Hutt City Cycling and Micromobility

Hutt City Cycling and Micromobility SSBC

IZ135600-0000-GN-RPT-0001 | 1

10 September 2020

Hutt City Council

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Project No:	IZ135600
Document Title:	Hutt City Cycling and Micromobility SSBC
Document No.:	IZ135600-0000-GN-RPT-0001
Revision:	1
Document Status:	Draft
Date:	10 September 2020
Client Name:	Hutt City Council
Project Manager:	Chris Groom
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File Name:	Hutt City Cycling and Micromobility SSBC_draft issued for client feedback.docx

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Document history and status

Revision	Date	Description	Author	Checked	Reviewed	Approved
1	06/08/20	Draft for client feedback	CG/TR	CG	TB/KR	BW
2	10/09/20	Draft for Waka Kotahi feedback	CG/TR	CG	TB/KR	BW

Contents

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs is to complete the programme development of a single stage business case in accordance with the scope of services set out in the contract between Jacobs and Hutt City Council ('the Client'). That scope of services, as described in this report, was developed with the Client.

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Executive summary

To be added with final version of report

1. Introduction

1.1 Project overview

Hutt City Council has made significant progress in completing the projects referenced in Walk and Cycle the Hutt 2014-2019 strategy which includes Wainuiomata shared path, Eastern Bays shared path and The Beltway. The purpose of this Single Stage Business Case (SSBC) is to identify the next stages in developing a connected cycleways and pathways network in Hutt City. The SSBC considers the needs of both bike using bikes and people using micromobility (e-scooters, e-skateboards and self balancing e-unicycles). This is because bikes and micromobility travel at similar speeds and use require similar amounts of space. The investment contained in the recommended programme will further improve accessibility to jobs, public transport, schools and community facilities by active and sustainable modes. The recommended programme contains both infrastructure (cycleways, shared paths, buffered bike lanes and traffic calming) as well as supporting measures (cycle skills training, end of trip facilities, market and events).

1.2 Previous work done to date

This SSBC builds on the Hutt City Cycling Improvements Strategic Case for Investment 2016 and Hutt City Cycleway Connectivity Assessment 2019. The strategic case was developed as part of the Beltway Project and identified the need for investment, investment logic mapping and problem/ benefit statements. As part of the SSBC the strategic case will be assessed against an updated evidence base to test whether the strategic case is still fit for purpose. The Hutt City Cycleways Connectivity Assessment is a cycling network study which identifies a complete cycling network in Hutt City including options for routes and treatments. This SSBC will inform the staged implementation of the complete active and sustainable modes network identified as part of the Connectivity Assessment.

1.3 Purpose of the report

The purpose of this report is to document the process undertaken to develop the recommended programme of investment in active and sustainable mode infrastructure and supporting measures. The recommended programme is part of the Hutt City Cycling and Micromobility Single Stage Business Case (SSBC) with the next stage being the completion of concept designs for the infrastructure projects. A SSBC pathway was chosen rather than separate Programme Business Case and Detail Business Case pathway due to low to moderate complexity, risk and uncertainty. This reflects Waka Kotahi advice on the business case pathway for single mode business cases.

1.4 Stakeholders

The stakeholders which have been consulted with during the development of this SSBC include representatives from:

- Hutt City Council
- Greater Wellington Regional Council
- Waka Kotahi
- Cycling Action Network
- Living Streets Aotearoa
- Elected representatives of Hutt City
- Community Groups

Stakeholder feedback was provided during a workshop hosted in Hutt City on 25 February 2020 which covered the strategic case and long list programme options. Further stakeholder feedback was sought on the short list programme and assessment via written feedback on 29 April 2020. Discussions with Waka Kotahi on the investment objectives and integration with other business cases occurred throughout the programme.

1.5 Impact of Covid-19

Overall it is considered that the post Covid-19 context does not change the strategic case for investment in safe and connected active and sustainable mode network in Hutt City. However, Covid-19 has placed additional short-term financial pressures on Hutt City Council and the National Land Transport Fund. To account for this the recommended programme has a light level of investment in the short-term with larger infrastructure projects being phased for the medium and long term.

1.6 Report structure

The Hutt City Cycling and Micromobility business case has the following format:

- Sections 2-4: Context, strategic case and strategic alignment confirms the strategic case for investment.
- Sections 5-7: Programme development documents the process followed to develop the recommended programme of investment including the economic assessment
- Sections 8-10: Financial, commercial and management cases
- Section 11: Next steps are outlined to continue the recommenced programme to design and consultation phase.

2. Programme Context

2.1 Population and Employment

In 2018 Hutt City had a population of 104,500 people which makes it the 7th largest city in New Zealand[1]. Between 2013 and 2018 Hutt City's population increased at an average rate of 1.2% per year with building consents increasing from 1189 in 2015/16 to 1633 in 2018/19[2].

Figure 2-1 shows the population density (residents per square kilometre) of Hutt City with the suburbs of Petone, Waterloo, Naenae, Taita and Stokes Valley having the highest population densities. The Western Hill suburbs and Eastern Bays are the residential areas with lower population densities. The Central City and Seaview/Gracefield also have low population densities but these areas have a high concentration of jobs.

[1] 2018 New Zealand Census

[2] Hutt City Council, 2019, *Population growing, building hits new highs, economy solid,* retrieved from http://www.huttcity.govt.nz/Your-Council/News-and-notices/media-releases/2019 -media-releases/population-growing-building-hits-new-highs-economy-solid

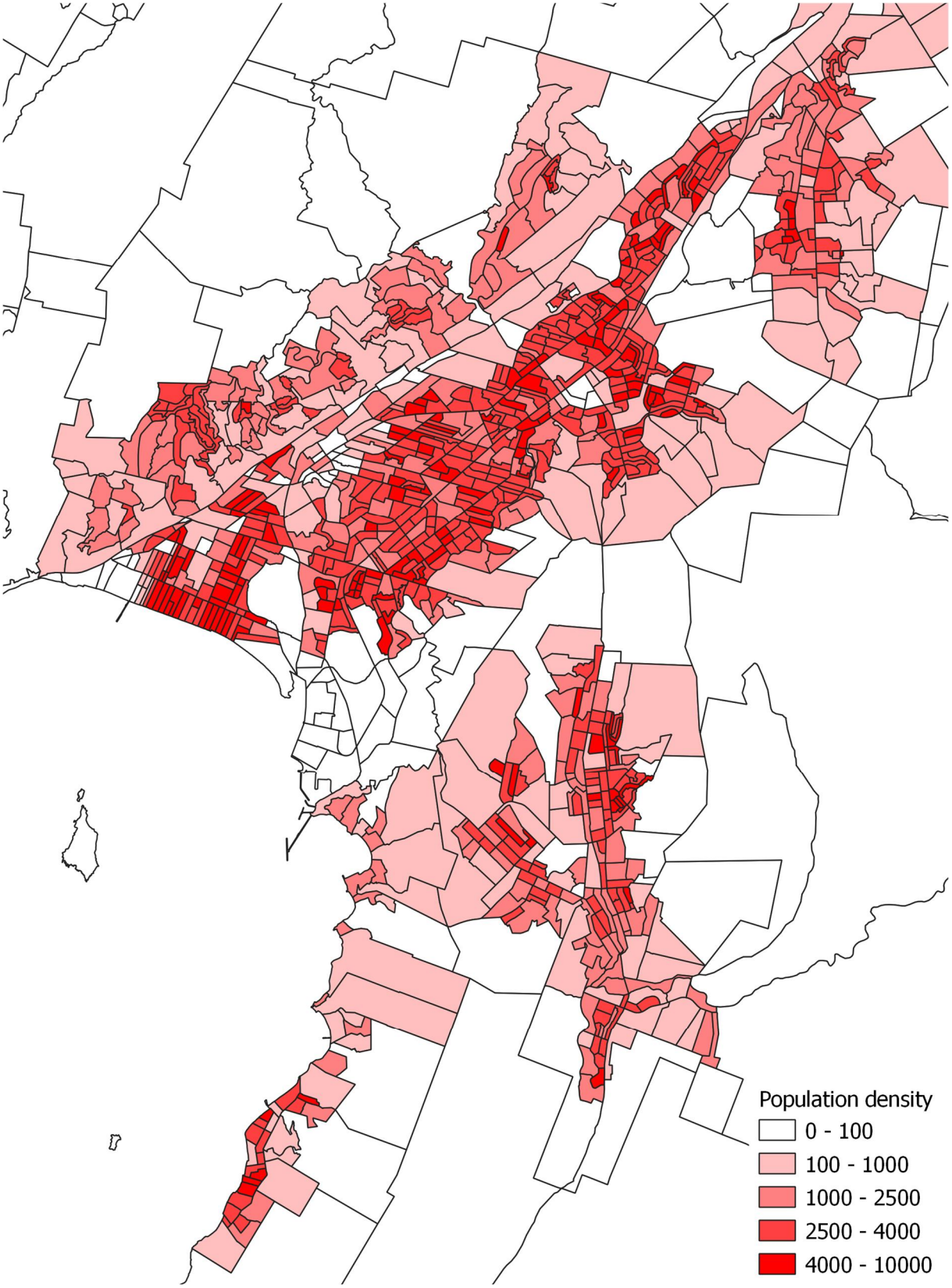


Figure 2-1: Population density (residents per square kilometre) of Hutt City. Source: 2013 NZ Census

A high density of young people (0 to 19-year olds) live in the suburbs of Petone, Waterloo, Naenae, Taita and Wainuiomata. Whereas the Western Hill suburbs and Eastern Bays have a comparatively lower density of young people.

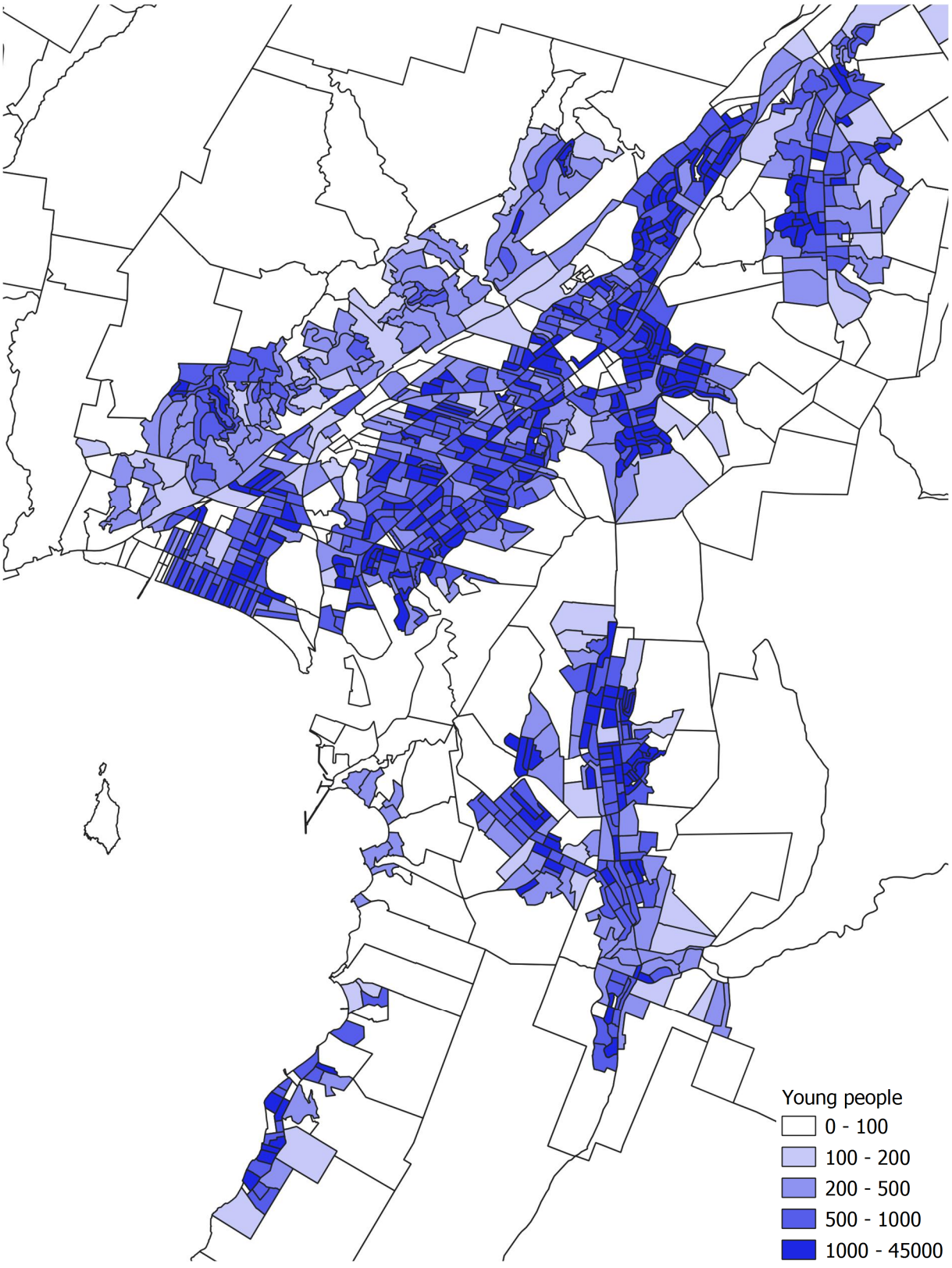


Figure 2-2: Number of young people per square kilometre in Hutt City. Source: 2013 NZ Census

Figure 2-1 shows that overall 62% of residents have jobs located within Hutt City, with 35% of residents commuting to Wellington City and 3% of residents travelling to Porirua or Upper Hutt for work. The area with the highest proportion local employment is Wainuiomata with 71% and the area with the lowest local employment is the Western Ward with 54%. The largest employment areas in Hutt City are Hutt Central with 8000 jobs, Petone with 5000 jobs, Gracefield with 4000 jobs and Hutt Hospital with 2250 jobs.

	Percentage of residents with jobs located in Hutt City	Percentage of residents with jobs located in Wellington City	Percentage of residents with jobs located in Porirua and Upper Hutt
Petone Community	56%	42%	2%
Eastbourne Community	56%	44%	0%
Central Ward	62%	36%	3%
Western Ward	54%	42%	3%
Eastern Ward	63%	33%	4%
Wainuiomata Ward	71%	26%	2%
Northern Ward	65%	27%	8%
All of Hutt City	62%	35%	3%

Table 2-1: Location of jobs for Hutt City residents from 2013 Census data (Source: Stats NZ Commuter View)

Implications for active and sustainable mode network development

Hutt City's population and employment patterns provides the following insights for the active and sustainable mode network development:

- The areas of Petone, Waterloo, Naenae, Taita, Stokes Valley and Wainuiomata have the highest population density and therefore cycleways in these areas may have the greatest potential uptake;
- A higher density of young people live in the suburbs of Petone, Waterloo, Naenae, Taita and Wainuiomata. Investment in these areas may provide the greatest opportunity to encourage more students to use active modes to and from school; and
- The majority of residents have jobs located in Hutt City (62%) with many of these trips to work being short distance and therefore well suited to cycling and micromobility. Average commute distance is discussed further in table 2-3 on page 17.

2.2 Transport System

The current transport network in Hutt City has the following main features:

- State Highway 2 which carries inter-city and inter-region traffic which runs north-south parallel to the Hutt River. The Petone, Dowse and Haywards Interchanges are grade separated with the Melling and Belmont intersection being signal controlled;
- Two rail lines serve Hutt City which are the Hutt Valley Line and Melling Line. The Hutt Valley line has a 20-minute off-peak service during weekdays and an hourly weekend service. With the Melling Line having an hourly off-peak service and no weekend service;
- The current cycleways/pathways in Hutt City are the Hutt River Trail, The Esplanade shared path, Wainuiomata Road shared path and sections of on road cycle lanes (Figure 2-3). Committed cycleways/pathways include Te Ara Tupua, The Beltway and Eastern Bays shared path which are at various stages of design and consenting. The current and committed cycleways/pathways network lacks safe and attractive connections to key destinations including Hutt CBD, Jackson Street and schools. There is also gaps in the cycleways/pathways network (particularly in Gracefield/Seaview), sections which provide poor cycling level of service and a lack of coverage in the main residential areas; and
- There is a network of footpaths along most local roads. Due to space constraints some roads in the Western Hill suburbs have a footpath only on one side of the road.

Hutt City's geography and the layout of the transport system creates several of pinch points which limits cycle accessibility. This is due to either a physical barrier or the need for people on bikes to use roads with high volumes and high-speed traffic. These pinch points include:

- State Highway 2 which cuts the Western Hill suburbs off from the rest of the city;
- Hutt River which divides Petone and Alicetown from the central city with limited provision for people on bikes being provided at river bridges;
- Hutt Valley Rail Line which separates Waterloo and Naenae of the eastern side from Taita and Hutt Central on the western side;
- Busy arterial roads which serve Hutt CBD which includes Waterloo Road, High Street, Woburn Road and Railway Avenue;
- Harcourt Werry Drive which is a high-speed road (70 km/hr) that limits access to the Hutt River Trail for people living in Taita, Avalon and Epuni;
- Busy multi-lane roundabouts including Hutt Road/ The Esplanade, Randwick Road/ Waione Street, Wainuiomata Road/ Main Road and Fairway Drive/ High Street; and
- Eastern Hutt Road which is a high-speed road (70 km/hr) that restricts access to Stokes Valley and Taita College.

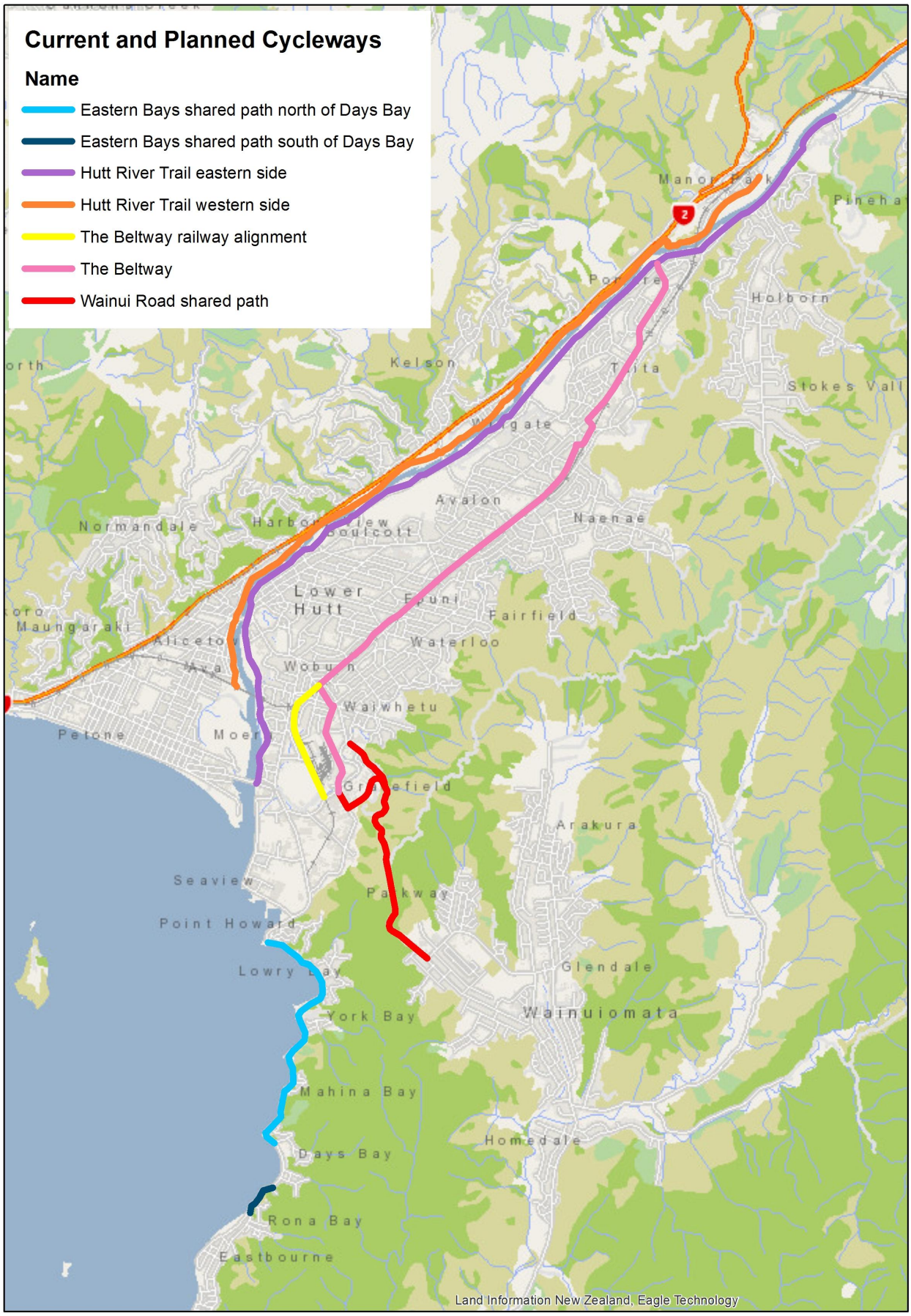


Figure 2-3: Current and planned cycleways network in Hutt City

Currently in Hutt City the majority of residents use motor vehicles as their main means of travel to work with a mode share of 73.4% (Table 2-2). Public transport and walking have the next highest mode shares with 18.3% and 4.7% respectively. Cycling is currently under represented as a transport mode in Hutt City with 2.2% of trips to work. There is the potential to significantly increase cycling mode share in Hutt City with comparable cities such as Nelson and Palmerston North having cycle mode shares of 7.0% and 5.0% respectively.

Main means of travel to work	Mode share from 2013 Census
Motor vehicle (including passenger and motor cycle)	73.4%
Public transport	18.3%
Bicycle	2.2%
Walked	4.7%
Other	1.4%

Table 2-2: Main means of travel to work

Figure 2-4 shows that the 2013 cycle mode share varies considerably across Hutt City. Stokes Valley and Wainuiomata has a cycle mode share of less than 1% with Eastbourne, Petone, Moera and Waiwhetu all having cycle mode shares of around 4%. The Wainuiomata shared path which opened after the 2013 Census was complete has removed a significant barrier to active and sustainable mode user to and from Wainuiomata.

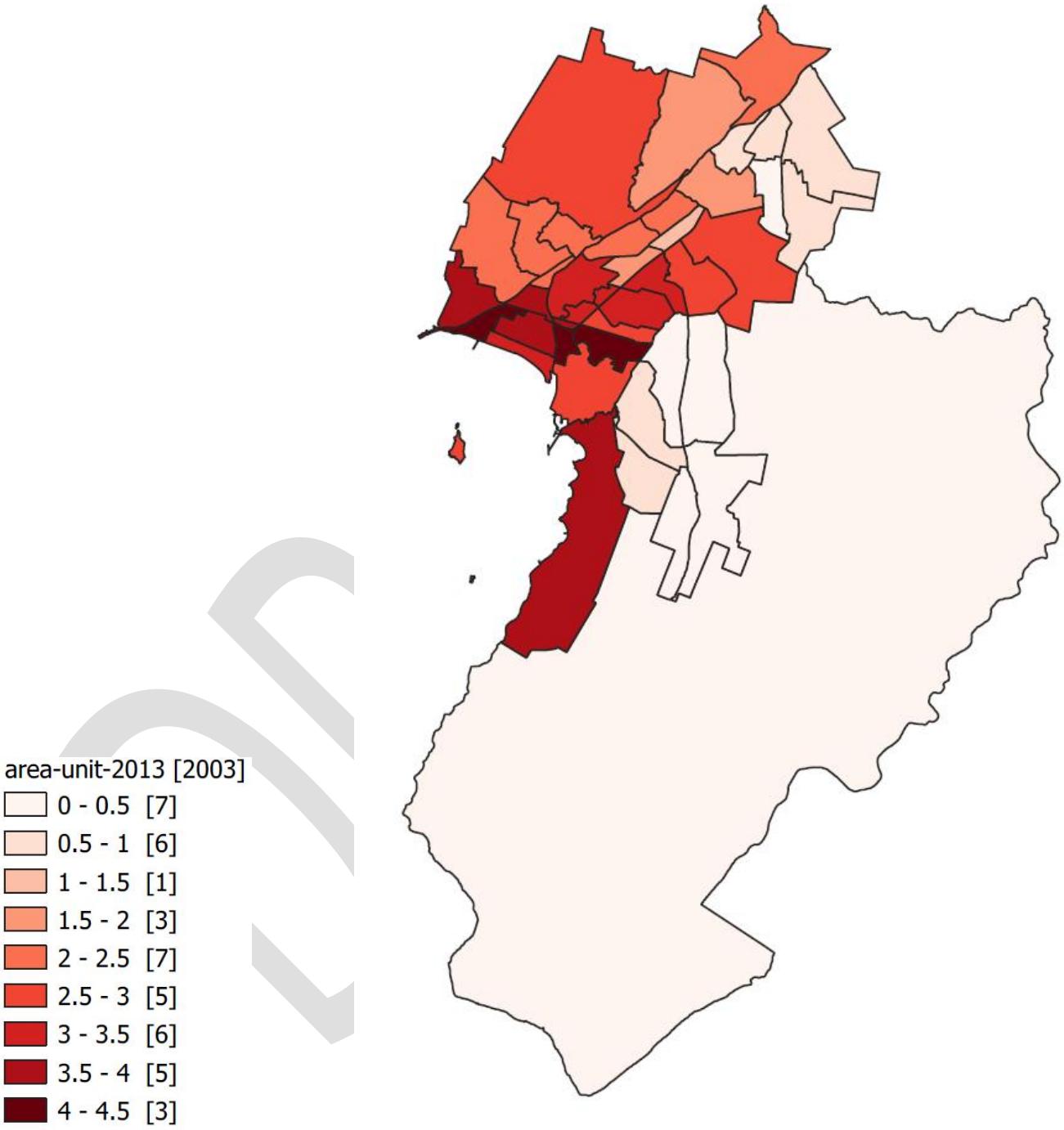


Figure 2-4: Cycle mode share in Hutt City by census area units

The distance travelled to work varies considerably between residents who work in Hutt City and residents who commute to Wellington City. Table 2-3 shows the average commute distance broken down by community board and ward area. The source data for the table is 2013 Census data about where people usually live and where they work. Commute distances are calculated on using straight line distance between census area units and do not follow the road network.

For residents who work in Hutt City the average commute distance is 3.9 km, which is around a 15 min cycle. The commute distance within Hutt City increases slightly for the Eastbourne Community and Northern Ward (5.9 km or a 20 min cycle) due to these areas being further away from the main employment centres. For residents who work in Wellington City the average commute distance is 14.9 km which represents a 45 min cycle. However, for residents in South Hutt City the commute to Wellington City is shorter at an average of 12.3 km or a 35 min cycle for the Petone Community.

	Average commute distance for trips within Hutt City	Average commute distance for trips to Wellington City
Petone Community	2.3 km	12.3 km
Eastbourne Community	5.9 km	11.2 km
Central Ward	2.5 km	15.1 km
Western Ward	3.9 km	14.7 km
Eastern Ward	3.4 km	15.8 km
Wainuiomata Ward	4.8 km	14.5 km
Northern Ward	5.9 km	20.6 km
All of Hutt City	3.9 km	14.9 km

Table 2-3: Average commute distance by community board and ward area in Hutt City

In December 2018 Lime was granted a permit by Hutt City Council and Upper Hutt District Council to operate a trial dock less e-scooter rental business. Lime e-scooters could be rented by the minute with users being able to park the e-scooters at their destination rather than needing to return them to fixed locations. In June 2019, Lime decided to pull out of the Hutt Valley market due to Wellington City Council selecting competitors Jump and Flamingo to operate e-scooter rentals in Wellington City. Therefore, at the time of writing this SSBC Hutt City does not have publicly available e-scooter rents however it is possible that another company may operate e-scooter rentals in the future. During the seven months of operation in the Hutt Valley 225,000 trips were taken on Lime scooters by 50,000 users.

An online survey by the University of Canterbury[3] in February and March 2019 provides the following insights into e-scooter usage:

- 25% of e-scooter users had used an e-scooter once and 75% had used e-scooters more than once;
- First time e-scooter users were most motivated by wanting to have fun and try e-scootering;
- Subsequent e-scooter use was motivated by the speed and convenience of e-scooters as a means of transport;
- Younger people, men and those in full-time employment were most likely to use e-scooters; and
- Only around half of users (51%) think that the footpath is an appropriate environment to ride an e-scooter.

For survey respondents who used e-scooters more than once the following travel behaviour was recorded:

- 57% of e-scooter trips replaced trips that would otherwise have been made by active modes;
- 28% of e-scooter trips replace a trip that would have been made with a motor vehicle; and
- 7% of e-scooter trips were new trips that would not otherwise have been made.

Implications for active and sustainable mode network development

Hutt City's transport system provides the following insights for the active and sustainable mode network development:

- There is the opportunity to connect the existing and planned cycleways/pathways network to key destinations and main residential areas which will increase cycling and micromobility uptake across the whole network;
- Removing barriers to active and sustainable mode accessibility from conflicts with other transport modes is an important consideration for the design of the cycleways/pathways network;
- Areas in Northern Hutt City and Wainuiomata have had lower cycling uptake than Southern Hutt City and the Western Hill suburbs;
- Trips to work within Hutt City are short distance which are well suited for cycling and micromobility with 62% of residents being employed within Hutt City;
- Commute trips to Wellington City particularly for areas in Northern Hutt City are longer and therefore may be better suited to more confident users. However, the availability of e-bikes/e-scooters and encouraging active and sustainable modes to train stations may help to reduce the importance of distance; and

[3] Fitt, H & Curl, A. *Perceptions and experiences of Lime scooters: Summary survey results*, 2019.

- E-scooter rentals are not currently publicly available in Hutt City although micromobility devices can be purchased and used by residents.

2.3 Socioeconomic Disparities

Hutt City, like most cities in New Zealand, has areas were residents on average have lower incomes and employment opportunities and areas with higher incomes and employment opportunities. The relative socioeconomic disparities of an area are measured in the New Zealand Deprivation Index which is shown in (Figure 2-5 on following page). The Deprivation Index classifies areas from a scale of 1 being least socioeconomically deprived to 10 which is most socioeconomically deprived. The areas in north-east Hutt City are amongst the 10% most socioeconomically deprived areas of New Zealand with Western Hills, Eastern Bays and Hutt Central being the least deprived.

For areas with high socioeconomic deprivation the availability of affordable transport options is an important factor in the accessibility of employment opportunities for residents in these areas. Cycling and micromobility along with public transport can provide affordable transport options compared to the cost of owning and maintaining a vehicle. However not all areas with high deprivation are within walking distance to a train station which includes parts of Naenae, Stokes Valley, Avalon and Moera.

Implications for active and sustainable mode network development

The New Zealand Deprivation Index provides the following insights for the active and sustainable mode network development:

- Some areas of Hutt City have high deprivation and low access to affordable transport options due to being located outside of a walking distance to a rail station. Therefore, encouraging cycling and micromobility provides the opportunity to improve access to employment opportunities both in Hutt City and the wider Wellington region.

