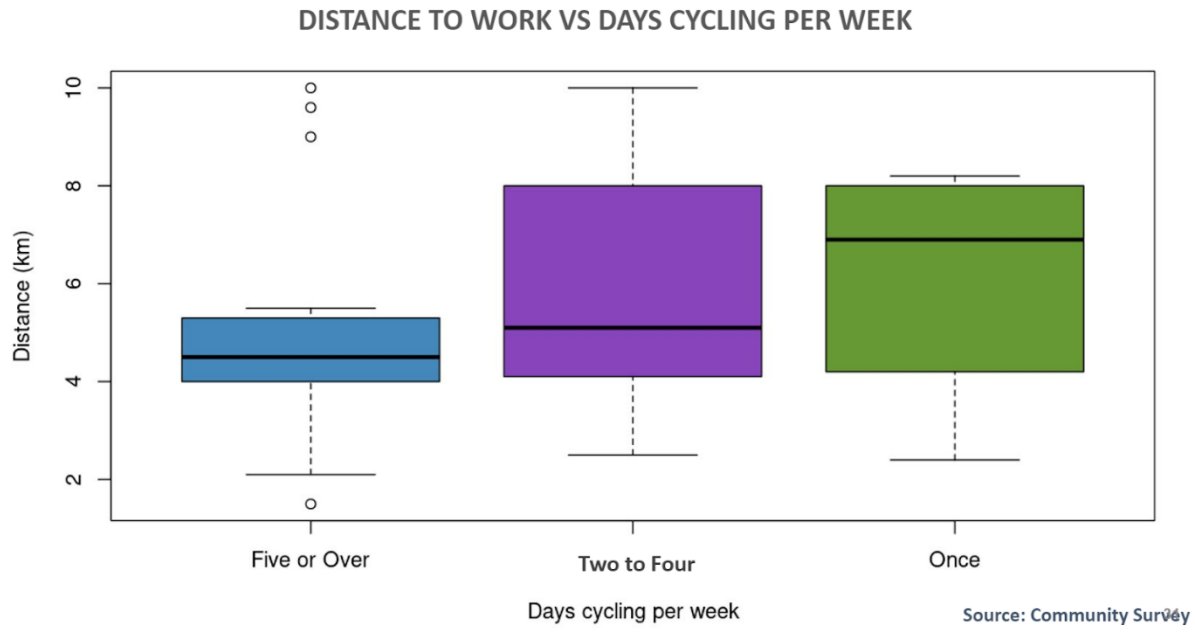

Figure 7: Box and whisker plot that shows the distance cycled against the number of days cycled.

Figure 7 shows the distance cycled against the number of days cycled. There is a much smaller spread for those who cycled five times or more per week, and they are limited to around five kilometres or less, with a few exceptional outliers. This suggests that for people to be consistent daily cyclists, they likely need to live within five kilometres of their workplace. People who cycled two to four days per week had the most significant spread, suggesting that people are happy to cycle further but that this may not always be practical or desirable for every day.

AFFLUENCE

Something that came through from the focus groups and the survey when we asked people why they thought so many people in Beckenham cycled was that the suburb is wealthy. As one focus group participant said:

"There is a threshold of money, Beckenham is a homogeneous suburb, educated, similar income." - (Focus Group 2, 2023)

This is verified by Figure B4, which shows that, while some of the suburbs around Beckenham also have high incomes, in the scheme of Christchurch, it is an affluent suburb. Something participants linked to affluence, and something participants were in general very passionate about, was cargo bikes, particularly electric ones. Focus group participants noted the price of cargo bikes and the "economic factor of having the gear" to use a bike rather than a car. Other participants noted how a cargo bike allowed them to be a one-car household, or it became their "second car" for transporting children. As many people in Beckenham are young families with children (Stats NZ, 2018) cargo bikes make taking children and doing jobs that would otherwise require a car possible.

