

Te Whare Wānanga o Waitaha CHRISTCHURCH NEW ZEALAND

Transportation in Halswell

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Executive Summary

Halswell is a suburb of Christchurch that has some of the lowest walking and cycling rates in the city (Statistics New Zealand, 2013). The reasons for this are multifaceted, although one explanation based on literature that seeks to explain this is the presence of perceived barriers (Pucher & Buehler, 2010). The research question that is answered in this report is: Are there any barriers to active transport in Halswell? If so, what are they and how can they be mitigated?

The methods for obtaining this data were questionnaires and a focus group. A survey question was also sent to Halswell Primary School and Oaklands School to determine the main modes of transportation the students used to get to school. From these methods, a total of 75 people within the Halswell community, and approximately 600 children were surveyed. Secondary data was also used. This included the 2013 census.

The results showed that more people walked to nearby destinations than might have been expected (47%), but as anticipated very few cycled either inside or outside of Halswell (4%). Furthermore, a number of people felt as though there were significant barriers to cycling within Halswell (37%). 45% of the students from Halswell and Oaklands School used active transport as their usual mode of travel to get to school. The most commonly cited barriers that limited cycling included lack of adequate cycling infrastructure and the current speed limits. No significant barriers to walking were found. To address the barriers found, and to increase current walking and cycling rates mitigation options are suggested. These include general options, such as segregated cycle ways, and more geographically specific options, such as signalled crossing points and traffic islands.

The first major limitation was, due to the nature of random sampling, not all age groups were incorporated into the data. Secondly, for the focus group there were not enough participants, or enough focus groups themselves.

Possible future research that could be considered is to investigate whether the mode of transport people chose to use is affected by the proximity of major highways. This could also be extended to whether the location of a school (both primary and secondary) affects the students preferred mode of transport. This is particularly relevant to the Halswell Community given that the main arterial route runs directly through the urban area.

1. Introduction

Halswell is a suburb of Christchurch that has some of the lowest walking and cycling rates in the city (Statistics New Zealand, 2013). One explanation that seeks to explain this is the presence of perceived barriers. This report aims to answer the question: *Are there any barriers to participation in active transport in Halswell? If so, what are they and how can they be mitigated?* There were four objectives that were used in order to answer this question: a) to identify the barriers of active transport within Halswell, b) to map the barriers and key community facilities within Halswell, c) to compare levels of active transport of two different schools within Halswell; and d) to establish the best mitigation options for the barriers identified in order to increase the current walking and cycling rates. To gather this information a variety of methods were used. This included a questionnaire and a focus group. In addition to this, an analysis of the wider literature was necessitated.

Due to the size of the population and the time constraints of this research it was appropriate to identify an area that was representative of the Halswell Community. This encompassed the two main arterial roads (Halswell Road and Halswell Junction Road), and Nichols Road. This area has majority of the Key Community Facilities located in it. A Key Community Facility can be defined as a "facility that meets the need of the community" (Upper Hutt City Council, 2007). The word community in this context means "a place or area considered together along with its inhabitants" (Oxford Dictionary, 2014). The Key Community Facilities are located in direct proximity to the respondents in the research area and are illustrated in Figure 1 below:



Key community facilities include:

Sports grounds Super market Church Halswell School Oaklands School Café's/Restaurants Library Community Center Swimming pool Friends/family Other

Figure 1: Key Community Facilities in relation to respondents

2. Literature review

A consistent finding throughout the literature is that walking and cycling are under used means of transport despite the individual and public health benefits they provide. The reasons for this are varied and often complex, however, a common finding is the presence of perceived barriers. Research has sought to explain this taking a variety of approaches and often suggests possible policy interventions to minimize the existence of barriers. This area of research is of particular significance to the Halswell Community as its will provide pertinent information and intervention strategies that will help increase walking and cycling rates in the area, and this literature review is highlighting some research that is of particular relevance to this research in Halswell.

