

PC34 – TRANSPORT ASSESSMENT

Private Plan Change Request

Remarkables Park Limited

Transportation Assessment Report

December 2010

Traffic Design Group



Private Plan Change Request

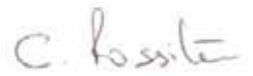
Remarkables Park Limited

Transportation Assessment Report Quality Assurance Statement

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Table of Contents

1.	Introduction	2
2.	Existing Transport Infrastructure	3
2.1	Location in the Transport Network.....	3
2.2	Area Description.....	3
2.3	Road Network.....	7
2.4	Public Transport	8
2.5	Footpaths and Cycle Routes	8
3.	Travel Patterns.....	9
3.1	Traffic Volumes.....	9
3.2	Hourly Traffic Patterns.....	10
3.3	Heavy Traffic Volumes	10
4.	Road Safety	14
5.	Future Changes to Infrastructure	16
5.1	Wakatipu Transportation Study	16
5.2	Passenger Transport	18
6.	Remarkables Park Zone	20
6.1	Road Network.....	20
6.2	Pedestrian Network	22
6.3	Cycle Network	23
6.4	Public Transport	23
7.	Plan Change 19	24
7.1	Description.....	24
7.2	Expected Traffic Generation.....	24
8.	Five Mile Special Zone.....	28
9.	Proposed Plan Change	29
9.1	General.....	29
10.	District Plan Provisions	31
10.1	Policies and Objectives	31
10.2	District Plan Rules	32
11.	Traffic Generation	33
11.1	General.....	33
11.2	Base Scenario - Existing Zoning plus PC19	34
11.3	PC34 Scenario	35
12.	Traffic Distribution	36
12.1	General.....	36
12.2	Expected Frankton Flats Zoning.....	36
12.3	Plan Change 34.....	37

13. Road Network Effects39
 13.1 Current Zoning.....39
 13.2 PC34 Scenario41
 13.3 PC19 Sensitivity Tests.....43
14. Conclusions45

Executive Summary

A transportation assessment was provided in support of the original Remarkables Park Limited private Plan Change proposal, Plan Change 34, which was lodged in March 2008. However, since that application was made, the vision for the development of the Remarkables Park Zone has evolved and has resulted in changes to the proposed road network and development details. This new assessment therefore supersedes the March 2008 transportation assessment.

Under this revised Plan Change request, Remarkables Park Limited is proposing to increase the size of Activity Area 5 and reduce the size of Activity Area 4. The proposed boundary changes to the activity areas will extend the existing commercial / retail area, Activity Area 5, to the south and east around the airport noise control boundary and also to the north across Hawthorne Drive to include a small portion of land east of Tex Smith Road. The proposed Plan Change will enable the existing Remarkables Park Town Centre to be expanded to include additional Large Format Retail facilities.

For this assessment of traffic effects, a base year of 2021 has been adopted because it is anticipated that the majority of the Remarkables Park Zone will have been developed by then. The assessment has focused on the weekday evening peak period because this is when retail activity is at its highest and combines with the evening commuter traffic to create weekday peak traffic conditions.

The Wakatipu Transportation Strategy identifies a range of transportation network improvements that will be required by 2021 so that acceptable levels of service are maintained for all road users. Several of the proposed improvements, such as construction of the Eastern Access Road and the Humphrey Street extension, will directly benefit the Remarkables Park Zone by improving access and these were taken into account as part of this assessment. However, since no designation exists for the Humphrey Street extension, there is some uncertainty regarding the time frame for this road network improvement.

While development of the Remarkables Park Zone is enabled by the existing zoning for the area, there are also proposals for urban development of the land to the north of the airport runway under Plan Change 19 to the District Plan. Since the Council notified their decision on Plan Change 19 in October 2009, the baseline scenario for the assessment of potential traffic effects associated with Plan Change 34 includes a development scenario for the northern Frankton Flats that is considered to be consistent with the QLDC decision version of the structure plan and the associated rules for the Plan Change 19 area.

A micro-simulation model of traffic movements on the Frankton Flats has been used to predict the levels of service provided by the road network under each development scenario. Based on the results obtained from the model for a scenario with Plan Change 19, it is predicted that the expansion to the retail facilities enabled by the changes to the structure plan for the Remarkables Park Zone will marginally increase intersection delays in the immediate vicinity of the Remarkables Park Town Centre but that the increases will be smaller than the typical variation in predicted travel times and therefore would not be noticeable to drivers.

It has been concluded that, with the road improvements identified by the Wakatipu Transportation Strategy, the proposed changes to the structure plan for the Remarkables Park Zone that would enable an expansion to the commercial / retail area would have only a small effect on road users compared with a development scenario based on the existing structure plan. Therefore, the Plan Change 34 application can be supported from a transportation perspective.

1. Introduction

Traffic Design Group has been commissioned by Remarkables Park Limited (RPL) to prepare this updated transportation assessment of a request for a Private Plan Change to amend the structure plan and provisions for the Remarkables Park Zone (RPZ). Under the proposed Plan Change, the existing commercial / retail area, Activity Area 5 (AA5), will be extended to the south and east around the part of Activity Area 8 (AA8) south of the Eastern Access Road (EAR) and also to the north across Hawthorne Drive to include a small portion of land east of Tex Smith Road. The proposed changes to Activity Area 5 will enable the existing Remarkables Park Town Centre (RPTC) to be extended to include additional Large Format Retail (LFR) facilities.

A transportation assessment was provided in support of the original RPL private Plan Change request, Plan Change 34 (PC34), which was lodged in March 2008. Since that request was made, the vision for the development of the RPZ has evolved and has resulted in changes to the proposed road network and development details. This new assessment therefore supersedes the March 2008 transportation assessment.

This report has been arranged to first discuss the location of the existing Activity Areas, the form of the arterial road network, the pattern of adjoining traffic movements and the existing traffic connections. An assessment of the existing road accident statistics in the Frankton area is followed by a summary of the strategy evolving from the current Wakatipu Transportation Study (WTS) for the future transportation system in the area. The additional retail development enabled by PC34 is then described and a review made of the likely traffic generation of the additional retail activities. The report then goes on to investigate the traffic related effects that could arise from PC34.

In the earlier assessment, the traffic effects were assessed against a future development scenario based on the current zoning of the District Plan. However, since the Council has notified its decision on Plan Change 19 although it is subject to appeal, the base scenario for the assessment of traffic effects has been updated to include a development scenario for the northern Frankton Flats that is considered to be consistent with the QLDC decision structure plan for that area and the associated rules.

2. Existing Transport Infrastructure

2.1 Location in the Transport Network

The location of the RPZ is indicated in **Figure 1** relative to the State Highway (SH) road network on the Frankton Flats and within the Wakatipu Basin. It shows the RPZ to the south of Queenstown Airport and east of the existing residential areas of Frankton. The Remarkables Park Town Centre (RPTC) represents the bulk of the existing development within the RPZ. State Highway 6 (SH6) provides the strategic transport link to the north and south while SH6A links Frankton with Queenstown.

Figure 2 shows the existing zones on the Frankton Flats as defined by the Queenstown Lakes District Council (QLDC) District Plan relative to the existing access roads, the airport noise boundary and airport outer control boundary (OCB). The RPZ is bounded to the west by the low density residential areas of Frankton and to the north by the airport designation.

Figure 3 indicates the location of the RPZ relative to the existing road network servicing Remarkables Park and the road hierarchy defined in the District Plan. The primary access route is from SH6 at the roundabout with Lucas Place, which leads to a second roundabout at the access road to the airport terminal (Henry Wigley Drive) and then via Lucas Place to the roundabout at the intersection with Hawthorne Drive, Robertson Street and Riverside Road.

The primary western access to the RPZ is complemented by the route from SH6 via Humphrey Street, Douglas Street and Robertson Street which serves people travelling from Kelvin Heights and other areas south of the Kawarau River.

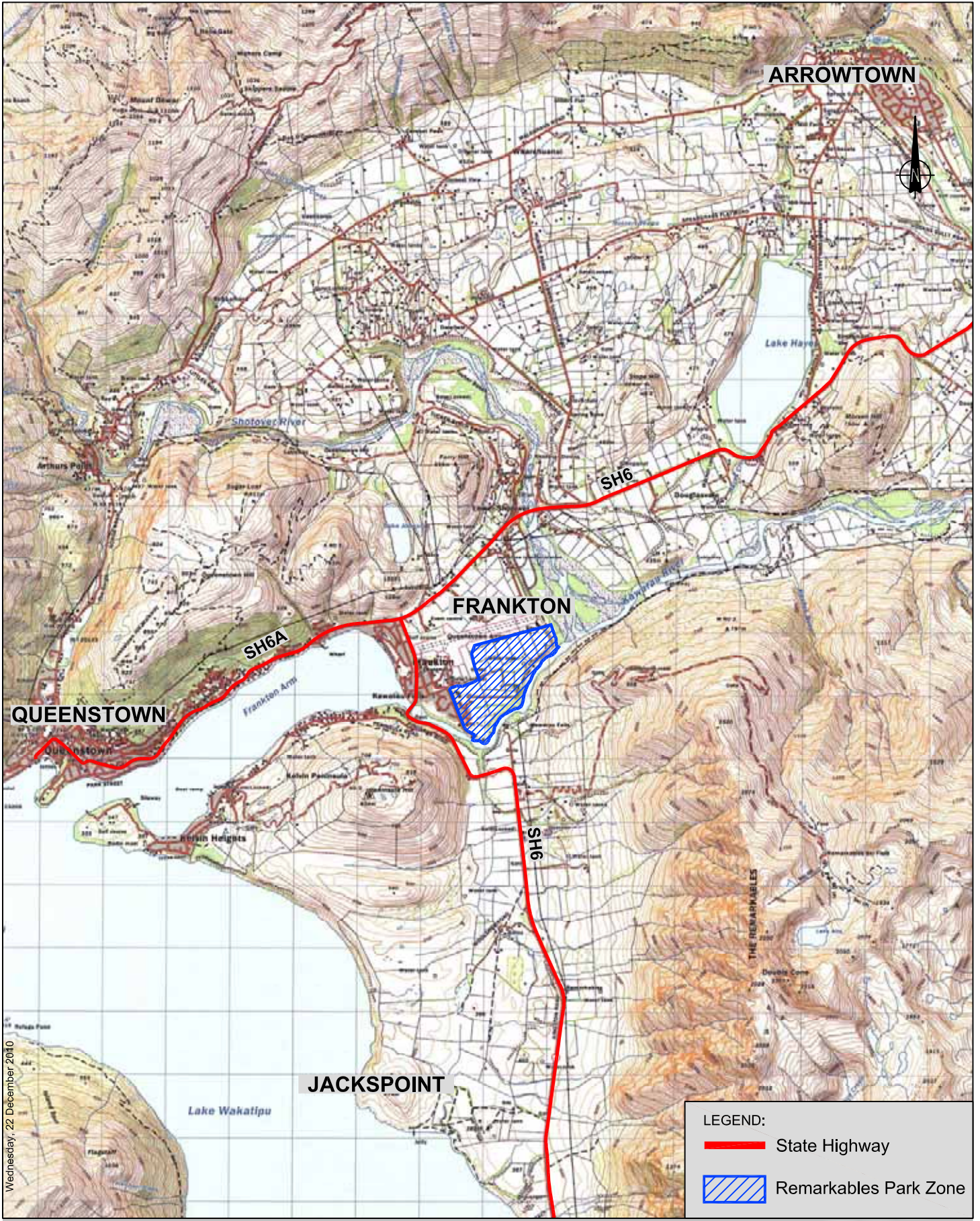
Access to the RPZ from Queenstown is along State Highway 6A (Frankton Road) and SH6 (Kawarau Road) to the Lucas Place roundabout. Access from Arrowtown, and areas to the east, is along State Highway 6 (Frankton Ladies Mile Highway) and SH6 (Kawarau Road) to the Lucas Place roundabout.

It has been noted that the current road hierarchy in the vicinity of Remarkables Park as defined by the District Plan is now out of date because Douglas Street, other than the section between Humphrey Street and Robertson Street, no longer plays a role in the road network consistent with its current Arterial Road status. With the closure of the north end of Douglas Street, its function has effectively been assumed by Lucas Place.

Obviously, as Remarkables Park is developed, the road hierarchy definitions will need to be adjusted and extended accordingly. For example, the existing section of Humphrey Street which feeds traffic through Douglas Street to Robertson Street meets the description of a Collector Road.

2.2 Area Description

The RPZ comprises about 150ha of land within the southern part of the Frankton Flats. It is generally bounded to the south by the Kawarau River, to the north by Queenstown Airport, to the West by Riverside Road and to the east by the Kawarau River and Shotover River delta. The RPZ includes eight activity areas, six of which are presently used as farmland and have yet to be developed.



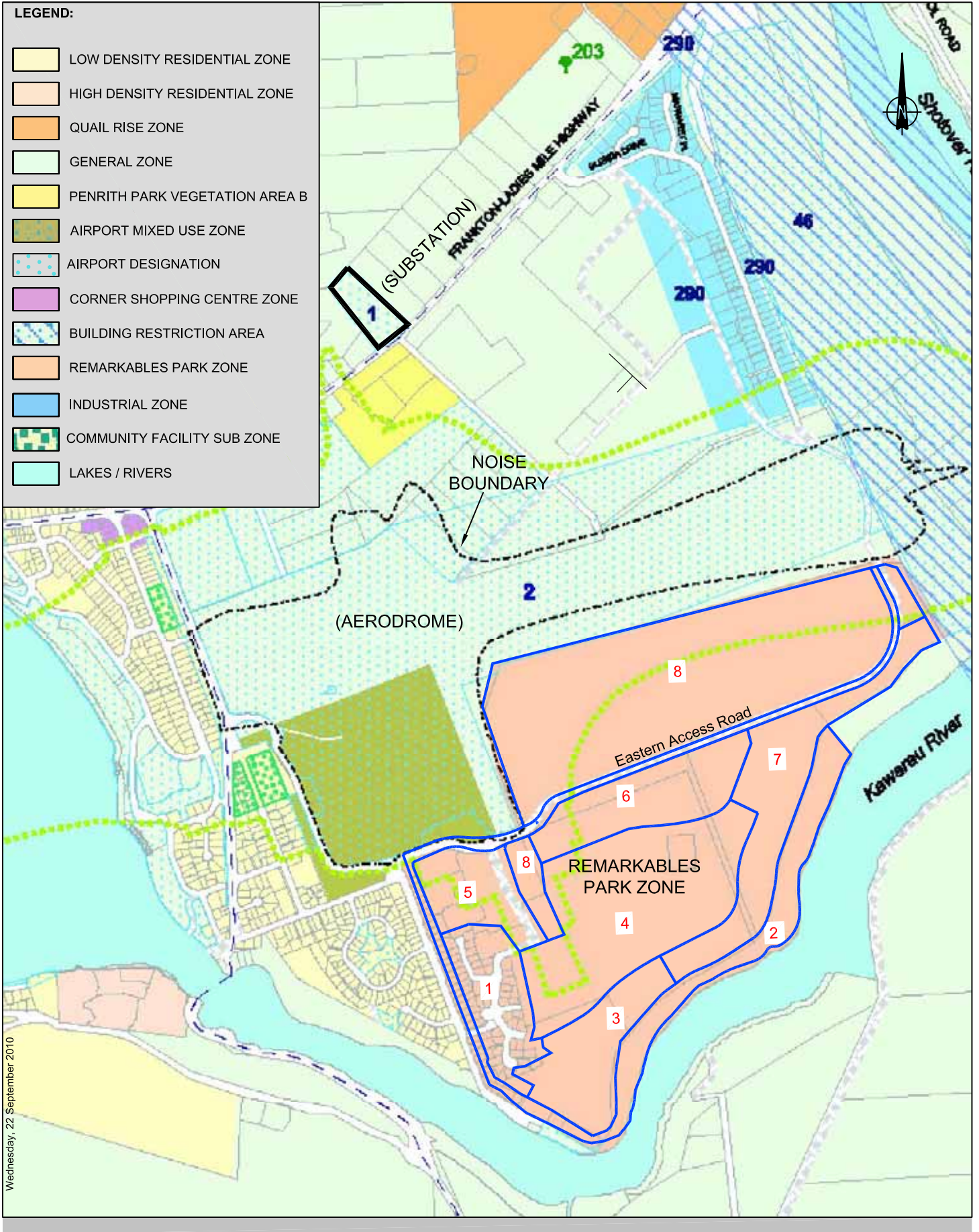
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Plan Change 34
 Remarkables Park Zone Location

