

#### 4. WAIRAKEI ROAD STAGE I – (PITCAIRN TO MANOR) STREET RENEWAL.



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##### PURPOSE OF REPORT

1. The purpose of this report is to seek the Board's support to Council for the Wairakei Road project (stage 1 – Manor to Pitcairn) to be approved to proceed to implementation and construction.

And

To seek Council approval:

- for the Wairakei Road project (stage 1 – Manor to Pitcairn) to proceed to implementation and construction; and
- for the resolutions for new parking and traffic restrictions associated with the project.

##### EXECUTIVE SUMMARY

2. This street renewal project is part of set of integrated projects in the Christchurch City Council's Capital Works Program in the 2005/06, 2006/07 and 2007/08 financial years. Wairakei Road Stage I (this project) covers the section of Wairakei Road from Manor Road, to Pitcairn Crescent. Stage II of this project group covers from the end of Stage I to the railway crossing adjacent to the Jeffreys Road intersection, and will be covered by a separate report.
3. The original concept was developed from community and technical objectives, and includes median and islands, traffic and cycle lanes, and parking spaces. Landscaping and trees are included where opportunities allow. The Aorangi/Wairakei intersection was proposed as an off-set 'T'. Feedback from the community has been considered to develop the scheme option in **Attachment 6** which has been identified as the preferred design option for the renewal of the kerb and channel in Stage I of this project. This final recommended option includes restricting right turning opportunities out of Aorangi Road to improve turning safety at the intersection – right turn collisions were a prominent issue at the intersection.
4. As part of the proposed upgrade to this section of road all overhead wiring will be under grounded and street lighting improved. Stage I of the under-grounding of the overhead wiring has already been completed with Stage II well underway.
5. There is good support for this project with two exceptions which are: -
  - Some properties and a veterinary clinic will lose some on street parking where kerb extensions are to be constructed to allow the planting of trees. These plantings will improve the streetscape and reduce traffic speed along this section of Wairakei Road.
  - Many Aorangi Road and Colwyn Street residents object strongly to the proposed prevention of the through traffic movement along Aorangi Road; and right turn onto Wairakei Road from Aorangi Road. The redesign of the intersection in this way is necessary to improve safety and address a significant crash history involving vehicles travelling straight across Wairakei Road.
6. Despite the objections of some sections of the Community to the turning restriction at Aorangi Road, it is put forward as the recommended option as it is considered to offer the best balance of costs and benefits to the roading network and the overall road-user community.

##### FINANCIAL AND LEGAL CONSIDERATIONS

7. The budget for this stage is \$1,686,729 that includes all consultation, design and project management considerations. \$583,000 has already been spent on under-grounding Stage I.
8. There are no legal implications. Council resolution is required to implement the parking restrictions and traffic management changes.

## STAFF RECOMMENDATIONS

It is recommended that the Board:

- a) Recommend to the Council the proposal shown on plan TP 172701 (**attachment 6**) for construction.
- b) Recommend to the Council to approve the following traffic restrictions for installation.

### **Removal of existing No Stopping**

- i. That the existing no stopping be revoked from the north side of Wairakei Road between Jennifer Street and Pitcairn Crescent.
- ii. That the existing no stopping be revoked from the south side of Wairakei Road between Aorangi Road and Pitcairn Crescent.