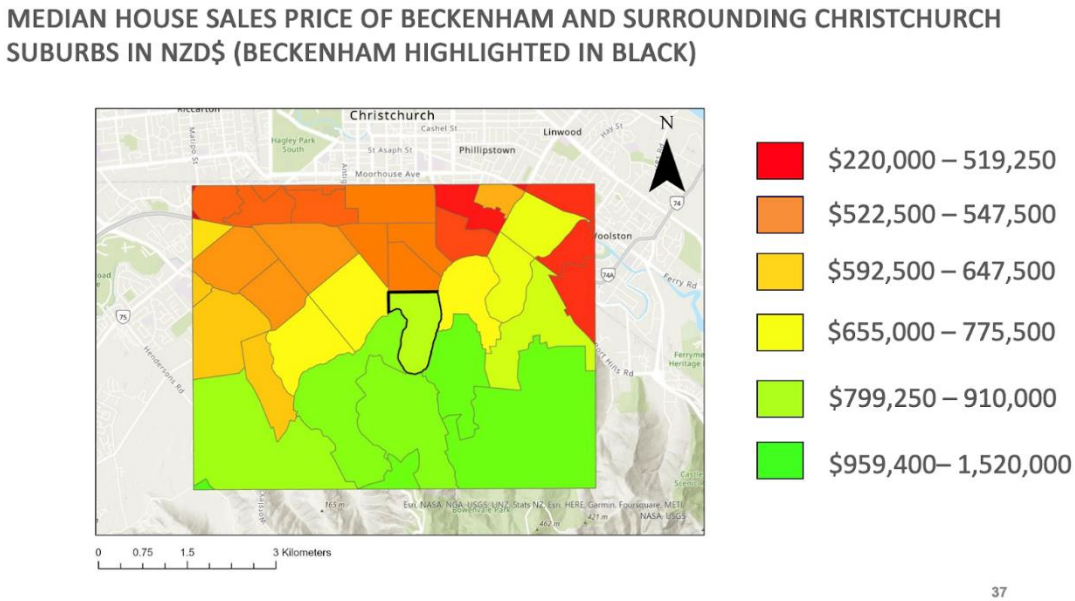

Figure 8: Map showing median house sales prices (in NZD$) in Christchurch City, using data from the 2018 New Zealand census (OneRoof-NZ, 2023).

Another factor in the affluence of Beckenham is the Beckenham loop character area. The Christchurch City Council has characterised Beckenham as a character area, which means the development is limited, and the houses remain in larger sections compared to other areas close to the city centre (CCC, 2019). As seen in Figure 8, Beckenham's house prices are much higher than the average in Christchurch. Focus group participants identified the house prices as a factor in influencing the demographics in Beckenham.

"Beckenham is part of the special amenity area, so you get a lot more standalone houses, which is one of the reasons people move here… it changes the demographic because of the prices" - (Focus Group 2, 2023)

DISCUSSION

The results show a variety of factors affecting the cycling rates of Beckenham residents. Some factors are found across the city, such as topography, whilst others may be more specific to Beckenham, such as a strong sense of community. However, the factors highlighted in the results section all combine to lead to the unique cycling culture in Beckenham.

The results gathered differed in some cases from what we might have expected in our literature reviews. For example, literature on gender and cycling suggests most cyclists are men in low-cycling countries (Russell et al., 2021). While this holds true for Aotearoa as a whole, most of the respondents in Beckenham were women and gender was not seen to be an issue in the focus groups. This suggests Beckenham has a similar cycling environment to high-cycling countries.

Another anomaly was the discussion around affluence. Literature suggests lower-income individuals cycle more as motor vehicles are less accessible to them (Marques et al., 2016). However, the situation in Beckenham bucks this trend. In fact, Beckenham's relative affluence seems to have a positive effect on cycling rates, as they can afford more expensive and utile vehicles such as cargo bikes.

The relatively high affluence in Beckenham is majorly due to the suburb being a character area, meaning the demographic of people that can live there is severely limited. This was also notable from both census data and the focus groups, which showed Beckenham is made up of mostly families with professional jobs. This may contribute to building a well-connected community – centred around children and similar lifestyles. As discussed before, cargo bikes came up alongside affluence throughout the focus groups, with many attributing their high levels of cycling to their cargo bike – while also noting the cost of these bikes.

This would have been good to research more at the beginning. It was not until we had conducted a focus group that we realised how important cargo bikes were. This is definitely an area for future research and may help explain the degree of affluence that leads to higher cycling levels amongst more high-income individuals.