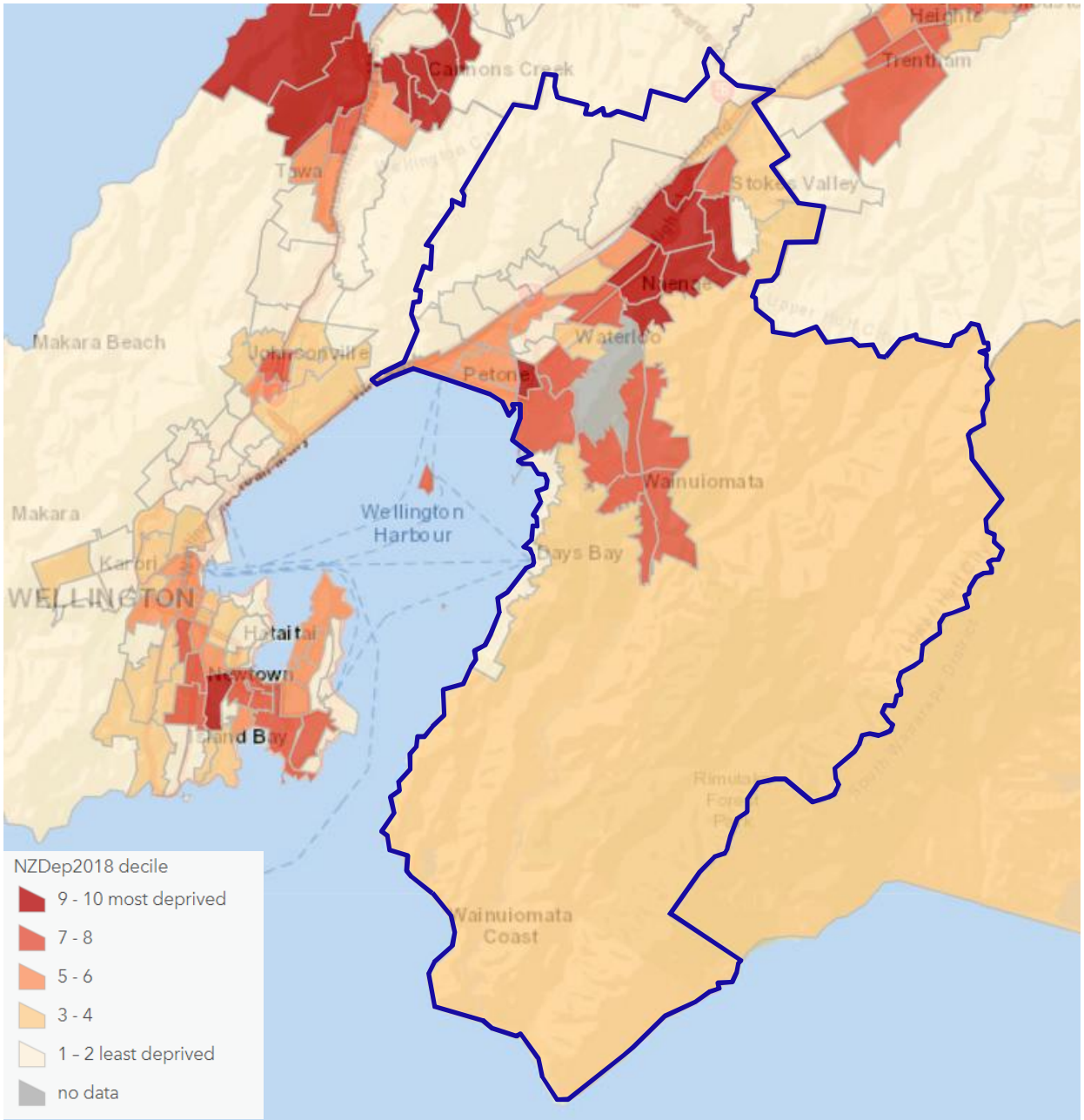


Figure 2-5: New Zealand Deprivation Index, 2018 (Source: University of Otago)

2.4 Geography

The most significant geographic feature of Lower Hutt is the flat valley floor which contains the central city and main residential areas of Petone, Waterloo, Naenae and Taita (Figure 2-6 on the following page). This area is well suited to cycling and micromobility with flat gradients and a relatively compact size with most residential areas being able to access the central city with a 10 to 20 min cycle. Another feature of Hutt City is the Western Hill suburbs which have steeper gradients which may limit potential uptake in these areas. Stokes Valley and Wainuiomata are more distant suburbs that would require a 30 to 40 min cycle to access the central city.

Implications for active and sustainable mode network development

Hutt City's geography provides the following insights for the active and sustainable mode network development:

- There is significant potential to shift trips to cycling and micromobility in Hutt City, particularly in the Valley floor which is flat and destinations relatively close; and
- The areas of Western Hill suburbs, Stokes Valley, Wainuiomata and Eastbourne also have potential to increase participation in active and sustainable modes. For these areas distance and road gradient may limit potential uptake however the increasing availability and usage of e-bikes and e-scooters may help to overcome these challenges.

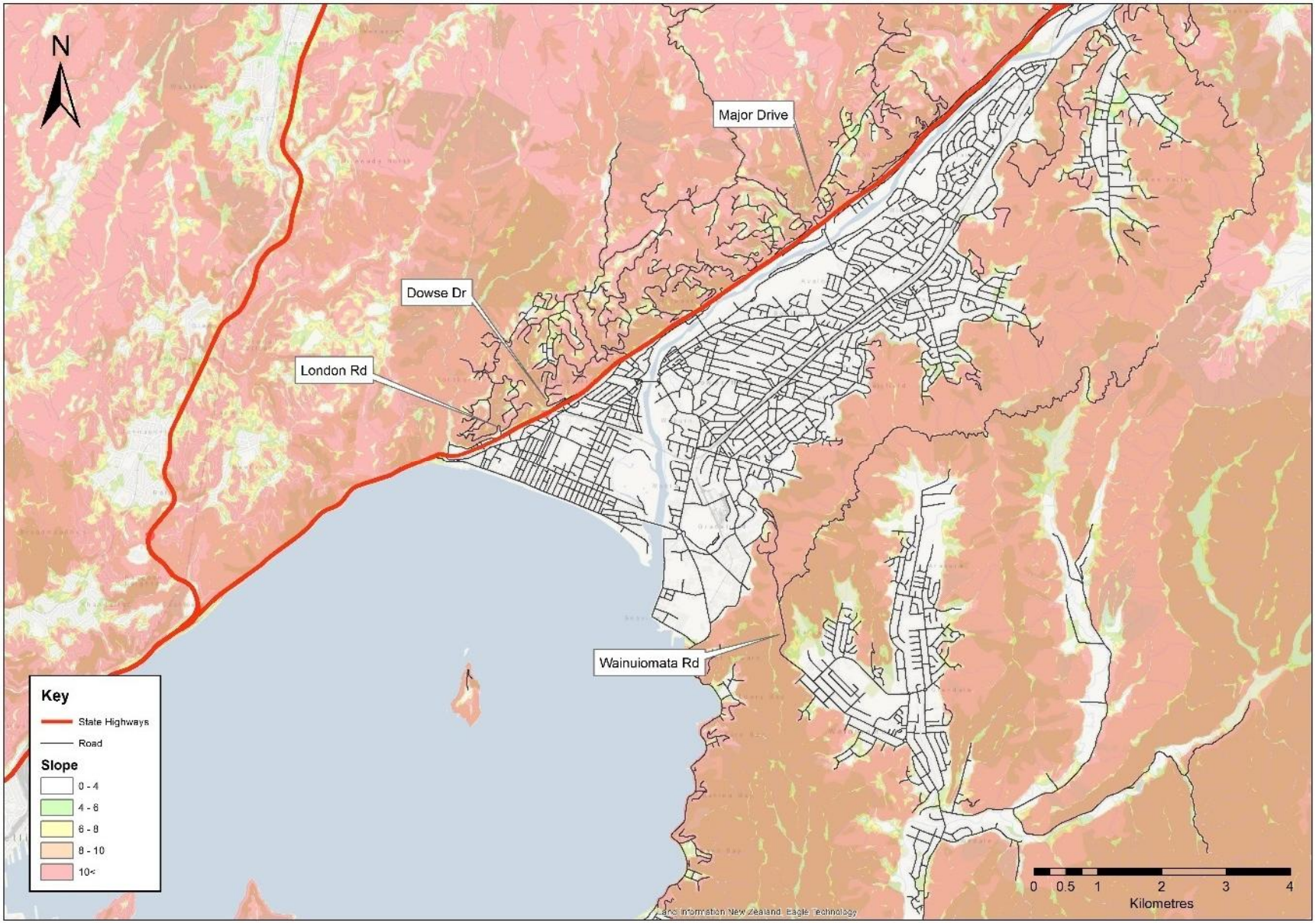


Figure 2-6: Hutt City slope steepness measured in degrees

3. Strategic Case

This section outlines the reasons to invest in developing improved connectivity, facilities and safety for people on bikes and people using micromobility in the Hutt City. The strategic case[4] for investment in cycling improvements was completed in 2016 with representation from key partner organisations including the Waka Kotahi, Hutt City Council and Hutt Cycle Network.

3.1 Defining the Problem / Opportunity

A set of problem statements were developed with the purpose of identifying the problems faced by people using bikes (and other residents who may be interested in cycling) in Hutt City. The problem statements were developed during a facilitated workshop held on 16 November 2015 following the investment logic mapping format (Refer to Figure 3-1 & Figure 3-2).

The agreed problems are as follows with relative importance shown with percentages:

Problem 1: The transportation network does not meet cycle needs or expectations, leading to an increase in urban congestion (50%)

Problem 2: A low and declining number of children are cycling to school contributing to increased vehicular congestion around schools (30%)

Problem 3: Cycling infrastructure is unsafe, resulting in an unacceptable number of crashes involving cyclists (20%)

For problem 1 it was found that key routes to the Hutt City CBD are unattractive and unsafe which leads to poor perceived and actual level of service for cycling. What cycling infrastructure does exist is poorly connected, does not follow desire lines and is poorly sign posted.

For problem 2 parents' perceptions that cycling is not safe lead to primary school children not being permitted to cycle to school alone. It was felt that this is a missed opportunity because older children would start cycling late and are not enthused by cycling.

Conflict with traffic particularly in the CBD, at roundabouts and around schools is seen as causing problem 3 with cycling infrastructure being unsafe. The perception of cycling being unsafe was identified as decreasing participating in cycling in Hutt City.

3.2 The benefits of investment

Stemming from the problem statements are the benefits of investment which are as follows:

Benefit 1: Improved safety for network users (30%)

Benefit 2: Increased participation in sustainable transport (40%)

Benefit 3: Reduced traffic volumes (30%)

The most critical benefit is increased participation in sustainable transport, this is because increase participation will partly achieve the other two benefits (improving safety and reduced traffic volumes). An increase in sustainable travel will have the 'safety in numbers' effect where motorists become more use to sharing the street with people on bikes.

[4] Strategic Business Case – Hutt City Cycling Improvements, Neil Caughey, Beca, 2016

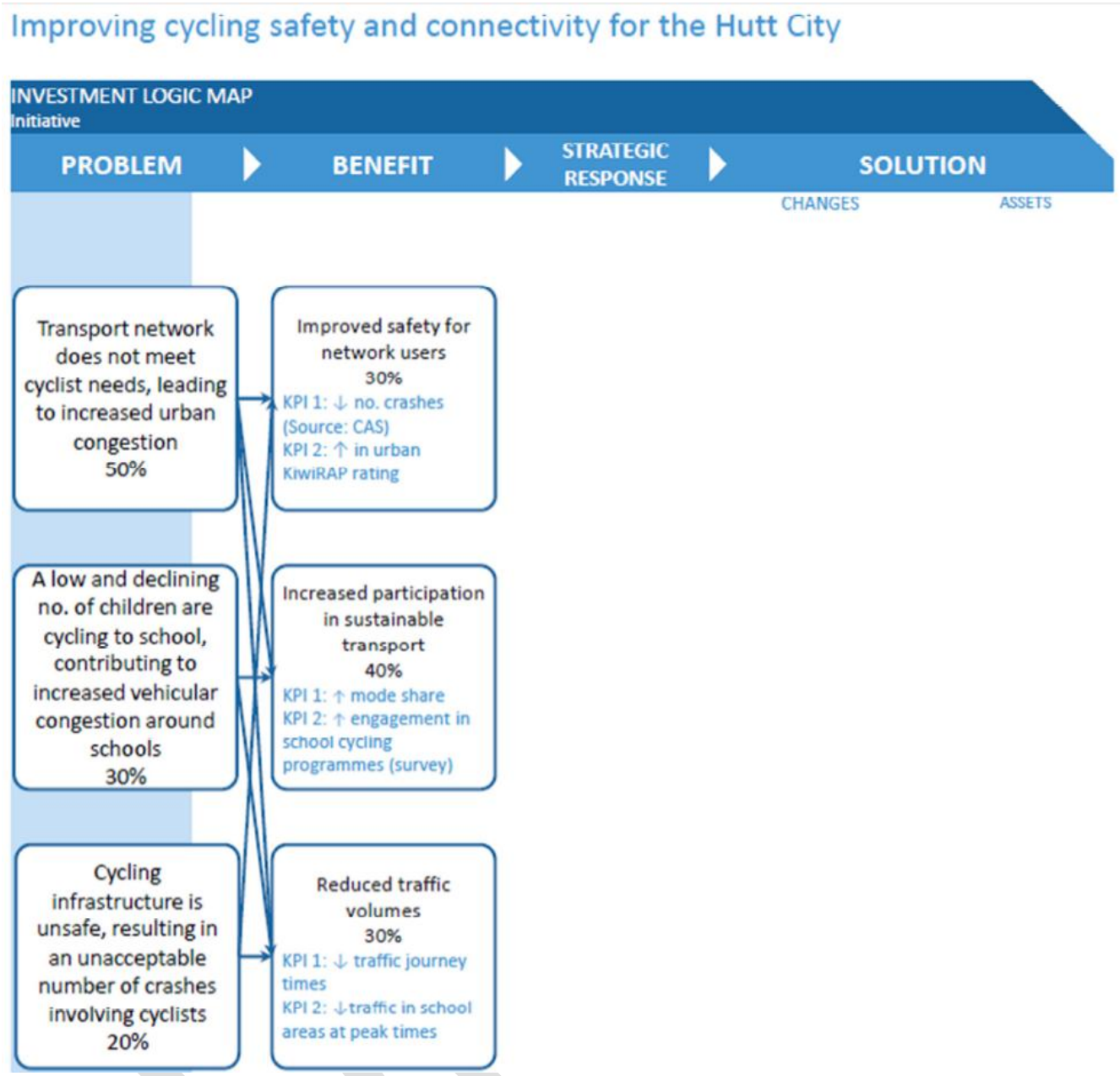


Figure 3-1: Investment logic map for cycling in Hutt City

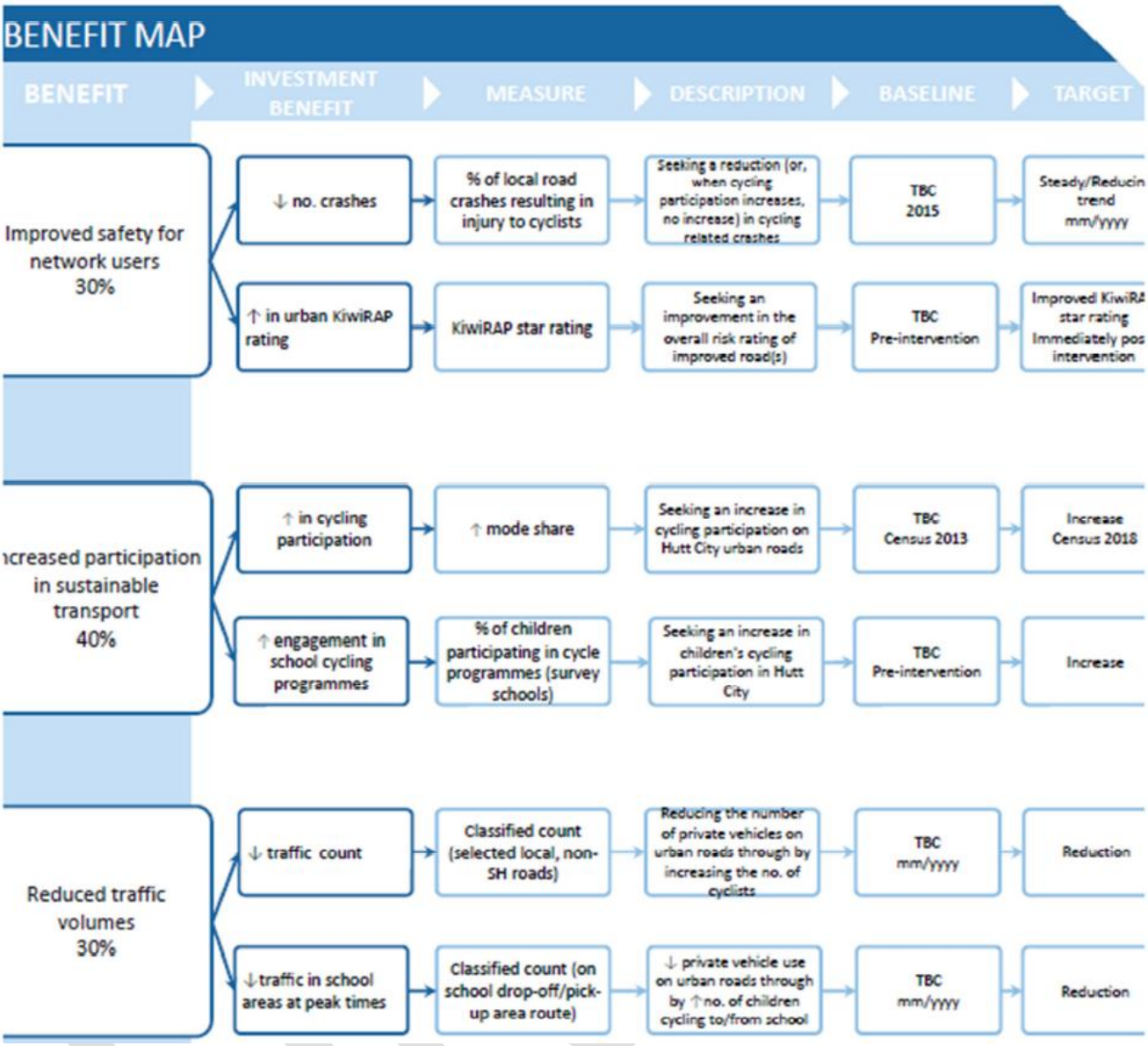


Figure 3-2: Benefit map for cycling in Hutt City

3.3 Confirming the strategic case

The first stage of this SSBC was to check whether the Strategic Case which was completed in 2016 is still fit for purpose. To achieve this the problem statements and benefits of investment were assessed against an updated evidence base. The following section outlines the results of this assessment.

3.3.1 The transportation network does not meet cycle needs or expectations

Census data was used to assess any change in participation in active modes (Figure 3-3). For the 2013 Census 2.2% of respondents used cycling as their main means of transport compared to 1.6% of respondents for the 2018 Census. During the same time period walking to work experienced a moderate decline from 4.7% in 2013 to 3.8% in 2018. This evidence indicates that participation in active modes is mostly stable however to achieve the objectives outlined in the strategic content (section 4), active mode share should be significantly increasing.

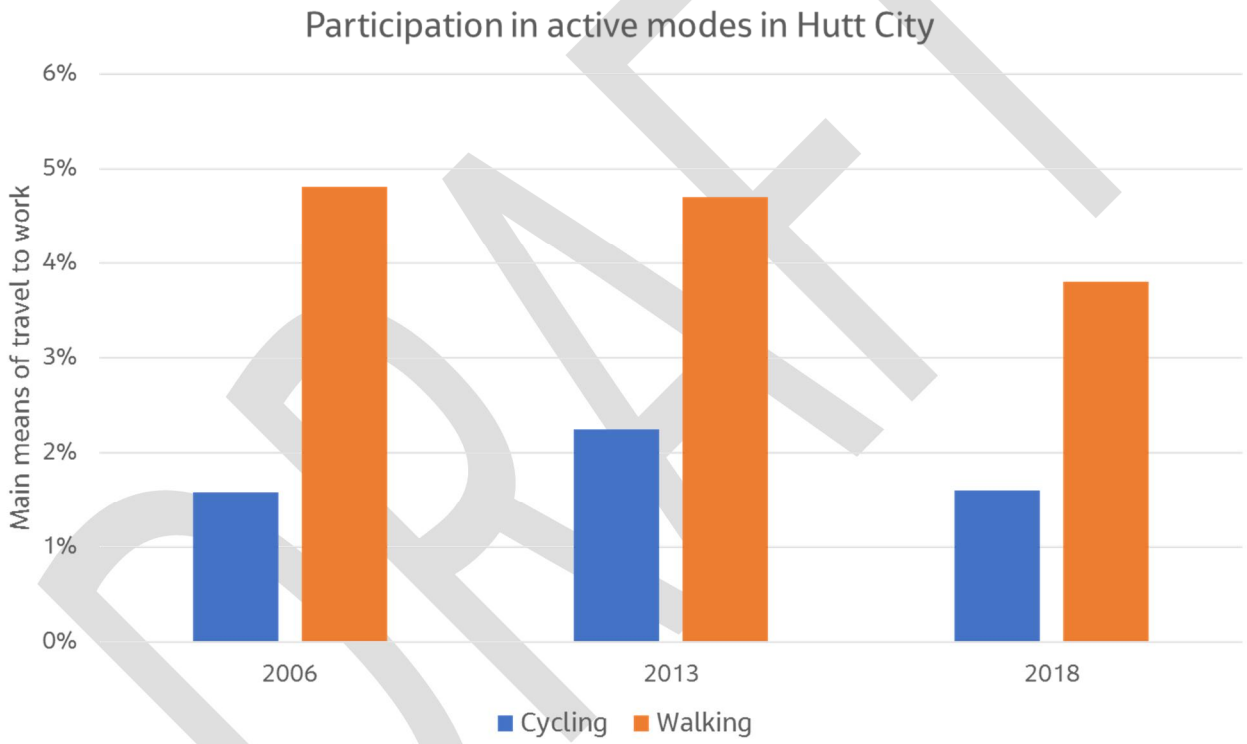


Figure 3-3: Percentage of Hutt City residents who used cycling or walking as their main means of transport to work on Census day (Source: NZ Census)

A recent survey into the attitudes and perceptions of cycling and walking found support for investment in cycling from respondents from Hutt City[5]. This is because 66% of respondents said that cycling is a great way to get around town and 67% of respondents supported investing in cycle lanes because it gives people more travel options (Table 3-1). However only 11% of respondents said that cyclists are sufficiently separated from traffic and only 30% of respondents said that they are satisfied with the availability of cycle paths/lanes. Most respondents from Hutt City were not satisfied with the level of service currently being provided to cyclists in their community.

Survey questions	Respondents from Hutt City
It is becoming more popular for people to use a bicycle to get to work, study or to the shops	52%
Investing in cycle lanes is important because it gives people more travel options	67%
The more people using bicycles, the better it is for drivers	40%
Cycling is a great way to get around town easily and efficiently	66%
My town has a well - connected cycle network	28%
Cyclists are sufficiently separated from traffic	11%
I'm satisfied with the availability of cycle paths/lanes in my community	30%
There are more/better cycle paths/lanes in my area	18%

Table 3-1: Responses to the attitudes and perceptions of cycling and walking survey for residents of Hutt City

3.3.2 A low and declining number of children are cycling to school

Information on the use of active transport to and from school for children aged 5 to 14 was obtained from Massey University Environmental Health Indicators. Figure 3-4 shows the percentage of children which regularly use active transport to and from school by District Health Boards (DHB) (Hutt Valley includes both Hutt City and Upper Hutt). Hutt Valley DHB had the third lowest proportion of students using active modes to school in New Zealand with 34%. This is much lower than Capital & Coast DHB (Wellington, Porirua and Kapiti areas) which had 58% of students using active modes to and from school. This evidence indicates that there is the opportunity to encourage more students to use active modes to school in Hutt City which will help to improve health outcomes.

[5] Waka Kotahi (2018). *Understanding attitudes and perceptions of Cycling and Walking.* https://www.nzta.govt.nz/assets/Walking-Cycling-and-Public-Transport/docs/NZTA-Attitudes-to-cycling-and-walking-final-report-2018.pdf

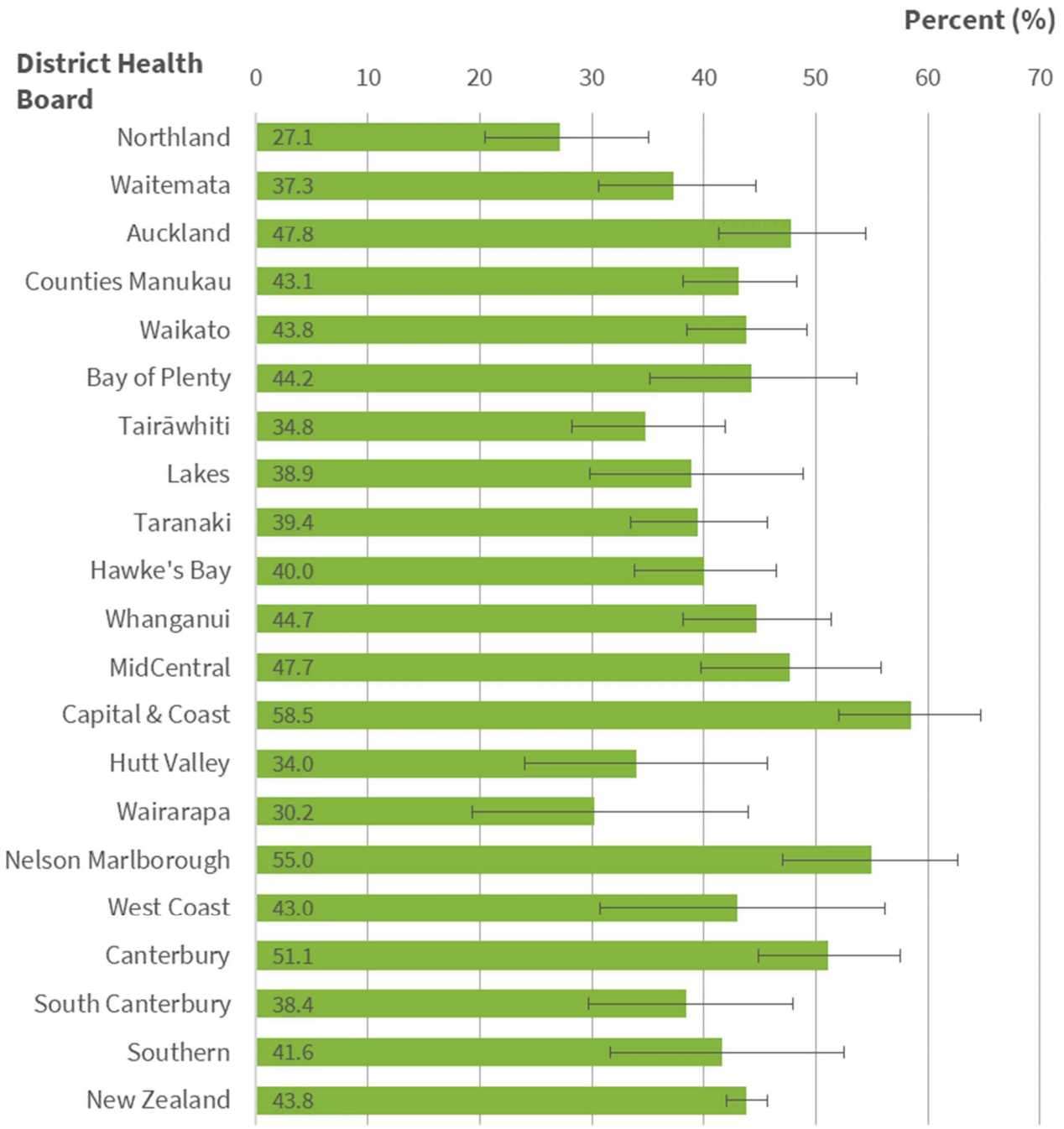


Figure 3-4: Proportion of students aged 5 to 14 that regularly use active transport to and from school by DHB (Source: Massey University Environmental Health Indicators)

3.3.3 Cycling infrastructure is unsafe

Figure 3-5 shows the recorded crashes involving cyclists in Hutt City for the three years prior to the Strategic Case and three years after. The graph shows an increase in crashes involving cyclists with 8 serious crashes between 2014 and 2016 compared to 13 serious crashes between 2017 and 2019. This evidence indicates that there is an ongoing safety issue for people using bikes in Hutt City.

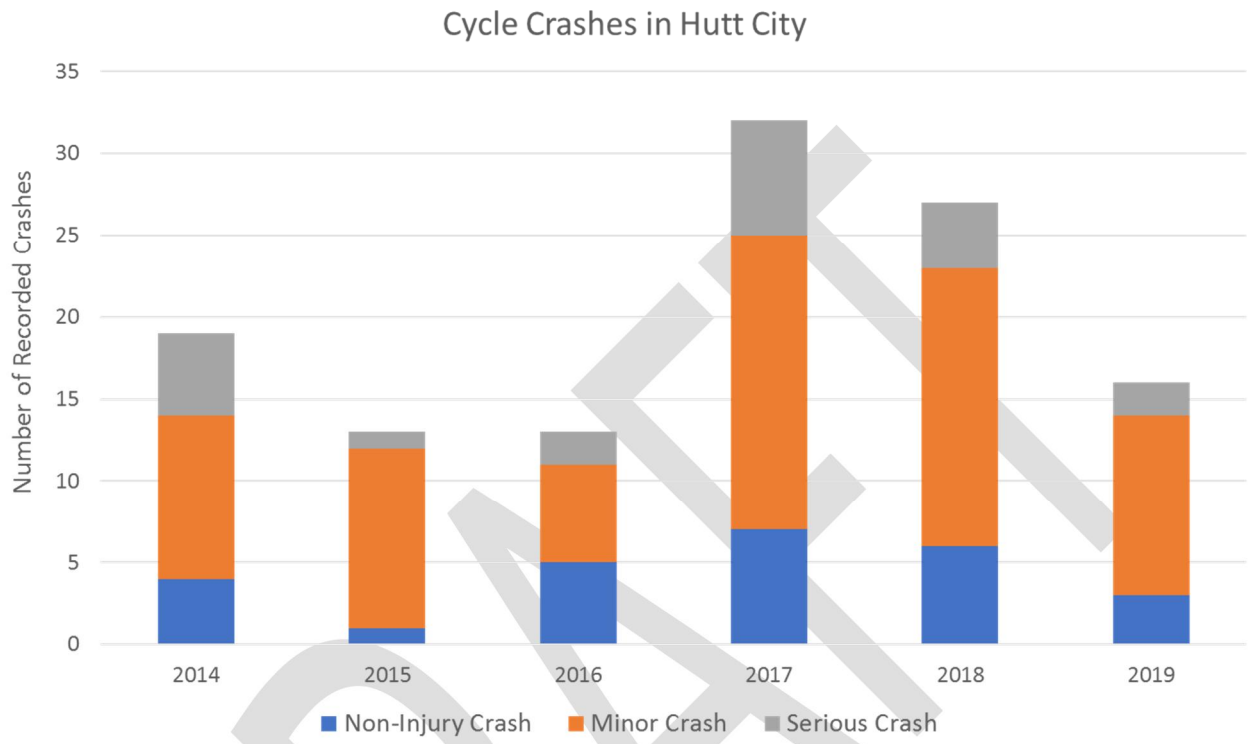


Figure 3-5: Recorded crashes involving cyclists in Hutt City (Source: CAS)

With regards to crash location 66% of crashes occurred at intersections whilst 33% of crashes occurred at mid-block locations. There is a cluster of crashes recorded in Hutt CBD, The Esplanade, High Street and Hutt Road as shown in Figure 3-6 on the following page.

The majority of crashes that occurred at intersections were due to motor vehicles failing to give way or turning across the path of bicycles. Of the intersection crashes, 48 crashes occurred at T-junctions or crossroads whilst 20 crashes occurred at roundabouts.

Crashes occurring at mid-block locations were due to a variety of factors including drivers failing to see cyclists when existing and entering driveways and drivers failing to give cyclists sufficient room when overtaking.

During the same time period there was one recorded minor injury crash involving micromobility which occurred at the corner of Kings Crescent and Pretoria Street. However, it is understood that there is a general underreporting of crashes involving micromobility users.

The implications of this evidence is that safety improvements at the intersections is important for reducing cycle crash rate because 2 out of 3 recorded crashes occurred at intersections. Also that improving safety for people using bicycles on CBD streets, The Esplanade, High Street and Hutt Road is important to address the cluster of recorded crashes that have occurred at these locations.

