

PROVISION FOR CYCLISTS IN SOUTHWEST PETONE



*Report for
Hutt City Council*



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March 2012

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Cover: View of Hutt Road near Wakefield Street and Dowse Interchange.

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1. INTRODUCTION

1.1 Background

Following completion of the Dowse to Petone upgrade of State Highway 2, Hutt City Council (HCC) has been concerned to ensure there is adequate provision for cyclists accessing southwest Petone or travelling through the area.

This study has been commissioned to investigate suitable strategies for managing cycle traffic, whether within the highway corridor, on parallel routes such as Hutt Road, or on new routes yet to be formed.

Location of the study area is shown in Figure 1 below.

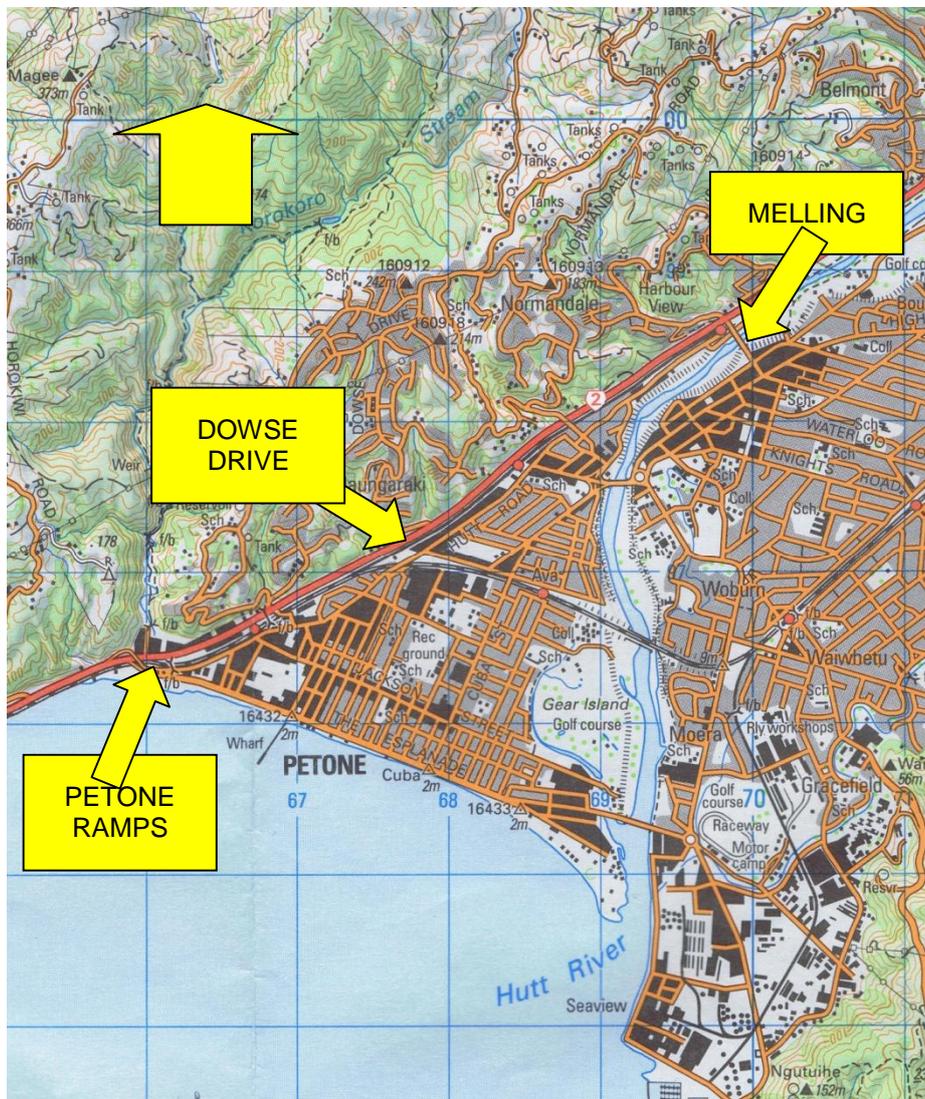


FIGURE 1: Location of study area

The investigation has been carried out by Barclay Traffic Planning with assistance from Boulter Consulting.