Another factor that cannot be overlooked is the importance of the river loop and the filtered permeability it creates. This in combination with slower speeds creates an instantly quiet and safe area, and negates the need for cycling-specific infrastructure inside Beckenham. Another area for further research would be the retrofitting of filtered permeability to other areas via the use of planter boxes and street furniture, or planting green belts. This could potentially be an unpopular addition to many car-centric areas, and as Beckenham has the river it is a

permanent non-negotiable barrier, however, with enough community buy-in, this could be implemented anywhere.

Some limitations of this project were the timeframe, we had to narrow the scope to make the research achievable. As a part of this, we did not engage much with mana whenua, or do much research into Māori in Beckenham and ethnicity in the suburb.

Additionally, future research in this area could take climate into account as many participants claimed they only cycled in good weather, and comparing the weather of Christchurch with the country could explain the cycling rates somewhat. Along these lines, Beckenham could have been compared with similar neighbourhoods in other cities across Aotearoa or even internationally, rather than just neighbouring suburbs to see if factors such as income and distance from the CBD are consistent factors in cycling outside of Christchurch.

CONCLUSIONS

In conclusion, our research identified several factors contributing to Beckenham's high cycling rates. These factors include the suburb's proximity to the city centre, the wide roading infrastructure and low speed limits, filtered permeability, sense of community and socio-economic status. Together, these factors create a cycling culture in the area. Not all these contributing factors are transferable to other communities, however implementing cycling infrastructure and creating filtered permeability can be achieved with strong community buy-in. However, it is important to recognise the limitations of this study in applying the findings. Future research should address these limitations to gain an understanding of cycling behaviours and influences in the rest of Aotearoa.

ACKNOWLEDGEMENTS

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APPENDIX A – Community Survey

Cycling and Beckenham

Start of Block: Admin block

Q39 **Learning lessons from the suburb with the highest cycle commuting rates in NZ**
Information Sheet for participants

Kia ora, You are invited to participate in a research study on cycling in Beckenham. This study is being conducted by geography students from the University of Canterbury | Te Whare Wānanga o Waitaha (UC). This project is in partnership with Dave Kelly, Chair of the Beckenham Neighbourhood Association (BNA), and is under the supervision of Simon Kingham, a lecturer at the university. The study is being carried out as a requirement for GEOG 309.

What is the purpose of this research?

This research aims to determine why cycling rates in Beckenham are proportionally higher than other suburbs. Beckenham has the highest commuter cycling rates in New Zealand, as per the 2018 census data. We are interested in finding out what it is about Beckenham that makes its residents want to cycle. The information from this study will help to identify why this is happening, in the hope that the reasons can be applied to other suburbs in New Zealand. It will also help the BNA to advocate for what is important for residents.

Why have you received this invitation?

You are invited to participate in this research because you live in Beckenham. Your participation is voluntary. You are free to withdraw at any time. To do this, simply close your browser window or the application (App) the survey is presented on. As this is an anonymous survey it will not be possible to withdraw your information after you have completed the survey.

What is involved in participating?

If you choose to take part in this research, please complete the online survey that follows this information page. This survey involves answering a series of questions about your general cycling habits and why you think Beckenham has high cycling rates. Completing the survey should take around 5 to 10 minutes.

What will happen to the information you provide?

All data will be confidential. All study data will be stored in password-protected files on the University of Canterbury computer network or stored in lockable cabinets in lockable offices. All data will be destroyed after completion of the study/publication of study findings Lily will be responsible for making sure that your data is only used by members of the research team for the purposes mentioned in this information sheet.

How will the results of the study be published?

Results may be published in peer-reviewed, academic journals. Results will also be presented during conferences or seminars to wider professional and academic communities. You will not be identifiable in any publication, unless you consent to this. I can send a

summary of the research to you at the end of the study, if you request this. If you provide an email address for this purpose, it will be linked with your survey responses.

Who can you contact if you have any questions or concerns?

If you have any concerns about the research, please contact: Simon Kingham: simon.kingham@canterbury.ac.nz If you have any questions about the research, please contact: Lily lro93@uclive.ac.nz If you have a complaint about this research, please contact the Chair of the HREC at human-ethics@canterbury.ac.nz.