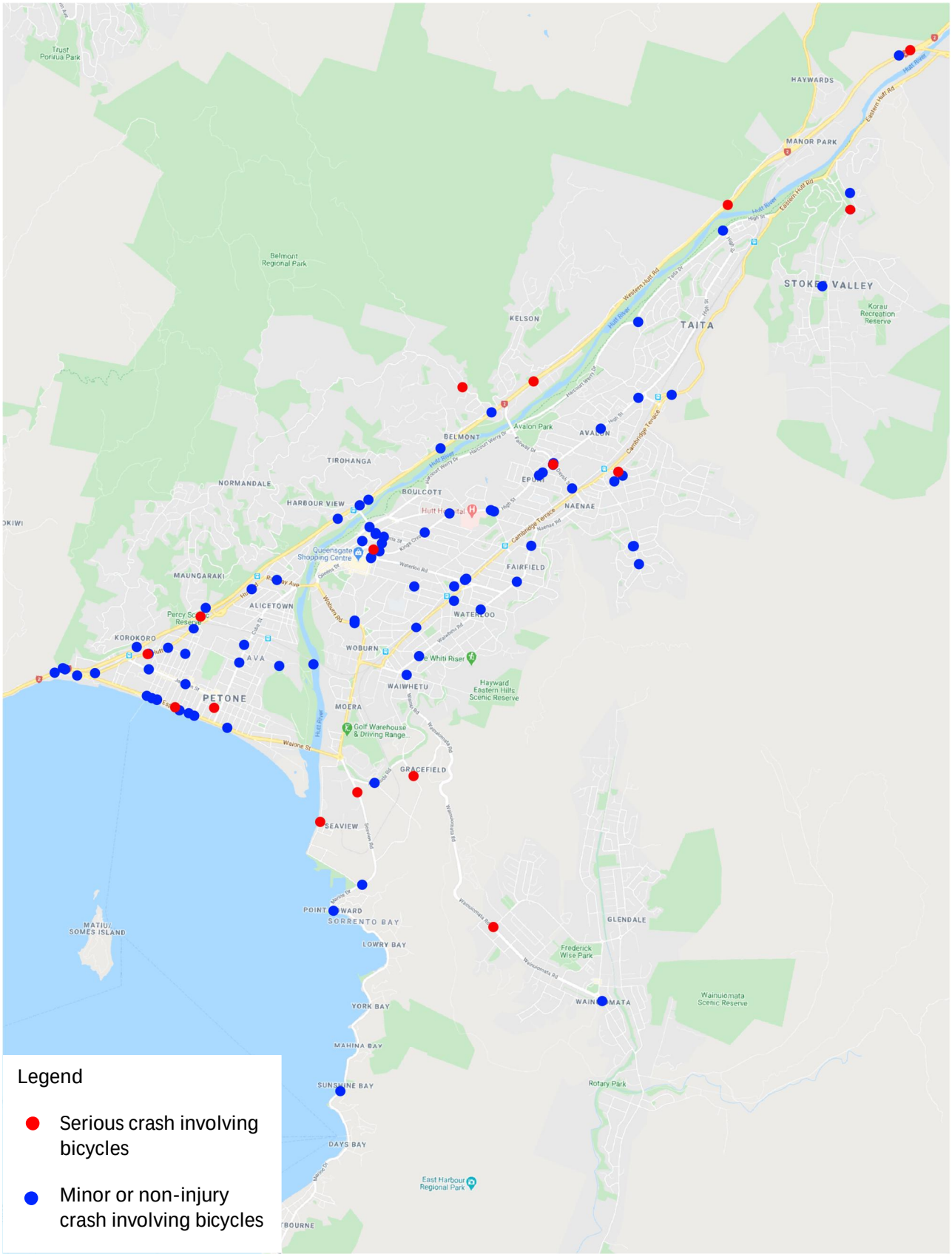


Figure 3-6: Reported crashes involving bicycles (2015-2019)

3.3.4 Overall findings

It was found that the problems identified in the Strategic Case are still relevant in 2020 and the updated evidence case indicates that these problems are still present. There is still more work to be done to achieve the strategic objectives of increasing cycling mode share, increasing active mode use to schools and improving safety for vulnerable road users. Therefore, it is considered that the Strategic Case is still fit for purpose and will be used to inform the following stages of this SSBC.

3.4 Investment objectives

In order to measure progress towards the benefit statements the following investment objectives have been developed as part of the SSBC. These investment objectives have been discussed with the Partnership Investments team at Waka Kotahi.

Investment objective 1: Increase the number of residents that use bikes and micromobility as a mode of transport

Measures:

- Census: increasing the number of residents that cycle to work and study from 1.6% in 2018 to 4% in the 2038 NZ Census
- Network coverage: increasing the length of the Hutt City cycling network from 26km in 2020 to 50km by 2036[1]

Investment objective 2: Increase the potential for school students to use active transport to and from school

Measures:

- Perception survey: increasing the proportion of residents that perceive children using active transport to and from school as being safe or very safe from 40% in 2019 to 55% by 2036 as measured by the Greater Wellington Transport Perceptions Survey
- Behaviour survey: increasing the proportion of 5-14 year old students who use active transport to and from school from 34% to 45% by 2036 as measured by New Zealand Health Survey

Investment objective 3: Improve safety for people who use bikes and micromobility

Measures:

- Recorded crashes: reducing DSI crashes involving cyclists by 30% by 2036 as recorded in CAS, 16 DSI cycle crashes reported in previous five-year period
- Risk rating: improving the rating of main cycling routes in Hutt City to a quality of service rating 2 (suitable for a wide range of users) by 2036 as defined by Auckland Transport's Quality of service evaluation tool for cycle facilities

[1] 14km of cycleways have committed funding

4. Strategic Alignment

This section describes how the investment in Hutt City cycling and micromobility and the identified investment problems and benefits align with local and national strategies.

4.1 Ministry of Transport

At the time of writing this report the Ministry of Transport had released the draft Government Policy Statement on Land Transport (GPS) 2021/22 for public consultation. However, the 2018/19 GPS was still in effect until 1 July 2021. Therefore, an overview of both the 2018/19 and 2021/22 is provided below with alignment between the investment objectives and both GPS being assessed.

4.1.1 2018/19 Government Policy Statement

The four strategic priorities to improve the performance of the land transport system are safety, access, environment and value for money (Figure 4-1). Safety reflects an increase in ambition for delivering a land transport system that is free of death and serious injury. For access there is a focus on supporting a mode shift for trips in urban areas from private vehicles to more efficient, low cost modes like walking, cycling and public transport. Environment prioritises reducing greenhouse gas emissions from transport and supports a mode shift to lower emission forms of transport.

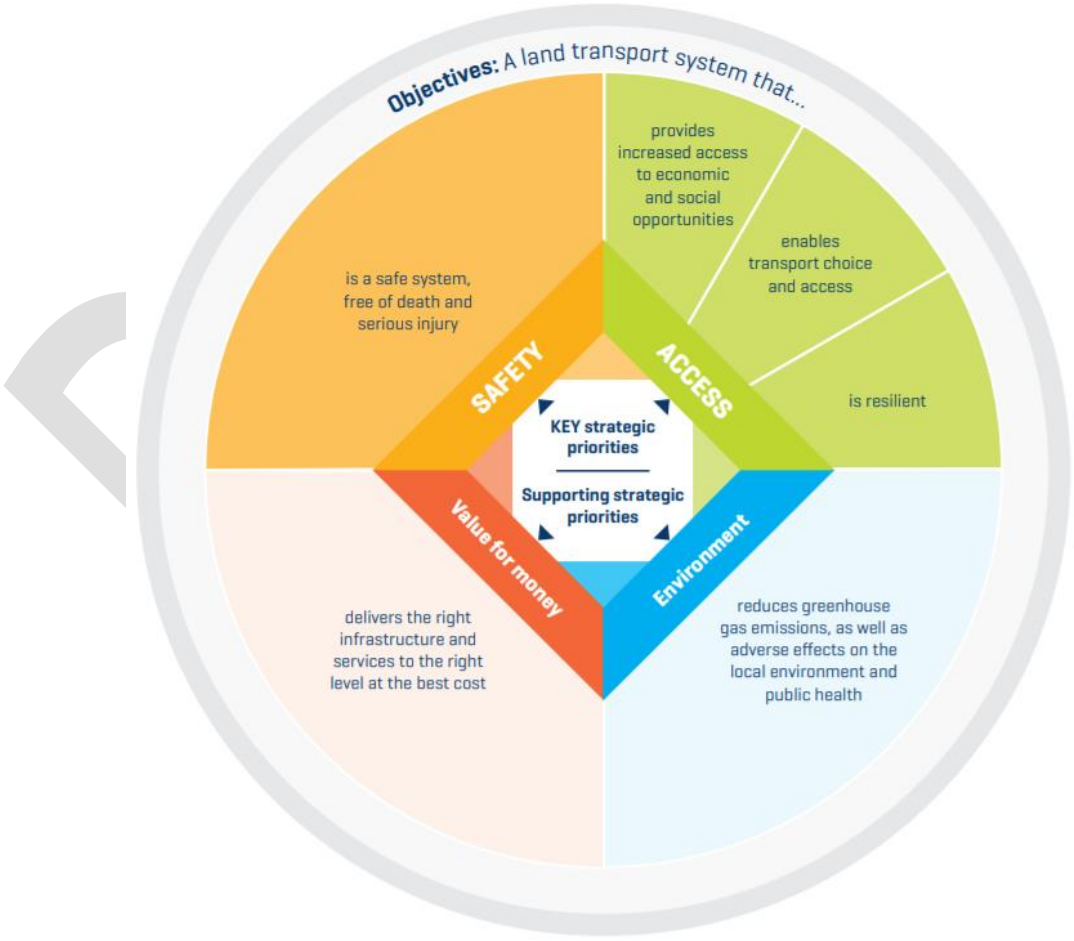


Figure 4-1: Strategic direction of the GPS 2018/19 (source: Ministry of Transport)

SSBC alignment with GPS 2018/19

The investment objectives for the Hutt City Cycling and Micromobility Business Case have a strong alignment with the 2018/19 GPS. This is because investment benefit 1, improved safety for network users, reflects the safety priority in the GPS. People using bikes and micromobility are over represented in injury crashes in Hutt City and therefore increased investment in shared paths and cycles will improve safety outcomes for these road users. Furthermore, investment benefit 2, increased participation in sustainable transport, aligns strongly with the access and environment priorities in the GPS. This is because increased participation in sustainable modes increases access to economic and social opportunities in Hutt City whilst also reducing greenhouse gas emissions.

4.1.2 2021/22 Government Policy Statement

The four strategic priorities for land transport investment are safety, better travel options, climate change and improved freight connections (Figure 4-2). A change from the 2018/19 GPS is that value for money is expressed as a principle that applies to all investment rather than a strategic priority. Other changes are the inclusion of improving freight connections as a strategic priority and refocusing the better travel options and climate change strategic priorities.

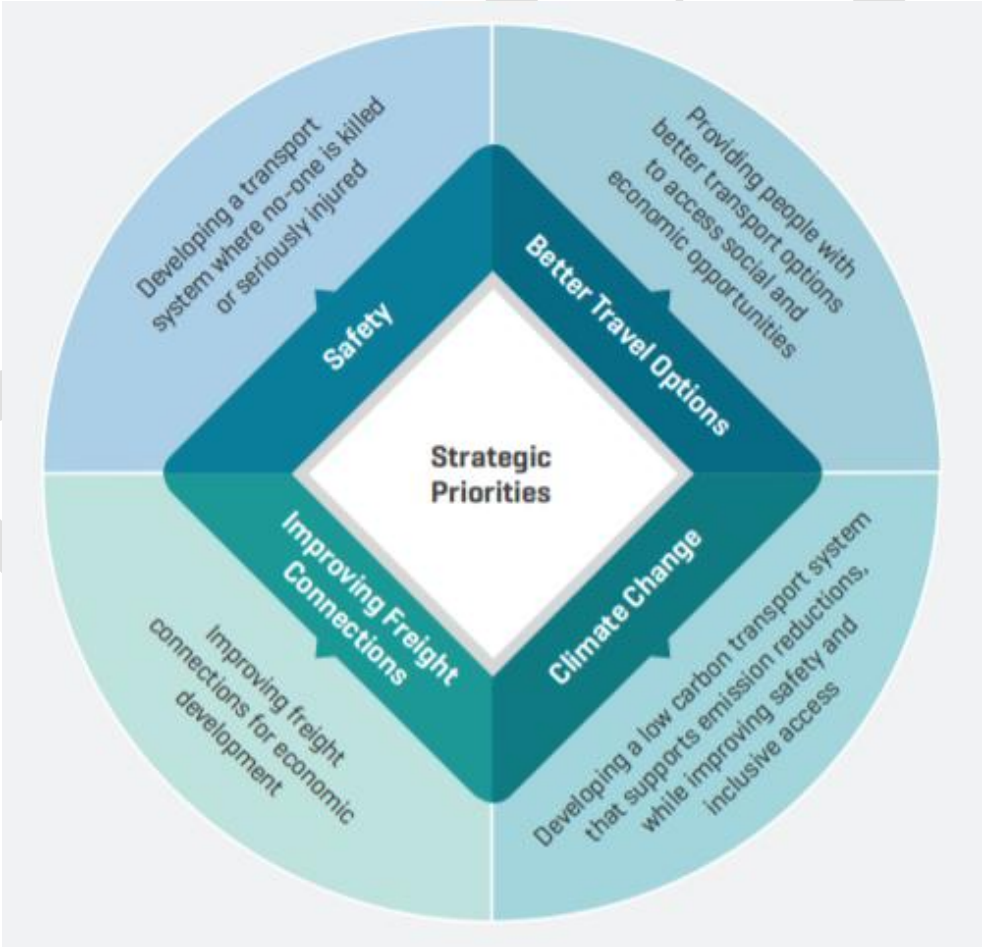


Figure 4-2: Strategic direction of the GPS 2021/22 (source: Ministry of Transport)

SSBC alignment with GPS 2021/22

The Hutt City Cycling and Micromobility Business Case also has a strong alignment with the 2021/22 GPS. This is because investment benefit 2, increased participation in sustainable transport, will give people better travel options to access jobs, education, healthcare and other destinations in Hutt City. Investment benefit 3, reduced traffic volumes, will help to reduce transport emissions by replacing vehicle trips which run on fuel with active mode trips or electric scooter trips.

4.1.3 Road to Zero 2020-2030

Road to Zero is New Zealand road safety strategy sets the guiding principles for how the road network is designed and how road safety decisions are made. The strategy has the vision of a New Zealand where no one is killed or seriously injured in road crashes. One of the seven guiding principles of the strategy is that we design for human vulnerability. People using bikes and micromobility are less protected in the event of a crash than people in vehicles and therefore we need to design for lower speeds where vulnerable road users may be present. Therefore, a focus area of the Road to Zero strategy is to invest in infrastructure safety treatments that are proven to save lives which includes traffic calming, separated walking and cycling facilities or shared-use paths.

One of the key investment benefits of this SSBC is improved safety for network users which aligns well with the Road to Zero strategy. The proposed investment in a connected network of safe cycleways and supporting cycle skills training will help to address the known safety issue for people using bikes (outlined in section 2.5).

4.1.4 Accessible Streets Public Consultation

E-scooters are classified as low-powered vehicles provided that the maximum power output does not exceed 300 watts[6]. This means that e-scooters are not classified as a motor vehicle and can be used with registration or a driver's licence. Other micromobility devices including electric skateboards and electric unicycles are classified as vehicles. However, these devices have difficulties in meeting vehicle safety standards which means that they cannot be operated on the road.

Currently e-scooters can be used on the footpath and on the road but cannot be used in cycle lanes which are designed for the sole use of cyclists. As part of the Accessible Streets Public Consultation document one of the proposed changes includes allowing e-scooters to use cycle lanes and cycle path[7]. Another proposed rule change for e-scooters as part of Accessible Streets is a 15 km/hr speed limit when using the device on a footpath. At the time of writing this SSBC Accessible Streets is a consultation document with any final rule changes expected in late 2020.

For the SSBC the Accessible Streets Public Consultation means that micromobility should be included as potential users of cycleways and bike lanes.

4.2 Waka Kotahi NZ Transport Agency

4.2.1 Cycling Safety Action Plan

In December 2014, the Cycling Safety Panel published its recommendations for making cycling safer and more attractive in the Cycling Safety Action Plan. The panel made 35 recommendations, with significant progress for many recommendations having been made through the National Cycling Programme. The 2018 final progress report outlines 10 key priority areas which are remaining actions to be covered.

These key priority areas include:

- Safer speeds for safer cycling;

[6] Low-powered vehicles, Waka Kotahi, Retrieved from https://www.nzta.govt.nz/vehicles/vehicle-types/low-powered-vehicles/

[7] Accessible Streets Public Consultation, Ministry of Transport, 2020, Retrieved from https://www.transport.govt.nz/multi-modal/keystrategiesandplans/road-safety-strategy/accessible-streets/

- Completing networks for cycling;
- Infrastructure solutions for people on bikes and driving heavy vehicles; and
- Expanding BikeReady and Bikes in Schools programmes.

These key priority areas helped to inform the recommend programme of this SSBC which includes both infrastructure and supporting measures both of which will improve cycling safety in Hutt City.

4.2.2 Cycling Network Guidance

The Cycling Network Guidance sets out a principles-based process for deciding what cycling provision is desirable and provides best-practice guidance for the design of cycleways. The process to planning a cycling network includes the following steps:

- Assessing cycling demand and identifying cycle route options;
- Considering different ways to satisfy the needs of the different people who will cycle;
- Evaluating cycle route options and facility types; and
- Prioritising the implementation of the cycle network plan.

The Cycling Network Guidance has informed the process followed as part of this SSBC and has been referred to throughout the programme development.

4.2.3 Amended Statement of Intent 2018-22

Waka Kotahi produces a State of Intent every three years that sets out its strategic direction to implement the GPS on Land Transport. The State of Intent contains eight position statements which describe the outcomes which Waka Kotahi seeks to achieve. Two position statements which are inclusive access and liveable communities have investment in walking and cycling as contributing to deliver on the position statements. The following is Waka Kotahi's position and targets for inclusive access and liveable communities;

Inclusive access: Everyone should have fair and equitable access to the transport system

- Target: Increased mode share of public transport and active modes in high-growth urban areas; and

Liveable communities: We will partner to efficiently combine planning and investment for transport and land use to contribute to more vibrant, interactive communities

- Target: Increased space in our cities dedicated to people

The Hutt City Cycling and Micromobility SSBC would help to achieve the inclusive access and liveable communities targets by increasing cycling mode share and providing more space for sustainable modes.

4.2.4 Arataki 2019

Arataki is Waka Kotahi's 10-year view of what is needed to deliver on the government's current priorities and long-term objectives for the land transport system. Five step changes were identified which are areas where there is the need for change over and above maintain base levels of service. These step changes are;

1) Improve urban form: provide connections between people, product and places

2) Transform urban mobility: shift from a reliance on single occupancy vehicles to more sustainable transport solutions

3) Significantly reduce harms: transition to a transport system that reduces deaths and serious injuries

4) Tackle climate change: support the transition to a low-emissions economy and enhance resilience to the impacts of climate change

5) Support regional development: enable regional communities to thrive socially and economically

For the Wellington region improving urban form, transforming urban mobility and tackling climate change were identified as important focus areas (Figure 4-3).

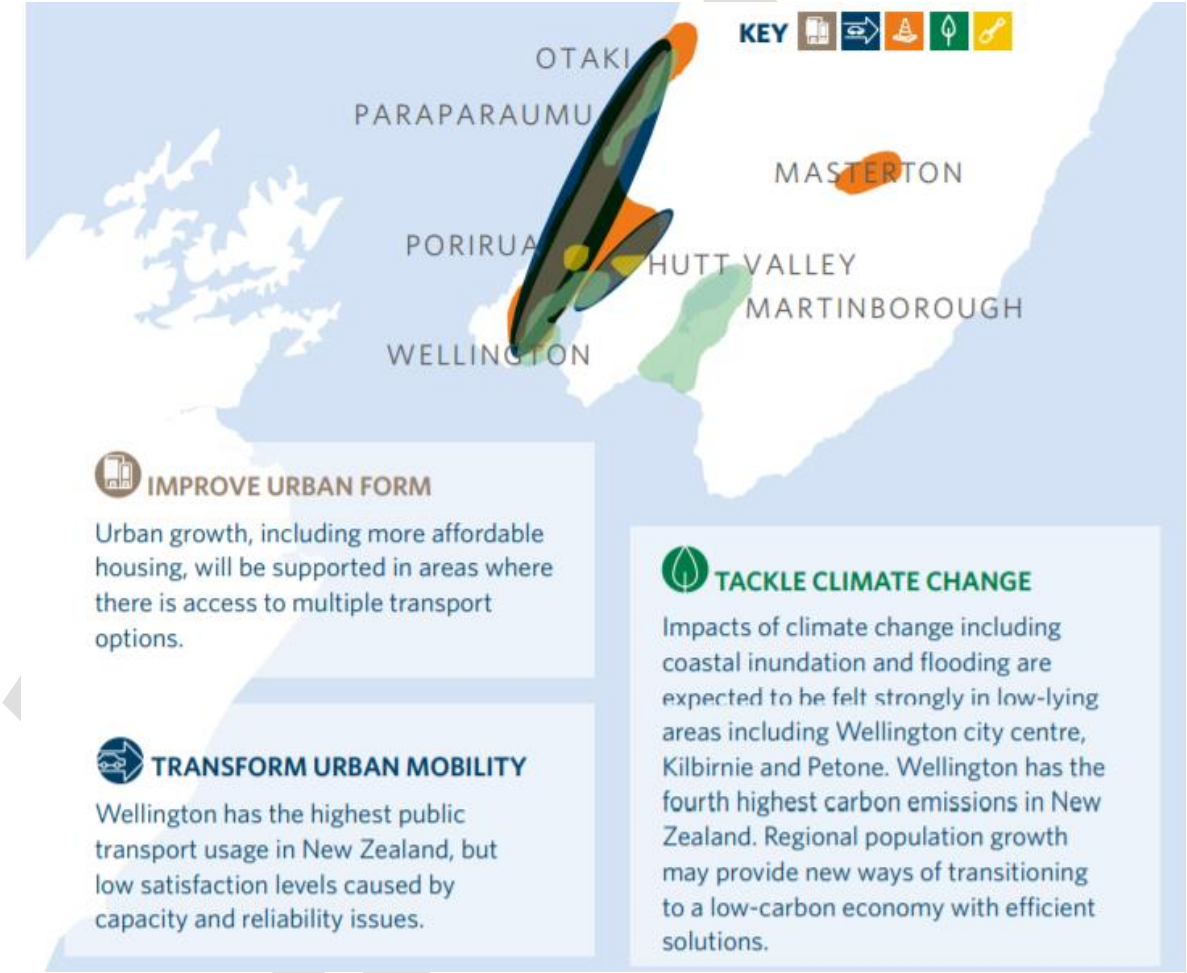


Figure 4-3: Wellington highly important focus areas (source: Waka Kotahi)

This SSBC will help to implement the three step changes identified for the Wellington Region. This is because further investment in cycling and micromobility will help to encourage sustainable transport modes which reduce the current high reliance on single occupancy vehicles.

4.3 Greater Wellington Regional Council

The Wellington Regional Land Transport Plan (RLTP) 2015 sets out the strategic direction for land transport in the Wellington region over the next 10 to 30 years. The strategic vision is to deliver a safe, effective and efficient land transport network that supports the region's economic prosperity in a way that is environmentally and socially sustainable.

To achieve this vision the RLTP has the following key strategic objectives:

- A high quality, reliable public transport network
- A reliable and effective strategic road network
- An effective network for the movement of freight
- A safer system for all users of our regional transport network
- An increasingly resilient transport network
- An attractive and safe walking and cycling network
- A well planned, connected and integrated transport network
- An efficient and optimised transport system that minimises the impact on the environment

In 2018 Greater Wellington completed a mid-term review of the RLTP. The review concluded that the strategic direction of the RLTP 2015 remains fit for purpose and identified public transport, resilience and active modes as key areas of focus until the 2021 RLTP is published.

Further investment in cycling and micromobility within Hutt City will help to achieve the regional strategic objectives of providing a safer transport network and an attractive cycling network.

4.4 Hutt City Council

The Hutt City Council plans and strategies that are particularly relevant to the development of Hutt City Cycling and Micromobility business case are:

- Urban Growth Strategy 2012-2032
- Petone 2040
- Walk and Cycle the Hutt 2014-2019
- Central City Transformation Plan 2019

4.4.1 Urban Growth Strategy 2012-2032

The strategy focuses on how much the city will need to grow in the future, where new homes and business will be located and what will be done to support and encourage this development. The Urban Growth Strategy has a target population growth of at least 110,000 people live in Hutt City by 2032 that would require an increase of at least 6,000 homes. The increase in housing is planned to be accommodated partly through greenfield development in the Upper Fitzherbert area of Wainuiomata and Upper Kelson area. Also, through intensification with high-rise apartments planned for the CBD and low-rise apartments provided for in pars of Eastbourne, Petone, Waterloo shops and the periphery of the CBD.

This SSBC considers the growth areas identified in the Urban Growth Strategy when developing the proposed Hutt City cycling and micromobility network.

4.4.2 Petone 2040

Petone 2040 is a strategic spatial plan for the Petone and Moera areas which coordinates development and urban design over the next 20 years. The spatial plan identifies seven areas within Petone and Moera for potential for housing intensification with apartments and townhouses being envisaged in these areas (Figure 4-4). For transport the spatial plan identifies The Esplanade, Hutt Road, Buick Street and Cross Valley Link as new or enhanced pedestrian and cycle routes (Figure 4-5).

Figure 4-4: Potential areas for housing intensification (source: Hutt City Council)

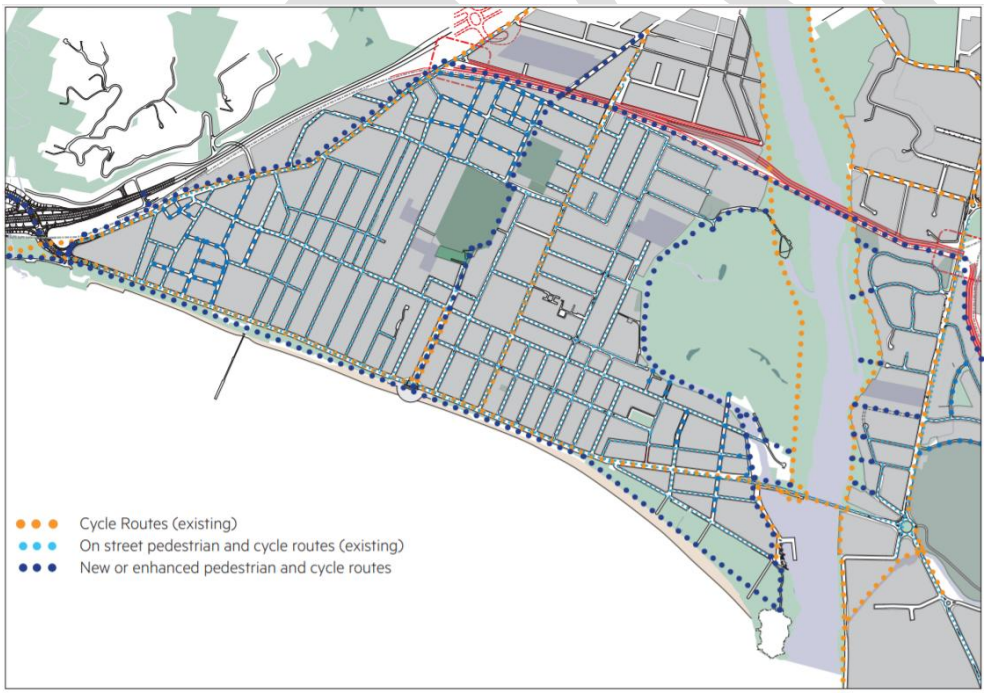


Figure 4-5: Proposed pedestrian and cycle routes (source: Hutt City Council)

This SSBC used the new and enhanced cycle routes identified in the Petone 2040 strategy as the starting point for the proposed cycling and micromobility network in Petone and Moera.

4.4.3 Walk and Cycle the Hutt 2014-2019

The Walk and Cycle the Hutt strategy has the aim of encouraging more people to cycle and walk more often and further, for commuting and recreational purposes. To achieve this the strategy contains the following objectives:

- Prioritise the completion of key walking and cycling routes which are a The Beltway, Eastern Bays shared path and Wainuiomata Hill Road;
- Improve connections between key routes and destinations such as the CBD, railway stations, community facilities, shops and schools;
- Identify and develop safe routes to schools;
- Provide well-designed bicycle parking and end of trip facilities in the city;
- Expand education, training and awareness programmes and events to change attitudes to cycling and walking; and
- Provide way finding information through signage and mapping, particularly for key routes and destinations.

Hutt City has made significant process in achieving the objectives of the Walk and Cycle the Hutt strategy with the key walking and cycling routes being completed or in the design/ consenting stages. This SSBC will help to achieve the other objectives of Walk and Cycle strategy including connections to key destinations, safe routes to schools and end of trip facilities.

4.4.4 Central City Transformation Plan 2019

The Transformation Plan establishes a comprehensive strategy for the coordinated development and design of Lower Hutt's central city and surrounding areas (Figure 4-6). The Transformation Plan contains the following key recommendations:

1. Concentrate retail activity within a smaller area of the central city
2. Encourage multi-level mixed-use development along the River frontage
3. Redevelop surplus commercial land around a consolidated urban core for multi-story apartments
4. Prioritise Queens Drive as the principle north/south route through the central city
5. Introduce new east-west streets and laneways to the street grid to improve access to the River frontage

Figure 4-6: Central City Transformation Plan overview map (source: Hutt City Council)

This SSBC would support the implementation of the Central City Transformation Plan by encouraging residents to access the Central City using sustainable transport modes. This will help to make the Central City a more people focused place because less car trips to the Central City means that road space could be used for other purposes.

4.5 Related Projects

At the time of writing this report there are three other business cases and programmes which interact with the Hutt City Cycling and Micromobility SSBC. The following section describes each of these business cases/ programmes and describes how the strategic outcomes complement the Hutt City Cycling and Micromobility SSBC.

4.5.1 Let's Get Wellington Moving

Let's Get Wellington Moving is a joint initiative between Wellington City Council, Greater Wellington Regional Council and Waka Kotahi. The focus is between Ngauranga Gorge and Miramar which includes the central city, Wellington Hospital and the airport. The long-term programme includes connected cycleways network, high-quality mass rapid transit, improvements at the Basin Reserve and an extra Mt Victoria Tunnel. The programme of early works priorities creating a better environment for people walking and on bikes and making travel by bus through the central city faster and more reliable (Figure 4-7).

Let's Get Wellington Moving will remove barriers for people to cycle from Lower Hutt to Wellington City with improvements for people cycling on Thorndon Quay and the Golden Mile and safer speed limits in the central city. Therefore, Let's Get Wellington Moving is complementary to the Hutt City Cycling and Micromobility SSBC because it will make it significantly safer and more attractive for people to commute to Wellington City by bike.