1.2 Scope

Objectives of the study include maximising safety for cyclists and promoting the use of cycles through improved facilities.

The investigation is intended as a scoping study, with possible measures considered at a concept level only. It is intended that costings and feasibility considerations will be researched as part of more detailed investigations at a future date.

2. DESCRIPTION OF ROAD NETWORK

2.1 Hierarchy

Traffic management by both New Zealand Transport Agency (NZTA) and HCC is based on a well-structured roading hierarchy which as far as possible separates the functions of through and access traffic movement.

At the top of the hierarchy and part of the strategic national network is State Highway 2. This is identified in the Hutt City District Plan [1] as a Primary Distributor Road, the highest possible classification, for which the predominant function is to be through movement.

Next highest are Major District Distributor Roads, also intended primarily for through movement. Within the study area this classification is represented by The Esplanade, which provides for through movement within Hutt City.

These roads are complemented by Minor District Distributors, including Hutt Road, Railway Avenue, Parliament Street, Bridge Street, Pharazyn Street and Block Road. Typically, these have a mixed function, with both through and access movement.

The final level in the Distributor road network is Local Distributor, providing access to local areas. These include Udy Street, Dowse Drive, Normandale Road, Bridge Street and London Road.

All non-distributor roads in the study area are classified as Access Roads, for which access functions predominates over through movement.

Cycling is a flexible, low-impact transport mode, and cycle routes do not need to be strictly consistent with the roading hierarchy. High status roads however do tend to have direct and continuous routes with a minimum of frontage activity, making them attractive for cyclists, especially those travelling longer distances.

2.2 Road characteristics

Physical characteristics of each road are generally in line with its hierarchy status. State Highway 2 between Melling and the Petone ramps is now close to motorway standard, with grade separated intersections and almost no direct property access. In addition it has four lanes with central median barrier, an alignment suitable for speeds of 80 to 100 km/h, and generous shoulders.

The main parallel route is formed by Block Road, Pharazyn Street, Bridge Street, Parliament Street and Hutt Road. These have two-lane carriageways, generally with parking on both sides. Carriageway width varies between 10.0 and 15.7 metres. A typical view of Hutt Road is shown in Figure 2.





FIGURE 2: Typical view of Hutt Road

Traffic volumes along the two routes are shown in Table 1. North of Petone, State Highway 2 has a flow of more than 35,000 veh/day, and south of Petone the flow is close to the maximum capacity of a four-lane road.

On the Pharazyn-Hutt route, flows are more moderate but still substantial for a two-lane road. In general flows are around 10,000 veh/day but there is a sharp increase in the section between Dowse Drive and Railway Avenue.

Location	Direction	7-day average (veh/day)
State Highway 2 S of Normandale overbridge N of Petone ramps between Petone and Ngauranga	Both	35,934
	Both	40,405
	Both	67,954
Pharazyn St	Both	9,578
Hutt Rd: North of Dowse interchange South of Dowse interchange Petone railway station	Both	18,271
	Both	11,644
	Both	11,841

TABLE 1: Traffic volumes [2] [3]

2.3 Road safety

Crash data [4] for the five-year period 2006 to 2010 are presented in Tables 2 and 3 for the two main alternative routes, State Highway 2 and the route formed by Block Road, Pharazyn Street, Bridge Street, Parliament Street and Hutt Road. (Note: at the time of writing a complete record for the 2011 year was not available.)

It should be noted that the Dowse Interchange was completed during the sample period, and the record will only partly reflect the benefit of safety improvements, especially those in the highway corridor.

It will be seen that for the State Highway 2 route a total of 265 crashes were recorded, of which 54 resulted in injury.