### **New no stopping: Wairakei Road – North Side, Manor to Pitcairn**

- iii. That the stopping of vehicles be prohibited at any time on the north side of Wairakei Road commencing at its intersection with Manor Place and extending 55 metres in a westerly direction.
- iv. That the stopping of vehicles be prohibited at any time on the north side of Wairakei Road (between its intersection with Manor Place and Torquay Place) commencing at its intersection with Manor Place and extending 112m in an easterly direction.
- v. That the stopping of vehicles be prohibited at any time on the north side of Wairakei Road (between its intersection with Torquay Place and Jennifer Street) commencing at its intersection with Torquay Street and extending 77m in an easterly direction.
- vi. That the stopping of vehicles be prohibited at any time on the north side of Wairakei Road commencing at its intersection with Jennifer Street and extending 25 metres in an easterly direction.
- vii. That the stopping of vehicles be prohibited at any time on the north side of Wairakei Road commencing at a point 71 metres east of its intersection with Jennifer Street and extending 29 metres in an easterly direction.
- viii. That the stopping of vehicles be prohibited at any time on the north side of Wairakei Road commencing at a point 71 metres west of its intersection with Aorangi Road and extending 37 metres in a westerly direction.
- ix. That the stopping of vehicles be prohibited at any time on the north side of Wairakei Road commencing at its intersection with Aorangi Road and extending 33 metres in a westerly direction.
- x. That the stopping of vehicles be prohibited at any time on the north side of Wairakei Road commencing at its intersection with Aorangi Road and extending 27 metres in an easterly direction.
- xi. That the stopping of vehicles be prohibited at any time on the north side of Wairakei Road commencing at a point 81 metres west of its intersection with Pitcairn Crescent and extending 22 metres in a westerly direction.
- xii. That the stopping of vehicles be prohibited at any time on the north side of Wairakei Road commencing at its intersection with Pitcairn Crescent and extending 18 metres in a westerly direction.
- xiii. That the stopping of vehicles be prohibited at any time on the north side of Wairakei Road commencing at its intersection with Pitcairn Crescent and extending 12 metres in an easterly direction.

**New no stopping: Wairakei Road – South Side, Murdoch to Aorangi**

- xiv. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at its intersection with Murdoch Street and extending 55 metres in a westerly direction.
- xv. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at its intersection with Murdoch Street and extending 33 metres in an easterly direction.
- xvi. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at a point 65 metres east of its intersection with Murdoch Street and extending 41 metres in an easterly direction.
- xvii. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at a point 149 metres east of its intersection with Murdoch Street and extending 47 metres in an easterly direction.
- xviii. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at a point 131 metres west of its intersection with Aorangi Road and extending 50 metres in a westerly direction.
- xix. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at a point 48 metres west of its intersection with Aorangi Road and extending 40 metres in a westerly direction.
- xx. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at its intersection with Aorangi Road and extending 17 metres in a westerly direction.
- xxi. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at its intersection with Aorangi Road and extending 38 metres in a easterly direction.
- xxii. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at a point 83 metres east of its intersection with Aorangi Road and extending 9 metres in an easterly direction.
- xxiii. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at a point 102 metres east of its intersection with Aorangi Road and extending 17 metres in an easterly direction.
- xxiv. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at a point 142 metres east of its intersection with Aorangi Road and extending 12 metres in an easterly direction.
- xxv. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at a point 168 metres east of its intersection with Aorangi Road and extending 7 metres in an easterly direction.
- xxvi. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at a point 188 metres east of its intersection with Aorangi Road and extending 19 metres in an easterly direction.
- xxvii. That the stopping of vehicles be prohibited at any time on the south side of Wairakei Road commencing at a point 212 metres east of its intersection with Aorangi Road and extending 43 metres in an easterly direction.

**New no stopping: Manor Place**

- xxviii. That the stopping of vehicles be prohibited at any time on the western side of Manor Place commencing at its intersection with Wairakei Road and extending 30 metres in a northerly direction.
- xxix. That the stopping of vehicles be prohibited at any time on the eastern side of Manor Place commencing at its intersection with Wairakei Road and extending 15 metres in a northerly direction.

**New no stopping: Torquay Place**

- xxx. That the stopping of vehicles be prohibited at any time on the western side of Torquay Place commencing at its intersection with Wairakei Road and extending 15 metres in a northerly direction.
- xxxi. That the stopping of vehicles be prohibited at any time on the eastern side of Torquay Place commencing at its intersection with Wairakei Road and extending 15 metres in a northerly direction.

**New no stopping: Jennifer Street**

- xxxii. That the stopping of vehicles be prohibited at any time on the western side of Jennifer Street commencing at its intersection with Wairakei Road and extending 15 metres in a northerly direction.
- xxxiii. That the stopping of vehicles be prohibited at any time on the eastern side of Jennifer Street commencing at its intersection with Wairakei Road and extending 15 metres in a northerly direction.

**New no stopping: Pitcairn Crescent**

- xxxiv. That the stopping of vehicles be prohibited at any time on the western side of Pitcairn Crescent commencing at its intersection with Wairakei Road and extending 13 metres in a northerly direction.
- xxxv. That the stopping of vehicles be prohibited at any time on the eastern side of Pitcairn Crescent commencing at its intersection with Wairakei Road and extending 15 metres in a northerly direction.