Pucher & Buehler (2010) argue that traffic danger is the most significant deterrent to participation in active transport. They base this on national aggregate data and various case studies, which commonly cite the United States and Australia as counties with low walking and cycling rates. To help address this problem possible policy interventions are suggested that have been successful in increasing walking and cycling rates in The Netherlands, Denmark and Germany. This includes auto-free and traffic-calming zones, segregated cycles way, well-lit side walks, refugee island crossings, pedestrian-activated crossing signals, 'bicycle streets', and rights of ways for walkers and cyclists at intersections. Saelens, Sallis & Frank (2003) based on over 70 studies argue that the urban layout of an area essentially determines the walking and cycling rates. They note that recent urban and transport designs have resulted in sprawling and exclusively residential areas, and suggest as a consequence physical activity has been "engineered out of our daily lives" (p.89) and dependence on automobiles has become inevitable. Policies suggested focus on building communities that accommodate high population density, that are well connected, and combine land-use purposes. Halswell, a community that "loves their cars" appear to be influenced by this problem, and the policy suggestions are particularly relevant given the recent population increase and potential development resulting from the Christchurch earthquakes.

Timperio et al. (2004) examined the relationship between parent's perceptions of the local neighbourhood and walking and cycling rates among children. This article is particularly valuable given the existence of two large primary schools in the Halswell Community. The results indicated that parental perceptions of the environment were directly related to their child's participation in active transport. Factors that affected the parents perception of the neighbourhood were road safety, how many times their child had to cross the road, whether they were likely to come across a stranger, and whether their destination was considered "walking distance" (1.5-1.6km). This information was gathered by a survey that was given to all parents who had children under the age of 12 in one of the selected 19 schools in Australia. Policies suggested that would improve the parents perception of the local neighbourhood were aimed at improving pedestrian and cycling features in particular crossing facilities to schools.

Leden, Garder & Johansson (2005) suggest a number of strategies that have been specifically designed to make pedestrian crossings safer for children and elderly. This includes the implementation of speed cushions (most effective 9 metres from the crossing), narrowing the street at pedestrian crossings, refuge islands, elevating the crossing, and reducing the speed in the crossing area. It is, however, important to be aware of the difficulties of such interventions in Halswell given that one of the schools is located on a main highway.

Benjamin, Schwebel & Morrongiello (2006) while not contesting the effectiveness of engineering solutions to improve crossing safety, argue that basic crossing training should not be ignored. This study employed 85 children aged 5 to 8 to participate in basic pedestrian crossing training, and results indicated that as little as fifteen minutes of individual training could make a measurable improvement in children's safe pedestrian behaviour.

Of particular relevance is the work of Roger Geller, an influential cycling academic based in Portland (Geller, 2009). He argues that no person should have to be "brave" to ride a bicycle – "yet all too often, that is the perception among cyclists and non-cyclists alike" (p. 1). Expanding on this, he argues that there are four different types of cyclists (Fig 2). The "strong and fearless" will ride regardless of any roadway condition. The "enthused and confident" don't mind sharing the road with other uses, but do appreciate a separate cycle path. The "interested but concerned" are interested about cycling but they are afraid to ride. They would, however, ride if the felt safe. The "no way no how" are not interested in cycling due to unrelated reasons. It is important to note that our research in the Community of Halswell is aimed at the group "interested but concerned" and mitigation options will focus on improving the overall safety of cycling.

Four Types of Transportation Cyclists in Portland By Proportion of Population



Figure 2: Four types of cyclists

All of the above literature helps explain the reasons why people chose not to walk or bike. In addition to this they outline policy suggestions that are likely to increase rates of active transport. This is expedient information that will be considered through out this project.

3. Methods

A variety of methods were used to address the research question and the objectives: questionnaires, a focus group and census data. To analyse the data gathered, it required mapping and inputting the data into excel to produce graphs and percentages. The data was collected via random sampling within our research area.

3.1 Questionnaires:

A questionnaire was conducted for the residents of Halswell. This was designed to provide both qualitative and quantitative data. A total of 75 questionnaires were gathered (n=75). The questionnaire consisted of ten questions ranging from general questions, such as age and gender, to how often do you travel to facilities and by what mode of transport? The questionnaire was made as short and concise as possible to insure that amount of responses were high and reliable.

An online survey was also set up, however, response rates were low. The survey consisted of the same questions that were asked in the questionnaire. Two responses were acquired, however, one was incomplete, so the data from this was not used. The link to the online survey was put into the letterboxes of residents who were not home.

A comparison study between both schools, looking at the rates of active transport amongst the children on their way to school, was also done. This was between Halswell Primary School and Oaklands School. Due to the fact that Oaklands is located in a residential area, backing into residential roads, it was expected that Oaklands would have higher walking and cycling rates compared to Halswell School, which is on a main road (Halswell Road). A total of 400 respondents from Halswell Primary School and 200 from Oaklands School were acquired. For ethical purposes the question was posed to the children via their teacher.