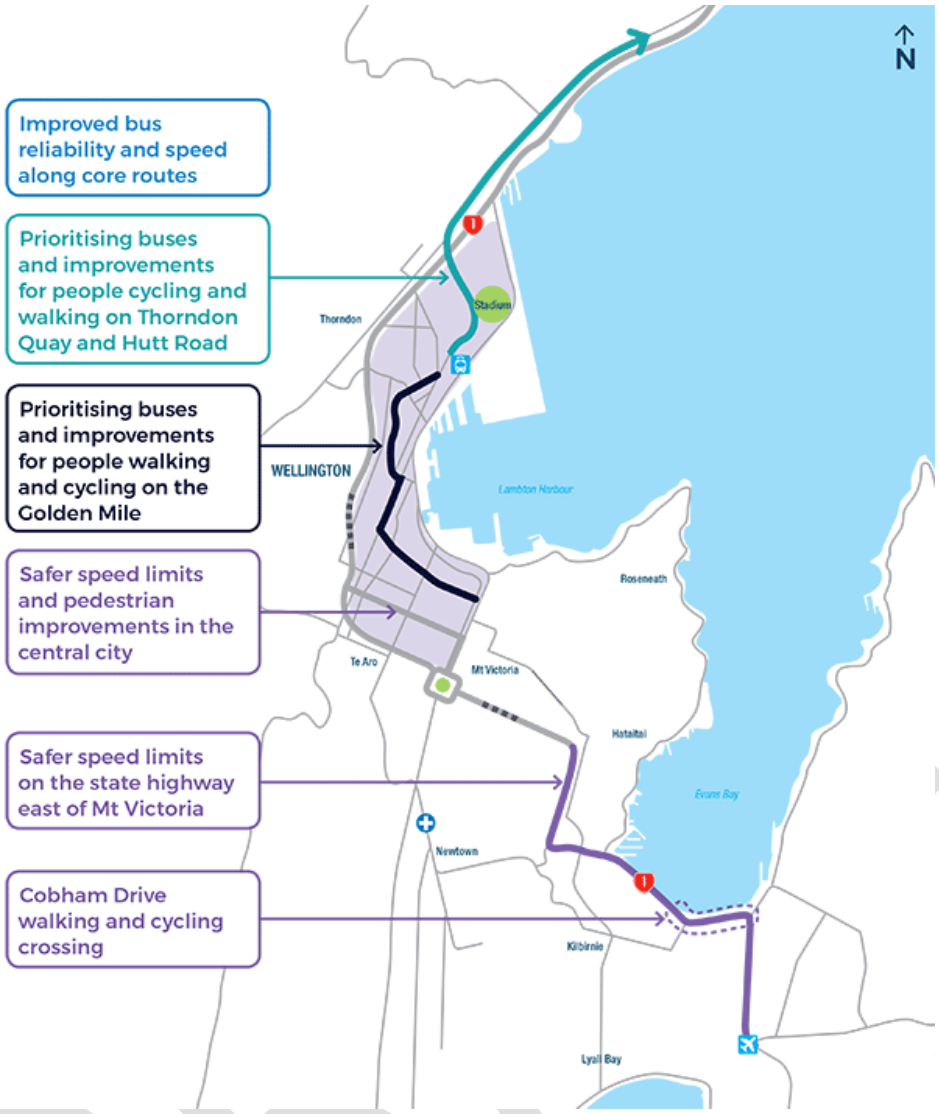


Figure 4-7: Early delivery programme (source: Let's Get Wellington Moving)

4.5.2 Riverlink

Riverlink is a collaborative programme between Greater Wellington Regional Council, Hutt City Council and Waka Kotahi to deliver flood protection, urban development plan and Melling Interchange transport improvements (Figure 4-8). In January 2020 the Government announced that the transport improvements at Melling will be funded as part of the NZ Upgrade Programme with construction expected to begin in late 2022. The key transport features are;

- A new Melling/SH2 interchange which removes the at-grade traffic signals;
- Moving the railway station closer to the city centre;
- A new pedestrian and cycle bridge between the relocated railway station and the central city;
- Slow traffic area in the central city with through traffic directed around the central city; and
- Intersection upgrades in the central city.

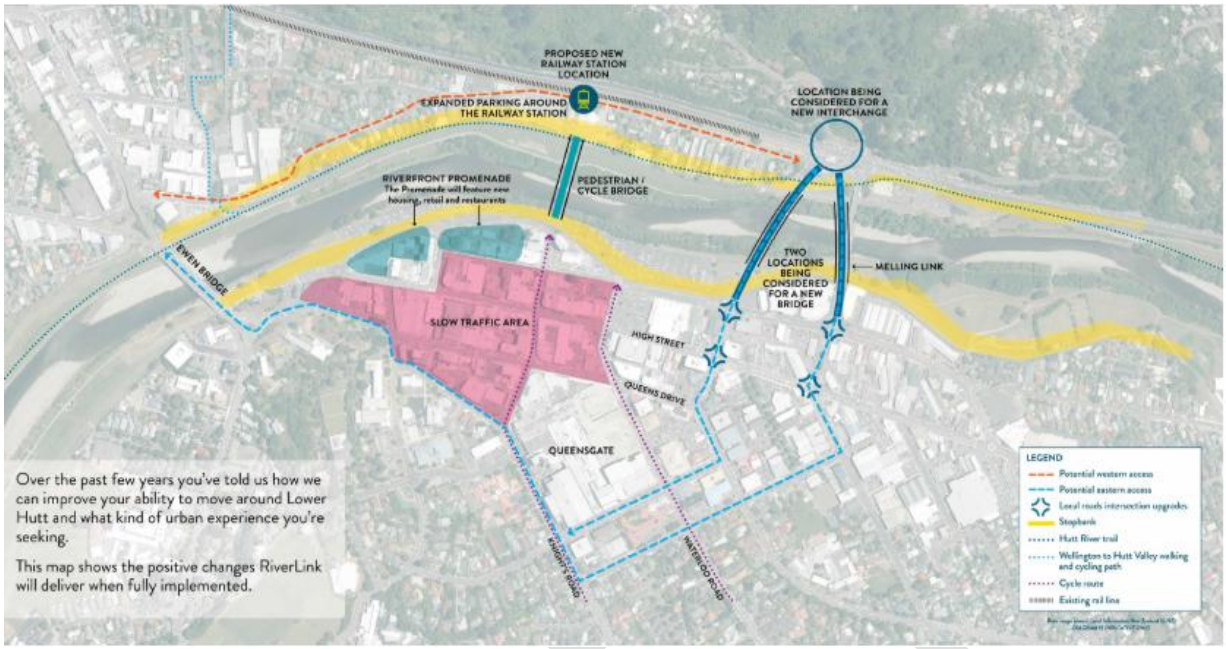


Figure 4-8: Possible transport improvements as part of Riverlink (source: Greater Wellington Regional Council)

The planned changes to central city traffic patterns and new pedestrian/cycle connections which are part of Riverlink have been reflected in the Hutt City Cycling and Micromobility SSBC. Riverlink supports the development of a safe and attractive cycling network in Hutt City by prioritising people walking and cycling in the central city and by improving busy intersections which can be a barrier to active modes.

4.5.3 Cross Valley Transport Connections

Cross Valley Transport Connections is a programme business case which was under development at the time of writing this report. The objective of the business case is to improve transport connections between Seaview, Waiwhetu and Wainuiomata to State Highway 2 and shift through traffic off The Esplanade. Proposed stage 1 improvements (Figure 4-9) include the following:

- Active mode improvements on The Esplanade, Hutt Road and Railway Avenue;
- Bus priority measures at key intersections; and
- Rail station access plans.

Longer term a new east-west multi-modal corridor is proposed which includes an upgrade of Ava Rail Bridge and new interchanges. However, this business case is at the early stages of development and is subject to changes during the planning process.

Cross Valley Transport Connections business case helps to achieve the same outcomes of improved safety and increased participation in active modes that the Hutt City Cycling and Micromobility SSBC seeks to achieve. This is because both business cases identify The Esplanade, Hutt Road, Wakefield Street and Railway Avenue as important active mode corridors which warrant improvements. Furthermore, the proposed replacement of the Ava Rail Bridge would enable a higher quality crossing to be provided for people using bikes and micromobility.

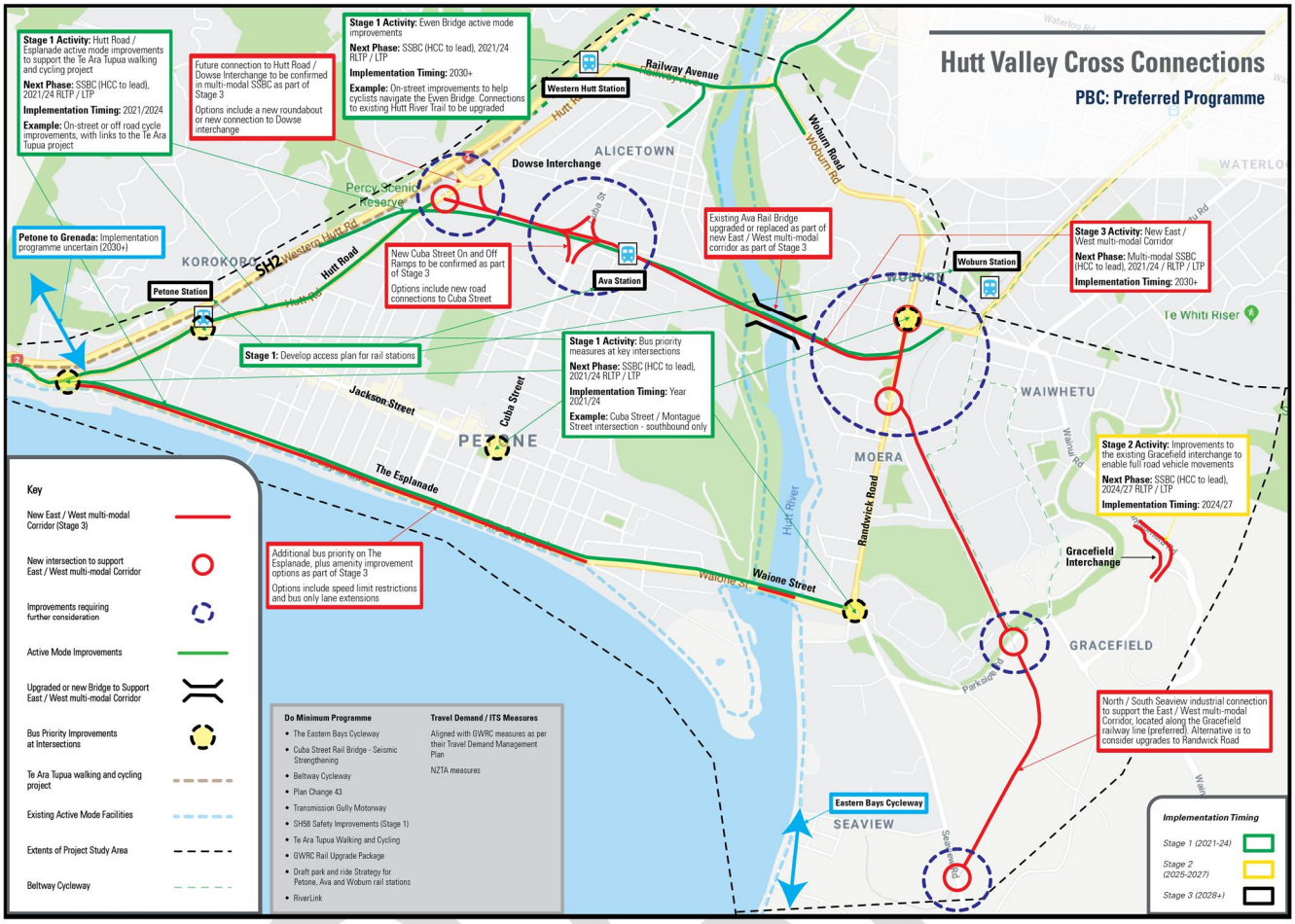


Figure 4-9: Draft programme for Cross Valley Transport Connections (note: programme is subject to change)

4.5.4 Innovating Streets

Waka Kotahi's Innovating Streets programme aims to make it faster and easier for road controlling authorities to transition local streets to safer and more liveable spaces for people (Figure 4-10). The types of projects which fall under the Innovating Streets umbrella are those which use lower cost and temporary techniques to trial changes to streets. An advantage of the Innovating Streets approach is that it can make community consultation easier because people can experience the space with the proposed changes. Using temporary materials also makes it easier to adjust the design during the trial which means that community feedback can quickly be incorporated.

Common types of Innovating Streets projects include:

- Parklets which repurpose parking spaces as mini urban parks;
- Events to re-imagine streets as public space;
- Traffic restriction to control vehicle speeds and improve safety for pedestrians and cyclists; and
- Reallocation of road space from vehicles to other uses.

Figure 4-10: Hutt City Play Streets where a residential street is temporarily closed to traffic

The Innovating Streets approach will be considered for the implementation of projects which are developed as part of this SSBC.

4.5.5 Te Ara Tupua

Te Ara Tupua is the project to create a safe walking and cycling connection between Wellington and Lower Hutt (Figure 4-11). Currently the only way to cycle between Wellington and Lower Hutt is on the shoulder of State Highway 2 which due to high speed traffic only appeals to experienced cyclists. The Petone to Melling section of Te Ara Tupua will run along the rail corridor between Petone and Western Hutt Stations before joining onto the Hutt River Trail. The Ngauranga to Petone section involves widening the sea wall between Ngauranga and Petone with pedestrians and cyclists having a new shared path on the harbour side. The Petone to Melling section is currently under construction and is expected to be completed by approximately May 2021. The Ngauranga to Petone section is currently in the consenting stage with construction expected to be complete in 2024.

Figure 4-11: Overview of Te Ara Tupua project

The Hutt City Cycling and Micromobility business case complements the Te Ara Tupua project by potentially improving connections onto the Wellington to Lower Hutt shared path. This would enable more people to access Te Ara Tupua that would further increase the benefits of the Wellington to Lower Hutt walking and cycling connection.

4.6 Covid-19 Response

The emergence of Covid-19 created uncertainties for New Zealand's communities and economy including the transport and local government sectors. This section outlines any potential changes to the programme context in a post Covid-19 environment. This section draws on Waka Kotahi research on the impact on Covid-19 as part of the Arataki information package[8].

4.6.1 Hutt City Council Emergency Budget

Prior to Covid-19, Hutt City Council was consulting on a 7.9% rates increase to accommodate expenses including a new Naenae pool, upgrades to water infrastructure and a modernisation of the rubbish and recycling system. Due to the challenges arising from Covid-19, Council agreed to an emergency one-year budget with a rates increase of 3.8%. The 2020/21 annual plan contains funding for The Beltway Cycleway, Cross Valley Transport connections investigation work and Riverlink consent applications and design work[9].

The Hutt City Cycling and Micromobility SSBC recognises the short-term funding constraints which Hutt City Council, like most Councils in NZ, are facing. Investment in a network of safe and attractive active/ sustainable modes network is a long-term project which is reflected in the financial case of this SSBC.

[8] Arataki – Potential Impacts of Covid 19, Final Report, 27 May 2020, Martin Jenkins and Infometrics for Waka Kotahi, https://www.nzta.govt.nz/assets/planning-and-investment/docs/arataki/arataki-potential-impacts-of-covid-final-report-may-2020.pdf

[9] Hutt City Council press release: http://www.huttcity.govt.nz/Your-Council/News-and-notices/media-releases/hutt-city-council-opts-for-lower-rates-increase-and-cuts-costs-for-year-ahead/

4.6.2 Transport demand

The immediate impacts of Covid-19 on the New Zealand economy a significant reduction in the tourism, retail and hospitality sectors. Furthermore, due to border restrictions and reduced airline capacity significantly less immigration, international students and work visas which may influence short to medium term population growth. For the economy as a whole the Treasury is forecasting a reduction in GDP and a rise in employment in 2020 with a recovery from the second half of 2021[10]. However, it is expected that the Wellington region will be shielded from the worst impacts due to a large proportion of residents being employment in the public sector and professional services[11].

Because of the relative resilience of the Wellington regional economy it is expected that the overall transport demand will remain largely unchanged over the medium to long term. There may be a sustained reduction in peak trips to the city centre due to increased working from home for professional services. However, supporting a mode-shift from single occupancy vehicle trips to sustainable modes remains a priority to reduce greenhouse gas emission. There will be an on-going need for affordable transport services to access employment and essential services which includes active modes and public transport.

One of the few benefits of Covid-19 is that people got to experience their local neighbourhood with a significant reduction in traffic due to travel restrictions during lock-down. This made it much more pleasant to walk and cycle which is an experience may make it easier for people to reimagine what their streets could be used for.

Overall it is considered that the post Covid-19 context does not change the strategic case for investment in safe and attractive cycling and micromobility network in Hutt City.

[10] Treasury Report T2020/973: Economic scenarios – 13 April 2020 https://treasury.govt.nz/publications/tr/treasury-report-t2020-973-economic-scenarios-13-april-2020-html#section-2

[11] Covid-19 implications for land transport – regional summary Wellington potential impacts, Waka Kotahi, https://www.nzta.govt.nz/assets/planning-and-investment/docs/arataki/regional-summary-9-wellington-potential-impacts-of-covid-19.pdf

5. Programme development

5.1 Long list development

The next step in developing the investment programme was to capture a list of programme options which are ways of determining the order in which the network will be developed. The programme options include both infrastructure improvements and supporting measures that encourage further uptake. Additional programme options were included in the long list based on stakeholder feedback, as discussed below.

At this stage in process the options were kept at a high level with the discussion being on what the strategic direction for investment should be rather than on specific routes or measures. During the short list development stage more detail was added to the programme options.

The long list of programme options are described in Table 5-1 & shown in Table 5-2 on the following pages:

Option	Name	Description	Supporting measures	Priority areas for investment	Target customers
1	Enhance connections to primary routes	Connections to Hutt CBD and Hutt Hospital, upgrading routes in Seaview/ Gracefield, connections between Hutt River Trail and the Beltway	Improved end of trip facilities and bike friendly business programme	Seaview/ Gracefield, Hutt Central, Epuni, Avalon and Taita	People of all ages and abilities who live close to the primary routes
2	Local employment access	Connections to main employment areas include Hutt CBD, Petone, Seaview/Gracefield, GNS and Avalon Studios	Improved end of trip facilities and work travel planning	Petone, Seaview/ Gracefield, Hutt Central, Epuni and Avalon	People of all ages and abilities who work locally
3	Rail station access	Connections to rail stations particularly by improving local roads	Improved end of trip facilities	Petone, Waterloo, Naenae and Taita	People of all ages and abilities who live within 15 min cycle to rail station
4	Demonstration neighbourhoods	Focusing investment in selected neighbourhoods to realise complete network in these areas	Neighbourhood accessibility plans to link infrastructure, enforcement, encouragement and education	Selection criteria to be determined	People of all ages and abilities who live within the selected neighbourhoods
5	Enhanced connections to schools	Focusing investment on cycleways which serve schools with supporting traffic calming measures	Cycling skills training, bikes in schools and school travel planning	Selection criteria to be determined	Students of all cycling abilities who attend local schools
6	Long distance commuter	Cycleways which feed onto the Wellington to Hutt Valley walking and cycling link (Te Ara Tupua)	End of trip facilities in Wellington CBD	Petone, Alicetown, Hutt Central and Waterloo	People who are more confident cyclists that work in Wellington CBD

Table 5-1: Long list programme descriptions

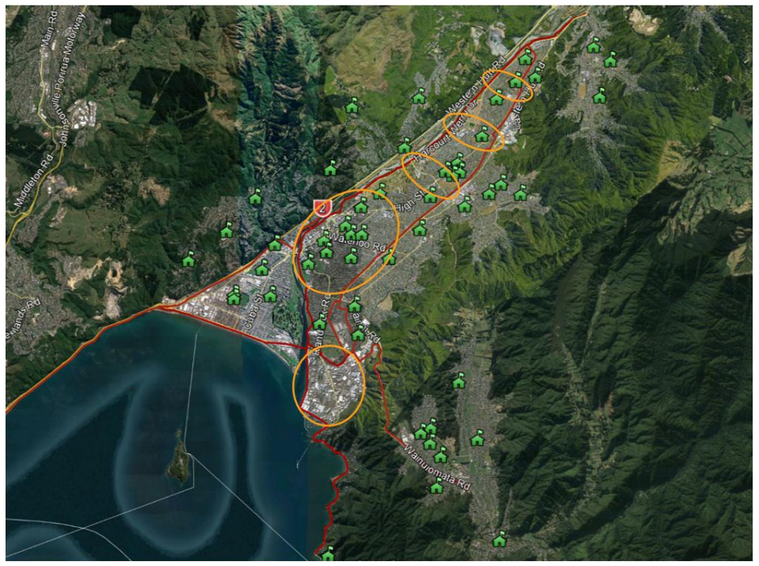
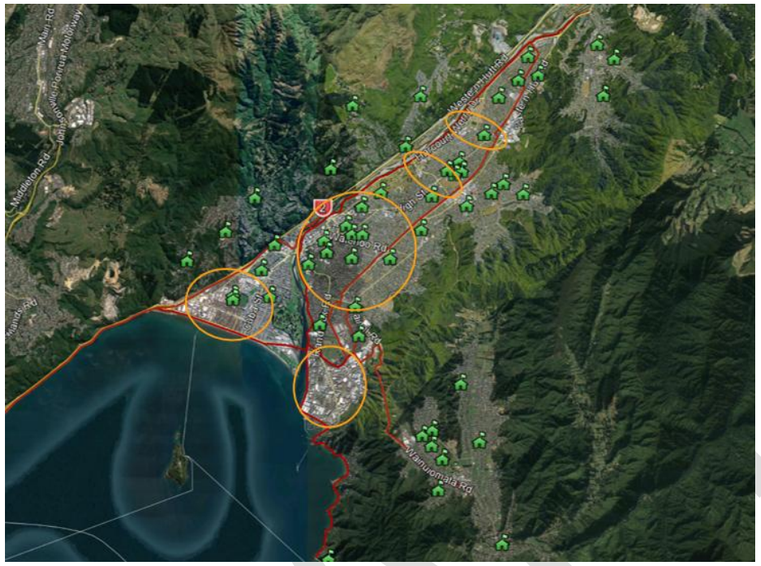
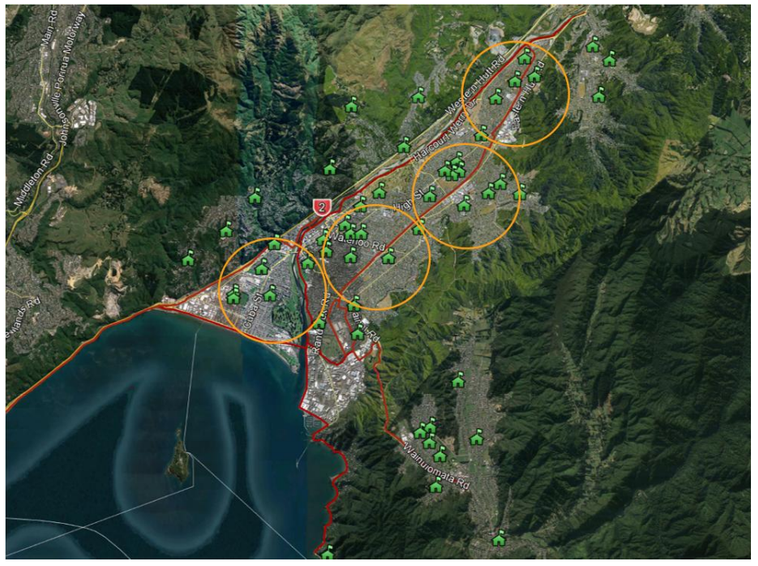
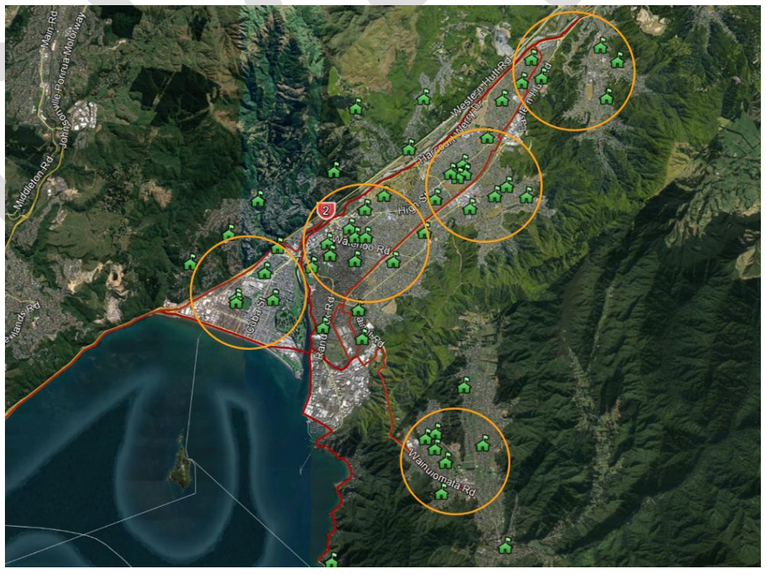
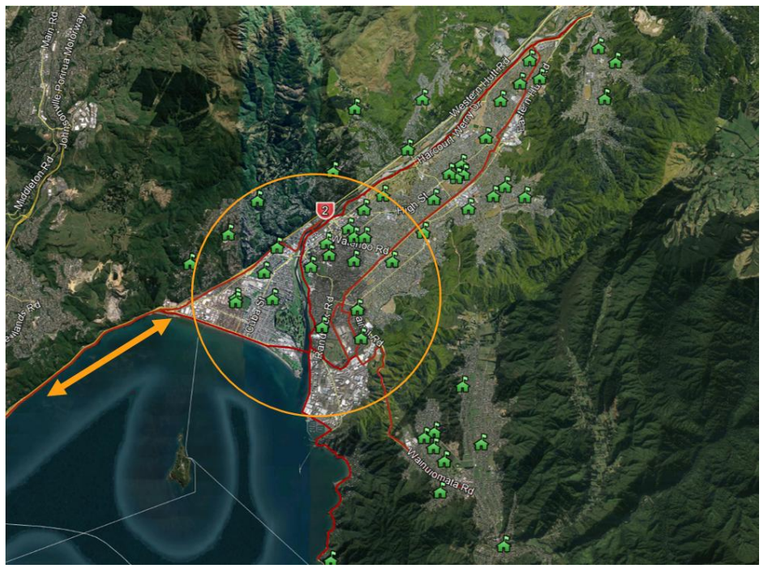
Option 1: Enhance connections to primary routes	Option 2: Local employment access	Option 3: Rail station access
		
Option 4: Demonstration neighbourhoods	**Option 5: Enhanced connections to schools**	**Option 6: Long distance commuter**
		

Table 5-2: Indicative focus areas for long list programmes

5.2 Long list feedback and assessment

At the first workshop hold on 25 February 2020 the programme options were discussed with the stakeholders with the aim of agreeing a short list of programmes to be explored further.

During a group activity, stakeholders were asked to provide feedback on what they liked and disliked about each of the programme options. Stakeholders were also asked to score each of the programme options based on how much of a priority they thought the programme would be for the community (Table 5-3 on the following page). The combination of both written feedback and scores allowed each of the programmes to be ranked against each other and for changes to the programme options to be discussed.

1. *Enhance connections to primary routes*

   Stakeholders liked that this option linked to key destinations including CBD and Hutt Hospital thereby encouraging more people to cycle for local trips. Another positive was the improved east-west connections that leveraging off the current investment in The Beltway cycleway.

   Stakeholders disliked the focus on existing/ adult cyclists and that the programme would not serve many schools. Overall this option was seen being part of wider programme but not enough on its own to address the problems.

2. *Local employment access*

   The positives are that this option encourages local workers to cycle which improves access to employment especially for areas like Seaview which has limited public transport services.

   Stakeholders felt that this programme would focus investment too much into a small number of areas as many suburbs do not have local employment. Another disadvantage is that the programme only caters for people who work locally and does not link to pubic transport for longer trips.

3. *Rail station access*

   Stakeholders liked that improving cycling and micromobility access to rail stations would take pressure off park and ride facilities. However, concern was raised about the security of bikes parked at the stations as bikes cannot be taken onboard peak trains. The security of bikes at rail stations could be addressed with additional cycle lockers.

4. *Demonstration neighbourhoods*

   The feedback received was that focusing on neighbourhoods provides the opportunity to connect communities and improve health outcomes. This approach can also be customised to each community and provides a measurable before and after comparison to demonstrate success.

   The concerns raised was the issue of equity for areas that do not receive investment as this could lead to different outcomes across the city. To address the issue of equity, some stakeholders felt that the focus should be on neighbourhoods which have low levels of participation in active modes and poor access to other transport modes.

5. *Enhanced connections to schools*

   Stakeholders liked that a focus on schools would help to develop life long cyclists that would improve health outcomes and build more independence for children. Another positive is that traffic calming measurements can be a lower cost intervention and that other measures such as school bikes trials could complement the infrastructure investment.

   The concerns raised were around parents' perceptions of safety, equity of access to bikes and scooters and open school enrolments. There is the potential address these concerns with infrastructure and supporting measures as part of this SSBC.

6. *Long distance commuter*

   This programme was seen as having the benefits of providing people with a sustainable transport option to commute to Wellington that would also take pressure off State Highway 2. The concerns raised was that this programme would rely on the timing of the Ngauranga to Petone project and that there would not be as many local community outcomes. Another issue raised was that the focus would be on the "strong and fearless" type cyclists who may already be cycle commuting.

Programme option	Score out of 10 (with 10 being the highest score) for the question; How much of a priority is each of the programme options?		
	Group 1	Group 2	Group 3
Option 1: Enhance connections to primary routes	9-10	5-6	9
Option 2: Local employment access	5-6	7	3
Option 3: Rail station access	5-6	6	7
Option 4: Demonstration neighbourhoods	8	8-9	7-8
Option 5: Enhanced connections to schools	7-8	10	10
Option 6: Long distance commuter	4	5	5-6

Table 5-3: Stakeholder scoring of the programme options

Both the written feedback and scoring of the long list of programme options from the stakeholder workshop reveals a consistent support for programme 1 (primary routes), programme 4 (demonstration neighbourhoods) and programme 5 (schools). For this reason, these three high level programme options were short listed to be developed further into detailed programmes. The process that was followed to further develop the short list of programmes is discussed below.

5.3 Short list development

Comparing the areas of investment for the three short-listed programmes (options 1, 4 and 5) revealed overlaps in destinations within Hutt City. For example, programme 1 which includes connections to Hutt CBD would also serve a cluster of schools including Sacred Heart College, Chilton Saint James and Eastern Hutt School. Another example Programme 4 is that potential demonstration neighbourhoods such as Wainuiomata and Naenae also contain several schools. Figure 5-1 shows the geographic overlap between the three short-listed programmes.

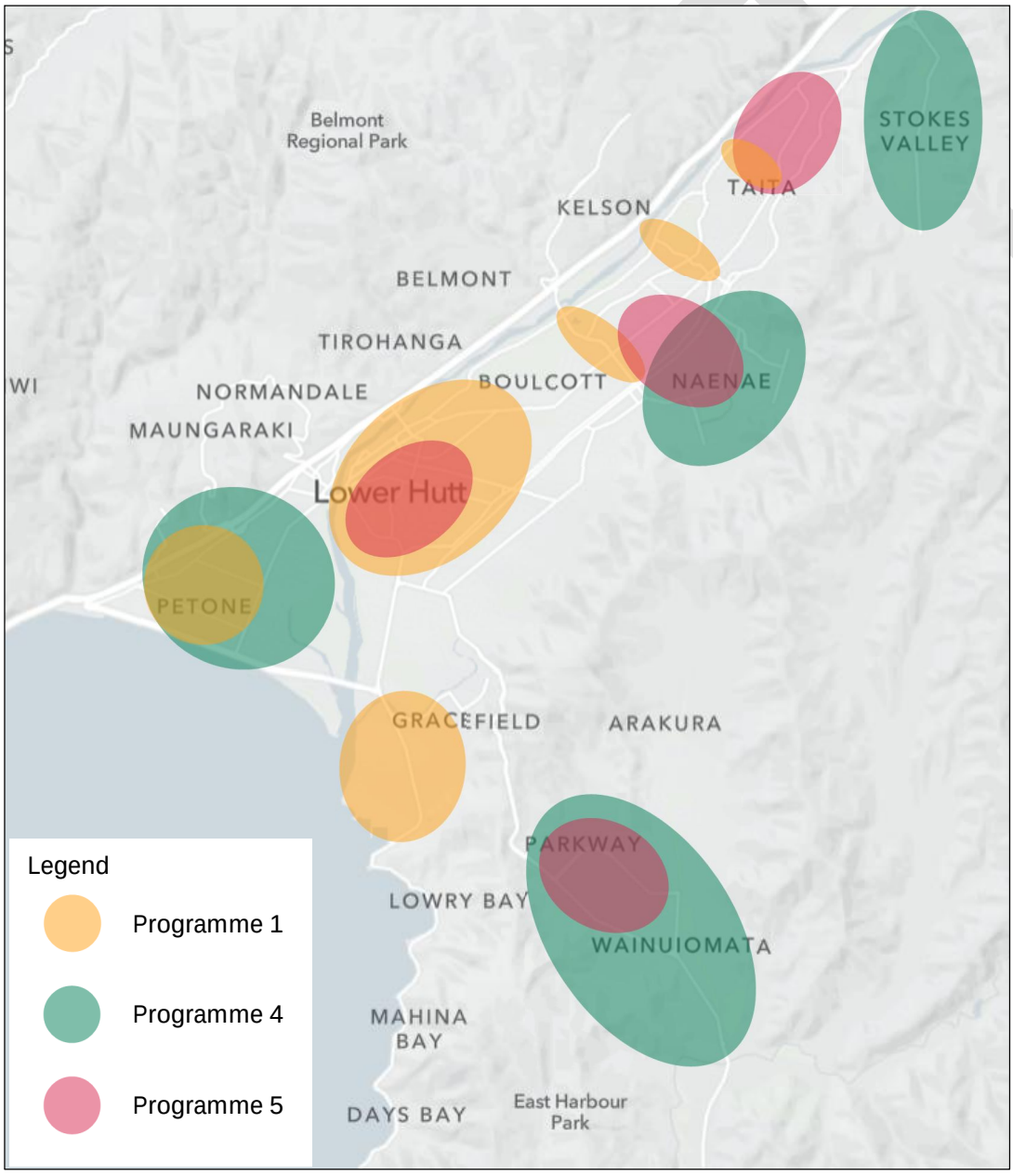


Figure 5-1: Map showing overlaps between programme focus areas

To achieve the investment objectives it is considered necessary that all the programmes contain connections between the primary cycleways to Hutt CBD, Hutt Hospital and Petone. This is because these areas are key destinations for employment, community facilities and retail that would provide the most effective way of increasing the number of residents that use bikes and micromobility. Furthermore, Hutt CBD has a cluster of recorded crashes and therefore providing safe cycleways in this area would help to improve safety for people who use bikes and micromobility.