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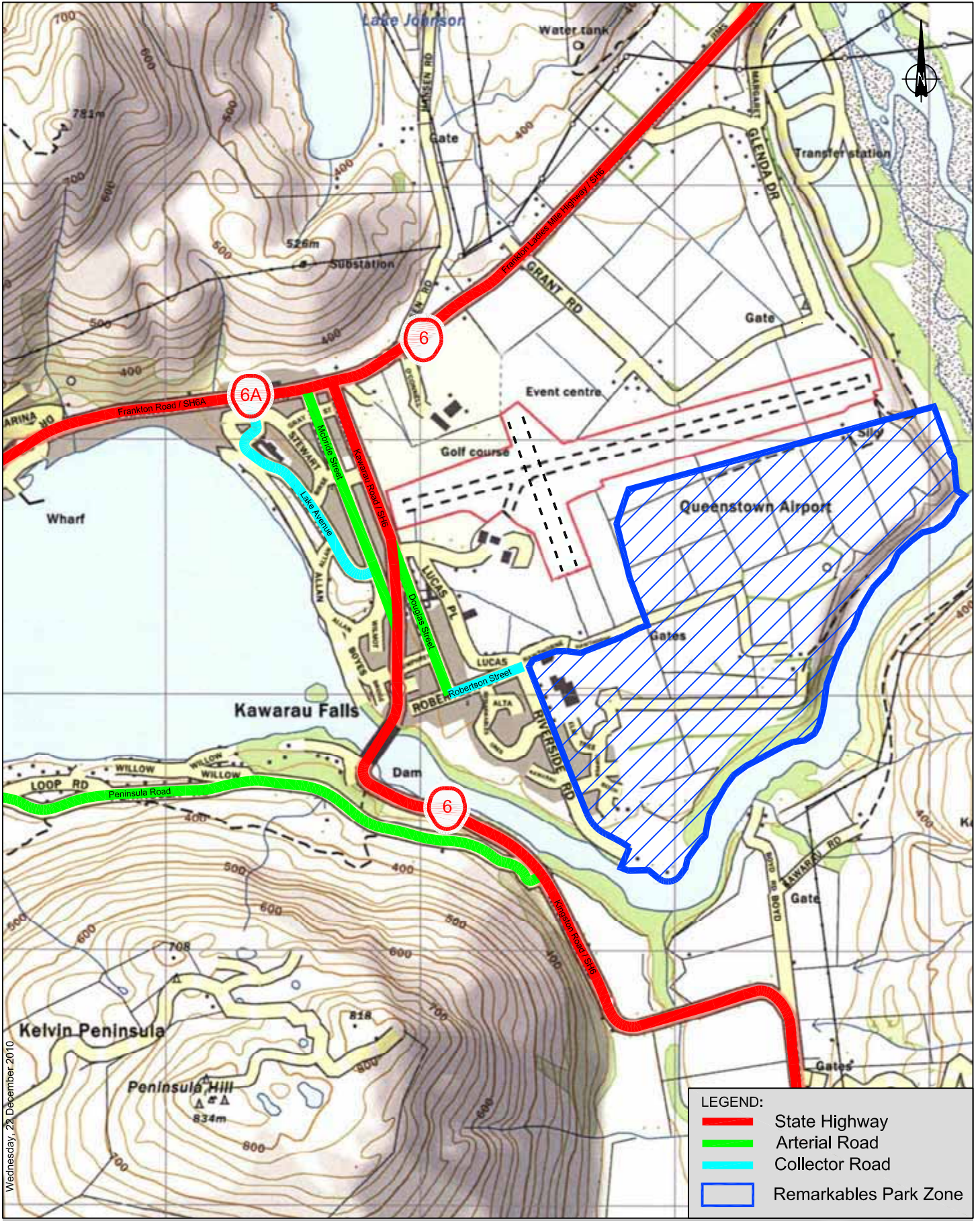


Plan Change 34
Existing Frankton Flats Zones

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Plan Change 34
 Roading Hierarchy

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Activity Area 1 (AA1) located immediately to the east of Riverside Road comprises existing low density residential development centred on a network of local roads with access from Riverside Road.

Activity Area 2 (AA2) forms the southern boundary of the RPZ along the Kawarau River and comprises three smaller areas, 2a, 2b and 2c. The District Plan describes AA2 as an area for public recreation.

Activity Area 3 (AA3) is located in the southern section of the RPZ. It is bounded to the west by the low density residential development in AA1 and to the south by AA2. The District Plan describes AA3 as the riverside peninsula area that *“will enable development of condominiums, visitor facilities and visitor accommodation, church, plaza, restaurants, cafes and riverside facilities.”*

Activity Area 4 (AA4) and Activity Area 6 (AA6) form the central region of the RPZ. High density development including visitor, residential, staff and student accommodation is proposed within AA4 while AA6 enables community facilities such as education, retirement homes, medical centre and hospital as well as high density residential and visitor accommodation development.

Activity Area 5, located south of Hawthorne Drive, includes the existing Remarkables Park Town Centre (RPTC). Access to the RPTC is from Hawthorne Drive which currently terminates some 75m beyond the access. From the eastern end of Hawthorne Drive, there is an unformed legal road that runs across the RPZ to the end of the airport runway.

Activity Area 7 (AA7) occupies the eastern area of the RPZ and provides views of the Shotover River, Kawarau River as well as surrounding mountain ranges. It is proposed that AA7 will provide a mix of residential and visitor accommodation with a range of housing types.

Activity Area 8 (AA8) at the north of the RPZ has been created as a buffer zone between the airport and other RPZ activity areas. Part of AA8 extends south of Hawthorne Drive to reflect the Outer Noise Control Boundary of the airport. Activities of a rural, recreational and commercial recreational nature and infrastructural utilities of a non-noise sensitive nature are permitted within this area.

2.3 Road Network

The rural sections of SH6 have a standard cross section with a two-lane carriageway that is approximately 7.3m wide except at the Kawarau River Bridge which is a single lane facility controlled by traffic signals that regulate traffic flows alternately for each direction of travel. This is an obvious bottleneck in the local network and investigations are underway to provide a new two lane bridge immediately downstream of the existing bridge.

The urban sections of SH6 have predominantly two lanes except at intersections where additional turning lanes are provided. The critical intersection of SH6 with Frankton Road (SH6A) is controlled by a roundabout which has a circulating carriageway that is single lane except for one of the four quadrants which provides two lanes for traffic entering from Frankton Road.

The speed limit on the section of SH6 from south of the Kawarau Bridge up to the intersection with SH6A is 70 km/h, it then increases to 80 km/h between that intersection and a point approximately 100m east of Glenda Drive where it becomes 100km/h. The speed limit on Frankton Road and the rest of the local road network is 50 km/h.

The primary access route to Remarkables Park and also to the airport from Kawarau Road (SH6) is via the roundabout intersection with Lucas Place. Two lane approaches are provided to the

roundabout on all three legs with specific provision made for two-lane through movements northbound along SH6 and from the airport exit to SH6 northbound.

Lucas Place has been constructed with a four lane carriageway between SH6 and the roundabout at the airport terminal access road. To the south of the airport roundabout, Lucas Place extends to Hawthorne Drive as a two lane carriageway that has adjacent car parking over some sections. The roundabout at Riverside Road / Robertson Street has two lane approaches but only single lane circulation. Hawthorne Drive leading to Remarkables Park has a divided carriageway which provides a 5m wide single lane each side of a central median with provision for kerbside parking.

The State Highway intersection with Humphrey Street has a right turn lane for traffic approaching from the south and a left-turn lane from the north. Currently, traffic accessing Remarkables Park from this direction is required to turn right out of Humphrey Street into Douglas Street and then left into Robertson Street before negotiating the Riverside Road roundabout to access Hawthorne Drive. Humphrey Street, Douglas Street and Robertson Street are all two lane streets with adjacent residential properties and on-street car parking within carriageway widths between 7m and 9m.

The existing primary access to the RPTC is at a priority controlled T-intersection from Hawthorne Drive that currently has low conflicting traffic flows associated with the farm which is accessed off the end of Hawthorne Drive.

2.4 Public Transport

Currently “Connectabus” operates public transport services across the Wakatipu Basin. The services have recently been re-organised as part of a long term strategy to improve the public transport services in the area. The RPTC service operates with 15 minute headway in business hours and at 30 minute headways outside business hours. The route follows Hawthorne Drive, Lucas Place via the Airport and Kawarau Road (SH6) to SH6A.

2.5 Footpaths and Cycle Routes

There are footpaths provided along all of the roads associated with the western access to Remarkables Park currently and appropriate pedestrian facilities are provided within the existing shopping centre with segregated footpaths provided to link the various retail (and office) facilities.

There are existing trails along the edge of the Kawarau River (within the RPZ) which will be maintained and enhanced as part of the Remarkables Park development. While there are currently no cycle lanes provided within the RPZ, there is ample width for cyclists along the existing section of Hawthorne Drive and its future extension has been planned to include cycle lanes.

3. Travel Patterns

3.1 Traffic Volumes

The importance of State Highway 6 (SH6) within the Frankton Flats is reflected by the daily traffic volumes and history of growth. The annual average daily traffic volume (AADT) east of the Shotover River has been growing by 6-7% per annum since 2000. A similar rate of growth is indicated by the AADT recorded east of the SH6 / SH6A intersection with a marginally lower rate south of the SH6 / SH6A intersection. This suggests that traffic volumes across the Frankton Flats have been increasing by about 6% per annum in recent years.

Year	SH6 – South Peninsula Rd	SH6 – Kawarau Bridge	SH6 – North Airport	SH6 – East Frankton Rd	SH6 – East Shotover
2000	1,978	4,267	7,888	7,001	5,045
2001	2,100	4,520	7,260	7,830	5,410
2002	2,300	4,100	10,700	8,780	5,670
2003	2,846	6,217	11,385	9,984	6,951
2004	3,174	5,437	12,692	11,563	7,975
2005	2,967	5,325	12,201	12,459	8,691
2006	3,117	4,581	13,700	13,151	9,609
2007	3,407	5,420	14,337	14,580	10,501
2008	2,855	5,653	14,198	14,718	9,842
2009	2,763	5,963	15,028	14,847	9,605
Growth/Annum	112	149	833	959	636
	4.1%	2.5%	5.5%	6.5%	6.6%

Table 1: SH6 Traffic Volumes - AADT

Table 2 shows the AADT for other roads currently used to access the RPZ.

Road	Count	Date
Lucas Place	7,000	Oct-2007
Hawthorne Drive	7,600	Sep-2009
Humphrey Street	1,900	Sep-2007
Robertson Street	2,400	Nov-2005

Table 2: Reported Traffic Volumes – AADT

The high volumes of traffic on Lucas Place and Hawthorne Drive reflect the influence of the RPTC and show that this currently forms the primary access route between the RPTC and state highway network.

3.2 Hourly Traffic Patterns

Figure 4 shows the hourly pattern of traffic volumes recorded on SH6 south of the SH6A intersection over the period of a week in February 2010. The first feature of note is that the evening peak two-way traffic flows remain high throughout the week and the weekend at about 1,600 vehicles per hour (vph) with a relatively minor peak in the morning during the week. The evening commuter peak is more prominent for the northbound than the southbound direction. Flows also remain high throughout the day over the weekend, ranging from 1,100 – 1,400 vph.

Annual traffic count data for SH6 indicates that February is a typical month and the flows during summer holiday peaks (Christmas and New Year) and annual holidays that coincide with the ski season, are up to 15% higher.

Figure 5 shows the pattern of daily arrival volumes at the RPTC during 2009 with the main holiday periods highlighted in red. The highest traffic volumes occur in the peak holiday season in early January and at Easter with the lowest traffic volumes occurring in May and June. The plot also shows that the pattern of daily arrivals in holiday periods is different from the non-holiday periods. In holiday periods, the number of daily arrivals remains fairly constant during the week whereas in non-holiday periods, there is typically a steady increase from Sunday to Saturday.

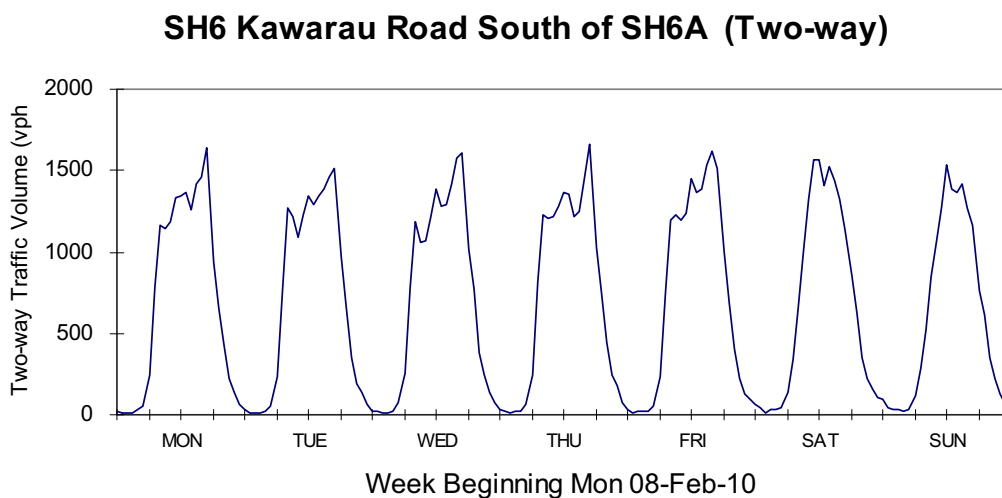
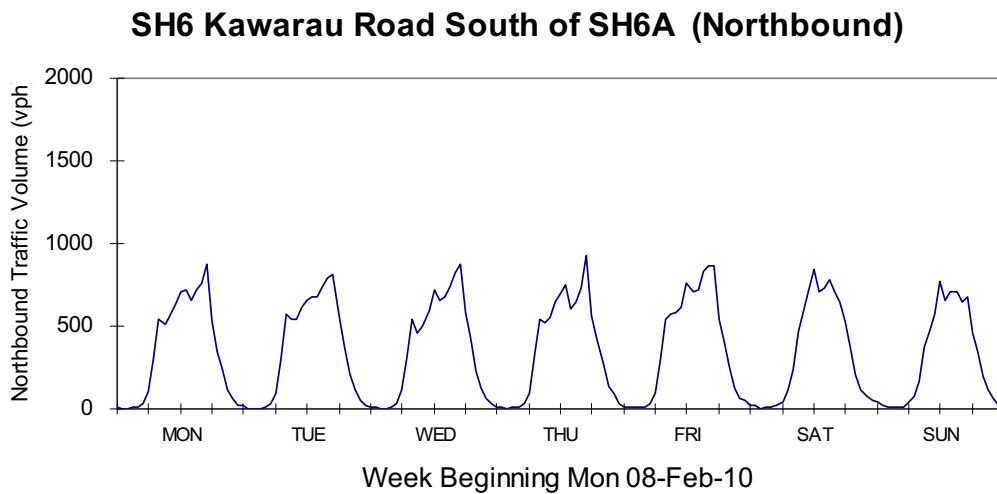
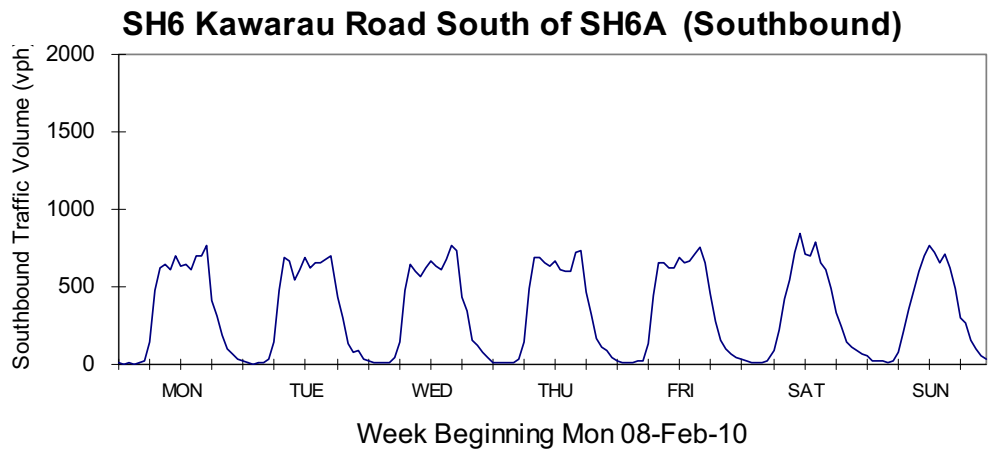
Figure 5 also shows the hourly pattern of one-way (entry) traffic demands at the entrance to the RPTC for the full period of a week in September 2009. This is regarded as an average month in the year but the pattern indicated is typical of that experienced at the shopping centre throughout the year other than during holiday periods. There is a steady build-up of traffic flows entering the centre throughout each day reaching peaks in the late afternoon of some 450vph. At weekends, the peak entry flow is typically marginally higher and occurs earlier in the afternoon.