3.2 Focus Group:

A focus group was also conducted, where a total of five participants attended. The aim was to discuss the research topic in more detail. This group was homogenous as it consisted of people who all had the same interests and views on the topic of concern. The group also filled in the questionnaire and subsequently discussed the questions *what do you perceive to be the main barriers to cycling*?; *what do you perceive to be the main barriers to walking*? and; *to increase walking and cycling rates in Halswell what implementation do you feel is important*? in more detail.

3.3 Census data:

Census data was also used to give an indication as to the modes of transport Halswell residents use when travelling to work. Due to this being about modes of travel to work, it was only used as an indication on what levels of active transport that might be seen in Halswell.

3.4 Mapping:

To display the data spatially two maps were made. The first was a map of the Key Community Facilities in relation to respondents. This was done by taking the approximate locations of the respondent's (+/- 3 houses) and facilities; geocoding them through batchgeo.com; uploading the KML file into ArcGIS 10.2 and; then converting this into a layer on the basemap. The map was then exported out as an image to be evaluated. The second was a map of the specific mitigation options. This used a basemap from ArcGIS overlaid with various shapes from Microsoft Office.

3.5 Statistics:

Statistics were formed from the data using excel and then broken down into each question using stacked column graphs and bar graphs. Each question from the questionnaire was used for data entry. From this a series of graphs could be formed then evaluated.

4. Results and Discussion

This section explains the results of the study in relation to the research question. The question 'Are there barriers to active transport in Halswell? If so, what are they and how can they be mitigated?' is multifaceted and as such, the results may be broken up into several distinct questions:

- a) What modes of transport do Halswell residents use when making regular journeys to key community facilities
- b) What modes of transport are most used by children travelling to school
- c) What factors do Halswell residents perceive as the greatest barriers to active transport in Halswell; and
- d) What changes do Halswell residents believe would make the largest impact in encouraging active transport around Halswell

These are generally quantitative questions, and the relevant information may be retrieved directly from the surveys, either through the paper questionnaire or the small survey delivered to Oaklands and Halswell primary schools.

4.1 What mode of transport do Halswell residents use when making regular trips to key community facilities use?

To answer this question, the data from the paper questionnaire proves the best source of information, particularly question 5: *How often do you use the following facilities in Halswell, and how often do you travel there?.*

Total Journeys to key community facilities



Figure 3: Total journeys to key community facilities

As Figure 3 shows that the most common mode of transport used by Halswell residents is the motor vehicle. However, walking and cycling rates indicate that active transport is not as low as was anticipated based on census data.

Frequency	more than one per week				more than one per month				more than one per year			
Transport	Total	Walk	Drive	Cycle	Total	Walk	Drive	Cycle	Total	Walk	Drive	Cycle
Sports Ground	5	80	0	20	20	55	40	5	10	70	30	0
Supermarket	18	61.111	33.333	0	51	43.137	54.902	1.9608	1	0	100	0
Church	0	0	0	0	12	25	75	0	7	0	85.714	0
Primary School	10	30	70	0	0	0	0	0	6	50	50	0
Restaurant/café	2	50	0	50	20	50	45	5	39	35.897	51.282	7.6923
Library	0	0	0	0	19	63.158	26.316	10.526	20	50	45	5
Community Center	1	100	0	0	6	33.333	66.667	0	11	36.364	63.636	0
Swimming pool	0	0	0	0	6	66.667	33.333	0	23	52.174	39.13	8.6957
Friends family	13	53.846	38.462	7.6923	32	43.75	56.25	0	13	46.154	46.154	7.6923
Other	3	33.333	66.667	0	4	100	0	0	2	100	0	0

Table 1: Total number of visits to each key community facility. Other locations include the day-care centre and doctors office

Looking specifically at active modes of transport Table 1 indicates that the vast majority of trips to Key Community Facilities were completed on foot. This could potentially be due to the generally older age of the survey participants (44% of respondents were older than 60) but is likely to indicate very low cycling rates for the community as a whole. Participants listing 'other facilities' are likely to be misrepresented in the sample due to the extremely low number of journeys made to any facility that was not listed in the survey. This indicates that the facilities chosen were accurate in representing the vast majority of journeys completed within the suburb. Overall, most journeys were made weekly to monthly with a slight majority preferring to drive. This indicates a positive view of the importance of active transport in the Halswell community, even if cyclists were poorly represented. The popularity of walking as a mode of transport is not consistent with 2013 Census figures indicating more prominent active transport use from our survey respondents than the greater Halswell community.

