Appendix K1

Integrated Transport Assessment - External

MT IRON
JUNCTION

Residential Development
Wānaka Luggate Highway

Transportation Assessment

CARRIAGEWAY
CONSULTING
traffic engineering | transport planning

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CCL file reference	15080 mt iron ta final
Status	Final
Issued	11 February 2026

1. Introduction

1.1. This Transportation Assessment has been prepared in relation to the substantive application lodged by Mt Iron Junction Limited under the Fast Track Approval Acts 2024 in accordance with the requirements of Section 42. The proposal is a listed project in Schedule 2.

1.2. This report has been prepared to support an application to develop land at 237 Wānaka Luggate Highway for a high density residential development. Section 43 of the Fast Track Approval Act sets out the information to be included in a substantive application, which includes an assessment of adverse effects of the project on the environment.

1.3. The report assesses the transportation effects of the project on the external transportation networks, including the state highway network and the district road of Riverbank Road. A second, seperate report addresses matters pertaining to the internal site layout and effects on the district roads of Junction Road and Mountain Road.

1.4. This Transportation Assessment sets out an analysis of the transportation matters associated with the proposed development on the relevant surrounding road network, with a particular focus on the state highway network and the State Highway 6 / State Highway 84 / Riverbank Road roundabout that is immediately adjacent to the site and where the greatest increase in traffic volumes will be seen. Where potential adverse effects are identified associated with changes in travel patterns that are likely to arise, ways in which these will be addressed are set out.

1.5. This report is cognisant of the guidance specified in the New Zealand Transport Agency (**NZTA**) '*Integrated Transport Assessment Guidelines'* and although travel by private motor vehicle is addressed within this report, in accordance with best practice the importance of other transport modes is also recognised. Consequently, travel by walking, cycling and public transport is also considered.

1.6. The report is also cognisant of feedback provided by NZTA.

1.7. This report has been prepared by Mr Andy Carr, in accordance with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note (2023). Mr Carr's qualifications and experience are summarised in Appendix A

2. Executive Summary

2.1. The proposal is to develop land at 237 Wānaka Luggate Highway for a high density residential development (250 houses) with a small amount of ancillary development also proposed, which includes a childcare centre for 65 children, a café (154sqm GFA) and a small retail unit (275sqm GFA). The non-residential elements of the proposal are to assist the site in being self-sufficient for residents' core needs, meaning that, for example, a resident would not be required to leave the site for a small amount of shopping but could instead walk or cycle to the on-site retail tenancy.

2.1.1. There is an existing resource consent on the site, for a service station (with associated signage, retail store, car wash and laundromat), worker accommodation buildings (nine units providing a total of 54 bedrooms) and 13 residential terraced housing units. If consent is granted for the current proposal, the worker accommodation and residential units will not be progressed.

2.1.2. As part of the assessment supporting this development, a traffic survey of the adjacent State Highway 6 / State Highway 84 / Riverbank Road intersection was carried in 2017. The survey showed that extensive queuing and delays on State Highway 6 (north) were already occurring, and this was forecast to become significantly worse with only a small amount of ambient traffic growth[1], unrelated to any traffic generated by the proposed development. The matter was brought to NZTA's attention and ultimately, the intersection was upgraded to a large roundabout to accommodate the prevailing and expected future traffic flows. One leg of the roundabout was constructed in order to serve the consented development, and it is proposed that the proposed development would also gain access from this leg.

2.2. As part of the assessment of this proposal, new traffic surveys were carried out at the State Highway 6 / State Highway 84 / Riverbank Road roundabout. Modelling of these traffic flows showed that at the current time (2025), the roundabout has sufficient capacity to accommodate existing traffic flows. However a further assessment of the State Highway 84 approach in the evening peak hour shows that when the consented development at the site plus traffic growth is considered, increased queues and delays can be expected to regularly arise in five to seven years' time (dependent on the modelling approach adopted). An observation of queue lengths was carried out and this confirmed that from time to time, the State Highway 84 approach in the evening peak hour already has extensive queues (albeit infrequently at present).

2.3. A review of (third party) assessments carried out in 2018 shows that the traffic flows that were then expected to arise in 2030 are already occurring in 2025. In other words, traffic growth over the past seven years has been much greater than was expected, and this is. However, the roundabout is expected to have sufficient capacity to accommodate ambient traffic growth plus the consented development in the morning peak hour.

2.4. In order to assess the effects of the proposed development, firstly a 'design year' of ten years hence has been adopted. Because the modelling shows that the roundabout has insufficient capacity in the evening peak period in five to seven years time, when the model is run just allowing for ambient traffic growth and the consented development for ten years (that is, not including the Fast Track Application), queues and delays are extensive (up to a 6-minute delay and queues of 170 vehicles on the State Highway 84 approach in the evening peak hour).