Figure 6 summarises a traffic count undertaken in June 2007 of the turning movements at the SH6 / Lucas Place roundabout during the morning and evening peak periods. The dominance of the RPTC and the airport in the evening peak is indicated by the fact that the heaviest movements are between the western access and SH6 to the North. However, the movement between the southern section of SH6 and the western access involves the lowest volumes in general, because traffic accessing the RPZ from the south generally uses Humphrey Street.

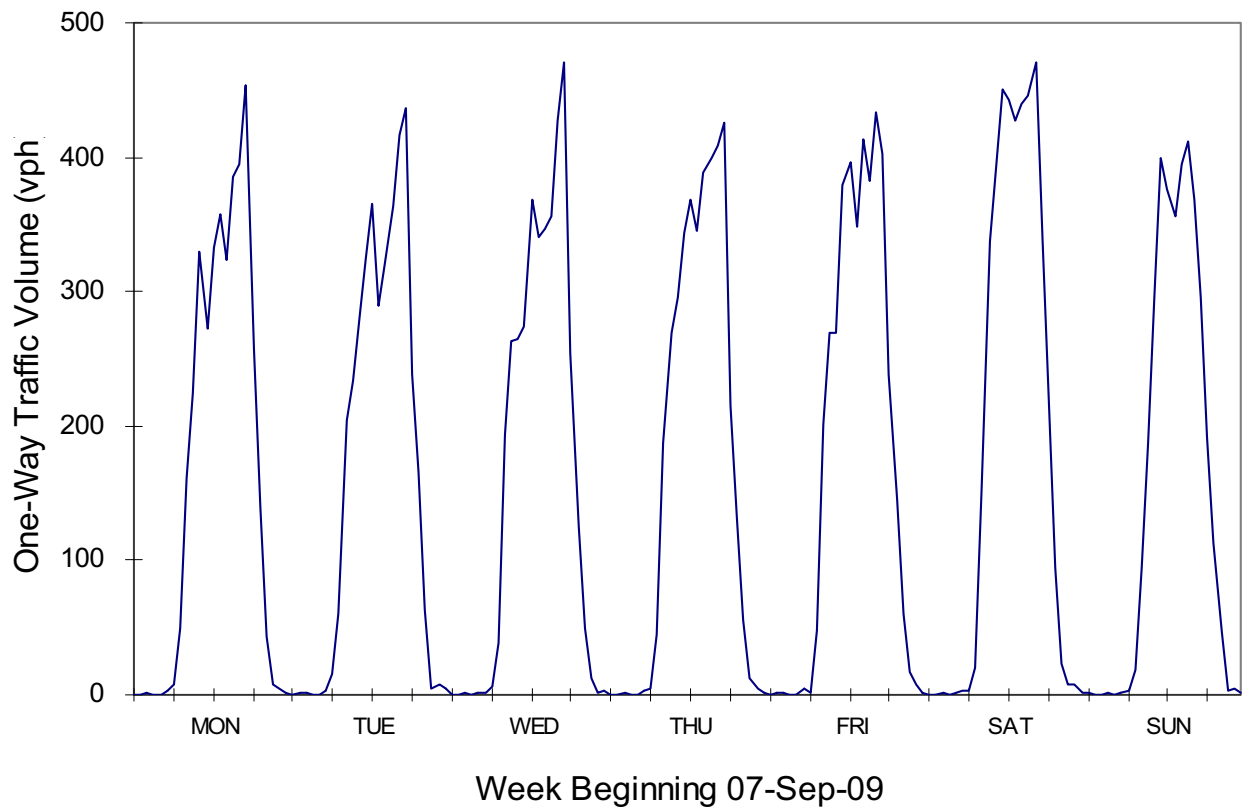
Figure 6 also shows the existing turning movements at the intersection of SH6 and Humphrey Street recorded in June 2007. The right turn movement from the south is considered significant in the context of access to the RPZ, however, it is worth noting that the left-turn from the north is three times greater.

3.3 Heavy Traffic Volumes

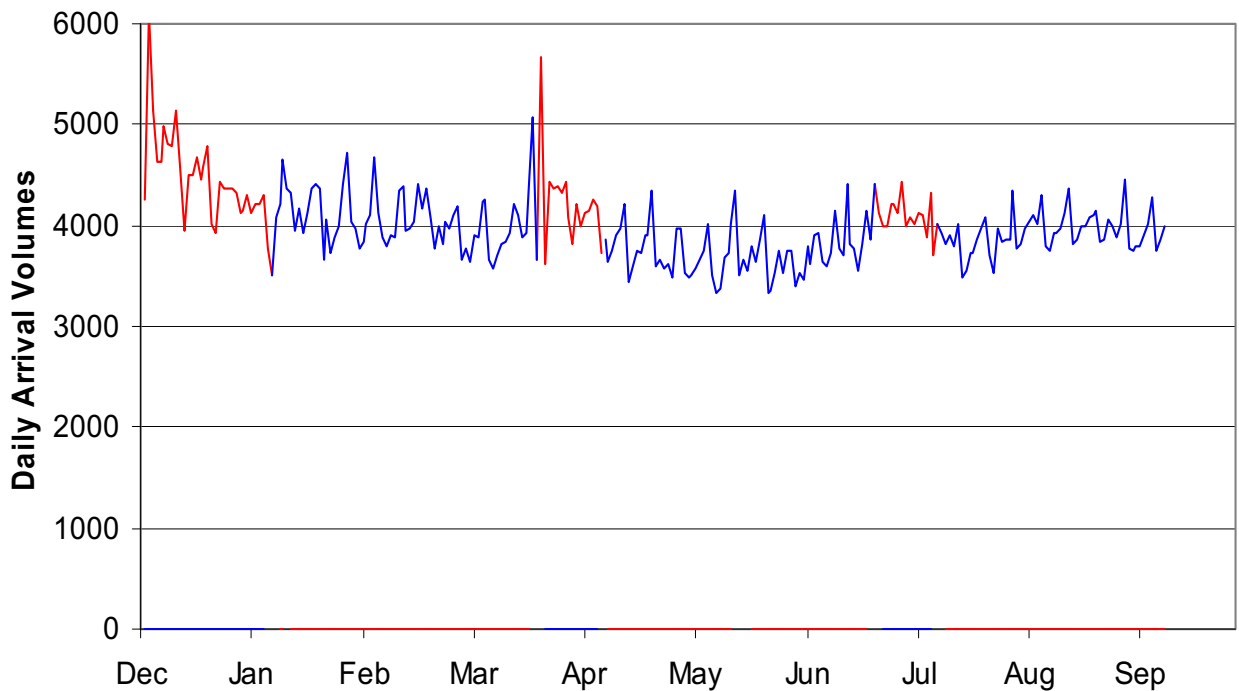
The percentage of heavy vehicles on the state highway network within the Frankton Flats is approximately 6%. This is likely to increase as Frankton becomes a major retail and commercial hub for the areas to the south and east particularly, and as new public transport services are provided.



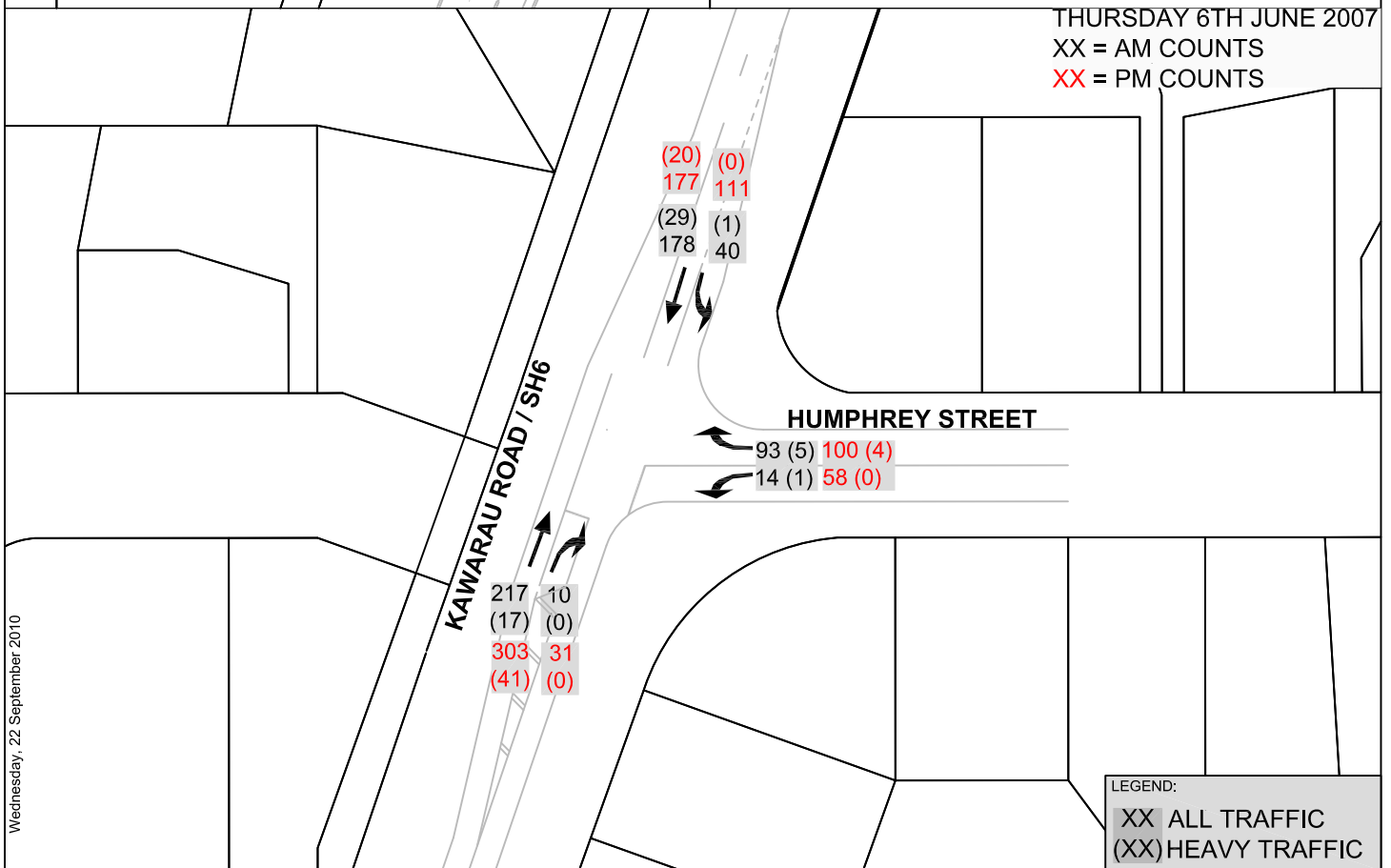
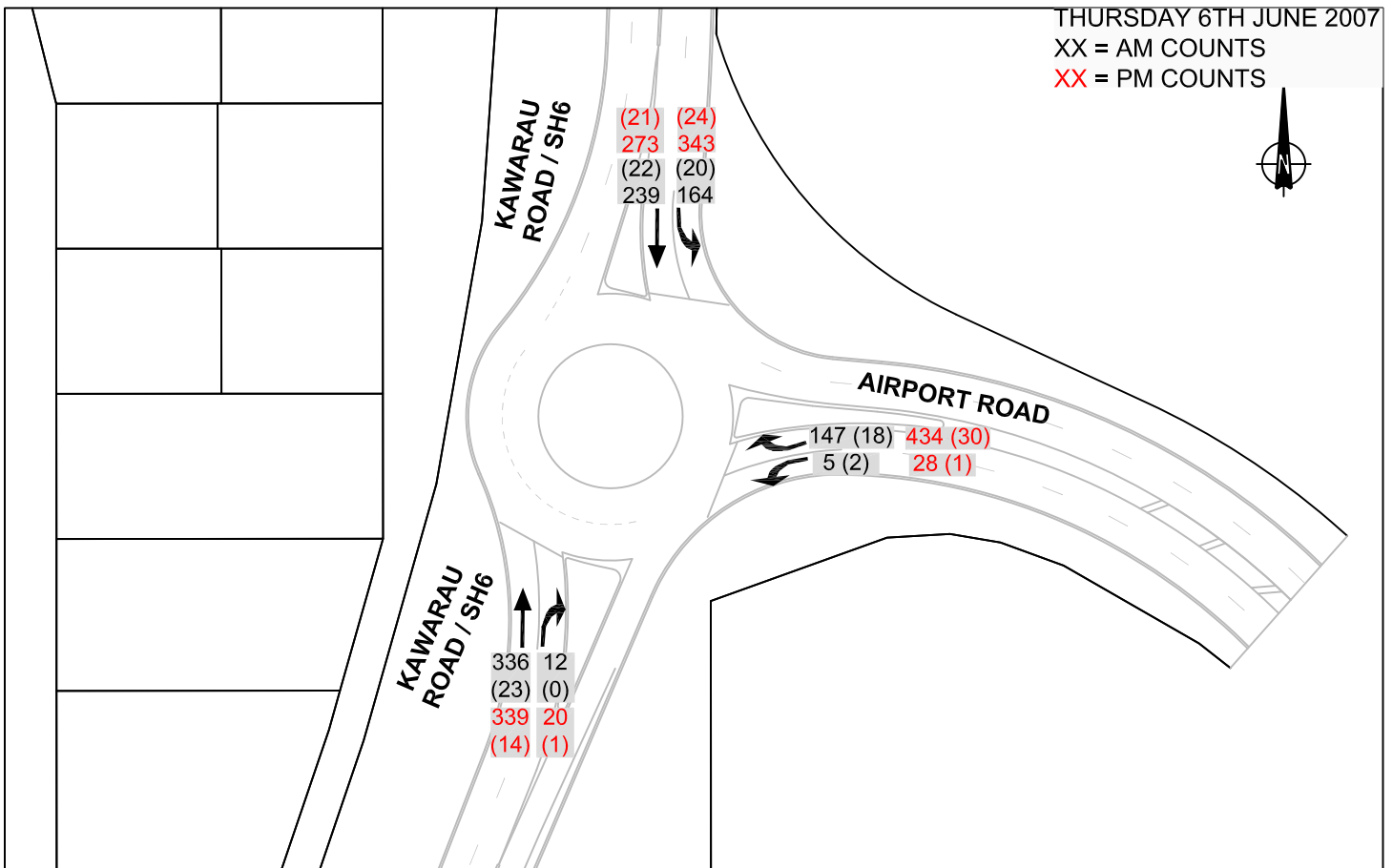
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Daily Arrival Pattern (2009)



Wednesday, 22 December 2010



Wednesday, 22 September 2010

Plan Change 34

Turning Movement Counts

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4. Road Safety

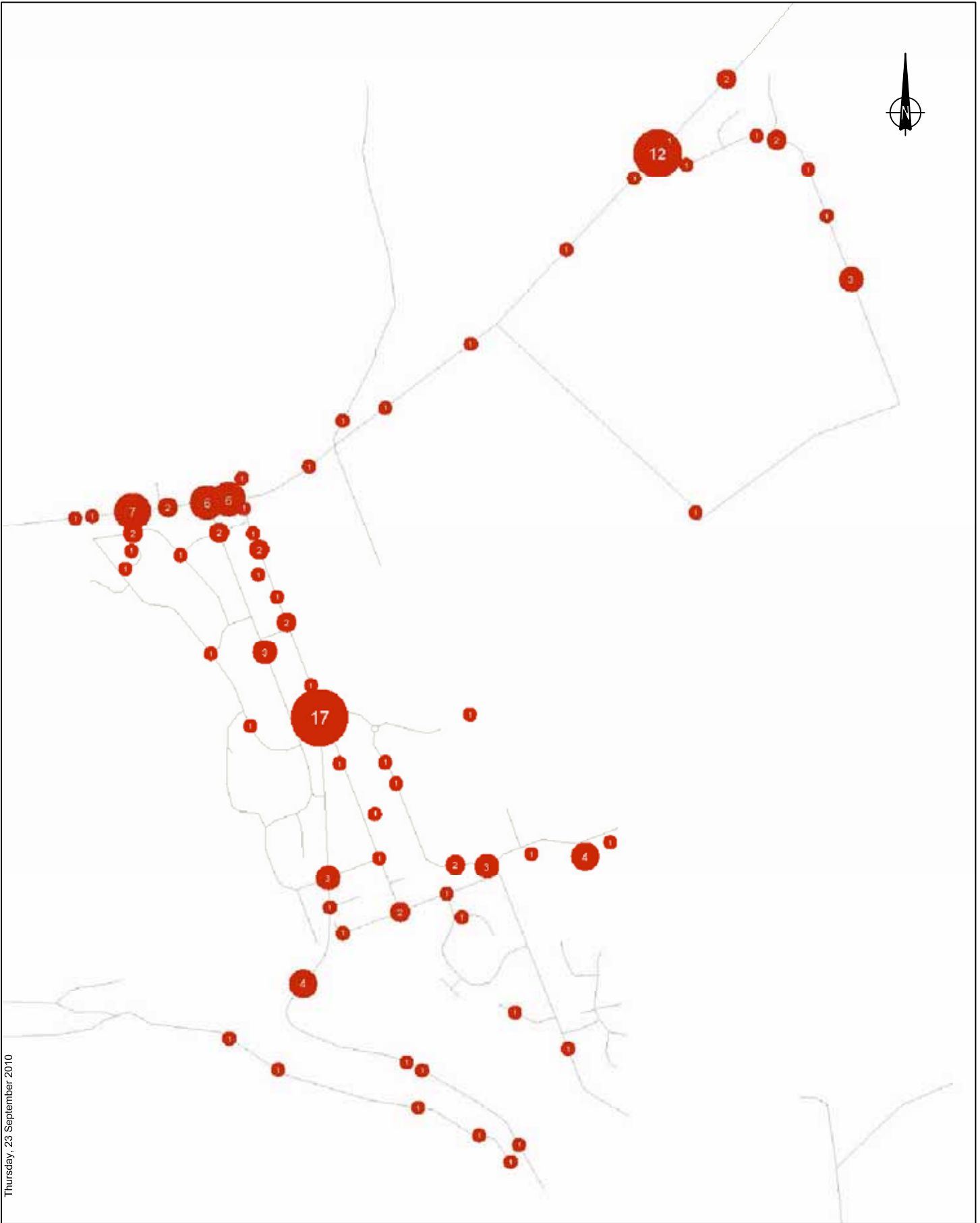
An investigation of the crash history on the road network of the Frankton Flats has been undertaken for the most recent five years, 2005-9, and available data for 2010. The location and number of recorded crashes has been indicated in **Figure 7**.