**New no stopping: Murdoch Street**

- xxxvi. That the stopping of vehicles be prohibited at any time on the western side of Murdoch Street commencing at its intersection with Wairakei Road and extending 13 metres in a southerly direction.
- xxxvii. That the stopping of vehicles be prohibited at any time on the eastern side of Murdoch Street commencing at its intersection with Wairakei Road and extending 13 metres in a southerly direction.

**New Time Limit parking restriction:**

- xxxviii. That the parking of vehicles be restricted to a maximum period of 10 minutes on the south side of Wairakei Road commencing at a point 39 metres east of its intersection with Aorangi Road and extending in an easterly direction for a distance of 6 metres. That any previous parking restrictions in the above mentioned areas be revoked.
- xxxix. That the parking of vehicles be restricted to a maximum period of 10 minutes on the south side of Wairakei Road commencing at a point 59 metres east of its intersection with Aorangi Road and extending in an easterly direction for a distance of 24 metres. That any previous parking restrictions in the above mentioned areas be revoked.
- xl. That the parking of vehicles be restricted to a maximum period of 30 minutes on the north side of Wairakei Road commencing at a point 34 metres west of its intersection with Aorangi Road and extending in a westerly direction for a distance of 30 metres.
- xli. That any previous parking restrictions in the above mentioned areas be revoked.

**Move existing bus stop to new location:**

- xlii. That the existing bus stop be revoked from the north side of Wairakei Road at its present position commencing 18 metres west of the intersection with Jennifer Street and extending 14 metres in a westerly direction, and reinstated on the north side of Wairakei Road commencing 21 metres east of the intersection with Jennifer Street and extending 20 metres in an easterly direction.
- xliii. That the existing bus stop be revoked from the south side of Wairakei Road at its present position commencing 2 metres west of the intersection with Jennifer Street and extending 12 metres in a westerly direction, and reinstated on the south side of Wairakei Road commencing 24 metres west of the intersection with Jennifer Street and extending 12 metres in a westerly direction.

- xliv. That the existing bus stop be revoked from the north side of Wairakei Road at its present position commencing 49 metres east of the intersection with Aorangi Road and extending 13 metres in an easterly direction, and reinstated on the north side of Wairakei Road commencing 45 metres east of the intersection with Aorangi Road and extending 22 metres in an easterly direction.
- xlv. That the existing bus stop be revoked from the south side of Wairakei Road at its present position commencing 5.5 metres east of the intersection with Pitcairn Crescent and extending 14 metres in an easterly direction, and reinstated on the south side of Wairakei Road commencing 19 metres east of the intersection with Pitcairn Crescent and extending 22 metres in an easterly direction.

**“GIVE WAY” Signs**

- xlvi. That a “Give Way” sign be placed against:
  - i. Manor Place at its intersection with Wairakei Road.
  - ii. Torquay Place at its intersection with Wairakei Road.
  - iii. Aorangi Road at its intersection with Wairakei Road.
  - iv. Pitcairn Crescent at its intersection with Wairakei Road.
  - v. Murdoch Street at its intersection with Wairakei Road.

**“STOP” Control**

- xlvii. That the existing “Stop” control on Aorangi Road be revoked.

## BACKGROUND

10. The primary purpose of this project is to replace the existing deep dish channels that are in poor condition with a modern profile kerb and flat channel. The carriageway is also in need of a major upgrade due to failures in areas of the running surface. This project has been integrated with a series of other capital works which are being planned together and will be implemented successively. This is the first stage of the integrated package that includes Wairakei Road (Pitcairn to Railway), Blighs Road, Watford St and Tillman Ave.
11. As part of current policy to underground arterial roads subject to reconstruction, the undergrounding is completed for stage 1 and nearly completed for stage 2 of this project within the 05/06 financial year.
12. This section of Wairakei Road is a minor arterial road with an average traffic flow of 16,000 vehicles per day. The Land Transport N.Z. crash data for the previous five years puts the number of reported crashes for this section of Wairakei Road at twenty-nine, ten of these being at the Aorangi Intersection – the predominant factor being collisions against right-turning vehicles.. No one common factor can be found with the crashes from Manor Place to Aorangi Road. Sections of Wairakei Road at present have no flush median which offers little protection for right tuning vehicles or pedestrians and cyclists wishing to cross the road. Deep dish channels also contribute to pedestrian crossing difficulties, especially for those in the Elmswood Court retirement village at the east end of this stage. Problems have also historically been noted in relation to camber problems and curve alignment.
13. An initial survey was conducted among affected residents and businesses in March 2005 to identify all issues and concerns that could be addressed with this project. This survey revealed a significant number of Aorangi residents wanted traffic signals at the Aorangi Road intersection while the majority of shopkeepers at this intersection did not. A summary of these responses can be read in **Attachment 2**. This feedback was considered in the development of the initial concept plan (**Attachment 1**).