[1] Ambient traffic growth is the increase in traffic volumes which occurs on the roading network due to new development further afield and, to a lesser extent, people's propensity to travel more.

2.5. The traffic generation of the proposed development has, as far as possible, been based on the trip rates used for the consented development on the site. Allowance has been made for a proportion of trips to the non-residential aspects of the proposal to be made by residents, and those who are already passing the site, as well as for some newly-generated trips.

2.6. When the traffic generation of the proposed development is added to the 'design year' volumes, there is an increase in queues and delays, with up to 200 vehicles and delays of more than seven minutes forecast in the evening peak hour.

2.7. To the north of the State Highway 6 / State Highway 84 / Riverbank Road roundabout, State Highway 6 passes through the settlement of Albert Town and forms the key access route for residents travelling south towards Wānaka and Queenstown. The highway then crosses the Clutha River by way of a bridge, and then provides the primary route to the settlement of Hāwea, approximately 11km north of the roundabout. A number of recent subdivisions have secured resource consent in recent years in Hāwea, and as there is only one bridge crossing of the Clutha River in the area, State Highway 6 provides the primary roading connection between Hāwea, Wānaka and Queenstown. As such, the vast majority of the traffic generated externally from Hāwea (and also Albert Town) passes through the roundabout.

2.8. As a result, the outcomes seen with the proposed development would arise with the same scale of development (250 houses) located on a hypothetical site served by State Highway 6 to the east or north. In other words, the effects do not arise as a result of this particular site being developed for this particular purpose, but would also occur from different types of development and/or in different locations. In that regard, it is relevant that the proposed District Plan contemplates a much higher level of activity within Albert Town with recent rezonings through the Proposed Queenstown Lakes District Plan allowing for double the residential density as was previously allowed under the operative Queenstown Lakes District Plan. It is therefore not unreasonable that the anticipated intensification of Albert Town will give rise to the same (or worse) outcomes as those anticipated under the proposed development.

2.8.1. The State Highway 6 / State Highway 84 / Riverbank Road roundabout has been constructed with shared walking and cycling routes immediately adjacent, so that cyclists do not need to travel on the circulating carriageway. The site has a shared walking and cycling route running through it, and importantly, it is proximate to the Three Parks commercial / mixed use area towards the west, which provides for commercial activities (such a supermarket, DIY outlet, 'big box' retailers and smaller retail outlets) as well as other commercial activities, recreational activities (such as the Wānaka Recreation Centre and Pool) and residential use.

2.8.2. Immediately adjacent to the site is the Mount Iron Track which is available for use by pedestrians and cyclists. This provides an off-road route (meaning walking and cycling does not have to occur on the state highway network), and there is an underpass provided further west on State Highway 6, which means that anyone walking or cycling between the site and Three Parks only has to undertake one at-grade crossing of a road. This is at Sir Tim Wallis Drive, which is a district road and is subject to a 40km/h speed limit, supporting pedestrian and cyclist safety. The road provides a number of formal crossing opportunities, including a pedestrian refuge.

2.8.3. A travel time survey showed that it is possible to walk between from the site boundary at the proposed connection to the Mount Iron Track, to the New World supermarket, in less than 20 minutes. However on-site observations showed that the majority of current users of the track were using bicycles, an allowing for an average speed of 13km/h[2], this journey could be

[2] https://www.bicycling.com/training/a70112860/average-cycling-speed-by-age-strava/

undertaken in around 8 minutes. Coupled with the advent of micromobility and e-bikes, Three Parks is easily within a viable, non-car travel distance and time, and the Austroads Guide to Road Design Part 4A ('*Paths for Walking and Cycling'*) indicates that the current width of the Mount Iron Track is able to accommodate increased use without the need for any improvements.

2.8.4. The Mount Iron Track continues westwards on the northern side of the highway, past a car park serving visitors to Mt Iron, and terminates at Anderson Road, approximately 3.5km west of the site. Anderson Road provides access to the Anderson Heights business area, and thus to employment opportunities.

2.8.5. Overall, the site provides for more opportunities to travel by non-car modes than residential development in locations that are further afield, where journey distances are greater and thus walking and cycling is less likely.

2.8.6. It is not considered that the small size of the development will give rise to the need for a scheduled public transport service in Wānaka (and the township does not have any scheduled services at present), but in the event that a service was to be implemented in future, it is likely that this will connect the main destinations in the area such as Hāwea, Albert Town, Three Parks and Wānaka. That being the case, the service is likely to run directly past the site on State Highway 6 and 84, and would therefore be accessible to residents.