Please read the following statement of consent and start the survey below.

Q1 **Statement of consent**

I have read the study information and understand what is involved in participating. By completing the survey and submitting my responses, I consent to participate

- ○ Yes, I consent (4)

Q2 You need to be at least 18 to complete this survey. Are you 18 or over?

- ○ Yes (1)
- ○ No (2)

End of Block: Admin block

Start of Block: Block 1

Q3 In the past 12 months, have you travelled by bike in Christchurch more often than once a month (including E-bike)?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Q4 Do you travel by Ebike in Christchurch more often than once a month?

- Yes (1)
- No (2)

Display This Question:

If Do you travel by Ebike in Christchurch more often than once a month? = Yes

And Do you travel by Ebike in Christchurch more often than once a month? = Yes

Or In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Q5 Do you travel by Cargo Bike in Christchurch more often than once a month?

- Yes (1)
- No (2)

Display This Question:

If Do you travel by Cargo Bike in Christchurch more often than once a month? = Yes

And Do you travel by Ebike in Christchurch more often than once a month? = No

Q6 Describe how or what you use your Cargo bike for.

_____

Display This Question:

If Do you travel by Cargo Bike in Christchurch more often than once a month? = Yes

And Do you travel by Ebike in Christchurch more often than once a month? = Yes

And In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Q7 Describe how or what you use your E - Cargo bike for.

_____

End of Block: Block 1

Start of Block: Non bike specific

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = No

Q8 Even though you don't cycle regularly we are interested in your opinions towards cycling

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = No

Q9 Describe any barriers you face towards cycling

_____

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = No

Q10 What could influence you to begin cycling?

_____

End of Block: Non bike specific

Start of Block: Travel habits

Q11 Which of the following best describes your current employment status? (Optional)

- I am in full time paid employment (1)
- I am in part time paid employment (2)
- I am not in paid employment (3)
- I am a full time tertiary student (4)
- Other (Please Specify) (9)

_____

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Q12 In the past 12 months, how often have you travelled by bike to work?

- I do not bike to work (1)
- Once a week (4)
- 2 to 4 times a week (2)
- 5 times or over a week (3)
- I did not work (5)
- Other (6) _____

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Q13 In the past 12 months, how often have you travelled by bike to Education (including dropping people at school, university etc.)

- I do not bike to education (1)
- Once a week (4)
- 2 to 4 times a week (2)
- 5 times or over a week (3)
- I do not attend education (5)
- Other (6) _____

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Q14 In the past 12 months, how often have you travelled by bike to other places (e.g. shopping, social activities, sport and recreation)

- ○ I do not bike to other places (1)
- ○ Once a week (4)
- ○ 2 to 4 times a week (2)
- ○ 5 times or over a week (3)
- ○ Other (5) _____

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Q15 How far do you cycle to your destination (Distance in kms)

	0 1 2 3 4 5 6 7 8 9 10
Work ()	
Education ()	
Other ()	

End of Block: Travel habits

Start of Block: Work and cycling

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Or In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = No

Q16 Does your workplace provide any of the following that support cycling?

- ☐ Secure bike storage (1)
- ☐ Shower and changing facilities (2)
- ☐ Subsidy for purchasing a bike (3)
- ☐ Workplace culture (4)
- ☐ Bike maintenance equipment (e.g pump) (6)
- ☐ Other (Please specify) (5) _____
- ☐ Not Applicable (e.g I don't commute to a regular workplace / I don't work) (8)

End of Block: Work and cycling

Start of Block: Saftey

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Q17 How safe do you feel when you are travelling by bike in Christchurch?

- ○ Very safe (1)
- ○ Safe (2)
- ○ Neither safe nor unsafe (3)
- ○ Unsafe (4)
- ○ Very unsafe (5)

End of Block: Safety

Start of Block: General cycling

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Or In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = No

Q18 Overall, how easy is it for you to travel by bike in Christchurch?