## PRINCIPLE OBJECTIVES

14. As a result of technical and community based issues investigations, the project objectives are to: -
  - Replace the existing kerb and dish channel with kerb and flat channel
  - Improve safety for pedestrians, cyclists, and vehicles
  - Provide improved pedestrian/cycle crossing facilities
  - Convert the overhead services to underground
  - Upgrade the street lighting
  - Provide suitable on street parking *where possible* to meet the needs of the residents and businesses.
  - Improve intersection functioning and safety.
15. Specific issues to be addressed are: -
  - The high number of crashes at the Aorangi/Wairakei intersection.
  - The piping of the upper reaches of Taylors Stream.
  - Speed reduction of vehicles along Wairakei Road.

## PUBLIC CONSULTATION

16. The original concept plan (**Attachment 1**) was distributed as part of a newsletter in September 2005. Feedback to this concept plan and several onsite meetings are summarised in **Attachment 3**. In response to this feedback several minor modifications have been made to the proposed kerb, landscaping, tree and footpath positions, and other features.
17. Significantly, primarily in response to a request from Land Transport New Zealand to further improve the safety of the Aorangi Road intersection, the original open intersection, as shown in **Attachment 1**, was modified. It was redesigned to prevent vehicles going straight through the intersection or making right turns out of Aorangi Road – full justification for these decisions are determined below.

18. Residents were advised of these changes to the Stage I concept plan, including the revised plan for the Aorangi/Wairakei intersection, in a newsletter distributed on the 31 March 2006. The majority of Wairakei Road residents supported this proposal, but a significant number of Aorangi Road residents opposed the alterations to the intersection of Aorangi Road because they want easier access onto and across Wairakei Road e.g. traffic signals.
19. The rest of this report is structured to advise on option development and selection for Wairakei Road generally, and then the Aorangi/Wairakei intersection specifically.

#### **WAIRAKEI ROAD OPTION DEVELOPMENT**

20. Two options were assessed as part of the Wairakei Road kerb and channel replacement as follows:

Option (a) has a

- A normal carriageway width of 15.6 metre to allow on-street parking on both sides of the road with free movement of traffic.
- A carriageway that narrows to 11.9 metre wide to allow the planting of trees to improve the streetscape and calm traffic.
- Pedestrian islands to aid the movement of pedestrians across Wairakei Road.
- A flush median to allow right turning vehicles to stop without impeding the flow of straight through traffic.
- Cycle lanes to improve cycle safety.

Option (b) which maintains the status quo i.e. do nothing.