The main differentiators is that programme 4 would include connections along main roads in outer areas and programme 5 would include connections to more schools. Therefore, the short-listed programmes were developed to compare outcomes from a base network which focused on central areas against a larger network which included central areas and outer areas. This approach also enabled a comparison of low, medium and high levels of investment.

5.3.1 Programme 1 - Base network

This programme represents a base network which prioritises improving connections between primary cycleways and providing new connections to key destinations. The focus areas for investment for programme 1 are Hutt Central, Epuni, Petone, Seaview and Avalon. Based on the workshop feedback Petone was added as a focus area which reflects Petone's role as a key employment and retail destination. Programme 1 has a comparatively low level of investment and does not serve outer residential areas.

The indicative network for programme 1 was developed by selecting the cycleways within the focus areas from the Hutt City Cycleway Connectivity Assessment complete network. A visualisation of the process followed to develop the network for programme 1 is shown in Figure 5-2.

In addition to infrastructure it was proposed that funding for increased bike parking and greater marketing and events are included in the programme. These supporting measures would help leverage the investment in infrastructure by providing secure bike parking at destinations and by increasing awareness of the benefits of active and sustainable modes.

Complete cycling and micromobility network concept

Base network focus areas

Programme 1 infrastructure

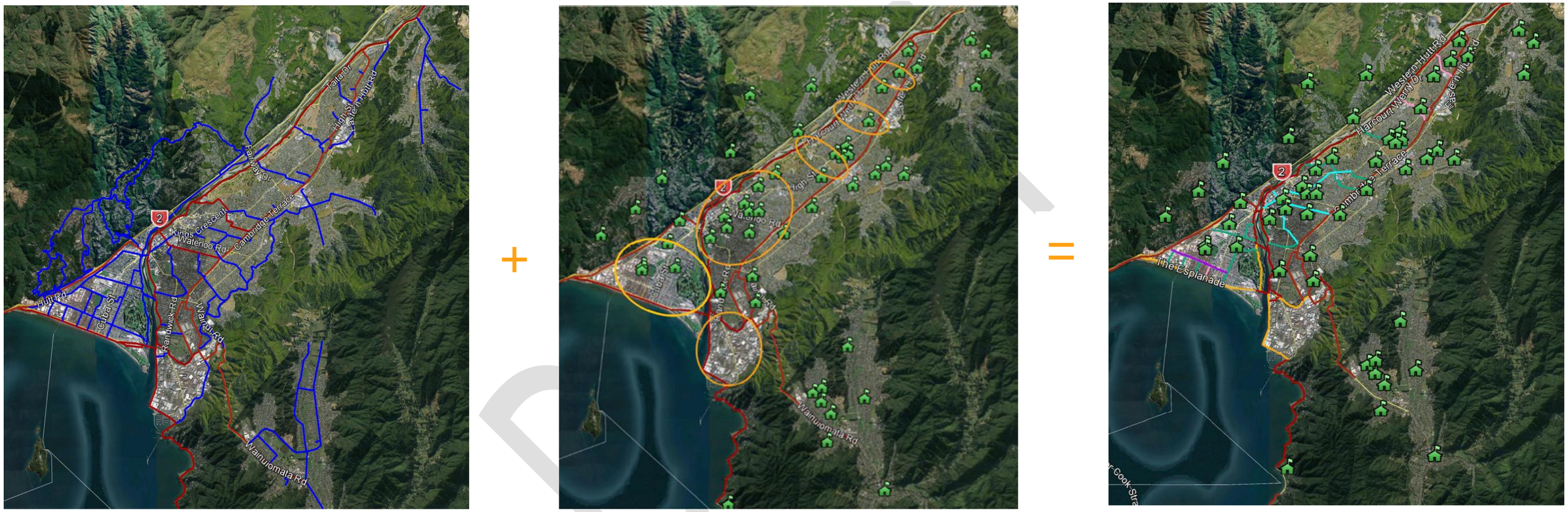


Figure 5-2: Visualisation of process to develop indicative network for programme 1

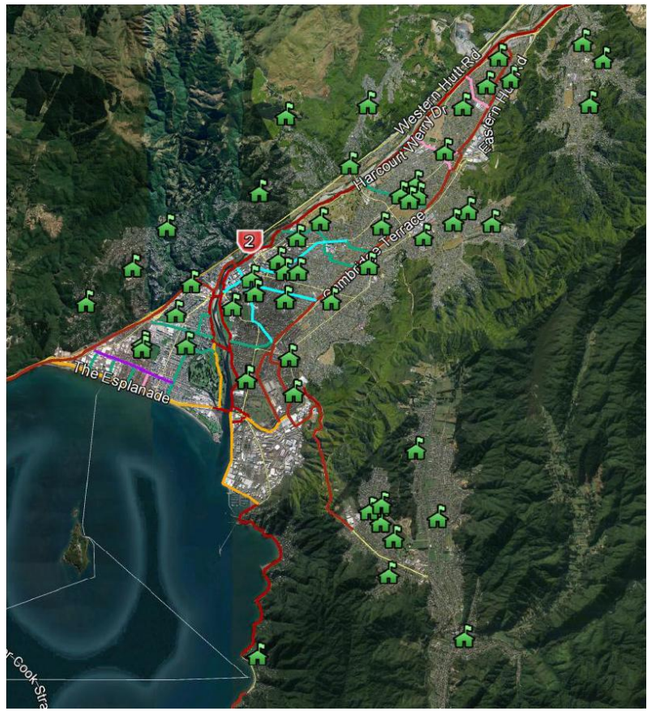
5.3.2 Programme 4 – Base + demonstration neighbourhoods

Programme 4 adds to the base network by including demonstration neighbourhoods which focus on completing the cycleways network in selected neighbourhoods. It is intended that the benefits from the first demonstration neighbourhood would be to build support for subsequent stages. Programme 4 has a medium level of investment compared to the other programmes and includes connections in both central and outer areas.

There was general agreement from the stakeholders that neighbourhoods that have poor health outcomes and lower access to affordable transport should be prioritised. To incorporate this feedback the selection criteria for the demonstration neighbourhoods included socio-economic deprivation index and public transport accessibility as criteria (criteria and results shown in Appendix A). The neighbourhoods of Stokes Valley, Naenae and Wainuiomata scored the highest based on the assessment criteria and were included in programme 4. A visualisation of the process followed to develop the indicative network for programme 4 is shown in Figure 5-5-3.

The supporting measures for programme 4 include increased bike parking, marketing and events and cycling training. The increased funding for cycling training could allow an expansion of the Bike Ready and Bikes in Schools programmes to reach more schools in Hutt City.

Base network



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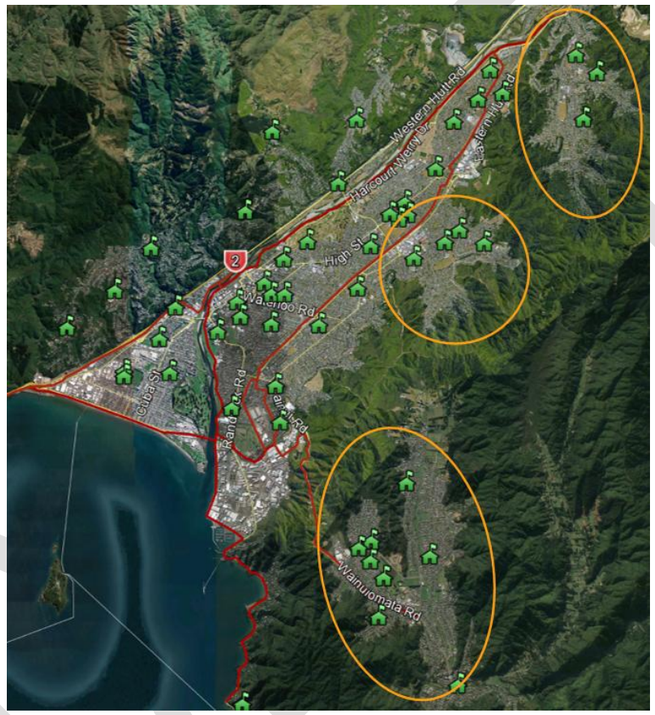
Demonstration neighbourhood focus areas



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Programme 4 infrastructure

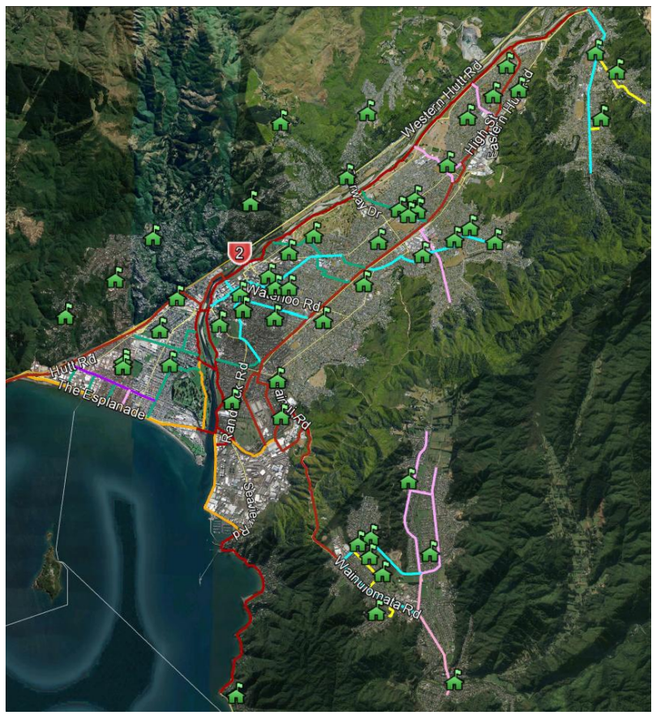


Figure 5-5-3: Visualisation of process to develop indicative network for programme 4

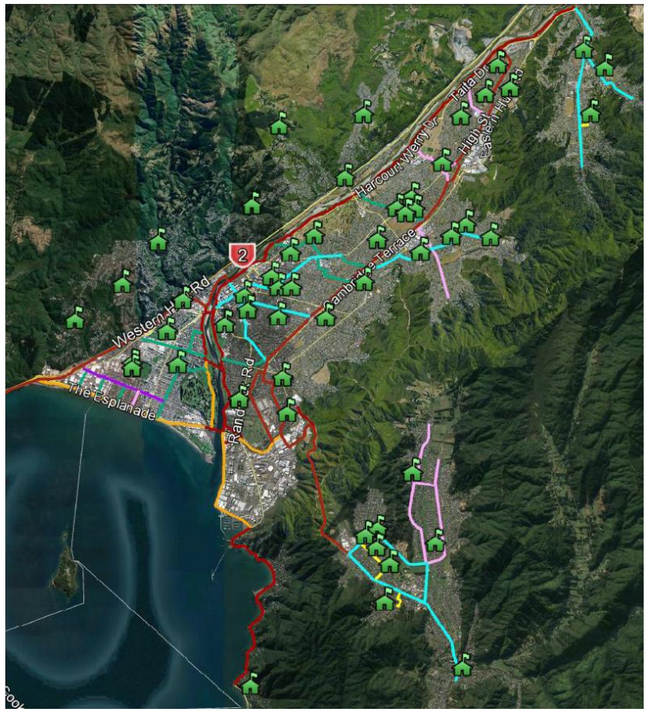
5.3.3 Programme 5 – Base + demonstration neighbourhoods + focus schools

Programme 5 adds to the base network and demonstration neighbourhoods by including investment in focus schools which includes traffic calming on local streets within the school zone. The aim would be to maximise the number of students that would have safe and attractive cycleways/pathways between their home and school. Programme 5 has a high level of investment compared to the other programmes and includes cycleways on main streets and traffic calming on minor streets.

In order to investigate which schools within Hutt City may have the highest potential for increased active mode use a selection process was developed (criteria and results shown in Appendix B). The selection criteria include the size of the school roll, the location of the school and any prior involvement in sustainable transport initiatives (Appendix B). The schools with the highest scores are in the areas of Wainuiomata, Hutt Central, Avalon, Naenae, and Taita. A visualisation of the process followed to develop the indicative network for programme 5 is shown in Figure 5-4.

To support the cycleways infrastructure programme 5 would include investment in increased bike parking, marketing and events and cycling skills training. It is proposed that cycle skills training be coordinated with infrastructure investment so that students which have safe cycleways/pathways to schools would also have the skills and confidence use active and sustainable modes to school.

Base + demonstration neighbourhoods



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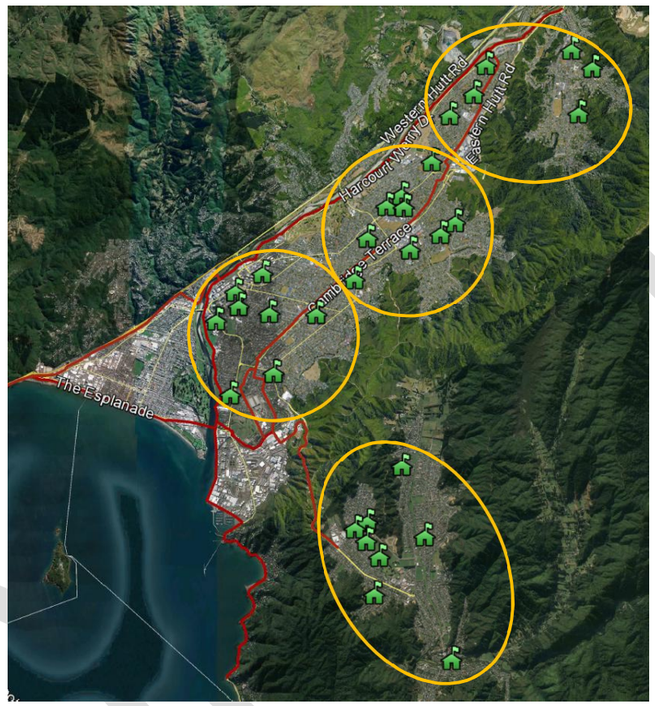
Focus schools



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Programme 5 infrastructure

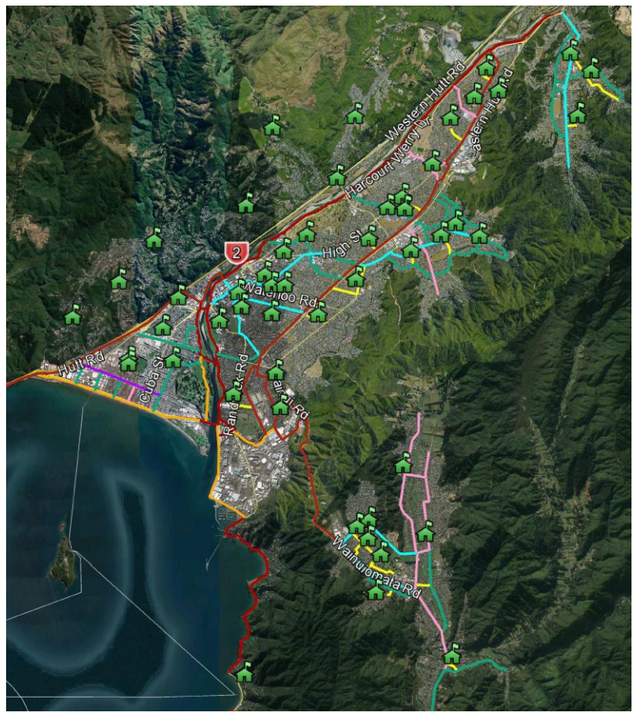

Figure 5-4: Visualisation of process to develop indicative network for programme 5

5.3.4 Do minimum – Complete committed cycleways

The do-minimum provides a baseline cycleways network that would be achieved with no additional investment in cycleways/pathways infrastructure (Figure 5-5). The do-minimum therefore includes the existing cycleways and projects that have funding committed (The Beltway and Eastern Bays shared path). Both the short-listed programmes and the do-minimum are assessed against the investment objectives in section 5.5.

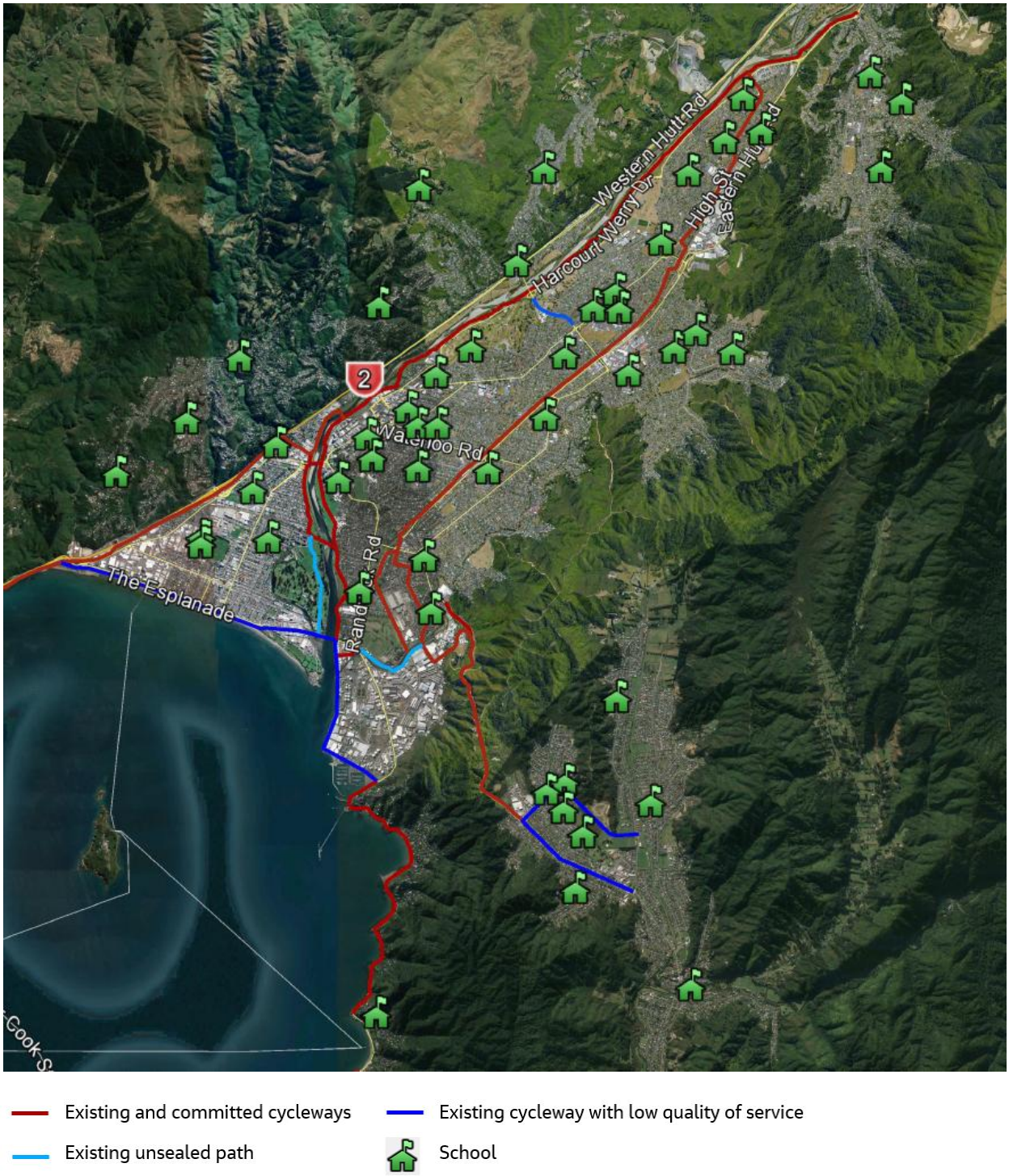

Figure 5-5: Do minimum cycleways network

5.4 Short listed programmes feedback

A second stakeholder workshop was organised for 1 April 2020; however, the decision was made to not proceed with the workshop and instead ask stakeholders for written feedback. This was due to the nationwide lockdown in response to Covid-19.

Information about the draft programme short list options including list of projects, supporting measures, programme budget and programme timing was sent to stakeholders. The draft programme options information is contained in Appendix C.

Summary tables of the feedback received from stakeholders are included below and are grouped by organisation. The table also includes comments from the project team on how refinements were made to the programmes to incorporate the stakeholder feedback.

5.4.1 Waka Kotahi

Feedback from stakeholders	Refinements made to programmes in response
Should have a clear long-term vision of the complete network and spell out how each step in the programme is a logical step towards achieving this 20 or 30 year vision	Incorporated feedback by separating the programme into short term, medium term and long-term phases
That there is a large amount of cross over between destinations in Lower Hutt to be broken down neatly into separate benefits e.g. a cycleway to the CBD will serve trips to work, schools and shops	Updated wording of SSBC to describe the programmes as benefiting multiple types of trips
Demonstration neighbourhoods should complete the full network in one area first but the programme reads like the three areas will be progressed together, seen as spreading effort/investment too thinly rather focusing on completing one area	Updated staging of programme to focus investment on completing one demonstration neighbourhood at a time
Programme timeframe is too short based on progress of other cycleways to date	Incorporated feedback by extending the programme timeframe to allow more time for design and consultation phases
Should consider interactions with Cross Valley Connection and Station Access Planning	Attended meeting with Cross Valley Link project team in June 2020 and discussed interactions between business cases
Should include a wider range of supporting measures as part of the programmes	Developed recommended supporting measurement in more detail
Surprised that Petone was not selected as a demonstration neighbourhood due to potential connection to Wellington to Hutt Valley cycleway and quiet streets	Included Petone as priority area for investment in updated programme

5.4.2 Petone Community Board

Feedback from stakeholders	Changes made to programmes in response
Uncertainty on whether funding would be available in post Covid financial environment	Programme staging updated to have a lower level of investment in short term
Felt that an upgrade of the current The Esplanade shared path is not feasible due to pinch points from buildings and high pedestrian volumes	Feedback incorporated by including on-road cycleway as treatment option for The Esplanade
Felt that focus should be on improving connections from The Esplanade to Jackson Street	Connections to Jackson Street included in quick wins programme
Would support a 30km/hr speed limit on Jackson St to improve safety but could not support a cycleway on Jackson St at this time	Feedback noted

5.4.3 Hutt Cycle Network

Feedback from stakeholders	Changes made to programmes in response
Programme 5 is preferred on the current options because inclusion of safe low traffic areas around schools which is essential to change perceptions of cycling for parents	Feedback noted
Encouraging cycling to schools is seen as essential for building momentum for social licence for further improvements	Feedback noted
Concern that Stokes Valley is included as demonstration area due to travel patterns and lack of planned development.	Priority areas for investment updated in recommended programme
Programme 1 was viewed as having benefits but would not go far enough to achieve the momentum that is needed to realise significant mode shift	Feedback noted
Supporting measures need to be spelled out including measures that may be outside of councils direct control	Developed recommended supporting measurement in more detail

5.5 Short listed programmes assessment

The short-listed programmes were assessed against the following:

- How likely the programmes would achieve the investment objectives;
- The deliverability and financial feasibility of the programmes; and
- An economic feasibility assessment following the economic evaluation manual (EEM).

The purpose of these assessments is to understand which short-listed programme would deliver the most community benefits relative to the size of the investment made. The assessments were also intended to understand the relative strengths and weaknesses of the short-listed programmes so that refinements to the programmes could be made.

5.5.1 Investment objectives assessment process

The short-listed programmes were assessed against how well they would achieve the investment objectives of increased participation in sustainable modes, improved safety and encouraging students to use active modes. Two assessment indicators were selected for each investment objective which use readily available information which are aligned with the investment measures. Table 5-4 below shows the indicators used for the short-listed assessment.

Investment objectives	Investment measures	Indictors used for assessment
Increase the number of residents that use bikes and micromobility as a mode of transport	Increase the number of residents that cycle to work and study from 1.6% in 2018 to 4% in the 2038 NZ Census	Estimated new cyclists using buffer method in EEM
	Increase the length of the Hutt City cycling network from 26km in 2020 to 50km by 2035	Length of proposed additional cycleways
Improve safety for people who use bikes and micromobility	Reduced DSI crashes involving cyclists (as a proportion of cycling's mode share) by 30% in 2035 as recorded in CAS	Estimated reduction in cycle crashes using crash reduction factors in EEM
	Improve the rating of main cycling routes in Hutt City to a quality of service rating 2 by 2035 as defined by Auckland Transport's Quality of Service evaluation tool for cycle facilities	Percentage of roads rated as quality of service 2 or better

Investment objectives	Investment measures	Indictors used for assessment
Increase the potential for school students to use active transport to and from school	Increase the proportion of residents that perceive children using active transport to school as being safe or very safe from 40% in 2019 to 55% by 2035 as measured by Greater Wellington's Transport Perceptions Survey	Number of schools served by the proposed cycling networks
	Increase the proportion of 5-14 year old students who use active transport to school from 34% to 45% by 2035 as measured by the New Zealand Health Survey	Number of young people within 400m buffer of proposed cycling networks

Table 5-4: Criteria for assessing short-listed programmes against investment objectives

5.5.2 Investment objectives assessment results

The results of assessing the short-listed programmes against the investment objectives are shown in Table 5-5 on the following page. The investment objectives assessment results provide the following insights:

- That programme 5 (base + demonstration neighbourhoods + focus schools) scored the highest against the investment objectives with the do minimum (complete committed cycleways) scoring the lowest. This reflects the larger cycleway network for programme 3 which serves a greater number of destinations and residential areas.
- The main differentiator between programmes 4 (base + demonstration neighbourhoods) and 5 (base + demonstration neighbourhoods + focus schools) was for increasing the potential for students to use active transport to and from school.
- Programme 1 (base network) scored low for increasing participation in active modes due to the lack of network coverage in the main residential areas. Programme 1 also scored relatively low for serving trips to and from school because the base network is focused on connections between cycleways and connections to Hutt CBD.

Investment objective	Indicators used for assessment	Do minimum: Complete committed cycleways	Programme 1: Base network	Programme 4: Base + demonstration neighbourhoods	Programme 5: Base + demonstration neighbourhoods + focus schools
Increase the number of residents that cycle to work and study from 1.6% in 2018 to 4% in the 2028 NZ Census	Estimated new users using buffer method	1	2	4	5
Increase the length of the Hutt City cycling network from 26km in 2020 to 50km by 2027	Length of proposed additional cycleways	3	5	5	5
Reduced DSI crashes involving cyclists (as a proportion cycling's mode share) by 30% in 2027 as recorded in CAS, 16 DSI cycle crashes reported in previous five-year period	Crash by crash analysis (method A) in the economic evaluation manual	1	3	4	4
Improve the rating of main cycling routes in Hutt City to a quality of service rating 2 (suitable for a wide range of users) by 2027 as defined by Auckland Transport's Quality of service evaluation tool for cycle facilities	Percentage of main roads rated as quality of service 2 or better	2	3	4	4
Increase the proportion of residents that perceive children using active transport to and from school as being safe or very safe from 40% in 2019 to 55% by 2027 as measured by the Greater Wellington Transport Perceptions Survey	Number of schools served by the proposed cycling networks	1	2	3	5
increase the proportion of 5-14 year old students who use active transport to and from school from 34% to 45% by 2027 as measured by New Zealand Health Survey	Number of young people within 400m buffer of proposed cycling networks	2	2	4	5
	Total score	**10**	**17**	**24**	**28**

5	4	3	2	1	0	-1	-2	-3	-4	-5
Very significant positive impact	Significant positive impact	Moderate positive impact	Minor positive impact	Very minor positive impact	Neutral impact	Very minor adverse impact	Minor adverse impact	Moderate adverse impact	Significant adverse impact	Very significant adverse impact

Table 5-5: Results for assessment of short-listed programmes against investment objectives

5.5.3 Deliverability and financial feasibility assessment process

The deliverability and financial feasibility of the short-listed programmes was assessed against the potential impacts on other transport modes, constructability and consentability and financial feasibility. It may be possible to mitigate the identified impacts during the design and consultation phases depending on the choice of cycleway layout. For each of the potential impacts a high-level assessment was completed against the considerations listed below.

Impact on other transport modes:

- Whether the cycleways in the programme would reduce road capacity on arterial or primary collector roads and therefore increase delays for vehicles and public transport
- Whether the programme would negatively impact on-street parking and how much demand for parking there is in the area

Constructability and consentability:

- Whether the programme includes the construction of new structures such as bridges or underpasses
- Whether the programme may negatively impact on sensitive natural environments

Financial feasibility:

- Whether the programme cost would be an increase or decrease in the level of investment in Hutt City compared to the Urban Cycleways Programme. This assessment does not include investment made in Te Ara Tupua. The workings for the financial feasibility are shown in the Appendix.

5.5.4 Deliverability and financial feasibility assessment results

The deliverability and financial feasibility assessment results (Table 5-6 on the following page) provides the following insights into the short-listed programmes:

- Programme 1 was assessed as being the easiest to deliver the most financially feasible due to the programme cost being less than the previous funding committed to cycling;
- All three programmes were assessed as being constructable and consentable because the cycleways would be within the existing road corridor and did not require new structures;
- All three programmes had the potential to have moderate impacts on other transport modes to the potential changes to intersection control and new crossings; and
- Programme 5 was determined to be unaffordable due to the significant increase (107% increase compared to the previous Urban Cycleways Programme) in funding required above current investment levels.
- Furthermore programme 5 would require a much larger share of the funding allocated in the 2021 GPS to the walking and cycling activity class than Lower Hutt's share of New Zealand's urban population (6.2% of funding required compared to Lower Hutt having a 2.5% of NZ's urban population)

Additional discuss on financial feasibility is provided in section 8 Financial Case.