- ○ Very easy (1)
- ○ Easy (2)
- ○ Neither easy nor difficult (3)
- ○ Difficult (4)
- ○ Very difficult (5)

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Or In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = No

Q19 What deters you from travelling more or more frequently by bike in Christchurch? (Select all that apply)

- ☐ Too many one way streets (1)
- ☐ The road layout is confusing (2)
- ☐ Speed limits are too fast (3)
- ☐ Sharing the roads with cars (4)
- ☐ Sharing the roads with buses and heavy vehicles (5)
- ☐ Roadworks and road closures (6)
- ☐ Not enough cycleways (9)
- ☐ Narrowed lanes are making it difficult to use some roads and streets (10)
- ☐ Inconsiderate and dangerous behaviour from other road users (11)
- ☐ Cycleways are not in the right locations (12)
- ☐ A lack of showers and changing facilities at my final destination (13)
- ☐ Other (Please specify) (8)

_____

End of Block: General cycling

Start of Block: Unsure about these ones

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Q20 What benefits do you cycle for? Please rank 1 - 6 with 1 being most important. (Drag up or down)

_____ Ease of commuting (1)
_____ Fitness (2)
_____ For the environment (3)
_____ Convenience (4)
_____ Time (5)
_____ Money (6)

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Q21 Do you actively go out of your way to cycle through or near green/blue space? (Parks, The river)

- ○ Yes (1)
- ○ No (2)

Q22 Research has shown that people can be grouped into one of the four groups in regards to their attitude toward cycling

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Or In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = No

Q23 Which of the following do you best identify with?

- ○ Strong and fearless : Willing to bicycle with limited or no bicycle-specific infrastructure (1)
- ○ Enthused and confident: Willing to bicycle if some bicycle-specific infrastructure is in place (2)
- ○ Interested and concerned: Willing to bicycle if high-quality bicycle infrastructure is in place (3)
- ○ No way no how: Unwilling to bicycle even if high-quality bicycle infrastructure is in place (4)

End of Block: Unsure about these ones

Start of Block: Beckenham Specific

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Q24 Outside of Beckenham do you go out of your way to use separated cycle ways where possible?

- ○ Yes (1)
- ○ Maybe (2)
- ○ No (3)

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Or In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = No

Q25 Do you live inside the Beckenham loop (Between Tennyson Street and the river)

- ○ Yes (1)
- ○ No (2)

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Or In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = No

Q26 Why do you think Beckenham has high rates of cycling?

_____

Q27 How long have you lived in Beckenham?

- I don't live in Beckenham (1)
- Less than 1 year (2)
- 1-2 years (3)
- 2-5 years (4)
- More than 5 years (5)

Display This Question:

If In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = Yes

Or In the past 12 months, have you travelled by bike in Christchurch more often than once a month (i... = No

Q28 Did you cycle more frequently before you lived in Beckenham?

- More frequently (3)
- About the same (4)
- Less frequently (5)

End of Block: Beckenham Specific

Start of Block: Personal Information

Q29 Which of the following do you identify with? (Optional)

- ○ Male (1)
- ○ Female (2)
- ○ Gender diverse (3)
- ○ I prefer not to say (4)

Q30 How old are you?

- ○ 18-24 (1)
- ○ 25-34 (2)
- ○ 35-44 (3)
- ○ 45-54 (4)
- ○ 55-64 (5)
- ○ 65 and over (6)

End of Block: Personal Information

Start of Block: End

Q31 Is there anything else you would like to tell us about your experiences travelling by bike in Christchurch? (Optional)

_____

Q32 Would you be willing to participate in a focus group to further discuss cycling in Beckenham .

- ○ Yes (4)
- ○ No (5)

Q33 Would like a copy of our report?

- ○ Yes (1)
- ○ No (2)

Display This Question:

If Would like a copy of our report? = Yes

Q34 Please enter your email below

_____

Display This Question:

If Would you be willing to participate in a focus group to further discuss cycling in Beckenham . = Yes

Q35 Please enter your phone number below

_____

Display This Question:

If Would you be willing to participate in a focus group to further discuss cycling in Beckenham . = Yes

Q36 Which of the following dates and times would you be available for the focus group?