This compares with a total of 177 for the Hutt Road alternative, including 39 injury accidents.

	Fatal	Serious injury	Minor injury	Non-injury
State Highway 2: Melling intersection to Petone Ramps	1	8	45	211
Route: Block Rd, Pharazyn St, Bridge St, Parliament St, Hutt Rd	1	6	32	138

TABLE 2: Crash record

Although State Highway 2 has a higher crash frequency than the Hutt Road route, it has a lower crash rate because of its higher flow, that is 17 reported injury accidents per 100 million vehicle-kilometres, compared with 36. Crash rate is a measure of personal risk and enables the safety performance of roads with different flow rates to be compared.

The rates of 17 and 36 are well within expected norms for the respective road types.

These comparisons are reflected in the crash record for cycles, shown in Table 3.

	Cycle injury crashes
State Highway 2: Melling intersection to Petone Ramps	3
Route: Block Rd, Pharazyn St, Bridge St, Parliament St, Hutt Rd	6

TABLE 3: Injury crashes involving cyclists

For the highway, crashes included one on the Petone on-ramp, one near Cornish Street and one near the former Korokoro Road intersection. On the



Hutt route, five of the six crashes occurred at intersections. Apart from the on-ramp collision, which can be said to be characteristic of bicycles, crash patterns for both routes appear to be similar to those of motor vehicles.

In the absence of cycle flow data it is not possible to quantify relative crash rates for cycles on the two routes. It must also be recognised that in absolute terms the figures in Table 3 are small and the comparison will be affected by random variation. The figures do however indicate that the Hutt Road alternative would need to be carrying about twice as many cycles as the highway before it could be regarded as offering greater safety.

3. TRAFFIC MANAGEMENT STRATEGIES

3.1 General requirements

If cycle facilities and routes are to be effective, they must meet a number of requirements:

- They must provide a level of service high enough to attract users away from alternative routes. This is particularly the case for cyclists travelling through the study area without an intermediate destination. In many cases they will be travelling between the Hutt Valley and Wellington, and will need a direct route with good pavements and a minimum of frontage activity.
- There needs to be good continuity and effective connections to other routes serving significant destinations.
- They must have good safety characteristics, especially at ramps and intersections.

As outlined in the introduction, there are essentially three possible strategies which will to varying degrees meet these requirements:

- Promote use of routes such as that formed by Block Road, Pharazyn Street, Bridge Street, Parliament Street and Hutt Road.
- Promote use of State Highway 2 by long-distance cyclists, with supplementary facilities on local roads for cyclists with local destinations.
- Establish a new route to be used by cyclists, with facilities either on or off road.

These alternatives will be considered in turn.

3.2 Route based on Hutt Road

General

As shown in Figure 3, a route can be formed from Melling to the Petone Ramps, using Block Road, Pharazyn Street, Bridge Street, Parliament Street and Hutt Road. Although approximately 300 metres longer than the parallel state highway route, the route links to local roads throughout its length, and connects well with the Hutt River Trail at Melling, to the Hutt central business district at Melling and Railway Avenue, and to waterfront routes at the Esplanade. There are also effective connections to hill suburbs, at Melling, Normandale, Dowse Drive and Pito-one Road.

Quite apart from any role for long-distance cycles, the route serves a number of potential cycle destinations, including the CBD, retail centres at Station Village and Jackson Street, education at Hutt Central School, and employment centres in Pharazyn Street, Hutt Road, Alicetown and Petone. It can also



provide convenient access to rail services at Melling, Station Village and Petone.

The basic route is already in place, including links to new riverbank walkways and cycleways at Melling.