	Programme 1: Base network	Programme 4: Base + demonstration neighbourhoods	Programme 5: Base + demonstration nieghbourhoods + focus schools
Impact on other transport modes	-2 Programme may require crossings of Harcourt Werry Dr and CBD intersection changes	-3 Programme may require crossings of Harcourt Werry Dr, CBD intersection changes and Wainuiomata intersection changes	-3 Programme may require crossings of Harcourt Werry Dr, CBD intersection changes and Wainuiomata intersection changes
Constructability and consentability	4 Cycleways within existing road corridor, cycleways in Hutt Central may require moving kerblines	4 Cycleways within existing road corridor, cycleways in Hutt Central may require moving kerblines	4 Cycleways within existing road corridor, cycleways in Hutt Central may require moving kerblines
Financial feasibility	3 reduction in per year funding commitment to cycling	-3 increase in per year funding commitment to cycling	-5 significant increase in per year funding commitment to cycling
Total score	**5**	**-2**	**-4**

Table 5-6: Results for deliverability and financial feasibility assessment

5.5.5 Economic feasibility assessment process

The economic assessment involved three main steps which are estimating the number of new users, estimating the reduction in cycle crashes and estimating the programme costs. The Hutt City Cycling and Micromobility SSBC was started in December 2019 and therefore the economic assessment follows the Economic Evaluation Manual 2018 process. In June 2020 the new Investment Decision-Making Framework was introduced by Waka Kowhai which includes a 4% discount rate and a 60-year evaluation period. Comments on the programme assessment under the new Investment Decision-Making Framework are included in section 7 of this report.

The process followed for each of these steps is described below.

Estimating the number of new users:

- The cycle demand worksheet from the EEM was used to estimate the number of new users for each programme;
- For each of the short-listed programmes buffers were drawn around the cycleways at a distance of 400m, 800m and 1600m;
- The area within each of these buffers and the population density was calculated using 2013 New Zealand Census data;
- The buffer areas and population density were entered into the cycle demand worksheet of the EEM to estimate the total new daily cyclists;
- The average cycle trip length in Hutt City was calculated using 2013 New Zealand Census commute to work data; and
- The total new daily cyclists and average cycle trip length was entered into the SP11 Walking and Cycling spreadsheet to calculate the value of the health and environmental benefits for cycling facilities (Refer to appendix for economic assessment spreadsheets).

Estimating the reduction in cycle crashes

- The first step was to retrieve the all recorded cycle crashes in Lower Hutt between 2010 and 2019 and display the crashes on a map;
- For each programme the number of crashes which occurred along corridors with new cycling facilities was counted;
- The under-reporting factors and crash reduction factors were determined from the EEM and Crash Estimation Compendium;
- Due to the limited research available on the crash rates for cycle paths and shared paths a sensitivity test assuming 0% crash reduction factor was included; and
- The number of cycle crashes, under-reporting factors and crash reduction factors where entered into the SP11 Walking and Cycling spreadsheet to calculate the value the crash cost reduction.

Estimating the programme costs:

- Research at completion costs for similar cycleways projects in New Zealand;
- Calculate the cost per kilometre and round up to determine a cost per kilometre for each category of project;
- Multiply the length of the proposed project by the cost per kilometre to estimate the infrastructure costs; and
- The proposed cycleways would all be within the existing road corridor and therefore it has been assumed that no land purchase, new bridges or land reclamation would be required.

5.5.6 Economic feasibility assessment results

The economic assessment provides the following insights into the relative efficiency of the programmes (Table 5-7 to 5-9):

- Programme 5 has the highest health and environmental benefits and crash cost savings due to having the largest cycleways network which could serve the greatest number of trips; and
- Programme 1 has the highest BCR with 3.4 with programme 5 having the lowest BCR with 2.1. The relative difference in BCRs is due to programme 1 having lower infrastructure costs than the other two short listed programmes.

	Programme 1	Programme 4	Programme 5
Health and environmental benefits	$143 million	$190 million	$226 million
Crash cost savings (with 20% crash reduction factor)	$2 million	$3 million	$5 million
Crash cost savings (with 0% crash reduction factor)	$0	$0	$0

Table 5-7: Benefit streams for the short-listed programmes

	Programme 1	Programme 4	Programme 5
Estimated infrastructure cost	$42 million	$88 million	$117 million
Supporting measure cost	$3 million	$3 million	$3 million
Total cost	$45 million	$91 million	$121 million

Table 5-8: Estimated programme costs in net present value

	Programme 1	Programme 4	Programme 5
Benefit cost ratio with 6% discount rate	3.4	2.3	2.0

Table 5-9: Benefit cost ratios for short listed programmes

5.5.7 Sensitivity tests

Sensitivity tests were undertaken for the BCRs of the short-listed programmes are shown in Table 5-10 on the following page. These sensitivity tests include changes to discount rate, crash reduction factors, number of new users, programme costs and cyclist growth rate. This analysis enables the assumptions contained in the economic analysis to be tested and to understand whether these assumptions influence the results.

Overall the sensitivity tests show that:

- The BCRs have a moderate sensitivity to discount rates with a lower discount resulting in all short-listed programmes having a BCR above 2.5;
- Crash reduction factor has little influence on the BCRs due to most of the economic benefits being from health and environmental benefits from new users;
- The uptake rate of new users has a moderate influence on the BCRs however even with 20% lower new user uptake the BCR range is 2.8 for programme 1 and 1.7 for programme 5;
- Programme cost has a moderate influence on the BCRs however even with 40% higher programme costs all programmes would maintain a BCR above 1; and
- The ordering of the short-listed programmes does not change with any of the sensitivity tests with programme 1 always having the highest BCR.

Sensitivity tests	Programme 1	Programme 4	Programme 5
4% discount rate	4.3	2.8	2.6
8% discount rate	2.8	1.9	1.7
0% crash reduction factor	3.4	2.2	2.0
20% higher uptake of new users	4.1	2.7	2.5
20% lower uptake of new users	2.8	1.8	1.7
20% higher programme costs	2.9	1.9	1.7
40% higher programme costs	2.5	1.6	1.5
2% cyclist growth rate	2.8	1.9	1.7
6% cyclist growth rate	4.0	2.7	2.4

Table 5-10: Sensitivity tests of BCRs for short-listed programmes

5.5.8 Incremental BCR Analysis

An incremental BCR analysis was undertaken of the short-listed programme options to test whether the additional investment for programmes 4 and 5 would provide positive returns. The incremental BCR analysis shown in Table 5-11 on the following page shows that for each additional dollar invested in programme 4 above the level of investment in programme 1 would return $1.10 in additional benefits. Furthermore, for the additional investment contained in programme 5 would return an additional $1.40 when compared to programme 4. This means that from an economic assessment point of view that higher levels of investment in cycleways/paths and supporting measures are justified.

	Target BCR	1		
Programme	Change in Benefits (NPV)	Change in Cost (NPV)	Change in BCR	Return above target?
1	n/a	n/a	n/a	n/a
4	$ 48,174,918	$43,240,000	1.1	**Yes**
5	$ 37,858,762	$27,260,000	1.4	**Yes**

Table 5-11: Results for incremental BCR analysis

5.5.9 Summary of programme assessment

In summary the assessment of the short-listed options shows that programme 1 performs poorly against the investment objectives. This is because the baseline cycleways network would not provide connections to the main residential areas or the majority of schools. Programmes 4 and 5 both performed well against the investment objectives with the main differentiator being that programme 5 scores higher for encouraging active transport to school.

Programme 5 was assessed as being financially unaffordable due to the significant increase in funding required above existing investment levels and pressure that it would place on the walking and cycling activity class of the NLTP. Although programme 5 has the highest health and environmental benefits and crash cost savings it has the lowest BCR due to high infrastructure costs.

On balance programme 4 performed best against the assessment because it scored well for most investment objectives whilst being financially feasible. Programme 4 would include both connections to key destinations in Hutt Central and Petone whilst also including suburban connections onto The Beltway and Wainuiomata shared path. Therefore programme 4 is effective in improving access to employment, community facilities and train stations by bike and micromobility across large areas of Hutt City.

However, it is considered that programme 4 would not go far enough for encouraging students to use active transport to school which is one of the investment objectives. Furthermore, encouraging students to use active transport was also seen by the reference group as being an essential element of any investment programme. Therefore, it is recommended that programme 4 be updated to include more connections to schools which is discussed further in the following section.

5.6 Programme 4+ development

The changes made to programme 4 to include more connections to schools and to reflect the feedback received from stakeholders on the short-listed programmes are as follows:

- Replace Stokes Valley with Petone as a demonstration neighbourhood because of the longer trip length in Stokes Valley and higher planned development in Petone. Furthermore, a complete cycleways network in Petone would maximise connections onto Te Ara Tupua;
- Include Udy St, Britannia St and Kensington Ave in the programme to form a complete cycleways network in Petone;
- Change The Esplanade facility type to on road protected cycleway between Waione Street bridge and Te Puni Street due to the limited potential to widen the existing shared path in areas; and
- Provide connections to all schools along The Beltway including Pomare, St Michael's, Taita Central, Avalon, Dyer Street, Epuni, St Bernard's, Waterloo, Hutt Intermediate and Randwick Schools.

The indicative network for programme 4+ is shown in Figure 5-6.

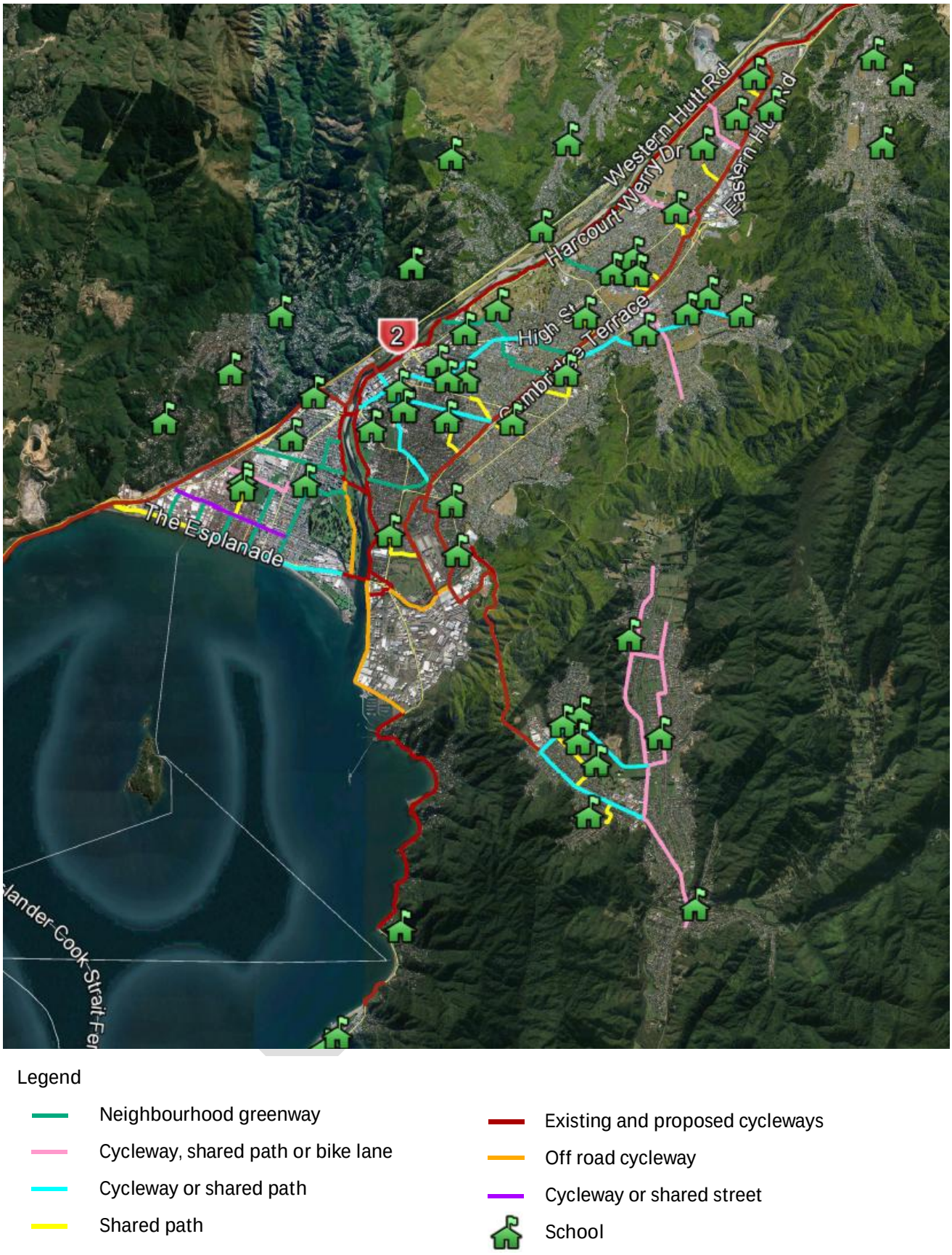

Figure 5-6: Indicative cycleways network for programme 4+

5.7 Updated programme assessment

The same assessment that was completed for the short-listed programmes as undertaken for programme 4+. The results for the assessment against the investment objectives, deliverability and financial feasibility and economic feasibility are shown below. The methodology for the assessment is discussed in section 5.7 above.

5.7.1 Effectiveness for achieving the investment objectives

The results for the assessment against the investment objectives are shown in

Figure 5-7 on the following page. Comparing the results for programme 4+ against the results for the short-listed programmes provides the following insights:

- Overall programme 4+ would be effective in achieving the investment objectives with a higher score for encouraging students to use active modes than programme 4; and
- Programme 4+ scores best of all the programmes for improving safety for bike and micromobility users because would invest in Petone which is an area that has a relatively high crash history.

Investment objective	Indicators used for assessment	Do minimum: Complete committed cycleways	Programme 1: Base network	Programme 4: Base + demonstration neighbourhoods	Programme 5: Base + demonstration neighbourhoods + focus schools	Programme 4+: Hybrid
Increase the number of residents that cycle to work and study from 1.6% in 2018 to 4% in the 2028 NZ Census	Estimated new users using buffer method	1	2	4	5	4
Increase the length of the Hutt City cycling network from 26km in 2020 to 50km by 2027	Length of proposed additional cycleways	3	5	5	5	5
Reduced DSI crashes involving cyclists (as a proportion cycling's mode share) by 30% in 2027 as recorded in CAS, 16 DSI cycle crashes reported in previous five-year period	Crash by crash analysis (method A) in the economic evaluation manual	1	3	4	4	5
Improve the rating of main cycling routes in Hutt City to a quality of service rating 2 (suitable for a wide range of users) by 2027 as defined by Auckland Transport's Quality of service evaluation tool for cycle facilities	Percentage of main roads rated as quality of service 2 or better	2	3	4	4	4
Increase the proportion of residents that perceive children using active transport to and from school as being safe or very safe from 40% in 2019 to 55% by 2027 as measured by the Greater Wellington Transport Perceptions Survey	Number of schools served by the proposed cycling networks	1	2	3	5	4
increase the proportion of 5-14 year old students who use active transport to and from school from 34% to 45% by 2027 as measured by New Zealand Health Survey	Number of young people within 400m buffer of proposed cycling networks	2	2	4	5	5
	Total score	**10**	**17**	**24**	**28**	**27**

5	4	3	2	1	0	-1	-2	-3	-4	-5
Very significant positive impact	Significant positive impact	Moderate positive impact	Minor positive impact	Very minor positive impact	Neutral impact	Very minor adverse impact	Minor adverse impact	Moderate adverse impact	Significant adverse impact	Very significant adverse impact

Figure 5-7: Assessment of hybrid programme against the investment objectives

5.7.2 Deliverability and financial feasibility

The results for the deliverability and financial feasibility assessment results are shown in the Table 5-12 below. Overall programme 4+ was assessed as having a moderate impact on other transport modes due to the possible need for additional traffic signals. All the programmes were all assessed as being constructable and consentable with the proposed projects using the existing road corridor. Programme 4+ would require an increase in funding allocated to cycleways/pathways and supporting measures compared to investments made in previous years.

	Programme 1: Base network	Programme 4: Base + demonstration neighbourhoods	Programme 5: Base + demonstration nieghbourhoods + focus schools	Programme 4+: Hybrid
Impact on other transport modes	-2 Programme may require crossings of Harcourt Werry Dr and CBD intersection changes	-3 Programme may require crossings of Harcourt Werry Dr, CBD intersection changes and Wainuiomata intersection changes	-3 Programme may require crossings of Harcourt Werry Dr, CBD intersection changes and Wainuiomata intersection changes	-3 Programme may require crossings of Harcourt Werry Dr, CBD intersection changes and Wainuiomata intersection changes
Constructability and consentability	4 Cycleways within existing road corridor, cycleways in Hutt Central may require moving kerblines	4 Cycleways within existing road corridor, cycleways in Hutt Central may require moving kerblines	4 Cycleways within existing road corridor, cycleways in Hutt Central may require moving kerblines	4 Cycleways within existing road corridor, cycleways in Hutt Central may require moving kerblines
Financial feasibility	3 reduction in per year funding commitment to cycling	-3 increase in per year funding commitment to cycling	-5 significant increase in per year funding commitment to cycling	-3 increase in per year funding commitment to cycling
Total score	**5**	**-2**	**-4**	**-2**

Table 5-12: Deliverability and financial feasibility assessment

5.7.3 Economic feasibility

The results from the economic assessment are shown in Table 5-13 to Table 5-15. The economic assessment shows that programme 4+ has higher benefits than programme 4 and lower costs than programme 5. The hybrid programme also had the highest crash cost savings of all the programmes because it invests in safe cycleways in Petone which has a relatively high crash history.

	Programme 1	Programme 4	Programme 5	Programme 4+
Health and environmental benefits	$143 million	$190 million	$226 million	$206 million
Crash cost savings	$2 million	$3 million	$5 million	$7 million

Table 5-13: Benefit streams for programme options

	Programme 1	Programme 4	Programme 5	Programme 4+
Estimated infrastructure cost	$42 million	$88 million	$117 million	$84 million
Supporting measure cost	$3 million	$3 million	$3 million	$3 million
Total cost	$45 million	$91 million	$121 million	$88 million

Table 5-14: Estimated programme costs

	Programme 1	Programme 4	Programme 5	Programme 4+
Benefit cost ratio	3.4	2.3	2.0	2.6

Table 5-15: Benefit cost ratios for short listed programme options

5.7.4 Sensitivity test

The same sensitivity tests were applied to programme 4+ that was used for the short-listed programme assessment. The results for the sensitivity tests are shown in Table 5-16 on the following page. Overall the results show that programme 4+ has a higher BCR than programme 4 across all the sensitivity tests used.

Sensitivity tests	Programme 1	Programme 4	Programme 5	Programme 4+
4% discount rate	4.3	2.8	2.6	3.2
8% discount rate	2.8	1.9	1.7	2.2
0% crash reduction factor	3.4	2.2	2.0	2.5
20% higher uptake of new users	4.1	2.7	2.5	3.1
20% lower uptake of new users	2.8	1.8	1.7	2.1
20% higher programme costs	2.9	1.9	1.7	2.2
40% higher programme costs	2.5	1.6	1.5	1.9
2% cyclist growth rate	2.8	1.9	1.7	2.2
6% cyclist growth rate	4.0	2.7	2.4	3.0

Table 5-16: Sensitivity tests comparing programme 4+ with the short-listed programmes

5.7.5 Incremental BCR Analysis

An incremental BCR analysis of programme 4+ was undertaken to test whether the increase in investment compared to programme 1 could be justified. The results on the following page (Table 5-17) show that the increase in programme cost is justified by the increase in benefits with a return of $1.70 for every additional dollar invested. The additional investment for programme 5 would not be justified by the benefits received due to a return of $0.60 for every additional dollar invested when compared to programme 4+. This indicates that programme 4+ is efficient in achieving economic returns.

	Target BCR	1		
Programme	Change in Benefits (NPV)	Change in Cost (NPV)	Change in BCR	Return above target?
1	n/a	n/a	n/a	n/a
4+	$ 67,236,548	$39,480,000	1.7	**Yes**
5	$ 18,797,132	$31,020,000	0.6	**No**

Table 5-17: Incremental BCR analysis for programme 4+

5.7.6 Summary of programme assessment

Considering the results of the assessment against the investment objectives, deliverability/ financial feasibility and economic feasibility it is recommended that programme 4+ be put forward to funding approval. This is because programme 4+ would be effective in improving access to employment, public transport, community facilities and schools by bike and micromobility. Programme 4+ would leverage the funding committed to cycleways/pathways in Hutt City by providing connections in Hutt Central, suburban neighbourhoods and to schools.

6. Recommended Programme

It is recommended that the implementation of the programme be staged as quick wins, medium-term and long-term to align with the completion of related transport projects and the available funding. The level of investment for the quick wins package reflects Council funding commitments towards completing the Urban Cycleways Programme and the post Covid-19 financial situation.

6.1 Quick wins 2021 to 2024

The quick wins package focuses on activities which can be implemented quickly and with low infrastructure costs. These activities include the Knights Road cycleway trials, connections to schools and links to Jackson Street. The Jackson Street cycleway trial would be implemented as part of the Innovating Streets programme. The purpose of the quick wins package is to leverage off the investment made in The Beltway and provide initial connections to Hutt CBD and Petone.

Area	Infrastructure	Supporting measures	Indicative level of investment
Petone/ Alicetown	Connections from The Esplanade to Jackson Street	Public bike parking Marketing, promotion and events	$
Hutt Central	Connections to schools along The Beltway Knights Road cycleway trial	Public bike parking Cycle skills training Bikes in schools Marketing, promotion and events	$
Waterloo	Connections to schools along The Beltway	Cycle skills training Bikes in schools	$
Epuni/Boulcott	Connections to schools along The Beltway	Cycle skills training Bikes in schools	$
Avalon	Connections to schools along The Beltway	Cycle skills training Bikes in schools	$
Taita	Connections to schools along The Beltway	Cycle skills training Bikes in schools	$

Table 6-1: Proposed activities for the quick wins package between 2021 and 2024

6.2 Medium term 2024 to 2030

It is proposed that the focus for the medium-term investment is completing the cycleways network in Hutt Central and Petone. This is because these areas are key destinations and this staging would align the cycling and micromobility programme with completion of Riverlink and Te Ara Tupua. Other areas of investment are upgrading Port Road and the Waiwhetu River shared path to better connect the Eastern Bays shared path, Hutt River Trail and Wainuiomata shared path.

Area	Infrastructure	Supporting measures	Indicative level of investment
Petone/ Alicetown	Formalise The Esplanade on road cycleway Extend north/south connections on Britannia St and Kensington Ave East/ west connections on Jackson St, Udy St and Wakefield St Upgrade Hutt River trail through Sladden Park	Cycle lane enforcement Marketing, promotion and events Way-finding signage and maps	$$$
Gracefield/Seaview	Upgrade shared paths on Port Rd and along Waiwhetu River	Way-finding signage and maps	$$
Hutt Central	Formalise Knights Road cycleway New connections to CBD on Bellevue Rd and Kings Crescent CBD cycleways timed to align with Riverlink project	Marketing, promotion and events Way-finding signage and maps	$$$
Epuni/Boulcott	Connections to Hutt Hospital on Brees St, Copeland St and Boulcott St	Way-finding signage and maps	$

Table 6-2: Proposed activities for the medium-term package 2024 to 2030

6.3 Long term 2030 to 2036

The proposed activities for the long-term programme include completing the cycleways networks in Naenae and Wainuiomata that would cater for both local trips and trips across Hutt City. Another focus area is to improve connections between The Beltway and Hutt River Trail in Avalon and Taita.

Area	Infrastructure	Supporting measures	Indicative level of investment
Naenae	Connections on Seddon St and Naenae Rd/ Rata St	Public bike parking Cycle lane enforcement Cycle skills training Bikes in schools Marketing, promotion and events Way-finding signage and maps	$$$
Avalon	Connections between Hutt River Trail and The Beltway	Cycle lane enforcement Way-finding signage and maps	$
Taita	Connections between Hutt River Trail and The Beltway	Cycle lane enforcement Way-finding signage and maps	$
Wainuiomata	Upgrades to The Parkway and Wainuiomata Road Shared paths to schools Connections to north and south Wainuiomata	Public bike parking Cycle lane enforcement Cycle skills training Bikes in schools Marketing, promotion and events Way-finding signage and maps	$$$

Table 6-3: Proposed activities for long-term package 2030 to 2036

6.4 Supporting measures

In addition to investment in cycleways/pathways the recommended programme includes supporting measures (including end of trip facilities, enforcement, training and information) which assist in achieving the investment objectives. The recommended programme proposes additional investment in public cycle parking ($0.75 million), marketing promotion and events ($1.5 million) and bikes in schools ($0.75 million). It is proposed that the support measures are coordinated with the implementation of the cycleways network to remove all barriers to active and sustainable mode uptake. The details of the supporting measures and lead organisations are detailed in Table 6-4.

Initiative	Recommended approach	Indicative investment
Public cycle parking (HCC lead)	Expand the cycle parking provided at key destinations including Hutt CBD, Petone, Days Bay and sports grounds. Potential to increase cycle parking by approximately 700 spaces. Investigate secure long stay cycle parking for Hutt CBD.	$0.75 million
Cycle parking at train stations (GWRC lead)	Continue to monitor the provision of cycle parking at train stations and adjust provision of cycle parking to ensure that demand is met.	N/A included as business as usual costs
Speed enforcement (Police lead)	Continue to work with Police on speed enforcement in high risk areas including around schools and town centres.	N/A included as business as usual costs
Cycle lane enforcement (HCC lead)	Continued enforcement and education to reduce parking in bike lanes.	N/A included as business as usual costs
Marketing, promotion and events (HCC and GWRC lead)	Targeted additional marketing, promotion and events to coincide with the completion of sections of the cycle network.	$1.5 million
Cycle skills training (GWRC lead)	Continuation of the Pedal Ready programme which is coordinated with the completion of the cycle network to schools	N/A included as business as usual costs
Bikes in Schools (HCC and GWRC lead)	Funding for additional schools to be involved in the Bikes in Schools which includes equipment and riding track. Potential for approximately 15 schools to be involved in programme	$0.75 million
Cycle way-finding signage and maps (HCC lead)	Implement a consistent way-finding and directional signage across the network to help users to navigate more easily	N/A signage and maps generally included in project costs

Table 6-4: Supporting measures for 2021 to 2036

7. Recommended programme assessment

This section assesses the recommended programme against Waka Kotahi's Investment Assessment Framework 2018-21. The recommended programme has a Very High/ Low assessment profile using the economic evaluation manual 2018 and a Very High/ Medium profile using a 4% discount rate (Table 7-1 & Table 7-2). Irrespective of which economic assessment methodology is followed the recommended programme would have a priority order 1 for the activities prioritised for improvement which includes walking and cycling improvements. This is because the recommended programme is assessed as having a very high results alignment against the GPS 2018-21 (Table 7-3 on following page).

GPS Priorities	Results alignment	Comments
Safety	High	There is a high perceived safety risk to use bikes with only 11% of respondents from Hutt City saying that cyclists are sufficiently separated from traffic in the "Understanding attitudes and perceptions of Cycling and Walking" study[12]. Furthermore, Hutt CBD has a high-risk rating using the KiwiRAP urban methodology[13].
Access	Very High	The recommended programme addresses critical missing links in a strategic network by providing new connections to Hutt CBD and improving connections between strategic cycleways Hutt City is defined as a major metro area and the recommended programmes addresses critical missing links to multi-modal interchanges including Waterloo, Petone, Naenae and Taita stations.
Environment	High	The recommended programme enables a significant modal shift from private motor vehicles to active modes with an estimated 1,880 new cyclists.

Table 7-1: Results alignment assessment

[12] Waka Kotahi (2018). *Understanding attitudes and perceptions of Cycling and Walking.* https://www.nzta.govt.nz/assets/Walking-Cycling-and-Public-Transport/docs/NZTA-Attitudes-to-cycling-and-walking-final-report-2018.pdf

[13] KiwiRAP, *Road Safety Risk.* https://roadsafetyrisk.co.nz/maps/personal-risk#Wellington

	Economic evaluation manual 2018	Investment Decision-Making Framework 2020
Recommended programme BCR	2.6	3.2
Cost benefit appraisal assessment	Low (BCR 1-2.9)	Medium (BCR 3-4.9)

Table 7-2: Cost benefit appraisal of the recommended programme

RESULTS ALIGNMENT	COST BENEFIT APPRAISAL	PRIORITY ORDER
Very high	L/M/H/VH	1
L/M/H	Very high (BCR 10+); PV_EoL	2
High	High (BCR 5-9.9)	3
High	Medium (BCR 3-4.9)	4
Medium	High (BCR 5-9.9)	4
High	Low (BCR 1-2.9)	5
Medium	Medium (BCR 3-4.9)	5
Medium	Low (BCR 1-2.9)	6
Low	High (BCR 5-9.9)	7
Low	Medium (BCR 3-4.9)	8
Low	Low (BCR 1-2.9)	Exclude

Table 7-3: Priority order for activities prioritised for improvement

8. Financial case

8.1 Indicative cost

The level of investment for the recommended programme is a total of $88 million over a 15-year period with $85 million budgeted for infrastructure improvements and $3 million towards supporting measures. The implementation recommended programme is staged with a lower level of investment in the first 3 years with the larger infrastructure projects timed to occur in the medium to long term.

Below is the indicative level of investment for each stage of implementation which relates to the list of projects contained in section 6. The cost estimates will need to be revised when more detail cost estimates are available during the design and consultation stage.

- Quick wins (2021 to 2024): $7.5 million for infrastructure and $0.6 million for supporting measures
- Medium term (2024 to 2030): $40.5 million for infrastructure and $1.2 million for supporting measures
- Long term (2030 to 2036): $37.0 million for infrastructure and $1.2 million for supporting measures

8.2 Indicative programme cash flow

Table 8-1 on the following page shows the indicative un-escalated programme cost by financial year which relates to the cost estimates for the projects included in the quick wins, medium-term and long-term packages. It has been assumed that investment in supporting measures would be even throughout the investment period. The programme cash flow will be revised throughout the implementation of the programme.

	Quick wins			Medium term						Long term					
Financial year	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36
Infrastructure investment	2.5	2.5	2.6	6.7	6.7	6.7	6.8	6.8	6.8	6.1	6.1	6.1	6.2	6.2	6.2
Supporting measures	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Annual total	2.7	2.7	2.8	6.9	6.9	6.9	7.0	7.0	7.0	6.3	6.3	6.3	6.4	6.4	6.4
Cumulative total		5.4	8.2	15.1	22	28.9	35.9	42.9	49.9	56.2	62.5	68.8	75.2	81.6	88

Table 8-1: Indicative un-escalated programme cost by financial year

8.3 Funding arrangements

Potential funding arrangements for the implementation of the recommended programme are as follows:

- Hutt City Council and Waka Kotahi co-funding projects at the normal funding assistance rate for Hutt City which for the 2018-21 National Land Transport Programme is 51%; and
- Inclusion of selected projects in the Innovating Streets programme which met the specific critieria of the programme. The funding assistance rate for Innovating Streets Programme is 90%.

The cycleways network contained in the recommended programme is within local road corridor and therefore it is assumed that no Highway Network Operations funding would be available.

The Urban Cycleways Programme 2014 contained a funding arrangement with 1/3 from the NLTP, 1/3 from the Urban Cycleways Fund and 1/3 Council share. The Urban Cycleways Programme is fully committed and at the time of writing this SSBC the Government had indicated that the Urban Cycleways Programme would not be renewed.

Final funding arrangements will depend on future government decisions on the funding assistance rate for cycling improvement activities.

8.4 Affordability

The affordability of the recommended programme depends on the following:

- Level of funding available from Hutt City Council which depends on Long Term Plan budget setting process which started in 2020;
- Funding available from the NLTF which is influenced by the level of funding allocated to the Walking and Cycling activity class in the GPS and funding committed to walking and cycling projects across New Zealand; and
- Level of funding available through other government funding sources such as the Shovel Ready Programme.

9. Commercial Case

9.1 Procurement approach

In addition to benefits to road users, investment in cycleways/pathways can also help to create jobs in the construction sector and support the wider Hutt City economy. Particularly for the quick wins package that would occur during the Covid-19 recovery Council could maximise local employment through the procurement approach used.

Council could look to move away from the lowest price conforming tender method and apply a greater weighting to the quality components of a construction tender process. This could improve the financial health of the local construction sector by ensuring that they have future work that would permit them to reinvestment in new employees. Nationally the Government is supporting the construction sector during the post Covid-19 period through the Shovel Ready Programme which could be further supported by Council.