- ☐ Monday 25th September 7:30pm (1)
- ☐ Thursday 28th September 7:30pm (2)
- ☐ Sunday 1st October 4pm (5)
- ☐ I'm not available any of these times (4)

End of Block: End

APPENDIX B – Other Graphs

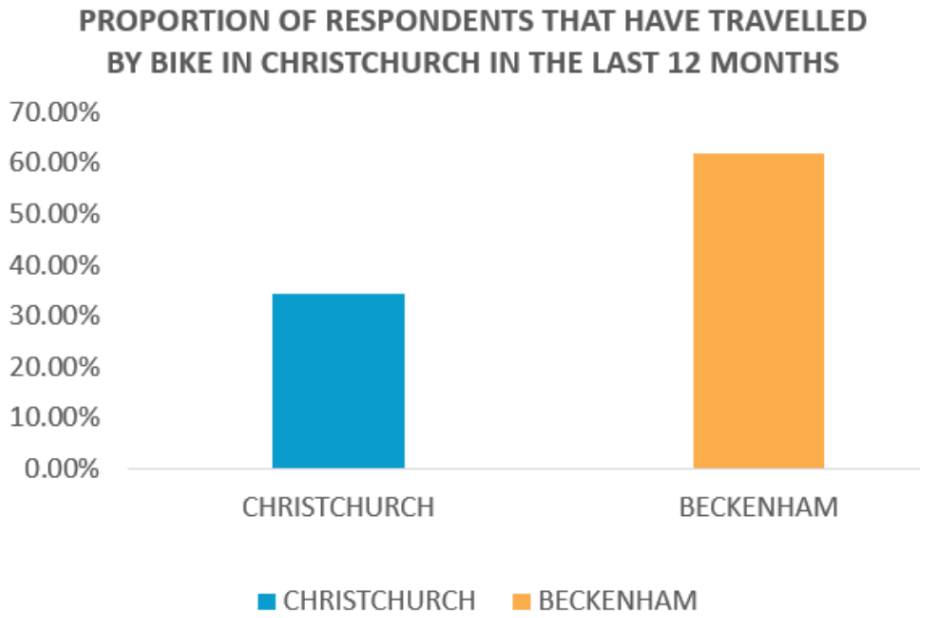

Figure B1: Graph that compares the proportion of Beckenham respondents who had cycled in the last 12 months compared to the average for the whole city, using data from the community survey for Beckenham data and the Life in Christchurch Transport survey for the Christchurch data.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.51
R Square	0.26
Adjusted R Square	0.23
Standard Error	2.63
Observations	153.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	6.00	349.81	58.30	8.43	7.35 x 10^-8
Residual	146.00	1009.60	6.92		
Total	152.00	1359.40			

	Coefficients	*Standard Erroı*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	2.56	1.92	1.33	0.19	-1.24	6.35	-1.24	6.35
2018 Median Income	0.00	0.00	1.77	0.08	0.00	0.00	0.00	0.00
Ethnicity Percentage (Proportion European)	0.03	0.02	1.56	0.12	-0.01	0.06	-0.01	0.06
Age (Percentage of People 29 or Younger)	0.02	0.03	0.71	0.48	-0.04	0.08	-0.04	0.08
Percentage with a Bachelor's Degree or higher (education)	-0.01	0.02	-0.49	0.63	-0.05	0.03	-0.05	0.03
Elevation above sea level (m)	0.01	0.01	1.32	0.19	-0.01	0.03	-0.01	0.03
Distance to CBD (KM)	-0.20	0.03	-6.47	0.00	-0.27	-0.14	-0.27	-0.14

Figure B2: Results from multiple regression analysis comparing cycling rates from Beckenham with other Christchurch suburbs using data from the 2018 New Zealand census (Stats NZ, 2018).