#### **PREFERRED OPTION AND OPTION ASSESSMENT**

21. Option (a) was developed as the primary option for consideration and consultation and is the preferred option. As a minor arterial road within the City Plan this section of Wairakei Road first and foremost must, *give priority to the safe, efficient and sustainable movement of people and goods*. Because of the number of underground services, options for actual road layout have been limited (eg tree planting cannot be placed over underground services).
22. Communication with residents drew a clear preference for on-street parking as opposed to expanded roadside berms with landscaping and trees.
23. As a result of the arterial road factors, safety and community based preferences, a road geometry has been identified which provides median space, traffic and cycle lanes, and road side parking where possible. Landscaping, and tree numbers have been included to suit residents and stakeholders as far as possible, a result of feedback received during the consultation process.
24. The Wairakei Road kerb and channel replacement project also provides an opportunity to address pedestrian and school travel safety concerns. These are predominantly dealt with in the Aorangi intersection information following. The work provides more pedestrian crossing opportunities (with pedestrian islands and median strip), as gaps in one traffic stream are a lot more frequent than simultaneous gaps in opposing traffic streams. Further to the Council resolution dated 6<sup>th</sup> October 2005 it was resolved that 40 km/hr temporary school speed zones be considered for incorporation within a capital project where a school zone is likely at a future time. Wairakei School is sited just outside the defined area of works but signage required to comply with the above will be within the upgrade proposed. As such, further investigation is being undertaken to determine whether preparatory equipment installation is appropriate.
25. After receiving responses to the original concept plan the following changes were considered or made:
  - The proposed kerb build out at No. 182 has been shifted to the east at the request of a property owner because he believed he would experience access difficulties to his property. This change has been incorporated within the scheme being sought for approval.
  - Other areas such as outside No.s 175 to 177 cannot be modified as this is on a slight bend in the road and for safety reasons it would be inappropriate to amend the parking at this point.
  - Reduction in the number of trees being planted has also been requested in a number of locations. These requests have been looked at and in a number of locations given the extent of larger specimens of trees found within individual properties request have been granted, but where appropriate trees have been relocated to maintain a 'green' streetscape.

26. The verandah on two to three of the shops at No. 169 will be cut back to allow on-street parking to continue outside the shops.
27. All revised features of the preferred option are shown in Attachment 6. The project achieves the aims and objectives. It should be noted that with the exception of the Aorangi/Wairakei intersection, this project has strong community support.
28. Option (b), the do nothing option - maintenance of the status quo will not result in any social or cultural benefits, nor would it meet the activity management plans for asset renewal. The existing streetscape would not be enhanced and an infrastructural asset not renewed, which would result in ongoing maintenance expenditure. Maintaining the status quo is not consistent with the Road Safety Strategy or the Christchurch City Council Financial Plan and Programme 2005, conflicts with the objectives of the Asset Management Plan, and fails to meet any of the transport management objectives. The option is not recommended.

#### **AORANGI ROAD INTERSECTION OPTION DEVELOPMENT**

29. The major area of option development was the intersection at Aorangi Road. Several options were considered for the Aorangi intersection;
  - Option 1 - straight cross, give way control intersection
  - Option 2 – traffic signals
  - Option 3 – roundabout
  - Option 4 - staggered intersection with a centre pedestrian island
  - Option 5 – staggered intersection, with restricted turning and larger median island.

#### **AORANGI ROAD INTERSECTION PREFERRED OPTION**

30. Option 5. The proposed option as shown on Attachments 5 (expanded version) and 6 improves traffic safety at the intersection by preventing vehicles right turning onto or travelling straight across Wairakei Road from Aorangi Road. These movements are the most common factor in reported crashes at this intersection – Attachment 4 shows the intersection collision pattern.

#### **ASSESSMENT OF OPTIONS**

31. Aorangi Road is classed in the City Plan as a local road. Daily traffic volumes have been measured as about 2,000 (in 2004) and 3,300 (in 2001) in the section north-east and south-west of Wairakei Road, respectively. The City Plan states that “urban local roads typically carry less than 1,500 vehicles per day” and as such, Aorangi Road is busier than a typical urban local road.
32. As part of Local Area Traffic Management, traffic calming has been installed in Aorangi Road in the past. This was in response to community concerns of degrading road safety, caused by an increase in traffic volumes. Aorangi Road is popular with many school cyclists, as it gives access to various schools. From surveys carried out as part of the Safe Routes to School project, we know that getting across Wairakei Road represents the greatest concern for school children in this area. It is acknowledged that some motorists on Aorangi Road experience difficulties crossing, or turning right onto Wairakei Road. Given the local road status of Aorangi Road, though, it should not be made easier to use Aorangi Road. Otherwise, the local road status of Aorangi Road would further erode. However much of the consultation feedback received from Aorangi Road residents has asked for measures that would make it easier for Aorangi Road traffic to turn right onto Wairakei Road, or to get across Wairakei Road.
33. **Option 5:** Staggered turn with restricted turning and island is the preferred option. The proposed median island in Wairakei Road at Aorangi Road will greatly simplify the task of crossing Wairakei Road, as cyclists and pedestrians will only need to concentrate on traffic coming from one approach only, rather than having to look out for a multitude of movements. They also will not be endangered by right turning traffic crossing their path. The island also provides right turning bays for traffic off Wairakei Road. There is no reduction in on-street parking for the shops with this proposal.
34. The key deciding factor in this option is the safety improvement provided by the elimination of right turns out of Aorangi Road. This action is opposed by the local residents. The design will also restrict the growth of the numbers of vehicles on Aorangi Road due to its reduced accessibility. It is worth noting that a contributor to the Aorangi intersection debate was LTNZ who strongly recommended a change from the original option, to the restricted turn option.