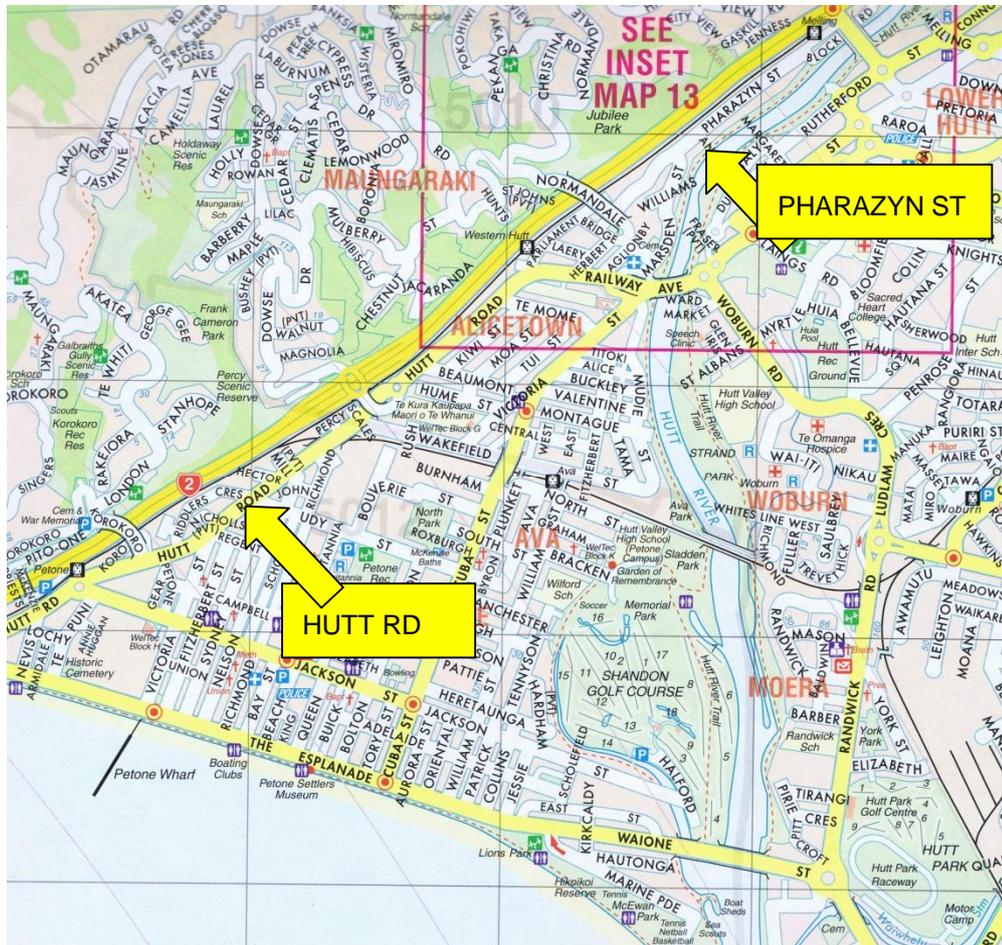


FIGURE 3: Route based on Hutt Road and Pharazyn Street

While the route will be effective in serving cycle traffic with a local destination, there are clear difficulties in its ability to attract long-distance traffic.

Cycle lanes

First, the road cross section is of limited width, and much of the available carriageway is already well committed for traffic lanes, a central painted median, and parking lanes.

If the route were to meet design guidelines such as those recommended by Austroads [5] while still providing for two parking lanes and a flush median, then a minimum kerb-to-kerb width of 17.8 metres would be required, made up as shown in Figure 4.