One feature of the pattern of accident distribution is the high number of accidents that have occurred at the SH6 intersection for the airport. Nearly all of these accidents (13 out of 17) occurred prior to the completion of the roundabout construction in early 2007. There have been four accidents since the roundabout was completed, two of which were the result of drivers following too closely while the others occurred when the driver lost control of a truck turning right at the roundabout. None of the four accidents at the roundabout resulted in injury.

The other locations that have had multiple accidents include the roundabout-controlled intersection of SH6 / SH6A, the SH6 / Glenda Drive intersection and the one-way bridge across the Kawarau River. The majority of the accidents close to the SH6 / SH6A intersection were not actually on the roundabout but in the surrounding car parking areas associated with the shops and the service station. The SH6 / Glenda Drive intersection is particularly noteworthy because twelve accidents have been recorded of which six resulted in serious or minor injuries. The poor accident history of the intersection is reflected in the urgent proposals for an upgrade. One of the accidents at the Kawarau Falls Bridge resulted in minor injury.

There has also been a cluster of crashes in the vicinity of the entrance to the car park of the Remarkables Park Town Centre but none of these crashes caused injury, with all being minor and typical of a car parking environment.

There were two crashes reported that involved pedestrians and two crashes that involved cyclists. Both crashes involving pedestrians occurred on residential roads and there were no common factors. The cyclist was at fault for one crash because they were riding without lights in twilight conditions. The second crash was between a cyclist on a footpath and a motorist turning at a driveway. None of the pedestrian or cyclist related crashes raise any particular safety issues with the existing road network.



Thursday, 23 September 2010

Plan Change 34
Road Accidents 2005 - 2010 Inclusive

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5. Future Changes to Infrastructure

5.1 Wakatipu Transportation Study

The Wakatipu Transportation Strategy (WTS) report (commissioned by QLDC) was issued in November 2007. There are many aspects to the WTS that will directly affect travel demands across the Frankton Flats; specifically there are proposals to effect a significant change in travel behaviour. The WTS includes a Travel Demand Management (TDM) Strategy that will include a high level of parking restraint particularly in Queenstown and a high quality public transport system.

A critical objective of the WTS is the reduction in the predicted future traffic volumes on SH6A to prevent “bumper to bumper traffic on Frankton Road travelling at an average speed of 20km/h by 2026”. It is expected that this reduction will be achieved through the development of more frequent public transport services and parking restraint in Queenstown along with Park-and-Ride facilities in the Frankton Flats. The WTS states; “It is estimated that these measures could translate to approximately a 20% transfer of car trips to public transport by 2026”.

The WTS does not identify targets for years before 2026 but indicates that a travel demand management programme would be initiated in the short term along with implementation of a high quality bus service. The initial implementation of park and ride schemes is also proposed for the short term and continuing into the medium term as facilities are expanded. There have also been proposals to promote car sharing to increase vehicle occupancy rates on SH6A which would also reduce traffic volumes over the wider Frankton Flats.

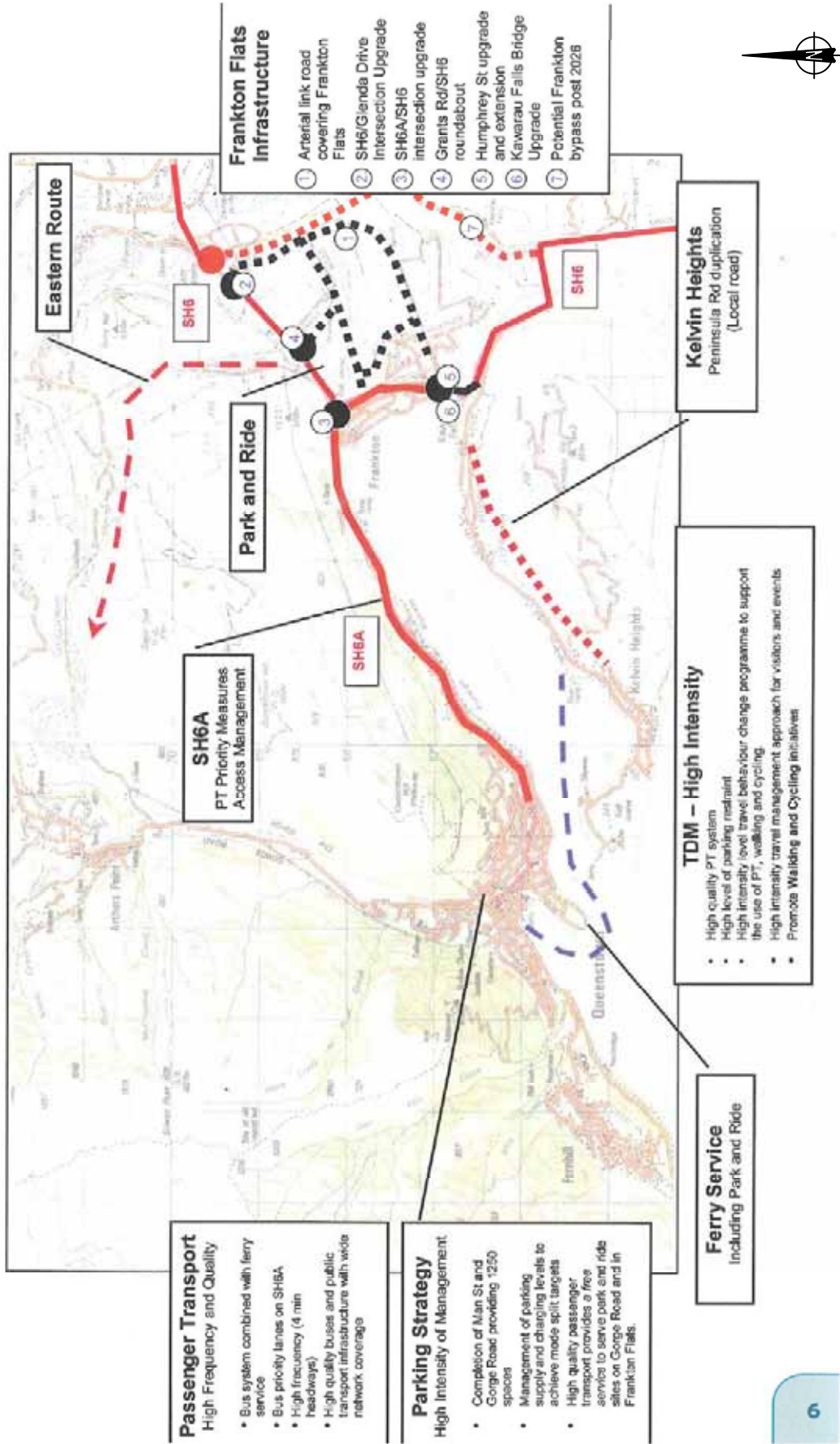
The WTS identified seven road infrastructure improvement projects for the Frankton Flats as shown in **Figure 8**. Four of these projects directly affect SH6 and will result in upgrades to major intersections between Glenda Drive and the Kawarau Bridge with an upgrade to the Kawarau Falls Bridge forming another project. Construction of a new arterial link around the eastern side of the Frankton Flats is also proposed for the short to medium term. The WTS identifies a potential bypass of the Frankton Flats but indicates that this would be unlikely to occur before 2026.

There are no collector or arterial roads currently defined in the District Plan within the area south of SH6 between Joe O’Connell Drive and Glenda Drive or the land between the airport runway and the Kawarau River. The recommendations from the WTS include the construction of a new arterial road, the Eastern Access Road (EAR), from SH6 west of Glenda Drive, around the east end of the runway, through the Remarkables Park Zone (RPZ) via Hawthorne Drive and connecting with SH6 near the airport terminal.

The construction of the EAR (Project 1) represents one of the larger road improvement projects identified within the WTS. Discussions between QLDC, Transit NZ (now NZTA), Shotover Park Limited (SPL), Remarkables Park Limited (RPL), Five Mile Holdings Limited (Receivers) and Queenstown Airport Corporation (QAC) have culminated in an agreed alignment for the Eastern Access Road, an extension to Glenda Drive and a proposed intersection upgrade at SH6 / Glenda Drive.

Thursday, 23 September 2010

7. Map: Wakatipu Transportation Strategy to 2026



The Notice of Requirement (NOR) for the Glenda Drive Roundabout and Associated Roads is under appeal (Court mediation has been set for January 2011). The NOR proposes that the existing SH6 / Glenda Drive intersection is converted to provide left-in movements only. A new roundabout will be constructed on SH6 about 280m to the south of Glenda Drive to provide the connection with the northern limit of the Eastern Access Road (EAR). The northern section of Glenda Drive will be re-aligned and extended to the west to meet the EAR at a roundabout.

The completion of the EAR around the eastern end of the runway to connect with Hawthorne Drive in Remarkables Park is forecast for about 2015 but could occur sooner with the co-operation of RPL and QAC over the provision of fill for the current construction of the runway end safety area (RESA).

The WTS also indicates that improvements to the SH6 / SH6A intersection and a roundabout at the SH6 / Grant Road will have been completed by 2015. Within Frankton, it is expected that the SH6 / Humphrey Street intersection will be upgraded to a roundabout and that Lucas Place between the airport and the RPTC will have been four laned.

With all of these improvements, it has been predicted that the Frankton Flats road network will have sufficient capacity to meet the predicted traffic demands for 2026 if the travel demand measures identified in the WTS are also implemented. The WTS has proposed management of parking availability, particularly in central Queenstown, as a way to discourage commuter traffic and as an incentive to use the new public transport systems. Park and Ride facilities are also proposed within the northern sector of the Frankton Flats so that motorists can interchange to buses for the journey along SH6A. Although the location of the park and ride sites has not been determined at this time, it is worth noting that their location will influence the level of reduction in traffic volumes that will be achieved at SH6 intersections across the Frankton Flats.

5.2 Passenger Transport

Figure 9 indicates the proposed bus routes from the WTS for future application in Queenstown. Three of the routes service Remarkables Park directly. Most of the routes use SH6A (Frankton Road) and it is proposed that public transport priority measures be instigated for this road as part of travel demand management proposals designed to encourage the use of travel modes other than private motor vehicles including ferries, cycling and walking as well as buses.

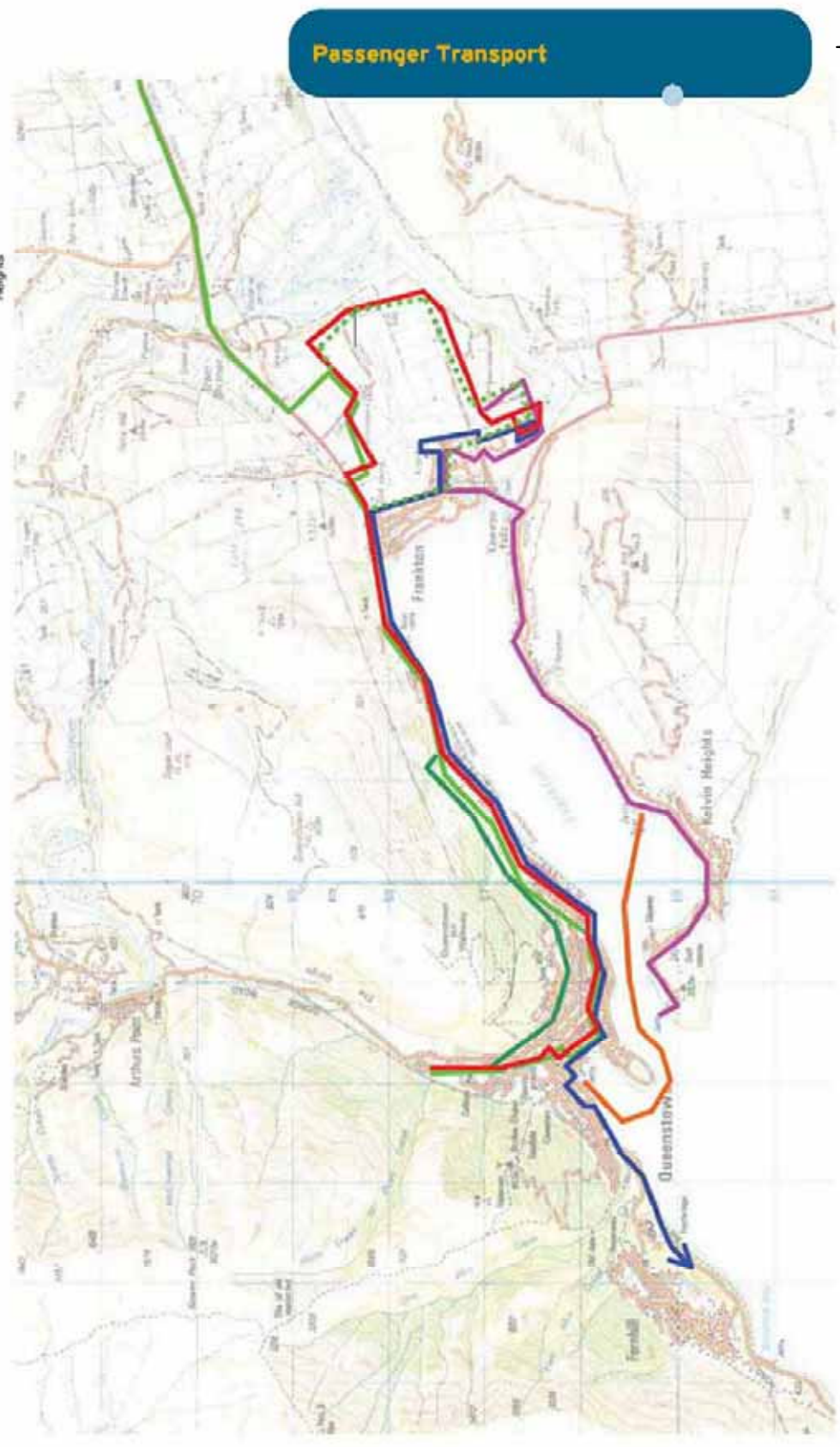
It is also noted that a proposal for ferry services on Lake Wakatipu is likely. RPL is actively proposing to support ferry services by providing a terminal for Remarkables Park on the Kawarau River.

As part of travel demand management measures, the WTS has proposed management of parking availability, particularly in central Queenstown, as a way to discourage commuter traffic and as an incentive to use the new public transport systems. Park and Ride facilities are also proposed within the northern sector of the Frankton Flats so that motorists can interchange to buses for the journey along SH6A. Although the location of the park and ride sites has not been determined at this time, it is worth noting that their location will influence the level of reduction in traffic volumes that will be achieved at SH6 intersections across the Frankton Flats.