9.2 Activity class

Parts of the cycling and micromobility programme could be implemented through the low-cost low risk activity class. The threshold for activities to be included within are those below $2 million dollars assuming a funding assistance rate of 51%. The low-cost low risk activity class allows the procurement process for small projects to be streamlined and would reduce the required project management time.

The activities which could be considered for inclusion in the low-cost low risk programme are shown in Figure 9-1

Activity	Type	Cost estimate ($ million)	Staging
Te Puni Street	Neighbourhood street	$0.44	Quick wins
Victoria Street	Neighbourhood street	$0.44	Quick wins
Bay Street	Neighbourhood street	$0.44	Quick wins
Bolton Street	Neighbourhood street	$0.44	Quick wins
William Street	Neighbourhood street	$0.44	Quick wins
Taita schools	Shared path	$0.86	Quick wins
Avalon schools	Shared path	$1.32	Quick wins
Waterloo schools	Shared path	$1.85	Quick wins
Hutt Central schools	Shared path	$1.39	Quick wins
Kensington Ave	Neighbourhood street	$0.99	Medium term
Brees Street	Neighbourhood street	$1.1	Medium term
Copeland Street	Neighbourhood street	$0.66	Medium term

Udy street	Shared path	$1.72	Medium term
Britannia Street	Shared path	$0.66	Medium term
Randwick School	Shared path	$0.26	Medium term
Hutt River trail	Shared path	$1.72	Medium term
Waiwhetu River	Shared path	$1.32	Medium term
Reynolds Street	Buffered bike lanes	$0.88	Long term
Percy Cameron Street	Buffered bike lanes	$0.88	Long term
Frederick Street	Neighbourhood street	$1.43	Long term
Main Road	Buffered bike lanes	$1.76	Long term
Sedden Street	Buffered bike lanes	$1.65	Long term
Reading Street	Shared path	$0.53	Long term
Konini Street	Shared path	$1.32	Long term

Figure 9-1: Activities for possible inclusion in low-cost low risk programme

9.3 Delivery capacity

During the 2018-2021 National Land Transport Programme period Hutt City Council will have delivered several large cycleway/pathway projects. The value of the cycleway/pathway projects which are completed or under construction are shown in

Figure 9-2 below:

Activity	Spend
Wainuiomata Hill Shared Path	$12,600,000
The Beltway	$6,900,000
Low Cost Low Risk cycling improvements	$3,200,000

Figure 9-2: Cycleway/pathway projects delivered by HCC in 2018 NLTP

This highlights the Councils recent experience in delivering significant cycleway/pathway infrastructure projects. The Beltway and Wainuiomata Hill Shared Path are both technically complex and high-profile projects which required specialist input and community consultation. In comparison the projects contained in the recommended programme are not as technically complex but would have a similar level of public interest.

9.4 Implementation risk review

An implementation risk review has been undertaken in accordance with the Waka Kotahi programme business case guidance (refer to Table 9-1 on following page). It is intended that the risk review be updated during the design phase of implementing the programme.

Risks Relating To	Likelihood	Comment	Risk owners	Risk mitigation
Technical	Low	The recommended programme includes protected cycleways on urban arterials and primary collector roads. These projects have a low technical difficultly as they do not require any structures, underpasses or land reclamation	Hutt City Council	Design stage provides the opportunity to mitigate any technical issues through route and treatment choice.
Operational	Low	The activities contained in the recommended programme have a low operational risk both during construction and for the continued operation of the network. This is because the proposed activities are appropriate for a low speed urban environment.	Hutt City Council	Traffic management plans will be developed as part of the implementation phase.
Financial	Medium	The cost estimates have been developed at a feasibility level of detail using costs per kilometre from similar cycleways projects. Activities and costs for the short-term programme have been considered against the HCC emergency budget. The larger cost burden for cycleway/pathway infrastructure has been allocated in the medium to long-term programmes to allow Council to adequately plan for these in their 10-year plan.	Hutt City Council	Refine cost estimates during design and consultation phase The programme is flexible enough to permit additional activities to be brought forward in phasing if the current financial situation improves.
Stakeholder/public	Low-Medium	It is expected to be a high level of stakeholder and public interest in the cycleways programme. A stakeholder and public engagement plan has been drafted as part of this business case and will be developed in more detail during the design phase.	Hutt City Council	Consult with stakeholders and the public early in the design phase
Environmental and social responsibility	Low	The potential to affect sites of cultural, heritage or environmental significance is low with all works to be undertaken within the existing road corridor.	Hutt City Council and construction contractor	Any residual environmental impact will be managed through the employment of best practice construction methods.
Safety	Low	The proposed treatments are standard to the transport network and do not have any special or significant ongoing maintenance requirements. Safety audits will be completed of the designs both pre and post construction which is common practice for transport projects. Overall the activities have been chosen because of their potential to improve safety.	Hutt City Council and construction contractor	Consideration will be given to safety in design practices during the design phase for the activities. Designs will be changes to address any potential safety issues identified as part of the safety audit process.

Table 9-1: Implementation risk review

10. Management Case

10.1 Programme management

Delivering the recommended programme will be managed by Hutt City Council who are experienced in managing the planning, design and delivery of large cycleway/pathway projects. Procurement of suppliers for both professional services and physical works will be in accordance with established procurement policy of the Council. The activities will be delivered in accordance with Waka Kotahi requirements and meet all reporting and funding requirements.

10.2 Co-Delivery

Some of the supporting measures include as part of the recommended are outside of Hutt City Council's direct control as they are delivered by other organisations. Examples include speed enforcement which is the responsibility the NZ Police and cycle skills training which is run by Greater Wellington Regional Council. It is therefore proposed that Hutt City Council partners with these organisations to coordinate the delivery of these measures with the development of the active and sustainable modes network.

10.3 Stakeholder communication and engagement plan

Communication and engagement with stakeholder and the community is critically important for the success of the proposed cycling and micromobility programme. Hutt City Council will take a collaborative approach in engaging with stakeholders and the community were feedback is sought early in the route and design choice process. This would be an iterative process where concepts would be presented to stakeholders and the community for feedback and then developed in more detail before further feedback was sought.

The list of key stakeholders includes:

- Community boards
- Hutt Cycle Network
- Living Streets Aotearoa
- Hutt Valley Chamber of Commerce
- Business associations
- Iwi
- Automobile Association
- Hutt Valley District Health Board
- School board of trustees
- Residents and business owners

10.4 Programme performance and review

The performance of the programme will be measured using the following information:

- Cycling and micromobility volume before and after infrastructure changes
- Crashes involving bikes and micromobility users
- Traffic volumes and speeds for streets with proposed traffic calming measures
- Surveys with cyclists and micromobility users to capture satisfaction with the facilities
- Level of service improvements
- Length of cycle network implemented
- Perception surveys of residents

Hutt City Council undertakes yearly manual counts of cyclists entering the CBD which provides a useful baseline to compare usage against. It is recognised that existing cycle counts to not cover outer areas of Hutt City and that a baseline of usage in these areas will also need to be undertaken.

11. Next steps

The next steps for the Hutt City Cycling and Micromobility SSBC are as follows:

- Endorsement of SSBC by Waka Kotahi;
- Workshop the SSBC recommendations with Hutt City Councillors;
- Endorsement of the recommended programme at Hutt City Council meeting;
- Inclusion of SSBC investment programme in National Land Transport Programme and Long Term Plan;
- Alignment between the recommended programme with business as usual activities of partner organisations; and
- Concept design and stakeholder/ community consultation starting with the activities included in the quick wins package.

Appendix A. Demonstration Neighbourhood Selection Criteria

Criteria	Scoring (out of 10)	Rationale
Commute distance for all modes using Census data	10 is average commute distance of 4.5 km and 1 is average commute of 9 km	Cycling and micromobility is less suited to long commutes and therefore areas with shorter commutes are scored higher
Population under 15 years old using Census data	1 is 15% of people aged under 15 years and 10 is 25% of people aged under 15 years	Investing in areas with a higher proportion of children provides greater community benefits from improved health outcomes
How well served the area is by Metlink high frequency bus routes or rail services	10 is the suburb is not served by a high frequency bus route or train line and 0 the suburb is served by multiple high frequency bus routes or train lines	Cycling and micromobility provides an affordable transport options and therefore areas with less transport choice would benefit more from investment
Proximity to primary cycling network (both current and committed)	10 suburb is within 0.5 km of the existing primary cycling network and 1 suburb beyond 1 km of the existing primary cycling network	Areas which are located close to the existing cycleways/pathway network offer the potential to connect onto the existing network and thereby leverage past investment
Presence of local shops, amenities and community facilities	10 is suburb contains three of either supermarket, library, medical centre, community centre and sports fields. 5 is suburb with two of the facilities	Trips to local services are well suited to cycling and micromobility because of the short distance
Number of serious crashes involving cyclists and pedestrians in last 10 years from CAS data	2.5 active mode crashes per square kilometre over last 5 years scores 10 and 0.5 crashes per km^2 scores 1	Areas with a history of high crashes involving active modes have the potential for greater safety benefits from investment
Socio-economic deprivation index score for the community	Areas with a low deviation score 10 and areas with a high deviation score 10	A high deviation score indicates that an area may have lower incomes and employment. Cycling and micromobility are affordable transport modes that can improve access to jobs.
Road gradient for arterial and collector roads within suburb	10 is flat, 5 is moderate gradient, 0 is steep gradient	Hilly areas are less suited to cycling and micromobility than flat areas and therefore may have lower uptake
Population density within suburb	10 is population density above 2800 people per km and 1 is population density of 1000 people per km	The more people that live in a neighbourhood the higher the potential uptake in cycling and micromobility is

	Petone	Korokoro	Alicetown	Maungaraki	Normandale	Belmont	Kelson	Stokes Valley	Taita	Avalon	Naenae	Epuni	Waterloo	Boulcott
Commute distance for all modes using Census data	6	5	6	3	4	1	1	1	1	3	3	4	4	5
Population under 15 years old using Census data	2	5	5	7	5	5	7	9	10	2	9	5	5	4
How well served the area is by Metlink high frequency bus routes or rail services	0	10	0	10	10	10	10	5	0	0	0	0	0	5
Proximity to primary cycling network (both current and committed)	10	0	10	0	0	5	5	10	10	10	5	10	5	5
Presence of local shops, amenities and community facilities	10	0	0	0	0	0	0	10	5	5	10	5	0	0
Number of crashes involving cyclists and pedestrians in last 5 years from CAS data	7	0	10	0	0	3	0	3	0	7	7	10	5	10
Socio-economic deprivation index score for the community	6	1	5	1	1	1	1	7	10	5	10	6	3	4
Road gradient for arterial and collector roads within suburb	10	0	10	0	0	0	0	5	10	10	10	10	10	10
Population density within suburb	3	1	8	4	4	4	4	5	7	8	9	8	7	4
	54	22	54	25	24	29	28	55	53	50	63	58	39	47
Short listed neighbourhoods								Y			Y			

	Woburn	Hutt Central	Wainuiomata	Waiwhetu	Eastbourne
Commute distance for all modes using Census data	7	6	4	5	2
Population under 15 years old using Census data	2	1	10	6	4
How well served the area is by Metlink high frequency bus routes or rail services	0	0	10	5	10
Proximity to primary cycling network (both current and committed)	10	10	10	5	5
Presence of local shops, amenities and community facilities	0	10	10	0	10
Number of crashes involving cyclists and pedestrians in last 5 years from CAS data	5	10	0	3	3
Socio-economic deprivation index score for the community	1	2	8	7	1
Road gradient for arterial and collector roads within suburb	10	10	5	10	10
Population density within suburb	4	4	5	3	5
	39	53	62	44	50
Short listed neighbourhoods			Y		

Appendix B. Focus schools selection criteria

Criteria	Scoring (out of 10)	Rationale
School roll	10 is 500 students enrolled, 5 is 350 students and 1 is 50 students	Larger schools have higher potential uptake in active modes
School character	Local school score 10, special character school score 5 and private school score 0	Private schools and special character schools draw students from a larger area. Long trips to schools are less suited to cycling and micromobility
Proximity to cycleway routes	School located within 200m of current or proposed cycleway score 10, within 400m score 5 and further than 400m score 0	Leverage existing investment in protected cycleways by connecting nearby schools
Safety around schools	Schools with 30 or more speed or vulnerable road user type crashes within 500m radius of school score 10	History of speed related crashes or crashes involving vulnerable road users is an indication that traffic calming could be needed
Road hierarchy	School gate on arterial road score 0, school gate on primary collector road score 5 and school gate on local road score 10	Arterial roads and collector roads have higher traffic volumes which makes cycling and micromobility less attractive transport modes
School involved in Movin' March	10 for involved in Movin March and 0 for not involved	Involvement in Moving March shows school engagement in active transport initiatives
School involved in Bikes in Schools	10 for involved in bikes in schools and 0 for not involved	Students would have been taught cycling skills are are therefore more likely to consider cycling to school
Road gradient	Road which school gate is on is flat score 10, moderate gradient score 5 and steep gradient score 0	Steep roads are less suited to cycling and micromobility especially for less confident users
Decile rating	Low decile is a 10 and a high decile is a 1	Prioritises investment in communities with the greatest needs

	Arakura School	Avalon Intermediate	Avalon School	Belmont School	Boulcott School	Chilton Saint James School	Dyer Street School	Eastern Hutt School	Epuni School	Fernlea School	Gracefield School	Hutt Central School	Hutt Intermediate	High Valley High School
School roll	3	4	5	8	7	3	4	10	2	5	5	6	10	10
School character	10	10	10	10	10	0	10	10	10	10	10	10	10	10
Proximity to cycleway routes	10	10	5	10	5	10	10	10	0	0	10	0	5	10
Safety around school	4	7	4	5	3	6	9	10	9	3	3	9	3	7
Road hierarchy	5	0	10	0	5	0	10	0	10	10	5	0	10	0
School involved in Movin' March	0	0	0	0	0	0	0	10	10	10	0	0	0	0
School involved in Bikes in Schools	0	0	0	0	0	0	0	0	0	10	0	0	0	0
Road gradient	10	10	10	0	10	10	10	10	10	10	10	10	10	10
Decile rating	8	8	8	3	3	0	6	1	7	6	5	2	2	2
Unweighted score	50	49	52	36	43	29	59	61	58	64	48	37	50	49
Short listed	Yes	Yes	Yes	No	No	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes

	Kelson School	Konini Primary School	Koraunui School	Korokoro School	Maranatha Christian	Maungaraki School	Muritai School	Naenae Intermediate	Naenae College	Naenae School	Normandale School	Our Lady of the Rosary	Petone Central School	Pomare School
School roll	5	3	5	4	3	7	8	7	10	5	4	5	1	1
School character	10	10	10	10	5	10	10	10	10	10	10	5	10	10
Proximity to cycleway routes	0	5	0	0	0	0	0	10	5	10	0	10	10	10
Safety around school	1	7	1	1	1	4	1	6	8	4	2	10	8	7
Road hierarchy	5	10	10	10	10	10	10	10	5	10	10	0	10	10
School involved in Movin' March	0	10	0	10	0	10	0	0	0	10	10	0	0	0
School involved in Bikes in Schools	0	0	0	0	0	0	0	0	0	0	0	10	0	0
Road gradient	0	10	10	0	0	0	10	10	10	10	0	10	10	10
Decile rating	1	6	7	0	3	0	0		7	7	0	5	6	9
Unweighted score	22	61	43	35	22	41	39	53	55	66	36	55	55	57
Short listed	No	Yes	No	No	No	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes

	Pukeatua Primary	Randwick School	Raphael House Rudolf Steiner	Rata Street School	Sacred Heart School	Sacred Heart College	San Antonio School	St Bernadettes School	St Bernards College	St Claudine Thevenet	St Michaels School	St Orans College	Sts Peter and Paul School	Taita Central School
School roll	3	3	4	7	3	10	1	2	10	5	2	10	9	3
School character	10	10	5	10	5	5	5	5	5	5	5	5	5	10
Proximity to cycleway routes	10	5	0	10	10	10	0	10	0	5	10	0	10	5
Safety around school	5	4	2	6	8	6	1	7	4	4	10	5	10	8
Road hierarchy	10	0	10	10	10	5	10	10	0	10	10	0	5	10
School involved in Movin' March	0	10	10	10	10	0	0	0	0	10	0	0	0	10
School involved in Bikes in Schools	0	10	0	10	0	0	0	0	0	10	0	0	0	0
Road gradient	10	10	0	10	10	10	10	10	10	10	10	10	10	10
Decile rating	7	7	0	8	0	3	0	7	4	7	8	0	1	8
Unweighted score	55	59	31	81	56	49	27	51	33	66	55	30	50	64
Short listed	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes

	Taita College	Tawhai School	Tui Glen School	Te Kura Kaupapa	Wa Ora Montessori	Wainuiomata Intermediate	Wainuiomata Primary	Wainuiomata High School	Waterloo School	Wellesley College	Wilford School
School roll	8	7	3	5	4	6	5	10	10	6	7
School character	10	10	10	5	5	10	10	10	10	0	10
Proximity to cycleway routes	0	0	0	0	10	10	10	10	5	10	10
Safety around school	4	2	3	5	3	9	4	4	8	2	2
Road hierarchy	0	5	5	10	10	10	5	5	10	5	10
School involved in Movin' March	0	10	0	0	0	0	10	0	0	0	0
School involved in Bikes in Schools	0	0	10	0	0	0	10	0	0	0	0
Road gradient	10	10	10	10	10	10	10	10	10	10	10
Decile rating	9	5	8	7	2	7	6	7	2	0	4
Unweighted score	41	49	49	42	44	62	70	56	55	33	53
Short listed	No	No	No	No	No	Yes	Yes	Yes	Yes	No	Yes

Appendix C. Notes for assessment of short listed programmes against investment objectives

Investment objective	Indicators used for assessment	Do minimum: Complete committed cycleways	Programme 1: Connections to primary routes	Programme 4: Connections to primary routes and demonstration neighbourhoods	Programme 5: Connections to primary routes, demonstration neighbourhoods and focus schools	Programme 4+: Hybrid
Increase the number of residents that cycle to work and study from 1.6% in 2018 to 4% in the 2028 NZ Census	Estimated new users using buffer method	Baseline	Estimated 31% increase in new users from baseline	Estimated 71% increase in new users from baseline	Estimated 81% increase in new users from baseline	Estimated 64% increase in new users from baseline
Increase the length of the Hutt City cycling network from 26km in 2020 to 50km by 2027	Length of proposed additional cycleways	26km existing and 14km committed	22km new cycleways	43 km new cycleways	72 km new cycleways	44 km new cycleways
Reduced DSI crashes involving cyclists (as a proportion cycling's mode share) by 30% in 2027 as recorded in CAS, 16 DSI cycle crashes reported in previous five-year period	Crash by crash analysis (method A) in the economic evaluation manual	Estimated 5% reduction in crashes	Estimated 17% reduction in crashes	Estimated 21% reduction in crashes	Estimated 24% reduction in crashes	Estimated 28% reduction in crashes
Improve the rating of main cycling routes in Hutt City to a quality of service rating 2 (suitable for a wide range of users) by 2027 as defined by Auckland Transport's Quality of service evaluation tool for cycle facilities	Percentage of roads rated as quality of service 2 or better	33% at quality of service 2 or above	51% at quality of service 2 or above	71% at quality of service 2 or above	71% at quality of service 2 or above	68% at quality of service 2 or above
Increase the proportion of residents that perceive children using active transport to and from school as being safe or very safe from 40% in 2019 to 55% by 2027 as measured by the Greater Wellington Transport Perceptions Survey	Number of schools served by the proposed cycling networks	9 schools served	18 schools served	34 schools served	35 schools served	34 schools served
Increase the proportion of 5-14 year old students who use active transport to and from school from 34% to 45% by 2027 as measured by New Zealand Health Survey	Number of young people within 400m buffer of proposed cycling networks	5000 young people nearby	7,500 young people nearby	15,000 young people nearby	15,000 young people nearby	13,000 young people nearby

Appendix D. Comparison of level of investment in cycleways/pathways infrastructure

Urban Cycleways Programme	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2020/21	2021/22	2022/23	Total project cost	Source
The Beltway				$ 1.50	$ 1.90	$ 1.15	$ 1.00	$ 0.90	$ 0.90	$ 7.35	Budget in Long Term Plan 2018-2028
Eastern Bays Shared Path				$ 2.25	$ 3.60	$ 2.00	$ 2.30	$ 2.20	$ 2.20	$ 14.55	Budget in Long Term Plan 2018-2028
Wainuiomata Shared Path	$ 4.30	$ 4.30	$ 4.30							$ 12.90	Actual construction costs
										$ 30.00	
	over 9 years	per year									
Previous investment in cycling	$ 34.80	$ 3.9									
	over 15 years	per year	change in level of investment								
Programme 1	$ 45	$ 3.0	-22%								
Programme 4	$ 91	$ 6.1	57%								
Programme 5	$ 120	$ 8.0	107%								
Programme 4+	$ 87	$ 5.8	50%								
Population of Hutt City in 2018	104500										
Urban population of New Zealand in 2018	4201960										
Hutt City shared of population	2.5%										
GPS 2021 funding for walking and cycling per yea	$ 130,000,000										
Programme costs average per year											
Programme 1	$ 3,000,000										
Programme 4	$ 6,100,000										
Programme 5	$ 8,000,000										
Programme 4+	$ 5,800,000										

Population of Hutt City in 2018	104500
Urban population of New Zealand in 2018	4201960
Hutt City shared of population	2.5%
GPS 2021 funding for walking and cycling per yea	$ 130,000,000
Programme costs average per year	
Programme 1	$ 3,000,000
Programme 4	$ 6,100,000
Programme 5	$ 8,000,000
Programme 4+	$ 5,800,000
Percentage of GPS funding required	
Programme 1	2.3%
Programme 4	4.7%
Programme 5	6.2%
Programme 4+	4.5%
*Assumed average for upper funding range	

Appendix E. Programme 1 Economic Assessment Spreadsheets

SP11 Walking and cycling facilities

Spreadsheet v8.0 (1-Jul-18)

Worksheet 7 – Cycle demand

This worksheet is used to calculate cycle demand for a new cycle facility. The new commuters section of the worksheet calculates the total new daily cyclist commuters. The new other section calculates the total daily new other cyclists. Finally the overall new cyclists is devised.
This worksheet is designed to be used when traffic counts have not been carried out or are unreliable or unavailable.

New and Existing cyclists

	Buffers (km)	<0.4	0.4 to <0.8	0.8 to ≤ 1.6
1	Area (km^2)	17.44	10.81	7.80
2	Density per square kilometre	1,812.00	1,597.00	1,378.00
3	Population in each buffer **(3)** = **(1)** x **(2)**	31,601.28	17,263.57	10,748.40
4	Total population in all buffers (Sum of **(3)**)		59,613.25	
5	Commute share (single value for all)		2.10%	
6	Likelihood of new cyclist multiplier	1.04	0.54	0.21
7	Row **(7)** = **(3)** x **(6)**	32,865.33	9,322.33	2,257.16
8	Sum of row **(7)**		44,444.82	
9	Cyclist rate **(9)** = (**(5)** x 0.96) + 0.32%		2.34%	
10	Total existing daily cyclists **(10)** = **(4)** x **(9)**		1,392.57	
11	Total new daily cyclists **(11)** = **(8)** x **(9)**		1,038.23	

SP11 Walking and cycling facilities

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Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.4 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	All movements	Vehicle involvement	Push cycle
1	Do-minimum mean speed	50	Road category	Urban other
	Posted speed limit	50	Cycle/pedestrian growth rate	4.00%
2	Option mean speed	50		

	Do-minimum	Severity			
		Fatal	Serious	Minor	Non- injury
3	Number of years of typical crash rate records		10		
4	Number of reported crashes over period	0	4	22	11
5	Fatal/serious severity ratio (tables A6.2(a) to (c))	0.07	0.93	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.28	3.72	22	11
7	Crashes per year = **(6)/(3)**	0.03	0.37	2.20	1.10
8	Adjustment factor for crash trend (table A6.1(a))		0.96		
9	Adjusted crashes per year = **(7)** x **(8)**	0.027	0.357	2.112	1.056
10	Under-reporting factors (tables A6.3(a) to (b))	1	1.5	2.75	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.027	0.536	5.808	7.392
12	Crash cost, 100km/h limit (tables A6.4(e) to (h))	4,100,000	465,000	25,000	1,700
13	Crash cost, 50km/h limit (tables A6.4(a) to (d))	4,100,000	435,000	24,000	1,400
14	Mean speed adjustment = (**(1)** - 50)/50		0		
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	4,100,000	435,000	24,000	1,400
16	Crash cost per year = **(11)** x **(15)**	110,208	233,021	139,392	10,349
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)		$492,970		

	Option				
18	Percentage crash reduction	20	20	20	20
19	Percentage of crashes 'remaining' [100 - **(18)**]	80	80	80	80
20	Predicted crashes per year **(11)** x **(19)**	0.02	0.43	4.65	5.91
21	Crash cost, 100km/h limit (tables A6.4(e) to (h))	4,100,000	465,000	25,000	1,700
22	Crash cost, 50km/h limit (tables A6.4(a) to (d))	4,100,000	435,000	24,000	1,400
23	Mean speed adjustment = (**(2)** - 50)/50		0		
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	4,100,000	435,000	24,000	1,400
25	Crash cost per year = **(20)** x **(24)**	88,166	186,417	111,514	8,279
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury		$394,376		
27	Annual crash cost savings = **(17)** - **(26)**		$98,594		
28	PV crash cost savings = **(27)** x DF		$1,627,647		**E**

SP11 Walking and cycling facilities

Spreadsheet v8.0 (1-Jul-18)

Worksheet 5 - Benefits for walking and cycling facilities

Worksheet 5 is used to calculate the walking and cycling facility benefits for the various options. Only one category for walking and one category for cycling may be used in an evaluation of a proposal. If an activity contains more categories, they must be submitted as separate evaluations.

Activities that combine walking and cycling may claim benefits for both modes but safety issues arising from pedestrian/cycle conflicts must be addressed, and if there are additional crash costs these must be accounted for in worksheet 6. Make sure the estimates of the new number of pedestrians and/or cyclists generated by the facility are realistic.

Required information:
L Length of new facility in kilometres
NPD Number of additional pedestrians per day
NTD Number of additional cycle trips per day
NSD Number of additional and existing cycle trips per day
DF Discount factor. The discount factor may differ by mode depending on the growth rate

Health and environment benefits for walking facility

Pedestrian growth rate (per annum) 0.00%

1 Health and environment benefits for footpaths and other pedestrian facilities

Benefit = number of additional pedestrians/day x length of new facility in km x 365 x $2.70

L		x NPD		x 365 x $2.70 x DF		= $		
	8.00				14.52		0	**(a)**

2 Health and environment benefits from improvements at hazardous sites
(provision of overbridges, underpasses, bridge widening or intersection improvements for pedestrians)

Benefit = number of additional pedestrians/day x 365 x $2.70

		NPD		x 365 x $2.70 x DF		= $		
					14.52		0	**(b)**

Health and environment benefits for cycling facility

Cyclist growth rate (per annum) 4.00%

3 Health and environment benefits for cycle lanes, cycleways or increased road shoulder widths

Benefit = number of additional cycle trips/day x length of new facility in km x 365 x $1.40

L		x NTD		x 365 x $1.40 x DF		= $		
	8.00		1,308		22.47		120,142,745	**(c)**

7	Data (only fill the applicable data)							
	Existing pedestrian/cycling volumes					NA	AADT in year	
	Estimated new pedestrian/cyclist volume					1,038		per day
	Estimated motor vehicle volumes					NA		AADT
	Estimated motor vehicle speed					NA		km/h
	Pedestrian/cyclist growth rate					4.00		%
	Width available for walking/cycling before					NA		m
	Width available for walking/cycling after					NA		m
	Length walked/cycled after works					8.00		km
	Length walked/cycled before works					8.00		km
	Expected reduction in private vehicle travel					NA		km per year
8	PV cost of do-minimum						$ 0	**A**
9	PV cost of the preferred option						$ 42,300,000	**B**
10	Benefit values from worksheet 4, 5, 6							
	PV travel time cost savings	$ 0	**C** x Update factor ^{TT}		1.19	= $ 0		**X**
	PV facility benefits	$ 120,142,745	**D** x Update factor ^{WCB}		1.19	= $ 142,969,867		**Y**
	PV crash cost savings	$ 1,627,647	**E** x Update factor ^{ACC}		1.19	= $ 1,936,900		**Z**
11	BCR_N = PV net benefits / PV economic costs = **X + Y + Z** / **B - A**				= 144,906,767 / 42,300,000	=	**3.43**	
12	FYRR = First year benefits / PV economic costs				= 5,445,698 / 42,300,000	=	**13%**	

Appendix F. Programme 4 Economic Assessment Spreadsheets

SP11 Walking and cycling facilities

Spreadsheet v8.0 (1-Jul-18)

Worksheet 7 – Cycle demand

This worksheet is used to calculate cycle demand for a new cycle facility. The new commuters section of the worksheet calculates the total new daily cyclist commuters. The new other section calculates the total daily new other cyclists. Finally the overall new cyclists is devised.
This worksheet is designed to be used when traffic counts have not been carried out or are unreliable or unavailable.

New and Existing cyclists

	Buffers (km)	<0.4	0.4 to <0.8	0.8 to ≤ 1.6
1	Area (km^2)	36.65	16.56	8.60
2	Density per square kilometre	1,559.00	1,419.00	1,324.00
3	Population in each buffer **(3)** = **(1)** x **(2)**	57,137.35	23,498.64	11,386.40
4	Total population in all buffers (Sum of **(3)**)		92,022.39	
5	Commute share (single value for all)		2.10%	
6	Likelihood of new cyclist multiplier	1.04	0.54	0.21
7	Row **(7)** = **(3)** x **(6)**	59,422.84	12,689.27	2,391.14
8	Sum of row **(7)**		74,503.25	
9	Cyclist rate **(9)** = (**(5)** x 0.96) + 0.32%		2.34%	
10	Total existing daily cyclists **(10)** = **(4)** x **(9)**		2,149.64	
11	Total new daily cyclists **(11)** = **(8)** x **(9)**		1,740.40	

SP11 Walking and cycling facilities

Spreadsheet v8.0 (1-Jul-18)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.4 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	All movements	Vehicle involvement	Push cycle
1	Do-minimum mean speed	50	Road category	Urban other
	Posted speed limit	50	Cycle/pedestrian growth rate	4.00%
2	Option mean speed	50		

	Do-minimum	Severity			
		Fatal	Serious	Minor	Non- injury
3	Number of years of typical crash rate records	10			
4	Number of reported crashes over period	0	6	33	13
5	Fatal/serious severity ratio (tables A6.2(a) to (c))	0.07	0.93	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.42	5.58	33	13
7	Crashes per year = **(6)/(3)**	0.04	0.56	3.30	1.30
8	Adjustment factor for crash trend (table A6.1(a))	0.96			
9	Adjusted crashes per year = **(7)** x **(8)**	0.040	0.536	3.168	1.248
10	Under-reporting factors (tables A6.3(a) to (b))	1	1.5	2.75	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.040	0.804	8.712	8.736
12	Crash cost, 100km/h limit (tables A6.4(e) to (h))	4,100,000	465,000	25,000	1,700
13	Crash cost, 50km/h limit (tables A6.4(a) to (d))	4,100,000	435,000	24,000	1,400
14	Mean speed adjustment = (**(1)** - 50)/50	0			
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	4,100,000	435,000	24,000	1,400
16	Crash cost per year = **(11)** x **(15)**	165,312	349,531	209,088	12,230
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)	$736,162			
	Option				
18	Percentage crash reduction	20	20	20	20
19	Percentage of crashes 'remaining' [100 - **(18)**]	80	80	80	80
20	Predicted crashes per year **(11)** x **(19)**	0.03	0.64	6.97	6.99
21	Crash cost, 100km/h limit (tables A6.4(e) to (h))	4,100,000	465,000	25,000	1,700
22	Crash cost, 50km/h limit (tables A6.4(a) to (d))	4,100,000	435,000	24,000	1,400
23	Mean speed adjustment = (**(2)** - 50)/50	0			
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	4,100,000	435,000	24,000	1,400
25	Crash cost per year = **(20)** x **(24)**	132,250	279,625	167,270	9,784
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury	$588,929			
27	Annual crash cost savings = **(17)** - **(26)**	$147,232			
28	PV crash cost savings = **(27)** x DF	$2,430,599			**E**

SP11 Walking and cycling facilities

Spreadsheet v8.0 (1-Jul-18)

Worksheet 5 - Benefits for walking and cycling facilities

Worksheet 5 is used to calculate the walking and cycling facility benefits for the various options. Only one category for walking and one category for cycling may be used in an evaluation of a proposal. If an activity contains more categories, they must be submitted as separate evaluations.