2.9. The crash history in the vicinity of the site does not indicate that there are presently any adverse road safety effects which may be exacerbated by the proposed development, although a degradation in road safety performance can be expected as queues and delays increase (as with any growth that increases congestion).

3. Site Overview

3.1. Location

3.1.1. The development site is located on the northwestern quadrant of the State Highway 6 / State Highway 84 intersection, around 2.7km east of Wānaka town centre. The site is zoned Rural in the proposed Queenstown Lakes District Plan (**District Plan**). The site also includes a partially completed existing development authorised by resource consent in 2021, discussed further below.

3.1.2. The location of the site in the context of the local area is shown in Figure 1 and in more detail in Figure 2.

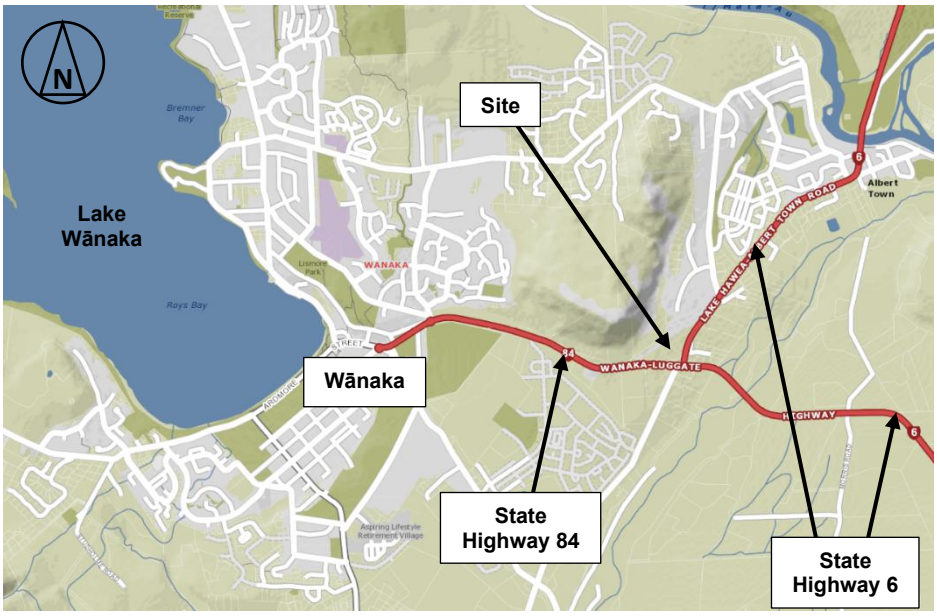


Figure 1: General Location of Development Site

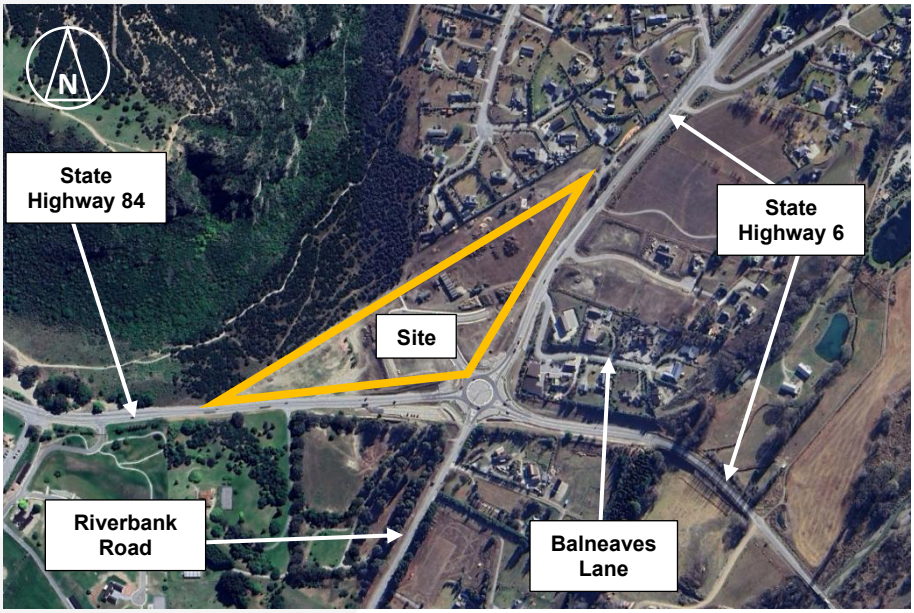


Figure 2: Aerial Photograph of Development Site and Environs

3.2. Road Hierarchy

3.2.1. The District Plan classifies State Highways 6 and 84 as State Highways, and although there is no formal definition of their purpose, it can reasonably be expected that they accommodate higher traffic volumes and connect settlements and key destinations both regionally and inter-regionally.