In summary, the planning for the future of strategic travel in the Wakatipu Basin has been substantially addressed by the WTS and therefore the transportation effects of the proposed subdivision need only be addressed at the local transportation network level, i.e. within the Frankton Flats.

Tuesday, 9 March 2010

-  **Bus Route 1** (10 minutes): Fernhill to Remarkables Park via Queenstown CBD, Frankton Flats and Queenstown Airport. Extended hourly to Glenorchy
-  **Bus Route 2** (10 minutes): Gorge Road car park to Remarkables park via Queenstown CBD and Five Mile
-  **Bus Route 3** (60 minutes): Arrowtown to Gorge Road car park via Five Mile and Queenstown CBD
-  **Bus Route 3A** (60 minutes): Arrowtown to Gorge Road car park via Remarkables Park, Frankton Flats and Queenstown CBD
-  **Bus Route 4** (15 minutes): Kelvin Heights to Remarkables Park via Queenstown Airport
-  **Ferry Route 5** (15 minutes): Kelvin Heights to Queenstown CBD
-  **Bus Route 6**: High-level route connecting Gorge Road (via Queenstown CBD) with turnaround at Goldfield Heights



6. Remarkables Park Zone

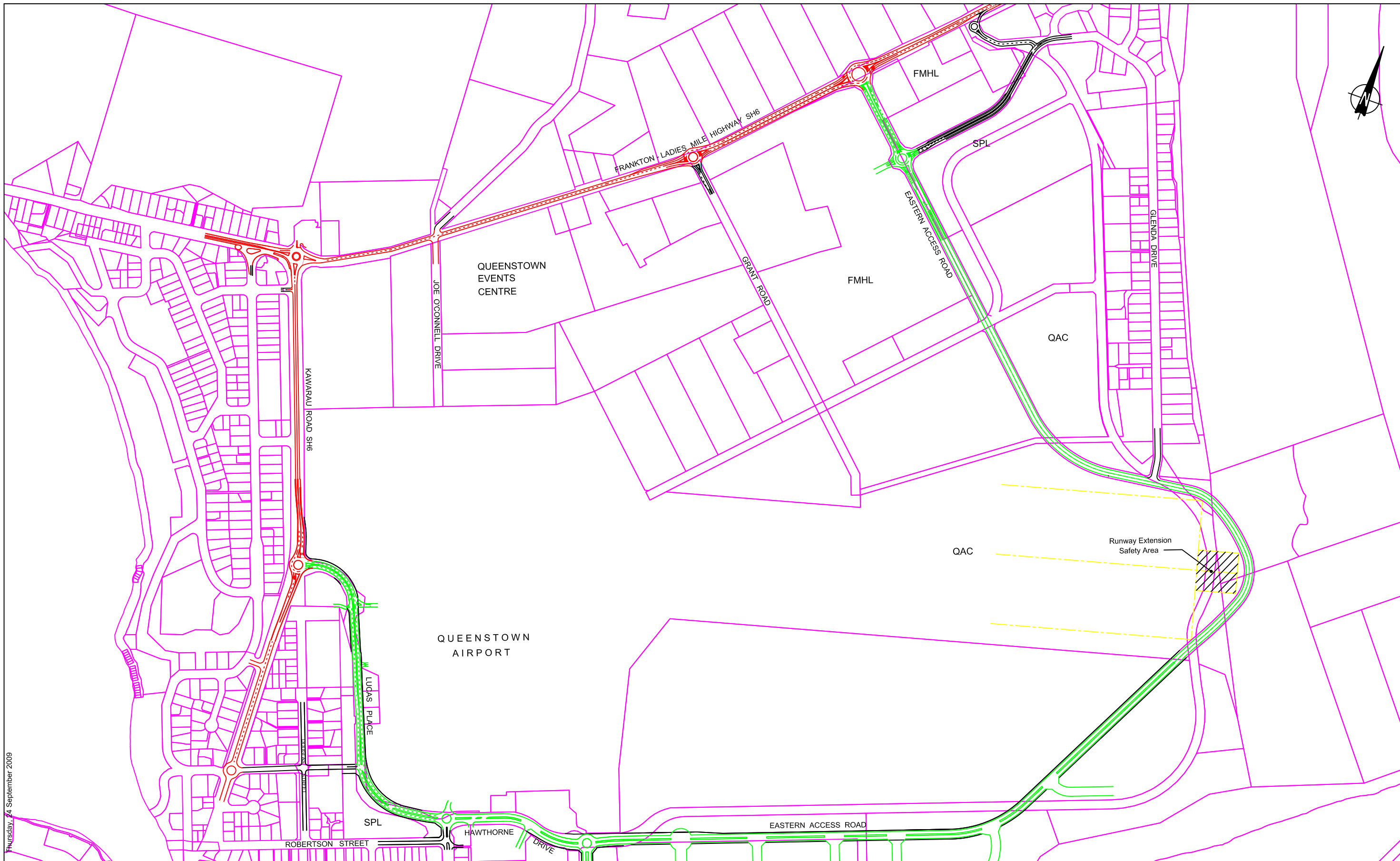
6.1 Road Network

Figure 10 shows the future arterial road network that is proposed to service development within the Frankton Flats. As part of the existing plans for development of the RPZ, it is proposed that the Eastern Access Road be re-aligned with an improved (and generally straighter) alignment through the RPZ and take account of the proposed RESA at the eastern end of the runway.

The internal road network for the RPZ will be made up of a hierarchy of roads that connect with the EAR or Red Oaks Drive, a new road that runs between the EAR and AA3. Since the status of the EAR and Red Oaks Drive has not been defined within the District Plan, they would be considered local roads by default. However, the WTS refers to the EAR as an arterial road and this status has been adopted for this assessment. Red Oaks Drive would form the primary link between the EAR and the future Remarkables Quay Village area within AA3 and its role within the transport network would meet the description of a collector road stated in the District Plan (*“Collector roads provide for the distribution and circulation of traffic between or within local areas and to and from the arterial road network”*).

The master plan for the RPZ seeks to set a positive precedent for future suburban development in the District and so it embraces original and innovative design. In this regard, a number of design features such as road widths and intersection spacing will not be in strict accordance with the requirements of the District Plan, which have generally been developed on the basis of past subdivision practices and published Standards. In more recent times, there has been a recognition (such as in SNZHB44:2001, ‘Subdivision for People and the Environment’) that this historic approach precludes more sustainable forms of land development. Since the primary objective is to create a liveable community, it follows that local residential streets can be treated as public spaces that are safe, convenient and provide a high level of amenity for all users.

Roads have previously been designed for the movement of vehicles, albeit with a distinction between the extent of through traffic versus local traffic. The road cross-sections adopted will have a significant influence on the character of the area as a whole. Carriageways, berms, footpaths, car parking, services, storm water and cycling infrastructure all need to share the road reserve but by varying the widths and styles of each component, greater emphasis can be given to any of these elements and to the level of amenity for those living alongside the road.



Thursday, 24 September 2009

REVISION	DATE	DESCRIPTION

Remarkables Park Private Plan Change (PC34)
Future Arterial Road Network

DRAWN: DKN
 DATE: 05-08-2009
 SCALE: 1:8000 @ A3
 DWG NO:6604-14-C10A

Traffic Design Group

10

The Kapiti Coast Subdivision Design Guideline provides a good example of the principles required and are summarised below.

- Designs should create an identity for the neighbourhood;
- Roads should accommodate the anticipated volumes of road users and desired vehicle speeds;
- Designs should encourage appropriate driver behaviours;
- Roads with less through traffic should allow for increased residential amenity;
- Narrow roads can help in slowing traffic, but must be wide enough to be safe and efficient, and allow access for the emergency services;
- Sight distances should be appropriate at intersections and accessways;
- Tight radii should be provided at intersections to slow traffic speeds;
- Intersections should be designed to ensure the safety of pedestrians and cyclists;
- Cycle lanes should be provided on roads with higher traffic volumes;
- Footpaths should be provided on both sides of the road, unless there is a clear case otherwise; and
- Designs should allow for public transport routes, and for every house to be within a viable walking time of a bus stop.

The road widths and configurations proposed for the RPZ have been designed to achieve a balance of the factors above. The overall form of the wider network has been developed to ensure that, while the minor residential roads could theoretically be used by through vehicular traffic, this is actively discouraged through appropriate street design, and in particular the narrowing of the street carriageway and consequential slowing of traffic. It is considered that this approach will provide a highly legible network with a high level of connectivity and permeability, thereby supporting more walking and cycling and hence, less use of motor vehicles.

Two local residential road cross-sections are proposed to promote a low speed environment that is cyclist and pedestrian friendly whilst remaining functional for the expected traffic volumes. It is proposed that “residential through” roads have footpaths on both sides of the road with a carriageway width that is considered to be sufficient to allow parking on both sides of the road whilst still enabling slow moving two-way traffic. The residential cul-de-sacs and low volume through roads would have a narrower carriageway with footpaths on both sides of the road. The narrower carriageway is considered to be sufficient to allow two cars to pass side by side next to a parked car or for a single car to pass in a one-way manoeuvre between cars parked on both sides of the road.

The cross-sections for roads providing access to potential future commercial developments will reflect the predicted traffic demands on each road and the predicted demand for on-street parking. While off-street parking will be required for all developments in accordance with the District Plan, there will be some demand for on-street parking (e.g. visitors) on particular roads and this can be used as part of the traffic calming strategy as parked cars restrict the available carriageway width and in some cases can reduce movement to temporary one-way operation thereby reducing the overall speed environment.

6.2 Pedestrian Network

Footpaths are proposed for both sides of all roads within the RPZ and off-road pedestrian links are also proposed through landscaping reserves to increase the connectivity between the public roads.

With the large scale accommodation of residential units in apartment blocks, there will also be areas of open space between these buildings which provides ample space for pedestrian facilities, at least for residents and guests.

Off-road pedestrian links are also proposed through development lots. A link between the Remarkables Quay Village loop road and a landscape reserve close to the Kawarau River is proposed that will provide access to the southern limit of Riverside Road. On the eastern side of the village area, a footpath will connect the road with other reserve areas by the Kawarau River. Other off-road paths will provide connections to the riverside track from the road-side footpaths.

Although not part of this Plan Change application, it is worth noting that combined pedestrian and cycle tracks through AA2 that provide views of the Kawarau River are also being considered. These tracks would provide links from the Remarkables Quay Village area to Glenda Drive via the eastern limits of the RPZ and the RESA. The path would also include regular access points into the residential areas of the RPZ via the landscaping reserves.

With all of these pedestrian links, it is considered that the proposed pedestrian network will provide good connectivity both within the RPZ and also to areas surrounding the RPZ.

6.3 Cycle Network

The proposed road network for the RPZ includes provision for cyclists either in the form of cycle lanes or mixed use carriageways on roads where cycle lanes are not marked.

A shared cycle / footpath is proposed for both sides of Hawthorne Drive because with the high volumes of traffic anticipated in the future, it is considered that only very experienced cyclists would choose to cycle on the carriageway. The off-road cycle route continues around the Red Oaks Drive / EAR intersection before cyclists are directed back towards on-road cycle lanes.

It is also proposed that all potential new collector roads within the RPZ such as Red Oaks Drive have cycle lanes. All other roads will have mixed traffic on carriageways that provide common space for cyclists and motor vehicles.

It is considered therefore that the RPZ will enable safe and efficient movement for cyclists within the RPZ and provide good connectivity to surrounding areas.

6.4 Public Transport

The WTS identifies a number of potential future passenger transport routes to service Queenstown, Arrowtown, Frankton and Kelvin Heights as shown in Figure 9. Each route provides a link between existing or proposed residential areas, Queenstown Airport and Remarkables Park. While detailed route information is not available at the current time to determine the appropriate locations for bus stops, the EAR and the potential collector roads within the RPZ have cross-sections that would allow indented bus stops to be constructed.

A bus route can be considered as accessible to a site if the majority of the site lies within 400-500m walking distance of a bus stop, which represents a walking time of about five minutes. This can be achieved with the existing bus service to the RPTC but accessibility and levels of service for the rest of the RPZ will need to be reviewed when the new services proposed by the WTS are realised.

7. Plan Change 19

7.1 Description

The QLDC decision on PC19 was notified in October 2009 but is subject to appeal. However, since none of the appeals object to the plan change in its entirety, it is expected that PC19 will ultimately enable extensive development of the northern Frankton Flats.

The structure plan contained within the QLDC decision includes six activity areas (A, C1, C2, D, E1 and E2) as shown on **Figure 11**. Activity Area A is intended to protect views of the natural landscape from SH6 by prohibiting construction of buildings within 50m of the highway. Activity Area C1 provides for a strong commercial and retail focus while Activity Area C2 is intended to promote a more residential environment with only small scale retail facilities. Together, they are intended to create an urban village environment. Activity Areas E1 and E2 enable light industrial activity while Activity Area D enables industrial and yard based activity on land closer to the airport runway.

The structure plan shows three roads whose alignments are fixed by the structure plan. The most significant of these is the Eastern Access Road which crosses the central region of the Plan Change area. Two roads are shown connecting Grant Road with the EAR; one road runs parallel with SH6 and is offset by a distance of 50m while the second run is aligned parallel with the airport runway and is located on the southern boundary of the Plan Change area. While the alignment for the EAR shown on the structure plan is not consistent with the alignment for the EAR indicated in the Notice of Requirement for the SH6 / EAR roundabout, this is not considered significant in the context of this assessment.

There are three other roads shown on the structure plan with indicative alignments. The roads to the north of the EAR will enable Glenda Drive to be extended to connect with the EAR and also service the land to the north of the EAR. Two of the proposed new roads extend to the south of the EAR and provide access to that land. The southernmost of these roads also provides a connection between the EAR and Grant Road.

7.2 Expected Traffic Generation

The traffic generation associated with PC19 will be determined by the types of activity that are developed and the potential quantum of each type of activity. While the PC19 rules allow intensive development of the Plan Change area, it is considered that such a development scenario is unlikely in practice because of adverse traffic effects.

Since the QLDC decision on PC19 is subject to appeal, for the purposes of this assessment, the development potential of the PC19 area and the associated traffic generation has been based on the evidence prepared by Mr Mead on behalf of QLDC for the appeal.

With a site of this size, it is likely that a significant proportion of the traffic generation would include traffic movements that will be linked to multiple destinations within the PC19 area or which will remain entirely within the boundaries of the site. It is considered that the proportion of internal or linked movements would be in the range of 20-30%. A conservative factor of 20% has been adopted for this assessment and the external traffic generation has been adjusted accordingly.



The traffic generation rate for the residential activity in the PC19 area has been set relatively low to reflect the high potential for trips to be made by modes other than private vehicle. For activity area C1 centre, a traffic generation rate that represents a range of mixed retail types has been adopted. For the other activity areas, the traffic generation rates have been based on survey data from Glenda Drive and from the New Zealand Trips and Parking Database.

Activity	Quantity	Traffic Generation Rate	Total Trips	% Linked / Internal	External Trips
C1 Residential	550 units	0.6vph per unit	330	20%	264
C1 Retail	11,500 m ² GFA	5.0vph per 100m ² GFA	575	20%	460
C1 Offices	10,350 m ² GFA	1.7vph per 100m ² GFA	176	20%	141
C2 Residential	2,150 units	0.6vph per unit	1,290	20%	1,032
C2 Retail	7,000 m ² GFA	5.0vph per 100m ² GFA	350	20%	280
C2 Offices	28,200 m ² GFA	1.7vph per 100m ² GFA	479	20%	384
D Yard Based	111,800 m ² site area	0.3vph per 100m ² site area	335	20%	268
E1 Offices	30,600 m ² GFA	1.7vph per 100m ² GFA	520	20%	416
E1 Industrial	86,500 m ² site area	0.5vph per 100m ² site area	432	20%	346
E2 Retail	12,700 m ² GFA	2.5vph per 100m ² GFA	318	20%	254
E2 Offices	39,800 m ² GFA	1.7vph per 100m ² GFA	677	20%	541
		Total	5,482		4,386

Table 3: PC19 Expected Traffic Generation (QLDC Decision)

Based on the development scenario outlined in the preceding table, it is expected that the PC19 area could generate about 4,400 external vehicle trips in the evening peak hour.

In response to the appeals on the PC19 decision, QLDC have prepared a new structure plan for the PC19 area and Mr Mead provides an expected development scenario for this new structure plan. The expected traffic generation with this new development scenario is outlined in the following table.