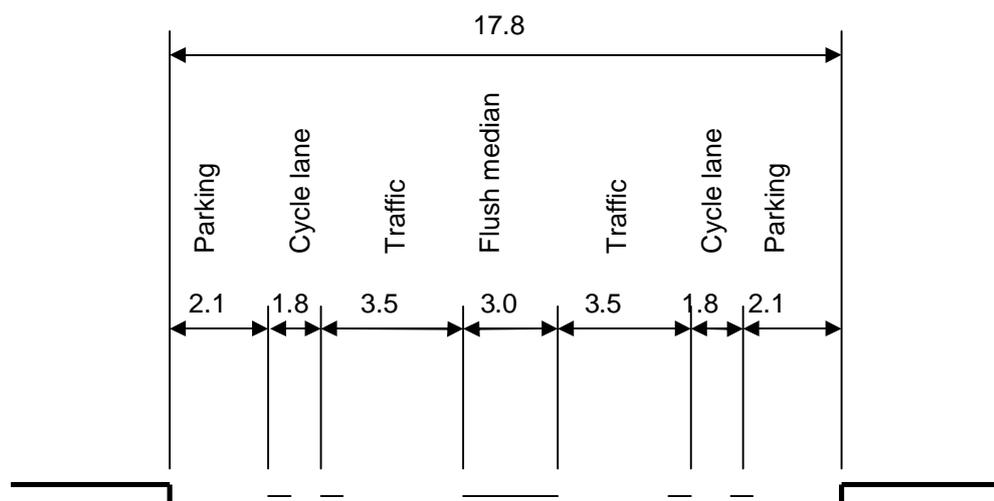


FIGURE 4: Minimum cross section dimensions for cycle lanes

These widths should be viewed as minimum dimensions only. For greater comfort and safety more space should be provided where possible.

Present kerb-to-kerb widths range between 10.0 and 15.7 metres, with much of the route 15.0 metres or less. Even at the widest points, it would be difficult to provide just one cycle lane, let alone two.

Some compromises to these dimensions could be considered, for example a slightly narrower flush median, or narrower traffic lanes. These however would reduce lateral clearances, make it more difficult for vehicles to remain within their lanes, and make for less comfortable operation generally. For busy arterial roads with active frontages and heavy kerbside parking, any reduction in design standards should be treated with caution.

Narrowing the cycle lanes themselves is not recommended. On the left hand side, this would make cyclists vulnerable to car doors opening suddenly. On the right, cyclists would depend for their safety on motorists deviating to get past.

In general, where there is insufficient space for a full cycle lane, the preference should be for widening the adjacent traffic lane instead of forming a substandard cycle lane. This means cyclists will share a lane with motor traffic and will need to be ready to take evasive action, especially in situations where motorists do not see them in time.

Combined cycle and pedestrian paths

Another option sometimes considered is the possibility of forming a combined cycle and pedestrian path behind the kerb. Once again it is important to have



adequate width, typically 2.5 metres or more. This can be provided on parts of the route, but not necessarily continuously for the full length.

Operation of combined paths however is not always satisfactory. Even with enough width, there can be a hazard from car doors being opened unexpectedly. Road users do not generally expect cyclists to ride on what is normally a footpath, and may not be alert to the potential for collision. This is particularly the case with active commercial frontages such as those found along Hutt Road and on parts of Pharazyn Street, and as an example it can be noted that on Hutt Road Kaiwharawhara in Wellington City, there have been numerous collisions between cycles and cars turning in or out of properties.

Further, as with any off-road facility, entrance and exit points can be problematic. Along the Hutt Road route, there are many side roads and cycles would need to leave and rejoin the path at every one.

A short length of combined cycle and pedestrian path already exists in the section of Hutt Road immediately north of the Esplanade. The path is part of recently constructed links to the Esplanade and Petone Ramps, and leads to an indicated crossing point on Hutt Road approximately 400 metres north of the Esplanade.

Some undesirable features of the path are apparent, including exposure to passenger-side car door openings, and encroachment of vegetation into the path. Near the termination point cyclists must negotiate their way past a reasonably substantial tree, as shown in Figure 5.



FIGURE 5: Tree obstructing cycle path (looking north)

If it is not possible to remove the tree, consideration should be given to ending the path south of the tree instead of to the north.

Along the path, the available width is a generous 3.6 metres, providing for good lateral clearance from parked cars. Such a width is not often available along Hutt Road, and the solution cannot be generally recommended.