3.2.2. Riverbank Road is a Collector Road, which is expected to accommodate both through traffic and also to provide for direct property access.

3.2.3. For completeness, Junction Road and Mountain Road are not listed in the District Plan, meaning that they are Local Roads and intended to provide for direct property access. However these roads are not considered further within this report, as the focus is on the effects on the external transportation networks (State Highways 6 and 84, and Riverbank Road.

3.3. Consent History

3.3.1. With assessment and preparation commencing in 2017, a proposal for the site was advanced which at the time included:

- A service station with ancillary retail units and a laundromat;
- Worker accommodation buildings, with ten units providing a total of 60 bedrooms;
- A child care centre for 90 children;
- Visitor accommodation, with 39 units plus a manager's residence;
- Commercial and retail development, with a total floor area of 2,218sqm GFA;
- Mini golf facility; and
- 17 residential terraced housing units, with a mix of 2 and 3 bedrooms.

3.3.2. As part of the Transportation Assessment of this proposal, traffic counts were carried out at the State Highway 6 / State Highway 84 / Riverbank Road intersection, which at that time was then formed as two priority tee-intersections. The survey showed that extensive queuing and delays on State Highway 6 (north) were already occurring, and this was forecast to become significantly worse with only a small amount of ambient traffic growth[3], unrelated to any traffic generated by the proposed development.

3.3.3. The matter was brought to NZTA's attention and ultimately, the intersection was upgraded to a large roundabout to accommodate the prevailing and expected future traffic flows. Consultant WSP was commissioned by NZTA to undertake the relevant design work, as part of which, NZTA asked WSP to consider whether the roundabout should have one or two circulating lanes. In a memorandum (dated November 2018), WSP concluded that by 2045, the State Highway 84 leg of the roundabout would be operating at 120% of its capacity in the evening peak hour. However, there was no recommendation in WSP's memorandum as to whether one or two circulating lanes was the appropriate solution, and the roundabout was subsequently constructed with one circulating lane and a 40m inner island.

3.3.4. Ultimately, NZTA made a neutral submission on the development proposed at the site in 2017. A statement of evidence subsequently produced by Mr Richard Shaw of NZTA and presented at the Council Hearing concluded that the conditions of consent proposed at that time were appropriate to ensure that the effects of the proposed development on the operation and safety

[3] Ambient traffic growth is the increase in traffic volumes which occurs on the roading network due to new development further afield and, to a lesser extent, people's propensity to travel more.

of the State Highway 6 / State Highway 84 / Riverbank Road intersection were adequately mitigated.

3.3.5. As a result of non-traffic related concerns, the development of the site was ultimately downsized with consent (RM181471) being granted by the Environment Court in 2021 for:

- A service station with associated signage, retail store, car wash and laundromat;
- Worker accommodation buildings, with nine units providing a total of 54 bedrooms; and
- 13 residential terraced housing units, with a mix of 2 and 3 bedrooms.

3.3.6. Condition 5 of the consent required the upgraded State Highway 6 / State Highway 84 / Riverbank Road intersection (that is, an upgrade to a roundabout) to be operational prior to the consented development being occupied by tenants or the public.

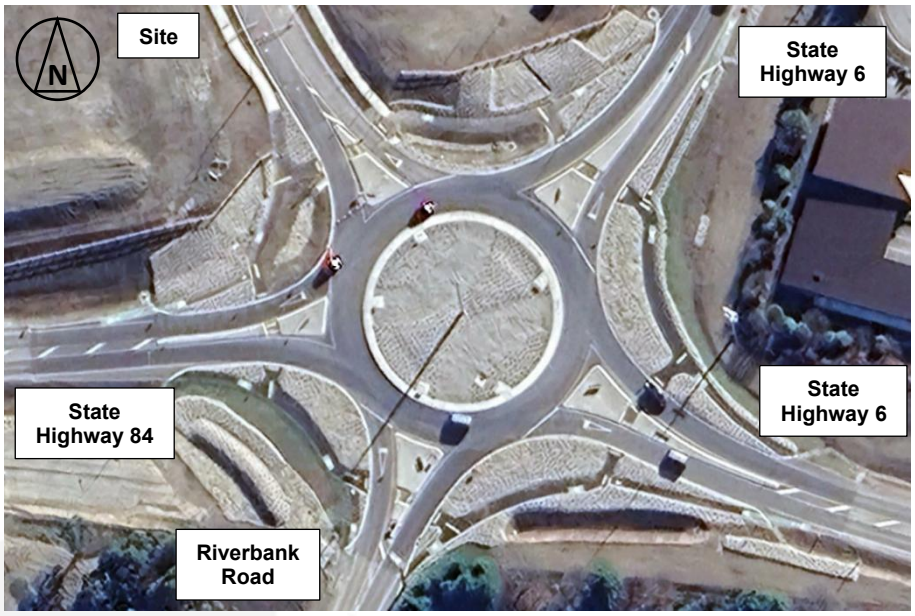
3.3.7. Development in accordance with the 2021 consent is underway including the construction of roading infrastructure and subdivision. The buildings approved by the 2021 consent have not yet been constructed.