Activity	Quantity	Traffic Generation Rate	Total Trips	% Linked / Internal	External Trips
C1 Residential	500 units	0.6vph per unit	300	20%	240
C1 Retail	15,900 m ² GFA	5.0vph per 100m ² GFA	795	20%	636
C1 Offices	11,000 m ² GFA	1.7vph per 100m ² GFA	187	20%	150
C2 Residential	1,550 units	0.6vph per unit	930	20%	744
C2 Retail	3,600 m ² GFA	5.0vph per 100m ² GFA	180	20%	144
C2 Offices	16,900 m ² GFA	1.7vph per 100m ² GFA	287	20%	230
D Yard Based	94,000 m ² site area	0.3vph per 100m ² site area	282	20%	226
E1 Offices	31,000 m ² GFA	1.7vph per 100m ² GFA	527	20%	422
E1 Industrial	88,200 m ² site area	0.5vph per 100m ² site area	441	20%	353
E2 Retail	19,100 m ² GFA	2.5vph per 100m ² GFA	478	20%	382
E2 Offices	58,700 m ² GFA	1.7vph per 100m ² GFA	998	20%	798
E2 Residential	185 units	0.6vph per unit	111	20%	89
		Total	5,516		4,413

Table 4: PC19 Expected Traffic Generation Potential (QLDC Appeals Structure Plan)

While the expected traffic generation of the PC19 area remains very similar under the revised structure plan, the changes in the underlying land use is likely to increase the traffic generation in areas close to the EAR and will reduce the traffic generation close to Grant Road.

8. Frankton Flats Special Zone

The District Plan includes specific provisions for the Frankton Flats Special Zone located to the west of Grant Road. The District Plan describes the purpose of the zone as enabling *“development of a new shopping centre incorporating opportunity for retailing, office, educational, visitor and residential accommodation and leisure activities, in a high amenity urban environment while maintaining and enhancing the natural values of the environment particularly as viewed from State Highway 6 as it enters the Frankton and Queenstown urban environment”*.

Queenstown Gateway Limited has recently taken ownership of land within the special zone and submitted a resource consent application *“to establish site developments, street layout, open space network and earthworks to create a shopping centre precinct”*. The application includes little information regarding transportation matters and no information regarding traffic generation or distribution.

An indication of the likely traffic generation of the proposed development has been determined with reference to the New Zealand Trips and Parking Database (NZTPDB). The NZTPDB includes data for a range of shopping centres. The average traffic generation rate of large shopping centres (>30,000m² GFA) is about 5.8vph per 100m² GFA in the weekday evening peak.

The resource consent application is for about 32,000m² GFA of retail and commercial floor area that includes a supermarket, large format retail, department store, general retail and offices. Visitor accommodation is indicated on the second floor of the buildings with 50 apartments proposed although the existing resource consents allow for more. On this basis, the retail centre could generate about 1,900-2,000vph in the evening peak hour.

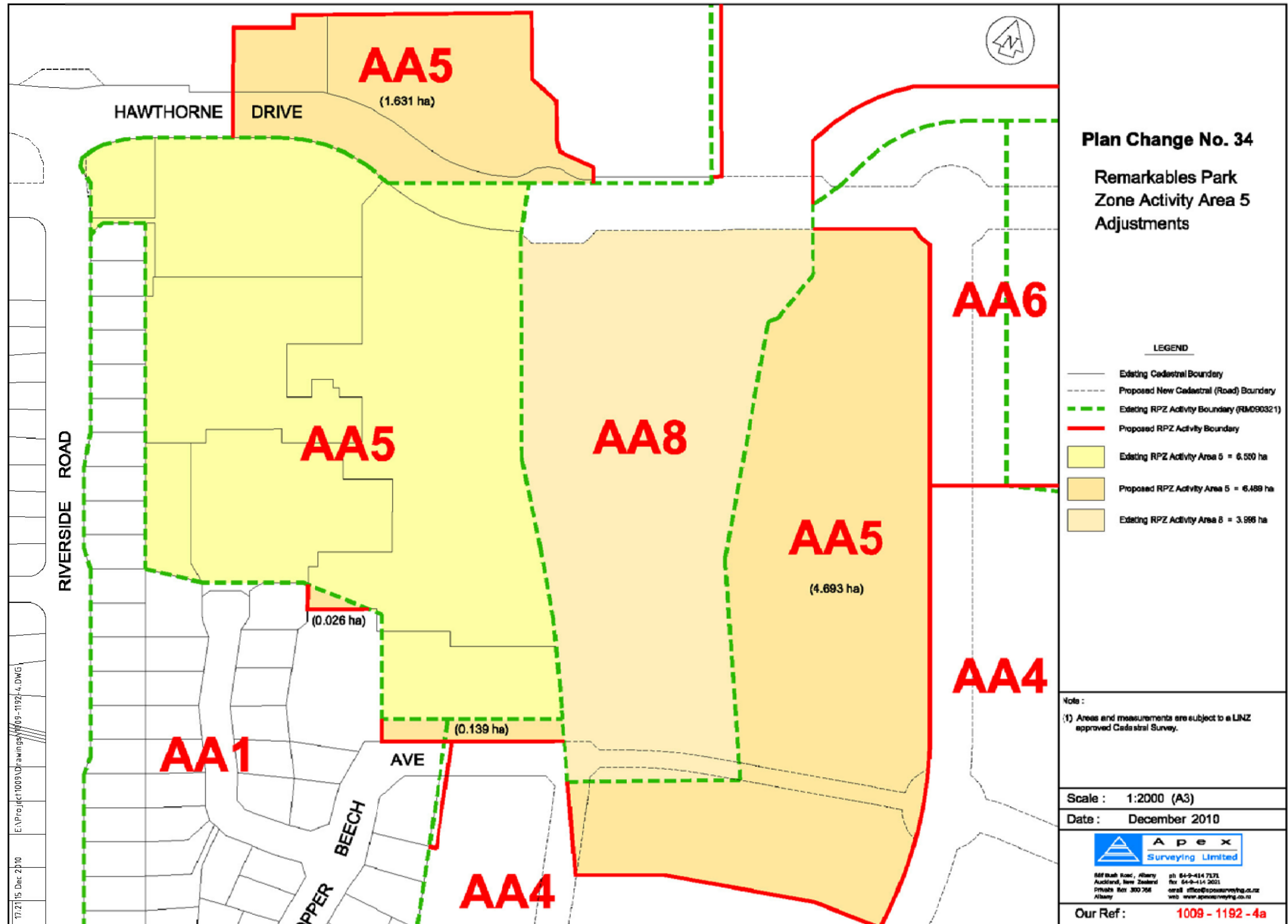
Based on the observed traffic generation rate at the RPTC however, it is considered likely that the traffic generation rate of the proposed development will be lower than 5.8vph per 100m² GFA in the weekday evening peak. The existing traffic generation rate of the RPTC is about 3.8vph per 100m² GFA and if the proposed retail centre generated traffic at the same rate, it would generate about 1,300vph in the evening peak hour.

It should be noted that even with this lower traffic generation estimate reduced by 20% to take account of the QLDC TDM measures that will encourage greater use of public transport, the traffic generation of the special zone remains higher than previously adopted by TDG (about 750vph) in all earlier traffic modelling of the Frankton Flats. This lower traffic generation has been retained for this assessment to maintain consistency with the earlier reported results.

9. Proposed Plan Change

9.1 General

Under the proposed Plan Change, the existing commercial / retail area, Activity Area 5 (AA5), will be extended to the south and east around the part of Activity Area 8 (AA8) south of the EAR as shown in **Figure 12**. The proposed changes to AA5 will enable the existing Remarkables Park Town Centre (RPTC) to be extended to the south and east and could enable development of additional Large Format Retail (LFR) facilities. It is also proposed that land to the north of Hawthorne Drive and east of Tex Smith Lane is included within the Remarkables Park Zone as part of AA5.



10. District Plan Provisions

10.1 Policies and Objectives

The District Plan includes several relevant policies and objectives relating to transportation that need to be considered as part of this Plan Change request. Firstly there are general policies relating to transportation and secondly there are specific policies and objectives relating to the RPZ in particular.

The general Transport Objectives and Policies are provided within Section 14.1.3 of the District Plan. The relevant objectives relate to efficiency, safety and accessibility, the environmental effects of transportation, parking and loading, pedestrian and cycle transport, and to public and visitor transport.

The comprehensive and integrated nature of the development enabled by the revised structure plan for the RPZ and its geographically strategic location support the objectives relating to efficiency. The RPZ is well located with respect to existing urban development and future growth, as well as to the roading network and key district facilities such as the Queenstown Airport and Events Centre. The retail activities, employee accommodation and educational facilities will consolidate the Frankton area as a key district centre supporting the Wakatipu Basin area thereby providing relief to the section of the road network between Queenstown and Frankton. The integrated nature of the activities located within the RPZ will inherently reduce the demand for travel beyond Remarkables Park and will enable short trips to be made by alternative modes of transport. This location of activities in a structured way will also assist in protecting the amenity of adjacent activities that are sensitive to the environmental effects of additional traffic.

The provision of a limited number and well designed high capacity accesses onto SH6 will protect the function of that route. In this regard it is noted that PC34 does not require any additional SH6 access points. The arterial access will be supported by an internal road network designed to ensure efficient travel that supports the road hierarchy and removes unnecessary trips from the state highway.

The RPZ contains provisions to encourage and promote the safe movement of cyclists and pedestrians through well located and designed infrastructure; PC34 does not change these provisions. The use of public transport will be encouraged and the site is well located to be incorporated into any future public transport routes as demand for public transport grows.

Whilst the general Transport Objectives and Policies provide an overall framework to control transportation matters within the RPZ, the RPZ also has specific objectives and policies related to the transport network. Objective 5 in 12.10.3 relating to transport networks seeks to achieve:

“High levels of accessibility, safety and convenience for all persons travelling to, from, or within the zone by a wide range of transport modes while ensuring acceptable levels of amenity.”

A comprehensive set of existing RPZ Policies are contained in the District Plan to meet this Objective. These policies provide for the general structure of the internal transportation network and its connections to the external road network as outlined below:

- to provide a network of streets and accessways with physical distinctions between each, based on function, convenience, traffic volumes, vehicle speeds, public safety and amenity;
- to encourage use of the river and lake as an alternative transport network, connecting Queenstown, Frankton, and the RPZ;

- to provide appropriate and attractive landscaped areas and routes within the RPZ for cycle and pedestrian movement, and an ability to link these with accessways between Frankton and Queenstown;
- to provide a safe and convenient pathway system for pedestrians, cyclists and in-line skaters for access to and within the Zone and for recreational purposes; and
- to promote walking and cycling as ways of carrying out daily activities.

Controls based on the activities proposed with the Plan Change area are available within the zone rules that provide the Council with the ability to have discretion on a range of transportation matters including the roading pattern and design, connections to the state highway, pedestrian links, car parking and sight lines.

PC34 will enable the development of an extended town centre precinct with direct access to the proposed road network, Red Oaks Drive and Hawthorne Drive. This is considered to be consistent with the Transport related Objectives and Policies for the RPZ and is in accordance with the general Transport Objectives and Policies identified in Section 14.1 of the Plan.

10.2 District Plan Rules

While RPL have provided TDG with an indicative layout to enable a realistic estimate of traffic generation, it does not include sufficient detail to allow a compliance check of the layout against the rules of the District Plan. However, it is not considered appropriate or necessary to address such details as part of the Plan Change request because the development concept may change and accordingly specific compliance assessments will be undertaken when resource consent applications are submitted.

11. Traffic Generation

11.1 General

For this assessment of traffic effects, it is not considered useful to examine the Plan Change area in isolation from the surrounding areas because it is anticipated that development of the surrounding land will occur in the same time frame as the development of the RPZ. An assessment year of 2021 has been adopted because it is anticipated that development of the RPZ and also land to the north of the airport runway would be substantially complete by then.

The assessment of the traffic effects has been undertaken using a micro-simulation modelling approach which allows for the different travel patterns to be clearly identified and the performance of the various road access networks to be evaluated realistically taking into account all the dynamic interactions between adjacent intersections and the delays associated with blocking effects that can occur with queuing from particularly heavily loaded intersections.

Based on the planning time frames within the WTS, it is anticipated that the Eastern Access Road will have been constructed to provide additional access to the RPZ, relieving the existing western access. A roundabout will be constructed at the SH6 / Eastern Access Road intersection. Also by this time, the western access is expected to be fully developed. It is expected that the realignment of Hawthorne Drive, the construction of a roundabout at the SH6 / Humphrey Street intersection, the full four laning of Lucas Place and the four laning of SH6 between the Airport and State Highway 6A will all have been completed.

As part of the WTS, it is proposed that travel demand management measures will be actively promoted through travel plans to encourage people to make greater use of alternative transport modes including walking, cycling and public transport. With the integrated nature of the RPZ, it is expected that a significant shift from private car to alternate transport can be achieved. Based on the objective of the WTS to reduce traffic volumes by 20% by 2026, it is estimated that a 15% general reduction in private car trips could be achieved by 2021 across the Frankton Flats.

As mentioned previously in the discussion of the WTS, it is proposed that public transport should be promoted and given priority along Frankton Road (SH6A) in order to reduce private motor vehicle travel on this link which will potentially become severely congested in the future without significant improvement or travel demand management. The travel demand between downtown Queenstown and Frankton Flats has been reduced by 20% to reflect these recommendations. The increased use of public transport and the reduction in private vehicle use is expected to be achieved through bus priority measures along State Highway 6A, park-and-ride facilities located on the Frankton Flats in addition to the ferry service. The level of reduction in travel demand on SH6 between the Shotover River and Kawarau River will depend upon the location and number of park-and-ride facilities. For the purposes of this assessment, two park and ride car park locations have been modelled; one off Grant Road and one east of the Kawarau Road between the Airport and Frankton Road.

In terms of ferry services, the WTS has also recommended a single route from Kelvin Heights to the centre of Queenstown. However, more services have subsequently been proposed and RPL intend to provide a ferry terminal at Remarkables Park on the Kawarau River which they will actively promote to provide an extension of other services. On the basis of this facility, the traffic distribution between Remarkables Park and Queenstown has been reduced marginally (5%) compared with other external destinations even though the ferry service has the potential to have a greater effect.

11.2 Base Scenario - Existing Zoning plus PC19

The evening peak traffic conditions have been used for the assessment of the traffic effects associated with PC34 because that is the time of the typical weekday when most vehicular activity tends to occur, both in terms of the traffic generation of the proposed activities and their interaction with all other vehicle movements on the surrounding road network. In the morning, the vehicle movements associated with the dominant RPTC and the proposed extension of retail activities will be lower because the retail facilities do not open at the start of the commuter peak period. Furthermore, the other movements on the road network are generally lower because traffic movements in Queenstown are affected by recreational and tourist activities which also do not necessarily coincide with morning peak commuter travel movements.

The traffic generating potential of the current zoning of the extended retail area, which is currently part of AA4 and AA6 has been used to provide a base case against which to compare the traffic generation effects of the activities enabled by PC34. Under the existing structure plan for the RPZ, the part of the extended retail area that lies within AA4 (about 5ha) could be developed for residential purposes. With 5ha of land, it is considered that about 500 high density residential units could be constructed (based on 20% reserves, 40% building coverage, four levels and 150m² unit sizes). With a traffic generation rate of 0.6vph per unit in the evening peak, it is predicted that the Plan Change area could generate some 300vph in the evening peak hour.

The following table indicates the level of traffic generation associated with full development of Remarkables Park as currently zoned (nominally by 2021) based on the potential development plan referred to earlier which includes a small expansion of the existing retail area, the Quatside Resort Village, civic and cultural facilities including a conference centre and hotels, some mixed-use (commercial/residential) development, community facilities, commercial recreation and high density residential accommodation. The respective levels of traffic generation associated with each potential land-use activity are also provided in this table. It should be noted that the generation rates for each of the individual activities are relatively low because of the complementary effect of the integrated nature of the RPZ. The rates used for the existing RPTC have been based on the extensive traffic count data available for the centre over the period of its development and these rates have been calibrated to the existing floor areas. The generation rates for the potential hotels and residential accommodation have been discounted specifically to reflect the overall effect of the integrated, mixed-use development which will encourage local trips due to the relative self-sufficiency of the ultimate Remarkables Park development and the proposals for promoting sustainable modes such as walking and cycling.