4.2 What modes of transport are most used by children travelling to school?

To answer this question, it is necessary to refer back to the small survey delivered to all students at Oaklands and Halswell primary schools. For each location, all teachers were requested to ask their students *"How did you get to school today?."* This simple question generated a wealth of data showing the role active transport played in student's commute to school. To increase internal consistency, as well as to aid comparison between schools, classes have been combined to form four categories for each school: *years 0-2, years 3-4, years 5-6 and years 7-8.* This was necessary as some classes had only pupils from a single year level while others had students from multiple year levels. Halswell School was able to provide data from all class levels while Oaklands School was unable to gather data from the year 5-6 age group so this data has been omitted. Overall figures for both schools are shown as a percentage, so this is unlikely to affect inter-school comparison.



Figure 4: Transport to school

Similar to the adult residents of Halswell, the most common mode of transport amongst children is the automobile (Figure 4). It is interesting to note that the percentage of children being driven to school increases, as children get older. This was unanticipated as it was predicted that older children were more likely to be considered responsible enough to travel to school on their own. Another interesting point shown in the graph was the similarities in transport use between schools. It was expected that Oaklands School's more residential location and lower nearby speed limits would result in greater active transport use relative to Halswell Primary, situated on the 60Km/h stretch of Halswell Road. However, the results indicate the opposite. This trend could potentially be explained by Timperio et al. (2004) with the suggestion that other factors such as the number of streets to be crossed or the presence of potential strangers could have a more significant influence on parent's perceptions of child safety than anticipated.

4.3 What factors do Halswell residents perceive as the greatest barriers to active transport in Halswell?

To answer this question, it is once again necessary to return to the paper questionnaire. Questions 8: "*What do you perceive to be the main barriers to cycling?*" and 9: *"What do you perceive to be the main barriers to walking?*" These questions may be combined to give an overall view of potential barriers to both primary forms of active transport.



Perceived barriers to active transport within Halswell

Figure 5: Perceived barriers to active transport within Halswell

As Figure 5 shows, Halswell residents generally felt that there were significant barriers to cycling. This is likely to have contributed to the extremely low rates observed in the survey population. The most evident barrier was the lack of cycling infrastructure. This is a consistent finding among much of the literature (Pucher & Beuhler, 2010). Speed and proximity of traffic was also cited as a major barrier indicating that residents felt unsafe sharing the road with cars. In contrast, the majority of residents considered barriers to walking to be very minimal. Of those residents who considered "other barriers" to be

significant in reducing active transport rates, the majority mentioned the lack of uniform footpaths or specific regions (such as the Sparks Road intersection). Though it should be noted that very few residents stated "other barriers" as a factor influencing active transport use. Results in these columns are likely to have been influenced by the presence of outlying values.

4.4 What changes do Halswell residents believe would make the largest impact in encouraging active transport around Halswell?

To answer this question it is necessary to refer to question 10 from our questionnaire: *"To increase walking/cycling rates in Halswell, please rank the following (mitigation techniques) in terms of priority for improvement".* This question is vital for this research as it shows what improvements Halswell residents believe are the most important factors in encouraging active transport.



Figure 6: Changes to encourage active transport use

As was anticipated, the need for more cycle lanes proved to be the most popular technique for improving use of active transport (Figure 6). This view is significant as it shows that even those in the community classed as unwilling cyclists see the need for improved cycling infrastructure. Saelens, Sallis & Frank (2003) discuss how urban design and road layouts are vital in encouraging active transport use. Given the proportion of residents that

stated that infrastructure changes would have a positive impact on active transport use, it is likely that inner Halswell is poorly designed for active transport use.

5. Mitigation

After analysing all aspects of the data gathered, as well as taking into account our literature review, mitigation options that are likely to increase the current walking and cycling rates in Halswell can be summarised below. These mitigation options are intended to address the specific problem areas identified in Halswell and should also be considered in future development that is likely to occur subsequent of the population increase resulting from the earthquakes.

5.1 Segregated cycle ways

According to Pucher & Buehler segregated cycle lanes are the best possible way to make cycling safe, convenient and practical. This strategy has been implemented in both small and large cities. The ideal place to situate segregated cycle lanes is at intersections and on roads with high traffic flow. From the survey responses, segregated cycle lanes were the most commonly mentioned method to get people participating in cycling. Those that were surveyed or participated in the focus group also pointed out where these separated cycle lanes should be situated. These locations were on Halswell Road and Halswell Junction Road, two of the busiest roads within Halswell (Figure 7).