Frontage activity

Whichever road configuration is adopted, a major operational issue will be the high level of frontage activity at many places along the route. As part of investigations for the Dowse Interchange, in 2000 Barclay Traffic Planning carried out surveys of the Hutt Road frontage between Railway Avenue and Wakefield Street, a distance of approximately 1.0 kilometre [6]. It was found that during the course of a working day some 3,600 vehicle movements occurred along the frontage, made up of 2,800 access movements to or from commercial properties, 200 associated with residential properties, and 600 parking manoeuvres. The 3,600 movements account for approximately 1,800 veh/day of traffic flow, on a road which at the time was carrying 15,700 veh/day. Although the survey is now well dated, it gives an indication of the magnitude of activity, and means that cyclists will frequently encounter frontage manoeuvres as they travel along the route.

Intersections

Important as mid-block conditions and frontage activity are, attention also needs to be paid to the effect of intersections. Along the Pharazyn-Hutt route is a series of intersections, ranging from the major complex of signalised intersections at Melling, to minor Tee junctions on side roads along Hutt Road.

While any intersection is a potential source of conflict, the ones most of concern from a cyclist point of view are Melling, Railway Avenue, Udy Street and the major roundabouts at Dowse Interchange and The Esplanade. There is a further roundabout at Jackson Street but it is understood this may be converted to signal control as part of a proposed land use development.

To some extent the safety problems faced by cyclists reflect those of motorised road users, and the presence of three turning movement crashes at the Pito-one Road and Udy Street intersections is an indication of this.

There are however some particular concerns for cyclists, especially with large multi-lane roundabouts such as those at Dowse Interchange and the Esplanade. At the Esplanade, many cyclists can now bypass the intersection on purpose-built cycle paths, but at Dowse there is little scope for cycle-friendly features.

Level of service

While the route based on Hutt Road will be effective and serviceable for cyclists with a local destination, there must be serious doubts about its ability to attract long-distance cycle traffic away from State Highway 2.



In determining the relative attractiveness of alternative routes in attracting traffic, a key parameter is *level of service* (LOS). This represents the ease and quality of travel and is can be assessed according to measures such as speed, delay, presence of a cycle lane and lane width, number of intersections and property accesses, traffic volume and pavement condition. On most of these counts State Highway 2 is superior, and its appeal is further enhanced by being 300 metres shorter.

In the absence of action to either improve the attractiveness of Hutt Road or reduce the attractiveness of the highway, State Highway 2 will continue to be the preferred route for most long-distance cyclists.

Safety

As discussed earlier, in the most recent five-year period for which records are available, a total of six accidents were recorded along the Hutt-Pharazyn route. This is higher than the total for the parallel section of State Highway 2.

To a large extent crash patterns are similar to those for other road users, and safety issues can be considered as part of a wider investigation, without a need to single out cycling for particular attention.

HCC has long been aware of safety problems along Pharazyn Street and Hutt Road, and various parts of the route have regularly featured in crash reduction studies. Over the years these investigations have resulted in numerous safety improvements, including flush medians and turn prohibitions at the Railway Avenue intersection. There has also been extensive upgrading of pedestrian crossings, channelisation, signs and markings, and street lighting.

Some work remains to be done, for example the possible installation of signals at the Hutt Road / Udy Street intersection.

A continuing issue is the heavy reliance by businesses on kerbside parking. As properties redevelop this reliance should reduce, but the process is likely to be slow and uncertain.

3.3 State Highway 2 route

General

In the foreseeable future, continued use of State Highway 2 for cycle travel appears to be unavoidable.

Advantages

Despite its high operating speed, it has many desirable features from a cyclist's point of view:

- The route is direct and continuous.
- There are shoulders up to approximately 2.5 metres wide available, avoiding the need for cyclists to use the traffic lanes.

- Following the Dowse to Petone improvements, there are no minor intersections and almost no direct property access. The need for right-turn access to the corridor has been eliminated.
- There is excellent visibility, unaffected by on-street parking or other obstructions.
- There are good pavements.