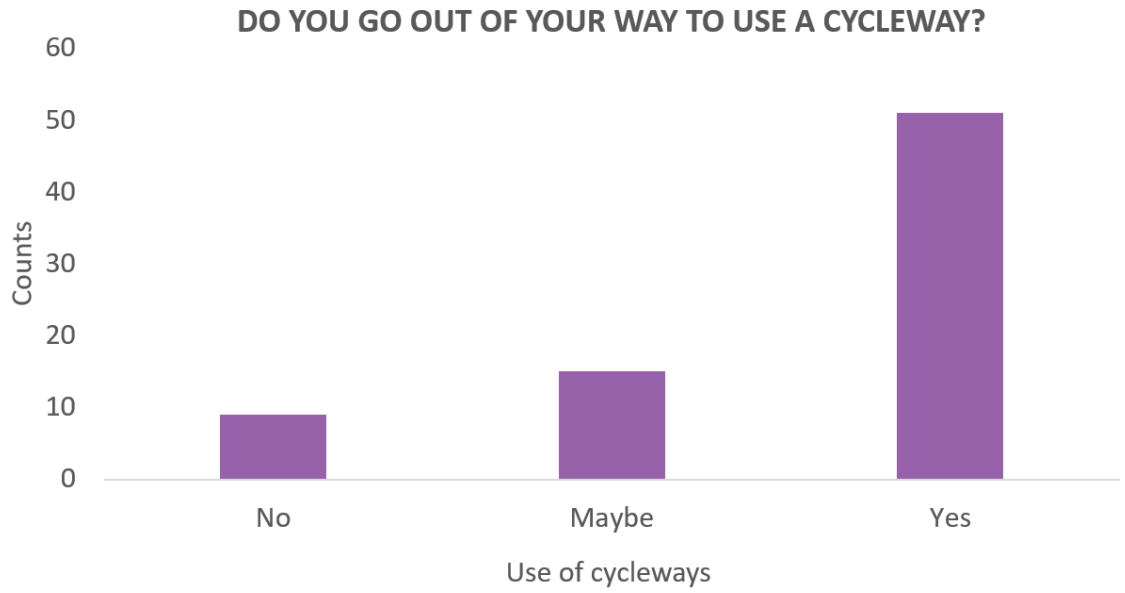

Figure B3: Graph showing summary of answers to the question: "Outside of Beckenham do you go out of your way to use separated cycleways where possible?", using data from the community survey.

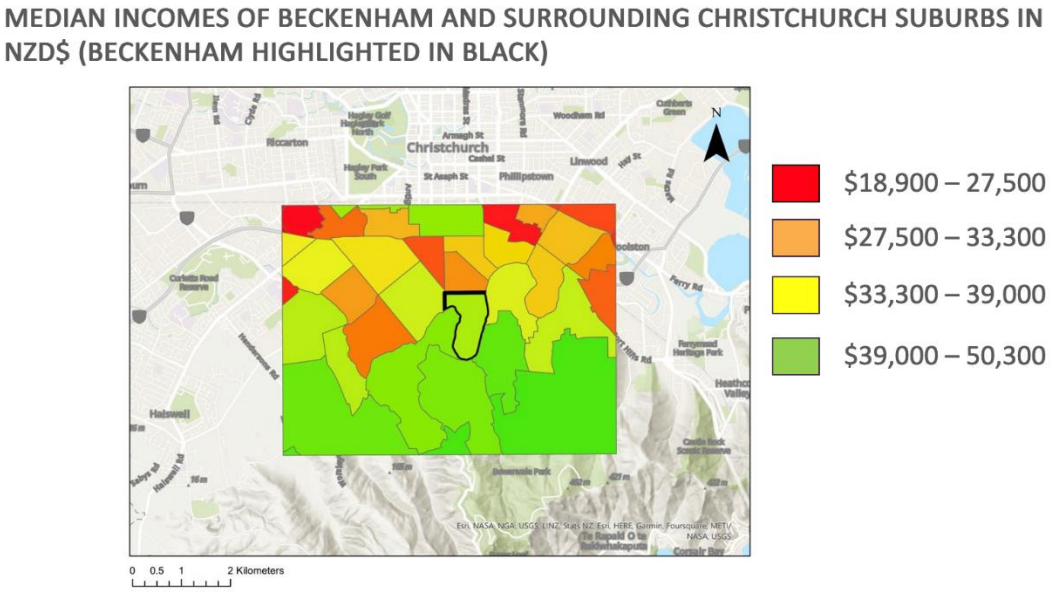

Figure B4: Map showing median incomes (in NZD$) in Christchurch City, using data from the 2018 New Zealand census (StatsNZ, 2018).