Activity	Quantity	Average Traffic Generation Rate	Traffic Generation (vph)
Remarkables Park Town Centre	37,000m ²	3.8 vph / 100m ²	1,406
Hotels	350 units	0.6 vph / unit	210
Visitor Accommodation	650 units	0.6 vph / unit	390
Civic and Cultural Facilities	18,000m ²	3.8 vph / 100m ²	690
Care Facilities	31,000m ²	1.9 vph / 100m ²	600
Commercial Recreation	36ha	20.0 vph / ha	720
Other Residential	1,600 units	0.6 vph / unit	960
Education	5,000m ²	4.0 vph / 100m ²	200
PC34 Land Area	500 units	0.6 vph / unit	300
Total			5,476

Table 5: Remarkables Park Zone Traffic Generation – 2021 PM Peak

It is expected that a total of some 5,500 vehicle movements per hour would be generated in the evening peak by the full development of Remarkables Park as currently zoned.

In terms of the land use to the north of the runway, the District Plan currently enables a 4ha development west of Grant Road (Frankton Flats Special Zone) that would include retail and commercial facilities as well as some accommodation. With the council decision on Plan Change 19 being notified although it is under appeal, it is anticipated that there will ultimately be extensive development of the land between Grant Road and the Glenda Drive Industrial Zone. For this assessment, the base scenario includes the PC19 development scenario described earlier in this report.

11.3 PC34 Scenario

Under the PC34 scenario, the commercial / retail area (AA5) would be extended to enable more commercial and retail activities to the south and east of the existing RPTC. The traffic generation of this type of activity will be higher than with residential development of the same area. The expected traffic generation of the extended retail area has been calculated using a representative mix of retail facilities for the area as shown in the following table.

Activity	Quantity (m ² GFA)	Average Trip Generation Rate	Traffic Generation (vph)
LFR (high traffic generator)	6,000	10.0 vph / 100m ²	600
Bulk Retail	4,000	2.4 vph / 100m ²	96
Department Store	5,000	2.5 vph / 100m ²	125
Smaller Shops / Cafes	7,500	5.0 vph / 100m ²	375
Total			1,196

Table 6: Indicative Development Details for “Extended Retail Area”

Under this development scenario, the traffic generation of the Plan Change area could increase from 300vph to about 1,200vph in the evening peak hour and the traffic generation of the RPZ as a whole would increase from 5,400vph in the evening peak hour to 6,300vph.

12. Traffic Distribution

12.1 General

The distribution of vehicular trips associated with the current zoning which have origins or destinations outside the Frankton Flats area is based on the predicted traffic generation of land uses associated with the various areas of the Frankton Flats and the total number of trips forecast by the WTS for the three external access points to the Frankton Flats: Shotover River bridge, Kawarau River bridge and State Highway 6A. The future distribution of trips to internal locations within Frankton Flats was determined partly from the trip distribution of the Wakatipu model taking into account differences in the anticipated land-use for each zone and partly from the results of a matrix estimation exercise using a traffic simulation model produced for the Frankton Flats. The traffic counts used for the matrix estimation exercise included turning movement counts collected specifically for this assessment and for other recent traffic investigations on the Frankton Flats as well as recent automatic traffic counts undertaken by the QLDC and Transit New Zealand.

As mentioned previously in this report, NZTA / QLDC have provided the forecast private vehicle travel demands between the three cordon points to the Frankton Flats; the Kawarau Bridge, the Shotover River Bridge and State Highway 6A. These demands provide the external to external travel movements for the trip matrix used for the future year simulation models as well as control totals for the trip distribution predictions for the ultimate development scenario in 2021 (the Wakatipu study model is actually based on predictions for 2026 but these have been used for the 2021 scenario used in this assessment as a worst case scenario).

The traffic demands from the WTS include substantially more development of the northern sector of the Frankton Flats than is permitted by current zoning. They also include two levels of demand; with and without provision for bus priority along Frankton Road. To reflect the reduction in private travel demands associated with the expanded public transport services, the demand matrix derived for this assessment includes travel demands that have been reduced by 10-20% compared with the base demands. The level of reduction has been predicted using the proximity of the model zones to a bus route, the dominant activity within the zone and the likely frequency of the bus service.

12.2 Expected Frankton Flats Zoning

The expected travel demand matrix for the Frankton Flats in the 2021 evening peak is shown below as a compressed version of the full matrix. The dominant activities within the northern Frankton Flats have been aggregated to show the distribution to the Glenda Drive Industrial Zone, the Shotover Business Park proposed west of Glenda Drive, the PC19 land excluding the Shotover Business Park but including the existing Frankton Flats Special Zone. Queenstown airport and the Events Centre have also been considered separately. The existing residential development from the Kawarau Bridge up to Frankton Road including the hospital has been aggregated and labelled as Frankton in the following table. These sectors have been included in the table with the three external cordon points mentioned above to provide an indication of the general travel pattern that would occur in the 2021 evening peak if the existing zoning were retained.

	Remarkables Park	Frankton	Glenda Drive	Shotover Park	PC19 Area	Events Centre	Airport	Queenstown	North-east	South	TOTAL
Remarkables Park	1,070	400	80	50	350	40	130	390	340	290	3,140
Frankton	490	370	100	30	310	20	60	200	110	30	1,720
Glenda Drive	80	120	30	10	100		20	130	150	40	680
Shotover Park	50	40	10	180	90			50	150		570
PC19 Area	340	280	70	80	780	50	90	260	310	190	2,450
Events Centre	50	20			60			20	10	20	180
Airport	160	90	20		90		180	120	100	40	800
Queenstown	370	260	90	40	280	10	90		240	90	1,470
North-East	320	80	90	120	320	10	70	270		30	1,310
South	270	30	30		210	10	50	120	40		760
TOTAL	3,200	1,690	520	510	2,590	140	690	1,560	1,450	730	13,080

Table 7: Expected Frankton Flats Traffic Demands – 2021 PM Peak Hour

It can be seen that Remarkables Park and the PC19 area dominate the distribution of local trips while SH6A (Frankton Road) will carry the highest state highway traffic volumes.

12.3 Plan Change 34

The following table illustrates the vehicle trip distribution forecast for the 2021 evening peak with the land-use traffic generation that will be enabled by PC34.

The trip matrix has been summarised on a similar basis to that indicated in the table above to provide a compressed matrix indicating the general travel pattern for the Frankton Flats.

	Remarkables Park	Frankton	Glenda Drive	Shotover Park	PC19 Area	Events Centre	Airport	Queenstown	North-east	South	TOTAL
Remarkables Park	1,240	430	80	50	370	50	130	430	370	320	3,470
Frankton	520	370	100	30	310	20	60	200	110	30	1,750
Glenda Drive	90	120	30	10	100		20	130	150	40	690
Shotover Park	60	40	10	180	90			50	150		580
PC19 Area	360	280	70	80	780	50	90	260	310	190	2,470
Events Centre	50	20			60			20	10	20	180
Airport	160	90	20		90		180	120	90	40	790
Queenstown	410	260	90	40	280	10	90		240	80	1,500
North-East	350	80	90	120	320	10	70	270		30	1,340
South	300	30	30		210	10	50	110	40		780
TOTAL	3,540	1,720	520	510	2,610	150	690	1,590	1,470	750	13,550

Table 8: Expected Frankton Flats Traffic Demands – 2021 PM Peak Hour with PC34

With the activities enabled by PC34, the overall traffic demands are expected to increase to about 13,550vph from 13,100vph in the evening peak. The traffic movements generated by Remarkables Park are expected to increase from about 5,100vph to 5,800vph.

While the increased traffic generated by the PC34 activities is distributed generally across all areas, there is expected to be a significant increase in trips within Remarkables Park as it will be the major beneficiary from the additional facilities in the area. However, with the proximity of the existing RPTC to the extended retail area, it is predicted that a high proportion of the retail traffic generation will be associated with multi-purpose trips and more walking trips and therefore, the wider traffic effects will be lower. The internal travel demands for the RPZ have been discounted by 25% to account for this.

13. Road Network Effects

13.1 Current Zoning

This section addresses the operational performance of the road network that is anticipated in 2021 following full development of Remarkables Park and the remainder of the Frankton Flats as currently zoned plus development of the PC19 area. As part of this assessment, upgrades and extensions to the existing road network have been identified that will be necessary to retain appropriate levels of service.

In this regard, the simulation modelling of the road network has been run with only essential upgrades to the network. The assessment, excluding PC34, has been undertaken first to provide a base level for comparison with the later PC34 assessment. This base level assessment has indicated that as well as upgrading the western accessway and completing the eastern access to Remarkables Park, it will be necessary to upgrade the intersection of SH6 / SH6A and the intersections on Ladies Mile (SH6) with Grant Road and the EAR. In other words, the level of traffic associated with the current zoning in the District Plan will require these upgrades on SH6 before 2021. Potential upgrade options include increasing the size of the roundabout, adding a second roundabout on the existing golf course and traffic signals. For this assessment, the intersection has been modelled with signals. The base assessment indicates that as well as the existing roundabout at the intersection of SH6 and SH6A being upgraded, it would also be necessary to impose associated restrictions on right turn movements from the local roads servicing the existing Frankton commercial area.

To accommodate the base level flows for 2021, the remainder of the existing road network will require the four laning of SH6 between Frankton and the airport, four laning of the western access road (Lucas Place), the removal of the existing roundabout at the intersection of Lucas Place / Robertson Street / Riverside Road / Hawthorne Road and the addition of the roundabout proposed for the intersection of Hawthorne Drive and the driveway to the existing RPTC. The base network includes the extension of Hawthorne Drive to Red Oaks Drive and all other new roads required for servicing the remaining development of Remarkables Park. A similar level of new road network will also be required to the north of the airport runway to service the Queenstown Gateway development and the Shotover Park / Glenda Drive development area. The network includes the link roads proposed by the WTS which includes the EAR to Remarkables Park and a road parallel with the airport runway through the northern sector of the Frankton Flats. The section of the link road around the western end of the airport runway has not been included for this assessment and neither has the link to the intersection of SH6 and 6A.

The following diagram indicates the expected level of performance of the road network based on turning movement delays measured from the simulation model for the base scenario. This indicates that with road network improvements identified within the WTS, the road network will operate with a good level of service. The only feature of note is that drivers on the southern approach to the Riverside Road roundabout are expected to experience long delays because of the high volumes of traffic travelling between Hawthorne Drive and Lucas Place.

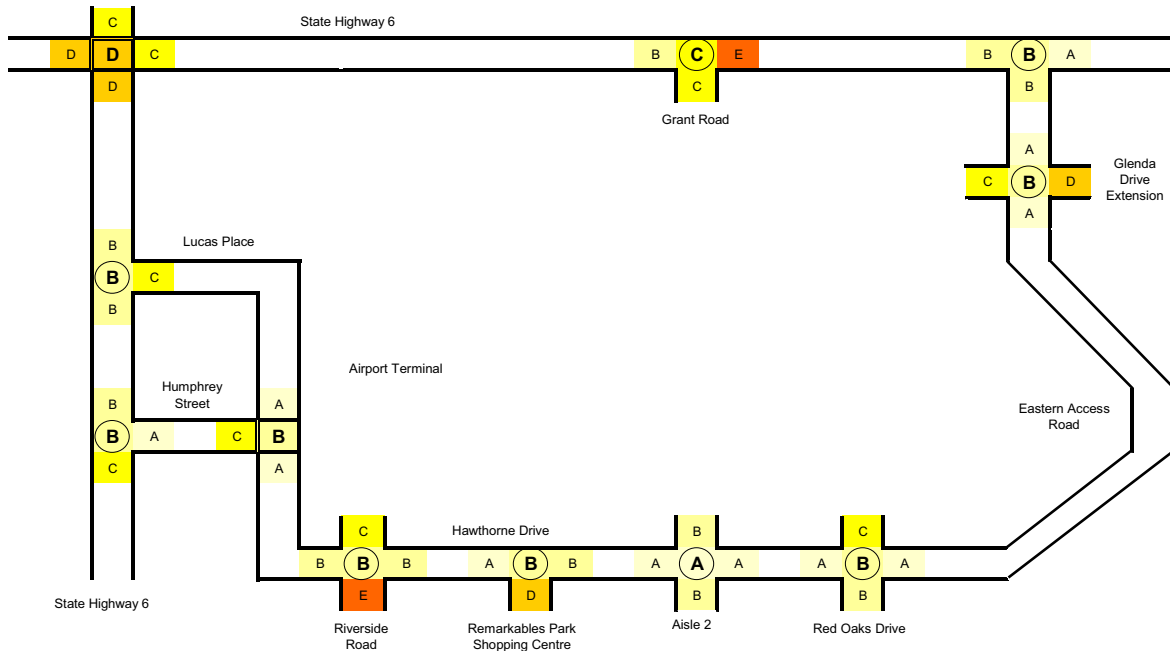


Diagram 1: Network Performance – 2021 PM PC19 (QLDC Decision)

The following table shows the predicted evening peak hour two-way traffic volumes on key roads within the Frankton Flats network.

Location	Traffic Volume (vph)
SH6 – Kawarau Bridge	1,500
SH6 – West of Shotover Bridge	2,800
SH6A – East of Marine Heights	2,800
SH6 – Kawarau Road South of SH6A	2,800
SH6 – East of SH6A	3,100
EAR – South of RESA	2,000
EAR – East of Red Oaks Drive	1,900
Hawthorne Drive – West Red Oaks Drive	1,900
Hawthorne Drive – West RPTC	2,800
Red Oaks Drive – South of EAR	700
Lucas Place – South Humphrey Street	2,500
Lucas Place – North Humphrey Street	1,500
Humphrey Street – East Kawarau Road	1,400

Table 9: Predicted Traffic Volumes – 2021 PM Base Scenario

The predicted traffic volumes clearly show the importance of the state highway network within the Frankton Flats with evening peak hour traffic volumes typically in excess of 2,000vph. Traffic volumes on the EAR to the east of the RPTC are predicted to be about 1,900vph while the importance of the western connection to Remarkables Park is reflected in the high predicted traffic volumes on Hawthorne Drive and Lucas Place.

The level of service for the road network as a whole can be determined by examining travel times and hence average vehicle speeds for journeys made within the road network. The US Highway Capacity Manual suggests that for roads with a typical free-flow speed of 50-55km/h, levels of service be assigned in accordance with the following table.

Average Vehicle Speed (km/h)	Level of Service
> 50	A
40 – 50	B
29 – 39	C
23 – 28	D
18 – 22	E
<= 17	F

Table 10: Level of Service Definition – Urban Roads

As an indication of the level of service being provided by the network during the evening peak period in 2021, travel time information has been collected from the simulation model for paths between the RPTC and the three external destinations as shown in the following table. The model indicates that the slowest average vehicle speeds occur on the route between the RPTC and SH6A to Queenstown and also shows the biggest range of travel times. This is attributed to the high volume of traffic using this route. An indication of the overall network performance can be determined by computing the average vehicle speeds across these journey paths. The average vehicle speed is predicted to be 36km/h which corresponds to a level of service, LOS C.

Origin	Destination	TIME			Speed (km/h)	LOS
		Ave (s)	Min (s)	Max (s)		
RPTC	South	285	216	408	33	C
RPTC	Queenstown	379	261	656	26	D
RPTC	North-East	395	312	632	38	C
South	RPTC	260	228	305	36	C
Queenstown	RPTC	332	243	451	28	D
North-East	RPTC	327	286	500	43	B

Table 11: Predicted Travel Times - 2021 PM Base Scenario

13.2 PC34 Scenario

The 2021 PC34 scenario includes the road improvements already identified for 2021 without PC34. For this assessment the simulation modelling of the Frankton Flats includes full development of the PC34 area for retail activity rather than residential land-use.

Again the simulation model has been used to assess the effect of the additional traffic generated by the development associated with PC34 on the performance of the road network that is proposed for full development of Remarkables Park and the rest of Frankton Flats. The predicted performance of this road network with the PC34 is indicated in the following diagram. The effect of the increased traffic volumes on the Western Access and Eastern Access Road to Remarkables Park is reflected by reductions in the Level of Service for some approaches,

typically from LOS B to LOS C. However, in each case, the predicted increase in average vehicle delay is less than five seconds and it is considered that this would not be noticeable to drivers. With all predicted levels of service being LOS D or better, the road network would meet the recommended minimum levels of service stated in the Otago Regional Land Transport Strategy. Accordingly, other than the roads required to directly service the PC34 area, no additional roading improvements will be required to the proposed (base) road network for mitigation of transportation effects.