The quality of ride and absence of interruptions mean higher speeds than the Hutt Road alternative, and a reasonably fit rider can expect to travel 5 to 10 km/h faster. This coupled with the shorter distance can result in time savings between Melling and the Esplanade of up to five minutes.

Safety

As discussed earlier, the crash record provides no evidence that cyclists are more at risk on the highway than on local roads such as Hutt Road. For the 2006 to 2010 period there were three cycle accidents reported on the highway, compared with six for the equivalent Hutt Road route. In view of the fact that two of the three highway crashes occurred before completion of the Dowse Interchange and related improvements, the record may improve further once a full five years of post-Dowse data are available.

Ramp conflicts

Although the near-motorway environment has a number of desirable attributes for cyclists, there are still significant issues to be considered, for example the ability to negotiate busy on and off ramps safely. These ramps are found at Petone (south-facing only) and Dowse Drive (north and south). In time further ramps may be constructed at Melling, as part of a new interchange.

Location	7-day average (veh/day)
Dowse interchange:	
<i>South-facing ramps:</i> Northbound off-ramp	4,624
Southbound on-ramp	5,003
<i>North-facing ramps</i> Northbound off-ramp	3,942
Southbound on-ramp	3,055
Petone interchange:	
<i>South-facing ramps</i> Northbound off-ramp	15,424
Southbound on-ramp	14,326

TABLE 4: Ramp traffic volumes



Here again the Dowse Interchange has been invaluable, reducing ramp flows at Petone from around 38,000 veh/day to the more manageable 30,000 shown in Table 4. Cyclists seeking to cross the ramp are no longer presented with a formidable wall of fast-moving traffic with few gaps.

Further north at Dowse Interchange, ramp flows are lower, generally 5,000 veh/day or less. These present much less of a challenge.

Where ramp conflicts are of concern, a number of management measures can be considered. At Dowse, clearly marked crossing points indicate a route across the ramps, encouraging cyclists to cross at right angles. A more sophisticated solution is to install illuminated signs activated by approaching cyclists. These warn motorists of the presence of cyclists. Such an installation has been implemented at the Petone off-ramp, and appears to be effective.

Another option is to construct a southbound cycle path between the back of the Dowse Interchange and the railway line. This would remove southbound cyclists from State Highway 2 and avoid them having to cross the two interchange ramps.

Full signalised control is also a possibility if at some time in the future, on-ramps are subject to ramp metering signals. Under these conditions, cyclists could be given full signalised right of way without disadvantaging motorists.

3.4 Possible new routes

As well as the State Highway and Hutt Road routes, a number of other route possibilities need to be considered. These are discussed in turn.

Pito-one Road

Construction of Pito-one Road at Korokoro offers the possibility of an off-highway route at least in the northbound direction. Cyclists would turn off the highway at Cornish Street, then proceed along Pito-One Road as far as London Road. From there, cyclists can either cross the highway to Hutt Road, or continue along the western side of the highway as far as Dowse Drive, passing through Percys Reserve for part of the distance. At Dowse, the cyclists can either rejoin the highway or cross to Hutt Road.

Within the Korokoro area, a route along Cornish Street and Pito-one Road would be indirect. Further north, the section through Percys Reserve would be relatively slow, with potential for conflict with pedestrians when the reserve was busy.

It is doubtful whether the route could attract significant numbers of cyclists off the highway.

Rail corridor

Were the Melling branch railway line ever to close, a continuous route from Melling Bridge to Wakefield Street would become available, with the possibility of being extended to Petone within the rail corridor. This could be developed as an off-road cycle track, similar in form to a one-lane road.

Even with the railway still in place, there may be scope for an off-road cycle path. South of Wakefield Street there appears to be space available within the rail corridor, although it may be difficult to fence off the railway without complicating maintenance activity.

The path would terminate at Petone Station where bridges and underpasses are available to provide connections to State Highway 2, Petone and Hutt Road.

HCC should approach Kiwirail with a view to investigating the feasibility of providing such a path within the rail corridor.