5.2 Reduced speed limits

Lowering speed limits is another intervention strategy that should be considered in encouraging active transport. Denmark, Germany, and the Netherlands are examples of countries that have targeted traffic safety in a multi-faceted way. Through these techniques, they have achieved much lower injury and mortality rates. Research suggests lowering the speed limit increases the likelihood of people choosing active modes of transport (Pucher & Buehler, 2008). The idea of reducing speed limits was a common response from those that were interviewed in the survey. Those that participated in the focus group also specifically mentioned it as a potential mitigation option. Due to the three different speed limits on Halswell Road, the limit at any one point may be unclear so either dropping the speed limit or keeping it consistent may be the best mitigation option for this problem (Figure 7).

5.3 Making crossings safer

Crossing infrastructure is another common intervention strategy that can be used in order to increase active transport rates. Leden, Garder & Johansson, (2005) suggest that the most successful structural options include physically raised crossed walks and traffic cushions 4 metres before the crosswalk.

Island crossings were another mitigation option that was suggested by not only those that were surveyed but also by those that participated in the focus group. The island crossings were pin pointed to be located on Nicholls Road, outside the shopping centre (Figure 7). This is due to the large amount of traffic that is currently using Nicholls Road. This stretch was not built to withstand the amount of traffic that is currently using it, making crossing particularly

difficult. In addition to this, the supermarket is also located there, as well as a temporary bus exchange. Introducing an island crossing offers a refuge where people can wait safely while the traffic clears.

A light signalled crossing should also be considered on Halswell Road connecting the swimming pool to the shopping centre. The reason this was requested is because currently it is difficult to cross, especially for children and elderly, due to the current speed limit and width of the road. This also connects two key community facilities and offers another safe crossing point for pedestrians.

Basic training can ultimately be the best mitigation option towards increasing pedestrian safety. Children especially need training when using island crossings, light signalled crossings and pedestrian crosswalks as these can provide a false sense of security. In America, they have implemented a basic training strategy to increase safe pedestrian behaviours. The results showed that children behaved more safely after training (Benjamin, Schwebel & Morrongiello, 2006). These training programmes should also be considered in Halswell and Oaklands primary schools to increase safety at all crossings.



Figure 7: specific mitigation options in Halswell

6. Limitations

There were several limitations to the research process and study of active transport in Halswell. Time was a major constraint, so the amount of work that could be attempted was limited and due to the nature of random sampling not all age groups were incorporated into the data (Preston, 2009). Additionally, given the limited time frame it took approximately 18 hours of surveying to receive 75 responses.

Another limitation to the study was the lack of focus groups that were undertaken and the number of participants. In each focus group, it is recommended that there are 8-10 participants (Secor, 2009). It is also recommended that, to achieve saturation of the population, 4 to 5 focus groups should be held (Secor, 2009). Due to lack of interest, it made it impossible to hold more than one focus group. Because of this, a fuller understanding of the barriers to active transport in Halswell and how these vary throughout the community could not be discovered.

Of the 75 respondents to the survey, more than 65% were over the age of 50. Due to this, many of them seemed to be confident walking around the busy roads of Halswell. However, because only 5 responses from parents with young children were received, gathering information about young parent's perceptions of road safety around the area was difficult. From these 5 responses, all 5 said that they would not want their children walking or cycling unsupervised around Halswell's main roads. It would have been useful to have more young parents as responders to give a wider perception of how safe Halswell's roads are. The statistics that were gathered from the schools was limited. Responses from only 10 of the 23 classes at Oaklands School were received, so a complete dataset for comparison to Halswell School was unable to be produced and all comparisons that were made could be unreliable.

Also, as the census data only included modes of transport to work, comprehensive information on the usual travel modes in Halswell was unavailable. This did not give complete information and did not allow for the use of comprehensive statistics to aid the project.

7. Conclusions

It is evident that Halswell Residents favour using vehicles as their preferred mode of transport. This report aimed to identify if there were any perceived barriers to active transport and provide possible mitigation options to increase the current walking and cycling rates. The results clearly indicated cycling rates in Halswell are low. This was an expected finding based on previous Census data. Paradoxically, the walking rates were much higher than anticipated, but still low in comparison to car use. After analysing relevant literature and prioritising the opinions of Halswell resident's possible mitigation options could be suggested. This included general options, such as segregated cycle ways, and more geographically specific options, such as signalled crossing points and traffic islands.

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