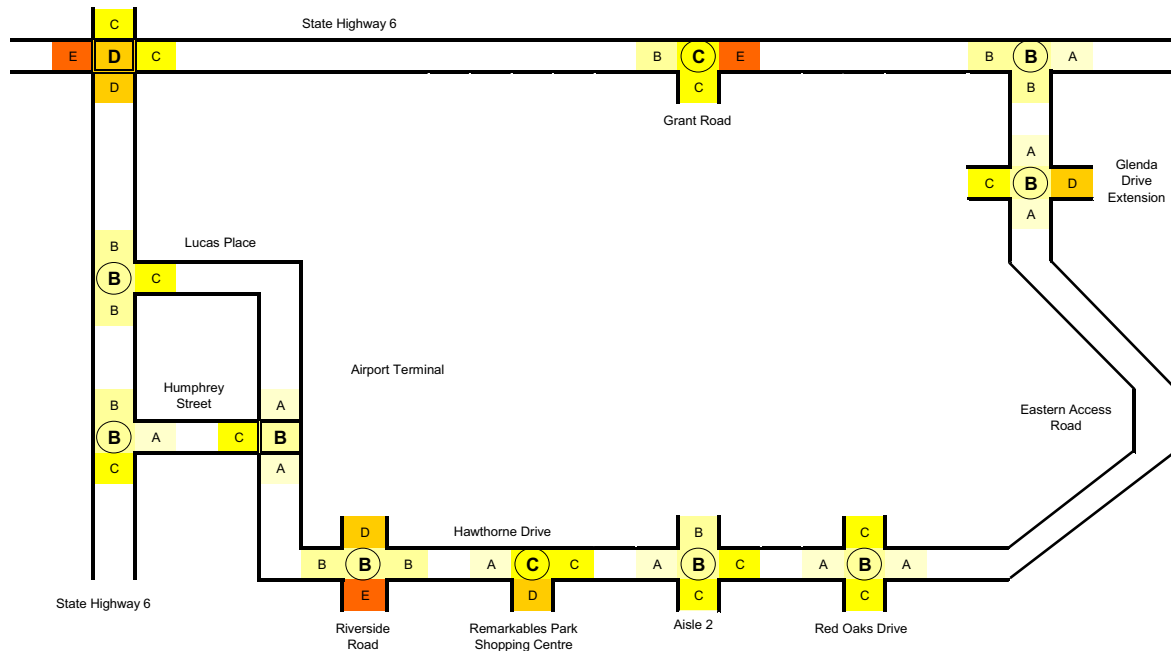


Diagram 2: Expected Network Performance – 2021PM PC19 (QLDC Decision) and PC34

The following table shows the predicted evening peak hour two-way traffic volumes on key roads within the Frankton Flats network with the changes in traffic volumes compared with the base scenario shown in parentheses.

Location	Traffic Volume (vph)
SH6 – Kawarau Bridge	1,500
SH6 – West of Shotover Bridge	2,800
SH6A – East of Marine Heights	2,800
SH6 – Kawarau Road South of SH6A	2,800
SH6 – East of SH6A	3,100
EAR – South of RESA	2,100 (+100)
EAR – East of Red Oaks Drive	2,000 (+100)
Hawthorne Drive – West Red Oaks Drive	1,900
Hawthorne Drive – West RPTC	2,900 (+100)
Red Oaks Drive – South of EAR	600 (-100)
Lucas Place – South Humphrey Street	2,600 (+100)
Lucas Place – North Humphrey Street	1,500
Humphrey Street – East Kawarau Road	1,400

Table 12: Predicted Two-Way Traffic Volumes – 2021 PM PC34 Scenario

The primary effect of PC34 is to increase traffic volumes on the roads immediately surrounding the new retail area. Apart from on the western access route to Queenstown, the additional traffic volumes rapidly disperse across the road network and any traffic effects will be minor.

Travel time data has again been collected from the simulation model to provide a comparison with the base scenario and is shown in the following table.

Origin	Destination	TIME			Speed (km/h)	LOS
		Ave (s)	Min (s)	Max (s)		
RPTC	South	340	231	605	28	D
RPTC	Queenstown	419	269	732	23	D
RPTC	North-East	405	317	769	37	C
South	RPTC	263	227	331	35	C
Queenstown	RPTC	364	262	543	26	D
North-East	RPTC	334	287	521	43	B

Table 13: Predicted Travel Times - 2021 PM PC34 Scenario

Compared with the base scenario, the average journey times have increased for journeys departing from the RPTC which reflects the higher traffic volumes on the primary access routes. The average vehicle speed across the six routes has been calculated as 35km/h which represents a level of service, LOS C.

13.3 PC19 Sensitivity Tests

Since QLDC have proposed a revision to the PC19 structure plan in response to the appeals to the Council decision, a sensitivity test has been undertaken to investigate the expected levels of service with the revised structure plan because it modifies the expected land use in the PC19 area.

The following diagrams show the expected performance of the road network with and without PC34 for the Frankton Flats area with the revised structure plan.

Apart from the roundabouts on the EAR providing access to the RPTC, the simulation model predicts no changes to the intersection levels of service although there could be some changes to the approach level of service at some intersections. Where there are changes in the approach level of service, the predicted increase in average vehicle delay is unlikely to be noticed by drivers because it is smaller than the typical variation in journey times through the intersection.

In this development scenario for the PC19 area, the model indicates some increased delay in departing from the RPTC and at Riverside Road. While the average vehicle delay on the Riverside Road approach to Lucas Place represents a level of service LOS F, the predicted increase in the average vehicle delay compared with the scenario without PC34 is about 10 seconds which would not be noticeable to drivers because it is less than the typical variation in travel times.

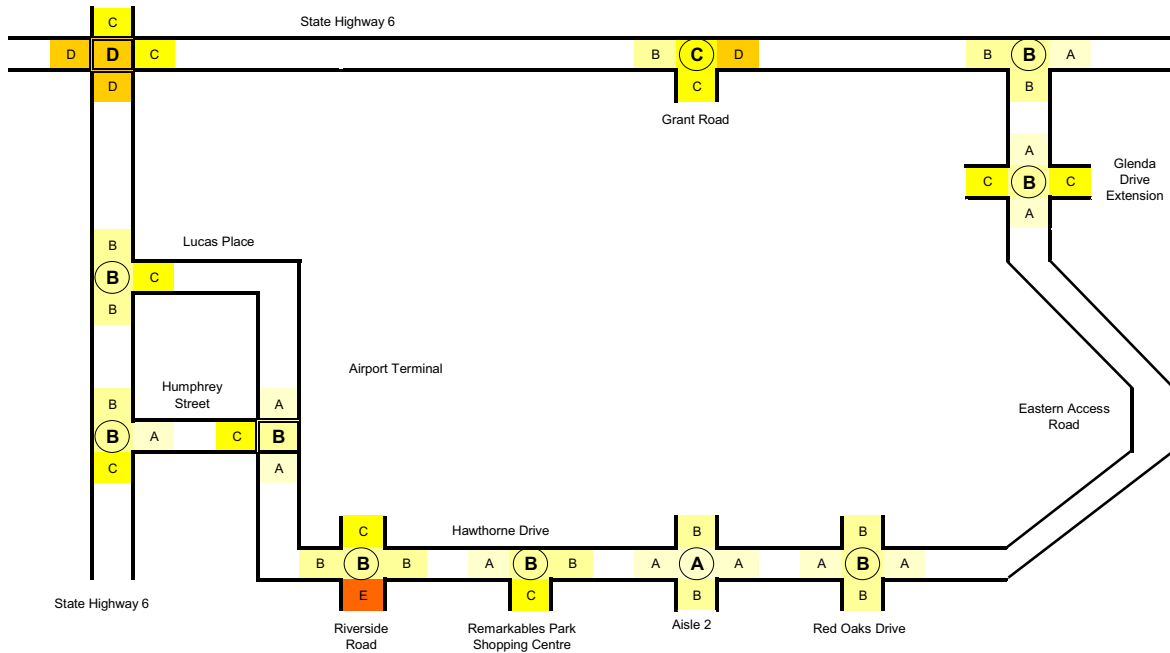


Diagram 3: Expected Network Performance – 2021PM PC19 (QLDC Appeals)

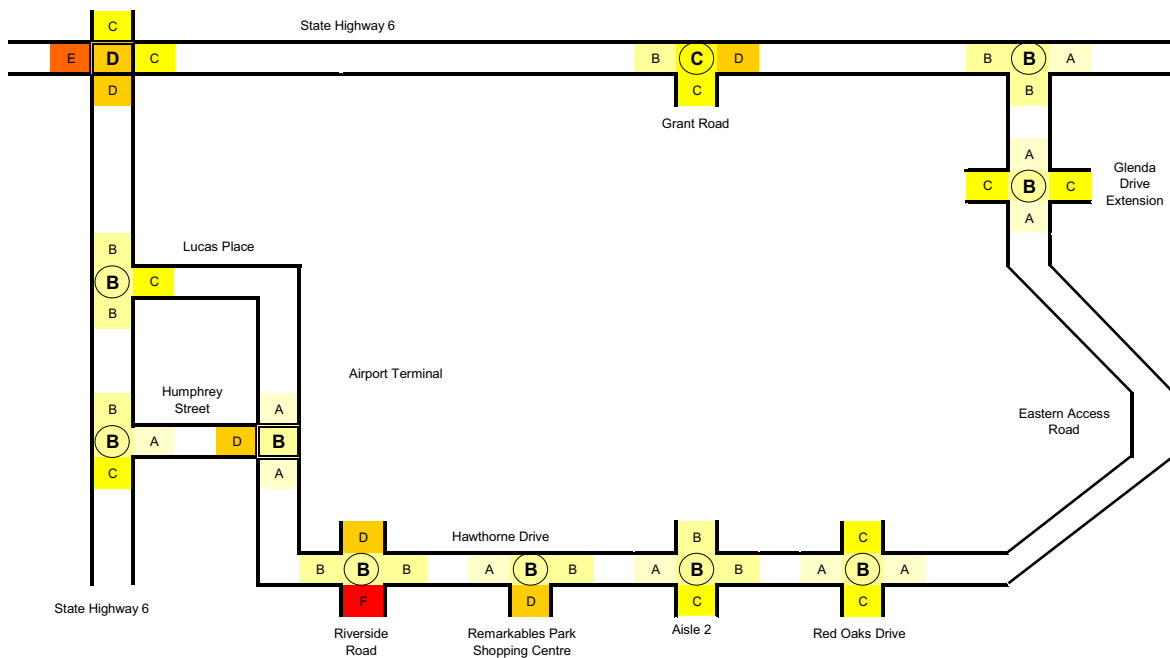


Diagram 4: Expected Network Performance – 2021PM PC19 (QLDC Appeals) with PC34

14. Conclusions

A detailed assessment of the transportation effects of PC34 that will enable the expansion of the existing Remarkables Park Town Centre to the east has been undertaken. This indicates that, with the improvements to the existing road network on the Frankton Flats that have already been proposed as part of the Wakatipu Transportation Strategy, there will be only small increases in the average vehicle delays at some major intersections and that these increases would not be noticeable to drivers.

The WTS has identified a strategy that is able to accommodate the future strategic traffic volumes on the arterial road networks feeding the Frankton Flats, albeit with a proposal to promote public transport priority along State Highway 6A and constrain private vehicle movement. The traffic simulation assessments undertaken with 2021 PM peak traffic forecast as part of this study of PC34 have identified that both the arterial road networks through the Frankton Flats and the local roads servicing Remarkables Park would be able to provide an adequate level of service for all road users even with the higher traffic generation anticipated with the development enabled by PC34. Accordingly, there is no need for any further major upgrades to the local or strategic road network to mitigate the effects of PC34.

With full development of the RPZ, the other developments permitted by current zoning for the northern sector of the Frankton Flats by 2021, the development associated with the recent approval by Council of PC19 (subject to appeal) and the associated road network upgrades and extensions, the level of traffic volumes on the local road network will be limited by the comprehensive, integrated development that is proposed to facilitate other modes of travel (walking, cycling and public transport). In this context, the development facilitated by the proposed PC34 will attract a considerable proportion of its users from the other extensive developments on the Frankton Flats. Therefore the additional traffic generation associated with PC34 will have lesser effects than might be anticipated on the performance of traffic movements, locally and strategically.

With PC19 being under appeal, two development scenarios for the PC19 area have been considered as part of this assessment. The first development scenario is consistent with the level of development expected by QLDC under the structure plan that formed part of the QLDC decision on PC19 and has been used as a baseline for assessing the effects of PC34. QLDC have since proposed a new structure plan in response to the appeals on the PC19 decision and a sensitivity test has been undertaken using a development scenario based on the revised structure plan. In both scenarios, the traffic effects of PC34 are generally limited to the RPZ although there could be a small increase in average vehicle delay at the SH6 / SH6A intersection. However, any increases in average vehicle delay are expected to be less than the typical variation in journey times and therefore would not be noticeable to drivers.

With the WTS proposals to enhance public transport and the capability of the comprehensive development of the RPZ to include appropriate facilities for walking and cycling, alternative modes of transport will be encouraged within the RPZ. With the ability to provide adequate facilities for alternative modes of transport, it is considered that there will be no adverse effects on sustainable travel due to the PC34.

Accordingly, the Plan Change application can be supported from a transportation engineering perspective.

Traffic Design Group Ltd
December 2010

Appendix A

Level of Service Definitions

Level of Service Definitions

The quality of service provided by a road network requires quantitative measures to characterise operational conditions within a traffic stream. The level of service (LOS) is a quality measure that describes the operational conditions generally in terms of measures such as speed and travel time, freedom to manoeuvre, traffic interruptions, comfort and convenience.

In general, six levels of service are defined with letters from A to F used to designate each level. A level of service A represents the best operating conditions while LOS F represents the worst conditions. Each level of service represents a range of operating conditions and the driver's perception of those conditions. Safety does not form part of the measures used to assign a level of service.

The following descriptions for individual levels of service have been taken from the Austroads Guides to Traffic Engineering Practice:

- **Level of service A** – represents free flow. Individual users are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high. The general level of comfort and convenience provided to the motorist or passenger is excellent.
- **Level of service B** – is in the range of stable flow, but the presence of other users in the traffic stream begins to be noticeable. Freedom to select desired speeds is relatively unaffected, but there is a slight decline in the freedom to manoeuvre within the traffic stream from level of service A. The level of comfort and convenience provided is somewhat less than at level of service A, because the presence of others in the traffic stream begins to affect individual behaviour.
- **Level of service C** – is the range of stable flow, but marks the beginning of a range of flow in which the operation of individual users becomes significantly affected by interactions with others in the traffic stream. The selection of speed is now affected by the presence of others, and manoeuvring within the traffic stream requires substantial vigilance on the part of the user. The general level of comfort and convenience declines noticeably at this level.
- **Level of service D** – represents high-density, but stable-flow. Speed and freedom to manoeuvre are severely restricted, and the driver experiences a generally poor level of comfort and convenience. Small increases in traffic flow will generally cause operational problems at this level.
- **Level of service E** – represents operating conditions at or near the capacity level. All speeds are reduced to a low, but relatively uniform value. Freedom to manoeuvre within the traffic stream is extremely restricted, and is generally accomplished by forcing a vehicle to “give way” to accommodate such manoeuvres. Comfort and convenience levels are extremely poor, and driver frustration is generally high. Operations at this level are usually unstable, because small increases in flow or minor perturbations within the traffic stream will cause breakdowns.
- **Level of service F** – is used to define a forced or breakdown flow. The condition exists wherever the amount of traffic approaching a point exceeds the amount that can traverse the point. Queues form behind such locations. Operations within the queue are characterised by stop-and-go waves, and they are extremely unstable.

Highway Capacity Manual 2000

The US Highway Capacity Manual 2000 (HCM2000) describes methods for determining the levels of service for roads and intersections. For urban roads, a level of service can be allocated by measuring the average vehicle speed on the road. At intersections, the level of service is determined by the average control delay for each vehicle travelling through the intersection.

Average Control Delay (s/veh)	Level of Service
≤ 10	A
11 – 20	B
21 – 35	C
36 – 55	D
56 – 80	E
> 80	F

Table A1: Level of Service Definitions - Signalised Intersections (HCM 2000)

Average Control Delay (s/veh)	Level of Service
≤ 10	A
11 – 20	B
21 – 35	C
36 – 55	D
56 – 80	E
> 80	F

Table A2: Level of Service Definitions - Roundabouts

Average Control Delay (s/veh)	Level of Service
≤ 10	A
11 – 15	B
16 – 25	C
26 – 35	D
36 – 50	E
> 50	F

Table A3: Level of Service Definitions – Priority Controlled Intersections (HCM 2000)

Average Vehicle Speed (km/h)	Level of Service
> 50	A
40 – 50	B
29 – 39	C
23 – 28	D
18 – 22	E
≤ 17	F

Table A4: Level of Service Definition – Urban Roads with 55km/h Typical Free-flow Speed