River trail

In recent years Greater Wellington and Hutt councils have undertaken extensive work in developing cycle and walking trails on both sides of Hutt River. On the western bank, there is now a sealed path from Ava through to the Kennedy-Good Bridge, with an unsealed track extending to Manor Park.

North of Melling the trail runs alongside State Highway 2 and is able to provide an effective alternative. South of Melling however river flows well to the east and at its mouth is approximately three kilometres east of the Petone Ramps. This effectively rules it out as a viable alternative to either State Highway 2 or Hutt Road, although the route will still have value for recreational cycling,



4. CONCLUSIONS

4.1 Summary

This study has been commissioned to investigate various route alternatives for cyclists passing through southwestern Petone, in particular the comparison between State Highway 2 and a parallel route based on Pharazyn Street and Hutt Road.

Other possible routes have also been considered, but of those available for use in the near future, none had the ride quality, continuity or directness to be effective alternatives, especially for commuters travelling between the Hutt Valley and Wellington.

It can be expected that State Highway 2 will be the preferred route for most commuter cyclists, with its direct alignment, wide shoulders, lack of intersections and minimal frontage activity. Despite its high-speed environment, it also appears to have a good safety record compared with Hutt Road. There is some concern about the ability to negotiate on and off ramps, especially at Petone, but measures such as defined crossing points and flashing signs can be implemented to reduce the risk. In addition the feasibility of providing a southbound cycle path between the back of the Dowse Interchange and the railway line should be investigated.

Principal alternative to State Highway 2 is the route formed by Block Road, Pharazyn Street, Bridge Street, Parliament Street and Hutt Road. Although effective for cyclists with local destinations, it has a number of inherent problems for commuter cycles, including inadequate width for exclusive cycle lanes, numerous intersections, and high levels of kerbside parking and frontage activity. However because of the lack of carriageway width dedicated cycle lanes cannot be provided. Instead, wider traffic lanes to accommodate on-road cyclists should be provided.

It is noted that the route has been the subject of crash reduction investigations at various times in the past, and a number of remedial measures have been implemented. Some problems remain particularly at intersections, but in general cycle safety can be addressed together with the safety of all road users, without the need to be singled out for special study.

In the absence of comprehensive information on cycle numbers and travel patterns, only limited analysis of accident exposure and project benefits has been possible. Any further investigation should include surveys to provide data on cycle usage in southwest Petone.

4.2 Recommendations

The following recommendations are presented for consideration:

- (a) That State Highway 2 be recognised as the preferred route for cyclists travelling between Melling Bridge and the Petone Ramps.

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- (b) That where necessary New Zealand Transport Agency be encouraged to consider further measures to improve cycle safety at on and off ramps.
 - (c) That HCC continues to promote cycle safety on routes parallel to State Highway 2, carrying out crash reduction studies as required. It is noted that the scope for combined cycle and pedestrian paths, and exclusive on-road cycle lanes, is limited.
 - (d) That HCC continue to develop off-road recreational and commuter cycle routes as opportunities become available.
 - (e) For the combined cycle and pedestrian path near the Esplanade, either a tree encroaching into the path at the northern end should be removed, or the termination point relocated to the south, clear of the tree.
 - (f) As part of any further investigations, the Council and NZTA should consider carrying out surveys to determine usage patterns by cyclists on key routes in southwest Petone.
 - (g) HCC should approach Kiwirail with a view to investigating the possibility of providing a cycle path within the rail corridor.



REFERENCES

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- (2) State Highway Traffic Data booklet 2006-2010
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- (3) Machine traffic counts
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- (4) *Crash Analysis System*
Computer database maintained by New Zealand Transport Agency.
- (5) *Guide to Traffic Engineering Practice: Part 14 Bicycles* and New Zealand supplement
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- (6) *State Highway 2 improvements: effects in Alicetown*
Report for Hutt City Council prepared by Barclay Traffic Planning
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