Activities that combine walking and cycling may claim benefits for both modes but safety issues arising from pedestrian/cycle conflicts must be addressed, and if there are additional crash costs these must be accounted for in worksheet 6. Make sure the estimates of the new number of pedestrians and/or cyclists generated by the facility are realistic.

Required information:
L Length of new facility in kilometres
NPD Number of additional pedestrians per day
NTD Number of additional cycle trips per day
NSD Number of additional and existing cycle trips per day
DF Discount factor. The discount factor may differ by mode depending on the growth rate

Health and environment benefits for walking facility

Pedestrian growth rate (per annum) 0.00%

1 Health and environment benefits for footpaths and other pedestrian facilities

Benefit = number of additional pedestrians/day x length of new facility in km x 365 x $2.70

L	x NPD	x 365 x $2.70 x DF	= $	
8.00		14.52	0	**(a)**

2 Health and environment benefits from improvements at hazardous sites
(provision of overbridges, underpasses, bridge widening or intersection improvements for pedestrians)

Benefit = number of additional pedestrians/day x 365 x $2.70

NPD	x 365 x $2.70 x DF	= $	
	14.52	0	**(b)**

Health and environment benefits for cycling facility

Cyclist growth rate (per annum) 4.00%

3 Health and environment benefits for cycle lanes, cycleways or increased road shoulder widths

Benefit = number of additional cycle trips/day x length of new facility in km x 365 x $1.40

L	x NTD	x 365 x $1.40 x DF	= $	
8.00	1,740	22.47	159,822,918	**(c)**

7	Data (only fill the applicable data)							
	Existing pedestrian/cycling volumes					NA	AADT in year	
	Estimated new pedestrian/cyclist volume					1,038		per day
	Estimated motor vehicle volumes					NA		AADT
	Estimated motor vehicle speed					NA		km/h
	Pedestrian/cyclist growth rate					4.00		%
	Width available for walking/cycling before					NA		m
	Width available for walking/cycling after					NA		m
	Length walked/cycled after works					8.00		km
	Length walked/cycled before works					8.00		km
	Expected reduction in private vehicle travel					NA		km per year
8	PV cost of do-minimum						$ 0	**A**
9	PV cost of the preferred option						$ 85,540,000	**B**
10	Benefit values from worksheet 4, 5, 6							
	PV travel time cost savings	$ 0	**C** x Update factor ^{TT}	1.19	= $ 0	**X**		
	PV facility benefits	$ 159,822,918	**D** x Update factor ^{WCB}	1.19	= $ 190,189,272	**Y**		
	PV crash cost savings	$ 2,430,599	**E** x Update factor ^{ACC}	1.19	= $ 2,892,413	**Z**		
11	BCR_N = PV net benefits / PV economic costs	=	**X + Y + Z** / **B - A**	=	193,081,685 / 85,540,000	=	**2.26**	
12	FYRR = First year benefits / PV economic costs			=	7,260,352 / 85,540,000	=	**8%**	

Appendix G. Programme 5 Economic Assessment Spreadsheets

SP11 Walking and cycling facilities

Spreadsheet v8.0 (1-Jul-18)

Worksheet 7 – Cycle demand

This worksheet is used to calculate cycle demand for a new cycle facility. The new commuters section of the worksheet calculates the total new daily cyclist commuters. The new other section calculates the total daily new other cyclists. Finally the overall new cyclists is devised.
This worksheet is designed to be used when traffic counts have not been carried out or are unreliable or unavailable.

New and Existing cyclists

	Buffers (km)	<0.4	0.4 to <0.8	0.8 to ≤ 1.6
1	Area (km^2)	48.41	9.72	6.77
2	Density per square kilometre	1,617.00	1,047.00	1,222.00
3	Population in each buffer **(3)** = **(1)** x **(2)**	78,278.97	10,176.84	8,272.94
4	Total population in all buffers (Sum of **(3)**)		96,728.75	
5	Commute share (single value for all)		2.10%	
6	Likelihood of new cyclist multiplier	1.04	0.54	0.21
7	Row **(7)** = **(3)** x **(6)**	81,410.13	5,495.49	1,737.32
8	Sum of row **(7)**		88,642.94	
9	Cyclist rate **(9)** = (**(5)** x 0.96) + 0.32%		2.34%	
10	Total existing daily cyclists **(10)** = **(4)** x **(9)**		2,259.58	
11	Total new daily cyclists **(11)** = **(8)** x **(9)**		2,070.70	

SP11 Walking and cycling facilities

Spreadsheet v8.0 (1-Jul-18)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.4 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	All movements	Vehicle involvement	Push cycle
1	Do-minimum mean speed	50	Road category	Urban other
	Posted speed limit	50	Cycle/pedestrian growth rate	4.00%
2	Option mean speed	50		

	Do-minimum	Severity			
		Fatal	Serious	Minor	Non- injury
3	Number of years of typical crash rate records		10		
4	Number of reported crashes over period	0	10	47	17
5	Fatal/serious severity ratio (tables A6.2(a) to (c))	0.07	0.93	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.7	9.3	47	17
7	Crashes per year = **(6)/(3)**	0.07	0.93	4.70	1.70
8	Adjustment factor for crash trend (table A6.1(a))		0.96		
9	Adjusted crashes per year = **(7)** x **(8)**	0.067	0.893	4.512	1.632
10	Under-reporting factors (tables A6.3(a) to (b))	1	1.7	3.6	1
11	Total estimated crashes per year = **(9)** x **(10)**	0.067	1.518	16.243	1.632
12	Crash cost, 100km/h limit (tables A6.4(e) to (h))	4,100,000	465,000	25,000	1,700
13	Crash cost, 50km/h limit (tables A6.4(a) to (d))	4,100,000	435,000	24,000	1,400
14	Mean speed adjustment = (**(1)** - 50)/50		0		
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	4,100,000	435,000	24,000	1,400
16	Crash cost per year = **(11)** x **(15)**	275,520	660,226	389,837	2,285
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)		$1,327,867		

	Option				
18	Percentage crash reduction	20	20	20	20
19	Percentage of crashes 'remaining' [100 - **(18)**]	80	80	80	80
20	Predicted crashes per year **(11)** x **(19)**	0.05	1.21	12.99	1.31
21	Crash cost, 100km/h limit (tables A6.4(e) to (h))	4,100,000	465,000	25,000	1,700
22	Crash cost, 50km/h limit (tables A6.4(a) to (d))	4,100,000	435,000	24,000	1,400
23	Mean speed adjustment = (**(2)** - 50)/50		0		
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	4,100,000	435,000	24,000	1,400
25	Crash cost per year = **(20)** x **(24)**	220,416	528,180	311,869	1,828
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury		$1,062,294		
27	Annual crash cost savings = **(17)** - **(26)**		$265,573		
28	PV crash cost savings = **(27)** x DF		$4,384,245		E

SP11 Walking and cycling facilities

Spreadsheet v8.0 (1-Jul-18)

Worksheet 5 - Benefits for walking and cycling facilities

Worksheet 5 is used to calculate the walking and cycling facility benefits for the various options. Only one category for walking and one category for cycling may be used in an evaluation of a proposal. If an activity contains more categories, they must be submitted as separate evaluations.

Activities that combine walking and cycling may claim benefits for both modes but safety issues arising from pedestrian/cycle conflicts must be addressed, and if there are additional crash costs these must be accounted for in worksheet 6. Make sure the estimates of the new number of pedestrians and/or cyclists generated by the facility are realistic.

Required information:
L Length of new facility in kilometres
NPD Number of additional pedestrians per day
NTD Number of additional cycle trips per day
NSD Number of additional and existing cycle trips per day
DF Discount factor. The discount factor may differ by mode depending on the growth rate

Health and environment benefits for walking facility

Pedestrian growth rate (per annum) 0.00%

1 Health and environment benefits for footpaths and other pedestrian facilities

Benefit = number of additional pedestrians/day x length of new facility in km x 365 x $2.70

L	x NPD	x 365 x $2.70 x DF	= $	
8.00		14.52	0	**(a)**

2 Health and environment benefits from improvements at hazardous sites
(provision of overbridges, underpasses, bridge widening or intersection improvements for pedestrians)

Benefit = number of additional pedestrians/day x 365 x $2.70

NPD	x 365 x $2.70 x DF	= $	
	14.52	0	**(b)**

Health and environment benefits for cycling facility

Cyclist growth rate (per annum) 4.00%

3 Health and environment benefits for cycle lanes, cycleways or increased road shoulder widths

Benefit = number of additional cycle trips/day x length of new facility in km x 365 x $1.40

L	x NTD	x 365 x $1.40 x DF	= $	
8.00	2,071	22.47	190,198,457	**(c)**

7	Data (only fill the applicable data)							
	Existing pedestrian/cycling volumes					NA	AADT in year	
	Estimated new pedestrian/cyclist volume					1,038	per day	
	Estimated motor vehicle volumes					NA	AADT	
	Estimated motor vehicle speed					NA	km/h	
	Pedestrian/cyclist growth rate					4.00	%	
	Width available for walking/cycling before					NA	m	
	Width available for walking/cycling after					NA	m	
	Length walked/cycled after works					8.00	km	
	Length walked/cycled before works					8.00	km	
	Expected reduction in private vehicle travel					NA	km per year	
8	PV cost of do-minimum						$ 0	**A**
9	PV cost of the preferred option						$ 113,740,000	**B**
10	Benefit values from worksheet 4, 5, 6							
	PV travel time cost savings	$ 0	**C** x Update factor ^{TT}	1.19	= $ 0	**X**		
	PV facility benefits	$ 190,198,457	**D** x Update factor ^{WCB}	1.19	= $ 226,336,164	**Y**		
	PV crash cost savings	$ 3,869,145	**E** x Update factor ^{ACC}	1.19	= $ 4,604,282	**Z**		
11	BCR_N = PV net benefits / PV economic costs = **X + Y + Z** / **B - A** = 230,940,447 / 113,740,000 =							**2.03**
12	FYRR = First year benefits / PV economic costs = 8,699,393 / 113,740,000 =							**8%**

Appendix H. Programme 4+ Economic Assessment Spreadsheets

SP11 Walking and cycling facilities

Spreadsheet v8.0 (1-Jul-18)

Worksheet 7 – Cycle demand

This worksheet is used to calculate cycle demand for a new cycle facility. The new commuters section of the worksheet calculates the total new daily cyclist commuters. The new other section calculates the total daily new other cyclists. Finally the overall new cyclists is devised.
This worksheet is designed to be used when traffic counts have not been carried out or are unreliable or unavailable.

New and Existing cyclists

	Buffers (km)	<0.4	0.4 to <0.8	0.8 to ≤ 1.6
1	Area (km^2)	41.04	9.60	9.60
2	Density per square kilometre	1,700.00	1,118.00	1,122.00
3	Population in each buffer **(3)** = **(1)** x **(2)**	69,768.00	10,732.80	10,771.20
4	Total population in all buffers (Sum of **(3)**)		91,272.00	
5	Commute share (single value for all)		2.10%	
6	Likelihood of new cyclist multiplier	1.04	0.54	0.21
7	Row **(7)** = **(3)** x **(6)**	72,558.72	5,795.71	2,261.95
8	Sum of row **(7)**		80,616.38	
9	Cyclist rate **(9)** = (**(5)** x 0.96) + 0.32%		2.34%	
10	Total existing daily cyclists **(10)** = **(4)** x **(9)**		2,132.11	
11	Total new daily cyclists **(11)** = **(8)** x **(9)**		1,883.20	

SP11 Walking and cycling facilities

Spreadsheet v8.0 (1-Jul-18)

Worksheet 6 - Crash cost savings

These simplified procedures are suitable only for **crash–by–crash analysis** (method A in appendix A6). There must be 5 years or more crash data for the site and the number and types of crashes must meet the specifications set out in appendix A6.1 and A6.2. If not, either the crash rate analysis or weighted crash procedure described in appendix A6.4 should be used. The annual crash cost savings determined from such an evaluation are multiplied by the appropriate discount factor and entered in worksheet 1 as total E. Evidence to support alternative analysis must be attached.

	Movement category	All movements	Vehicle involvement	Push cycle
1	Do-minimum mean speed	50	Road category	Urban other
	Posted speed limit	50	Cycle/pedestrian growth rate	4.00%
2	Option mean speed	50		

	Do-minimum	Severity			
		Fatal	Serious	Minor	Non- injury
3	Number of years of typical crash rate records		10		
4	Number of reported crashes over period	0	14	61	23
5	Fatal/serious severity ratio (tables A6.2(a) to (c))	0.07	0.93	1	1
6	Number of reported crashes adjusted by severity **(4)** x **(5)**	0.98	13.02	61	23
7	Crashes per year = **(6)**/**(3)**	0.10	1.30	6.10	2.30
8	Adjustment factor for crash trend (table A6.1(a))		0.96		
9	Adjusted crashes per year = **(7)** x **(8)**	0.094	1.250	5.856	2.208
10	Under-reporting factors (tables A6.3(a) to (b))	1	1.5	2.75	7
11	Total estimated crashes per year = **(9)** x **(10)**	0.094	1.875	16.104	15.456
12	Crash cost, 100km/h limit (tables A6.4(e) to (h))	4,100,000	465,000	25,000	1,700
13	Crash cost, 50km/h limit (tables A6.4(a) to (d))	4,100,000	435,000	24,000	1,400
14	Mean speed adjustment = (**(1)** - 50)/50		0		
15	Cost per crash = **(13)** + **(14)** x [**(12)** - **(13)**]	4,100,000	435,000	24,000	1,400
16	Crash cost per year = **(11)** x **(15)**	385,728	815,573	386,496	21,638
17	Total cost of crashes per year (sum of columns in row **(16)** fatal + serious + minor + non-injury)		$1,609,435		

	Option				
18	Percentage crash reduction	20	20	20	20
19	Percentage of crashes 'remaining' [100 - **(18)**]	80	80	80	80
20	Predicted crashes per year **(11)** x **(19)**	0.08	1.50	12.88	12.36
21	Crash cost, 100km/h limit (tables A6.4(e) to (h))	4,100,000	465,000	25,000	1,700
22	Crash cost, 50km/h limit (tables A6.4(a) to (d))	4,100,000	435,000	24,000	1,400
23	Mean speed adjustment = (**(2)** - 50)/50		0		
24	Cost per crash = **(22)** + **(23)** x [**(21)** - **(22)**]	4,100,000	435,000	24,000	1,400
25	Crash cost per year = **(20)** x **(24)**	308,582	652,458	309,197	17,311
26	Total cost of crashes per year (sum of columns in row **(25)** fatal + serious + minor + non-injury		$1,287,548		
27	Annual crash cost savings = **(17)** - **(26)**		$321,887		
28	PV crash cost savings = **(27)** x DF		$5,313,903		E

SP11 Walking and cycling facilities

Spreadsheet v8.0 (1-Jul-18)

Worksheet 5 - Benefits for walking and cycling facilities

Worksheet 5 is used to calculate the walking and cycling facility benefits for the various options. Only one category for walking and one category for cycling may be used in an evaluation of a proposal. If an activity contains more categories, they must be submitted as separate evaluations.

Activities that combine walking and cycling may claim benefits for both modes but safety issues arising from pedestrian/cycle conflicts must be addressed, and if there are additional crash costs these must be accounted for in worksheet 6. Make sure the estimates of the new number of pedestrians and/or cyclists generated by the facility are realistic.

Required information:
L Length of new facility in kilometres
NPD Number of additional pedestrians per day
NTD Number of additional cycle trips per day
NSD Number of additional and existing cycle trips per day
DF Discount factor. The discount factor may differ by mode depending on the growth rate

Health and environment benefits for walking facility

Pedestrian growth rate (per annum) 0.00%

1 Health and environment benefits for footpaths and other pedestrian facilities

Benefit = number of additional pedestrians/day x length of new facility in km x 365 x $2.70

L	8.00	x NPD		x 365 x $2.70 x DF	14.52	= $	0	(a)

2 Health and environment benefits from improvements at hazardous sites
(provision of overbridges, underpasses, bridge widening or intersection improvements for pedestrians)

Benefit = number of additional pedestrians/day x 365 x $2.70

		NPD		x 365 x $2.70 x DF	14.52	= $	0	(b)

Health and environment benefits for cycling facility

Cyclist growth rate (per annum) 4.00%

3 Health and environment benefits for cycle lanes, cycleways or increased road shoulder widths

Benefit = number of additional cycle trips/day x length of new facility in km x 365 x $1.40

L	8.00	x NTD	1,883	x 365 x $1.40 x DF	22.47	= $	172,957,790	(c)

7	Data (only fill the applicable data)							
	Existing pedestrian/cycling volumes					NA	AADT in year	
	Estimated new pedestrian/cyclist volume					1,883	per day	
	Estimated motor vehicle volumes					NA	AADT	
	Estimated motor vehicle speed					NA	km/h	
	Pedestrian/cyclist growth rate					4.00	%	
	Width available for walking/cycling before					NA	m	
	Width available for walking/cycling after					NA	m	
	Length walked/cycled after works					8.00	km	
	Length walked/cycled before works					8.00	km	
	Expected reduction in private vehicle travel					NA	km per year	
8	PV cost of do-minimum						$ 0	**A**
9	PV cost of the preferred option						$ 82,720,000	**B**
10	Benefit values from worksheet 4, 5, 6							
	PV travel time cost savings	$ 0	**C** x Update factor ^{TT}	1.19	= $ 0	**X**		
	PV facility benefits	$ 172,957,790	**D** x Update factor ^{WCB}	1.19	= $ 205,819,770	**Y**		
	PV crash cost savings	$ 5,313,903	**E** x Update factor ^{ACC}	1.19	= $ 6,323,545	**Z**		
11	BCR_N = PV net benefits / PV economic costs = **X + Y + Z** / **B - A**			= 212,143,315 / 82,720,000	= **2.56**			
12	FYRR = First year benefits / PV economic costs			= 8,019,591 / 82,720,000	= **10%**			

Appendix I. High level cost estimates

Programme 1					
Location	**Type**	**Length (km)**	**Construction cost estimate**	**Professional services costs**	**Total project cost**
Reynolds St	Buffered bike lane	0.8	$ 800,000	$ 80,000	$ 880,000
Percy Cameron St	Buffered bike lane	0.8	$ 800,000	$ 80,000	$ 880,000
Frederick St	Neighbourhood street	1.3	$ 1,300,000	$ 130,000	$ 1,430,000
Knights Rd	Protected cycleway	1.1	$ 3,300,000	$ 330,000	$ 3,630,000
Bellevue Rd	Protected cycleway	1.3	$ 3,900,000	$ 390,000	$ 4,290,000
Kings Crescent	Protected cycleway	1.6	$ 4,800,000	$ 480,000	$ 5,280,000
Whites Line West	Neighbourhood street	2.5	$ 2,500,000	$ 250,000	$ 2,750,000
Brees St	Neighbourhood street	1	$ 1,000,000	$ 100,000	$ 1,100,000
Copeland St	Neighbourhood street	0.6	$ 600,000	$ 60,000	$ 660,000
Port Rd	Shared path	1.8	$ 2,160,000	$ 216,000	$ 2,376,000
William Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Hutt River trail	Shared path	1.3	$ 1,560,000	$ 156,000	$ 1,716,000
The Esplanade	Protected cycleway	2.1	$ 6,300,000	$ 630,000	$ 6,930,000
Jackson Street	Neighbourhood street	1.4	$ 1,400,000	$ 140,000	$ 1,540,000
Te Puni Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Victoria Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Bay Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Bolton Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Waiwhetu River	Shared path	1.0	$ 1,200,000	$ 120,000	$ 1,320,000
Margaret Street	Protected cycleway	0.6	$ 1,800,000	$ 180,000	$ 1,980,000
Queens Drive	Protected cycleway	1	$ 3,000,000	$ 300,000	$ 3,300,000
Infrastructure cost					$ 42,262,000
Supporting measure cost					$ 3,000,000
Total programme cost					$ 45,262,000

Programme 4					
Location	**Type**	**Length (k**	**Construction cost estimate**	**Professional services costs**	**Total project cost**
Reynolds St	Buffered bike lane	0.8	$ 800,000	$ 80,000	$ 880,000
Percy Cameron St	Buffered bike lane	0.8	$ 800,000	$ 80,000	$ 880,000
Frederick St	Neighbourhood street	1.3	$ 1,300,000	$ 130,000	$ 1,430,000
Knights Rd	Protected cycleway	1.1	$ 3,300,000	$ 330,000	$ 3,630,000
Bellevue Rd	Protected cycleway	1.3	$ 3,900,000	$ 390,000	$ 4,290,000
Kings Crescent	Protected cycleway	1.6	$ 4,800,000	$ 480,000	$ 5,280,000
Whites Line West	Neighbourhood street	2.5	$ 2,500,000	$ 250,000	$ 2,750,000
Brees St	Neighbourhood street	1	$ 1,000,000	$ 100,000	$ 1,100,000
Copeland St	Neighbourhood street	0.6	$ 600,000	$ 60,000	$ 660,000
Port Rd	Shared path	1.8	$ 2,160,000	$ 216,000	$ 2,376,000
William Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Hutt River trail	Shared path	1.3	$ 1,560,000	$ 156,000	$ 1,716,000
The Esplanade	Protected cycleway	2.1	$ 6,300,000	$ 630,000	$ 6,930,000
Jackson Street	Neighbourhood street	1.4	$ 1,400,000	$ 140,000	$ 1,540,000
Te Puni Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Victoria Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Bay Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Bolton Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Waiwhetu River	Shared path	1	$ 1,200,000	$ 120,000	$ 1,320,000
Margaret Street	Protected cycleway	0.6	$ 1,800,000	$ 180,000	$ 1,980,000
Queens Drive	Protected cycleway	1	$ 3,000,000	$ 300,000	$ 3,300,000
Wainuiomata Road	Protected cycleway	1.7	$ 5,100,000	$ 510,000	$ 5,610,000
Parkway	Protected cycleway	1.8	$ 5,400,000	$ 540,000	$ 5,940,000
Wellington Road/ Fitzherbert F	Buffered bike lane	3.3	$ 3,300,000	$ 330,000	$ 3,630,000
Wise St/ Nelson Cres/ Norfolk	Buffered bike lane	2.6	$ 2,600,000	$ 260,000	$ 2,860,000
Main Road	Buffered bike lane	1.6	$ 1,600,000	$ 160,000	$ 1,760,000
Stokes Valley Road	Protected cycleway	3.1	$ 9,300,000	$ 930,000	$ 10,230,000
Rata Street/ Naenae Road	Protected cycleway	3.2	$ 9,600,000	$ 960,000	$ 10,560,000
Sedden Street	Buffered bike lane	1.5	$ 1,500,000	$ 150,000	$ 1,650,000
Glen Road	Shared path	1.3	$ 1,560,000	$ 156,000	$ 1,716,000
Kairimu Street	Shared path	0.2	$ 240,000	$ 24,000	$ 264,000
Reading Street	Shared path	0.4	$ 480,000	$ 48,000	$ 528,000
Konini Street	Shared path	1.0	$ 1,200,000	$ 120,000	$ 1,320,000
Infrastructure cost					$ 88,330,000
Supporting measure cost					$ 3,000,000
Total programme cost					$ 91,330,000

Programme 5					
Location	***Type***	**Length (k**	**Cost estimate**	**Professional services costs**	**Total project cost**
Reynolds St	Buffered bike lane	0.8	$ 800,000	$ 80,000	$ 880,000
Percy Cameron St	Buffered bike lane	0.8	$ 800,000	$ 80,000	$ 880,000
Frederick St	Neighbourhood street	1.3	$ 1,300,000	$ 130,000	$ 1,430,000
Knights Rd	Protected cycleway	1.1	$ 3,300,000	$ 330,000	$ 3,630,000
Bellevue Rd	Protected cycleway	1.3	$ 3,900,000	$ 390,000	$ 4,290,000
Kings Crescent	Protected cycleway	1.6	$ 4,800,000	$ 480,000	$ 5,280,000
Whites Line West	Neighbourhood street	2.5	$ 2,500,000	$ 250,000	$ 2,750,000
Brees St	Neighbourhood street	1	$ 1,000,000	$ 100,000	$ 1,100,000
Copeland St	Neighbourhood street	0.6	$ 600,000	$ 60,000	$ 660,000
Port Rd	Shared path	1.8	$ 2,160,000	$ 216,000	$ 2,376,000
William Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Hutt River trail	Shared path	1.3	$ 1,560,000	$ 156,000	$ 1,716,000
The Esplanade	Protected cycleway	2.1	$ 6,300,000	$ 630,000	$ 6,930,000
Jackson Street	Neighbourhood street	1.4	$ 1,400,000	$ 140,000	$ 1,540,000
Te Puni Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Victoria Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Bay Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Bolton Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Waiwhetu River	Shared path	1	$ 1,200,000	$ 120,000	$ 1,320,000
Margaret Street	Protected cycleway	0.6	$ 1,800,000	$ 180,000	$ 1,980,000
Queens Drive	Protected cycleway	1	$ 3,000,000	$ 300,000	$ 3,300,000
Wainuiomata Road	Protected cycleway	1.7	$ 5,100,000	$ 510,000	$ 5,610,000
Parkway	Protected cycleway	1.8	$ 5,400,000	$ 540,000	$ 5,940,000
Wellington Road/ Fitzherbert F	Buffered bike lane	3.3	$ 3,300,000	$ 330,000	$ 3,630,000
Wise St/ Nelson Cres/ Norfolk	Buffered bike lane	2.6	$ 2,600,000	$ 260,000	$ 2,860,000
Main Road	Buffered bike lane	1.6	$ 1,600,000	$ 160,000	$ 1,760,000
Stokes Valley Road	Protected cycleway	3.1	$ 9,300,000	$ 930,000	$ 10,230,000
Rata Street/ Naenae Road	Protected cycleway	3.2	$ 9,600,000	$ 960,000	$ 10,560,000
Sedden Street	Buffered bike lane	1.5	$ 1,500,000	$ 150,000	$ 1,650,000
Glen Road	Shared path	1.3	$ 1,560,000	$ 156,000	$ 1,716,000
Kairimu Street	Shared path	0.2	$ 240,000	$ 24,000	$ 264,000
Reading Street	Shared path	0.4	$ 480,000	$ 48,000	$ 528,000
Konini Street	Shared path	1.0	$ 1,200,000	$ 120,000	$ 1,320,000
Wainuiomata	Neighbourhood street	5.1	$ 5,100,000	$ 510,000	$ 5,610,000
Naenae	Neighbourhood street	8.8	$ 8,800,000	$ 880,000	$ 9,680,000
Stokes Valley	Neighbourhood street	3.9	$ 3,900,000	$ 390,000	$ 4,290,000
Wainuiomata schools	Shared path	2.2	$ 2,640,000	$ 264,000	$ 2,904,000
Naena schools	Shared path	0.7	$ 840,000	$ 84,000	$ 924,000
Taita schools	Shared path	0.7	$ 780,000	$ 78,000	$ 858,000
Avalon schools	Shared path	1.0	$ 1,200,000	$ 120,000	$ 1,320,000
Waterloo schools	Shared path	1.4	$ 1,680,000	$ 168,000	$ 1,848,000
Hutt Central schools	Shared path	1.1	$ 1,320,000	$ 132,000	$ 1,452,000
Randwick School	Shared path	0.7	$ 840,000	$ 84,000	$ 924,000
Infrastructure cost					$118,140,000
Supporting measure cost					$ 3,000,000
Total programme cost					$121,140,000

Programme 4+					
Location	***Type***	**Length (km)**	**Cost estimate**	**Professional services costs**	**Total project cost**
Reynolds St	Buffered bike lane	0.8	$ 800,000	$ 80,000	$ 880,000
Percy Cameron St	Buffered bike lane	0.8	$ 800,000	$ 80,000	$ 880,000
Frederick St	Neighbourhood street	1.3	$ 1,300,000	$ 130,000	$ 1,430,000
Knights Rd	Protected cycleway	1.1	$ 3,300,000	$ 330,000	$ 3,630,000
Bellevue Rd	Protected cycleway	1.3	$ 3,900,000	$ 390,000	$ 4,290,000
Kings Crescent	Protected cycleway	1.6	$ 4,800,000	$ 480,000	$ 5,280,000
Whites Line West	Neighbourhood street	2.5	$ 2,500,000	$ 250,000	$ 2,750,000
Brees St	Neighbourhood street	1	$ 1,000,000	$ 100,000	$ 1,100,000
Copeland St	Neighbourhood street	0.6	$ 600,000	$ 60,000	$ 660,000
Port Rd	Shared path	1.8	$ 2,160,000	$ 216,000	$ 2,376,000
William Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Hutt River trail	Shared path	1.3	$ 1,560,000	$ 156,000	$ 1,716,000
The Esplanade	Protected cycleway	2.1	$ 6,300,000	$ 630,000	$ 6,930,000
Jackson Street	Neighbourhood street	1.4	$ 1,400,000	$ 140,000	$ 1,540,000
Te Puni Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Victoria Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Bay Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Bolton Street	Neighbourhood street	0.4	$ 400,000	$ 40,000	$ 440,000
Waiwhetu River	Shared path	1	$ 1,200,000	$ 120,000	$ 1,320,000
Margaret Street	Protected cycleway	0.6	$ 1,800,000	$ 180,000	$ 1,980,000
Queens Drive	Protected cycleway	1	$ 3,000,000	$ 300,000	$ 3,300,000
Wainuiomata Road	Protected cycleway	1.7	$ 5,100,000	$ 510,000	$ 5,610,000
Parkway	Protected cycleway	1.8	$ 5,400,000	$ 540,000	$ 5,940,000
Wellington Road/ Fitzherbert F	Buffered bike lane	3.3	$ 3,300,000	$ 330,000	$ 3,630,000
Wise St/ Nelson Cres/ Norfolk	Buffered bike lane	2.6	$ 2,600,000	$ 260,000	$ 2,860,000
Main Road	Buffered bike lane	1.6	$ 1,600,000	$ 160,000	$ 1,760,000
Rata Street/ Naenae Road	Protected cycleway	3.2	$ 9,600,000	$ 960,000	$ 10,560,000
Sedden Street	Buffered bike lane	1.5	$ 1,500,000	$ 150,000	$ 1,650,000
Reading Street	Shared path	0.4	$ 480,000	$ 48,000	$ 528,000
Konini Street	Shared path	1.0	$ 1,200,000	$ 120,000	$ 1,320,000
Kensington Ave	Neighbourhood street	0.9	$ 900,000	$ 90,000	$ 990,000
Udy Street	Shared path	1.3	$ 1,560,000	$ 156,000	$ 1,716,000
Britannia Street	Shared path	0.5	$ 600,000	$ 60,000	$ 660,000
Taita schools	Shared path	0.7	$ 780,000	$ 78,000	$ 858,000
Avalon schools	Shared path	1.0	$ 1,200,000	$ 120,000	$ 1,320,000
Waterloo schools	Shared path	1.4	$ 1,680,000	$ 168,000	$ 1,848,000
Hutt Central schools	Shared path	1.1	$ 1,260,000	$ 126,000	$ 1,386,000
Randwick School	Shared path	0.2	$ 240,000	$ 24,000	$ 264,000
Infrastructure cost					$ 85,162,000
Supporting measure cost					$ 3,000,000
Total programme cost					$ 88,162,000