35. **Option 1:** Straight across- give way control. The straight across intersection is what exists at Aorangi/Wairakei at present. Given the crossing difficulties of pedestrians and safety concerns for turning vehicles, it was not considered appropriate to fully reinstall the existing geometry – improvements needed to be made for intersection safety.
36. **Option 2:** Traffic signals: Traffic signal control has been looked at and modelling has shown that traffic signals could be operated with current traffic volumes. However, installation of signals is not supported for the following three reasons. Each reason by itself is important enough to reject traffic signals as a sensible option for this location.
- Firstly, Aorangi Road, together with adjoining streets, would form a convenient corridor to travel from as far as Harewood Road to Riccarton Road (utilising Matsons Avenue and Ilam Road) if it were not for the difficulty of crossing Wairakei Road. If signals were provided at Wairakei Road, traffic volumes on Aorangi Road could be expected to increase by a very substantial amount. This would run counter to the local road classification in the City Plan and should be seen against the background of Aorangi Road being already busier than the typical local road.
  - Secondly, the desire is to minimise the number of traffic lights on arterial roads, as the function of arterial roads is to provide for the greatest level of movement possible, whereas traffic lights stop drivers. New traffic signals are generally only supported where the side street also has an important network function, i.e. is at least a collector road.
  - Thirdly, the adjacent signalised intersections that Wairakei Road forms with Greers Road and Grahams Road are operated in a way that good two-way co-ordination for Wairakei Road can be achieved for most of the day. That means that when Wairakei Road traffic has moved through the first of these two intersections, it will arrive at the second intersection when the lights are green. Note that this co-ordination is achieved in both directions. The Aorangi Road intersection with Wairakei Road is close enough to the signals at Greers Road that the Aorangi Road intersection would need to be co-ordinated with Grahams/Greers intersection. Unfortunately this would mean that co-ordination would now only be provided in one direction. Travelling in the opposite direction, traffic would always arrive at the second intersection when the lights are red. This is contrary to the principle of providing the greatest level of movement possible.
37. These assessments concluded that the inclusion of signals would have significant detrimental effects to the local road network and therefore could not be considered any further as an option. These effects would be to:
- Elevate Aorangi's status within the road hierarchy by increasing traffic volumes along what is effectively and previously a controlled local road.
  - Reduce the level of service for Wairakei Road traffic at all times.
  - Significantly reduce the on-street parking along Wairakei Road in front of the Aorangi shops
38. **Option 3:** Roundabout. It would not be feasible to construct a roundabout with a safe geometric layout within the legal road corridor available. To implement a roundabout would need significant property purchase. This option has not been investigated further as the balance of traffic flow through the intersection does not justify the investigation of significant land purchase.
39. **Option 4:** Staggered intersection, pedestrian island. This option was originally shown in the first concept plan to be promulgated (**attachment 1**). This option would provide benefits to crossing pedestrians due to the island, and benefits to right turning vehicles from Aorangi to Wairakei. It would also mean that vehicles intending to progress straight through from Aorangi to Aorangi would need a 'dog leg' including a right turn. This action generally improves the safety of right turning vehicles. However, on a very busy arterial such as Wairakei Road, turning opportunities are limited, so risk taking in turns is increasing. Although there is some benefit in this layout for right turner protection, there will still be a high exposure to right turning vehicles taking risks in "gap selection" and therefore continued collision risk. It is not considered that the benefits offered in this layout are adequate to the extent and type of risks still presented by allowing straight-through and right turn actions. This option also subjects pedestrians to some uncertainty as there is a need for them to judge whether vehicles turning out of Aorangi Road will cross their path. This option is not recommended and option 5, the modified version, is preferred.