4. Current Transportation Networks

4.1. Roading Network

4.1.1. The site is served via Junction Road, which forms one leg of a five-leg roundabout which lies directly to the southeast of the site. State Highway 6 forms the eastern and northern legs, with State Highway 84 forming the western leg and Riverbank Road being to the south. This roundabout was constructed very recently (being completed in 2024) and was put in place to resolve existing high levels of queuing and delay on State Highway 6 (north) in the morning peak hour. This issue was identified as part of a development proposed on the site (as described above) and so the roundabout was also designed to accommodate the traffic which was expected to be generated by the consented development.

4.1.2. Each leg of the roundabout provides one traffic lane, and the roundabout is constructed with a 40m raised inner island and one circulating lane of 6m width.



Photograph 1: Aerial Photograph of Roundabout

4.1.3. The eastern leg of the roundabout, State Highway 6, provides a connection to Luggate some 10km to the south, to Cromwell, and a route through the Kawarau Gorge towards Queenstown. However the general area is through which it passes is generally rural / rural residential. The highway has a posted speed limit of 80km/h for a distance of 430m east of the roundabout, and 100km/h further east. The highway itself has one traffic lane in each direction, with a variable sealed shoulder, and a gently undulating and winding alignment.

4.1.4. State Highway 6 (north) also has a posted speed limit of 80km/h, but this reduces to 70km/h approximately 1.7km north of the roundabout. This section of the highway also has one traffic lane in each direction, with a narrow sealed shoulder, although just north of the roundabout the shoulders are widened to facilitate vehicles turning into two minor roads (Balneaves Lane) and Head Place. The highway has a gently undulating and winding alignment.

4.1.5. To the immediate north of the roundabout, State Highway 6 passes through the settlement of Albert Town and forms the key access route for residents travelling south towards Wānaka and Queenstown. The highway then crosses the Clutha River by way of a bridge, and then provides the primary route to the settlement of Hāwea, approximately 11km north of the

roundabout. A number of recent subdivisions have secured resource consent in recent years in Hāwea, and as there is only one bridge crossing of the Clutha River in the area, State Highway 6 provides the primary roading connection between Hāwea, Wānaka and Queenstown. As such, the vast majority of the traffic generated externally from Hāwea (and also Albert Town) passes through the roundabout.

4.1.6. State Highway 84 forms the western leg of the roundabout and shares similar characteristics to the other state highway approaches with a gently undulating and winding alignment, one traffic lane in each direction, and an 80km/h speed limit. Approximately 550m west of the site, Ranch Terrace joins the highway from the south and provides access to the Te Rangi subdivision of 18 large residential lots. Some 100m west of this, the access to the 'Puzzling World' tourist attraction connects to the highway at a priority intersection. Both of these locations have right-turn bays for drivers turning off the highway, and widened shoulders to support other turning movements.

4.1.7. From this point, the highway descends with the State Highway 84 / Sir Tim Wallis Drive roundabout located 500m to the west. This roundabout has one circulating lane of 7m width and an inner island of 34m diameter. Sir Tim Wallis Drive form the southern leg of the roundabout, and serves the 'Three Parks' mixed use development, which provides commercial activities (such a supermarket, DIY outlet, 'big box' retailers and smaller retail outlets) as well as other commercial activities, recreational activities (such as the Wānaka Recreation Centre and Pool) and residential activity is also provided for.

4.1.8. Some 600m west of this roundabout, the speed limit on the highway reduces to 50km/h and 250m west of this, Anderson Road joins State Highway 84 from the north at a roundabout. The roundabout has two approach lanes on the northern and western legs, and one lane on the eastern leg. The roundabout has one circulating lane and an inner island of 18m diameter.

4.1.9. Anderson Road serves northern areas of Wānaka including an industrial / commercial area just northwest of the roundabout, and the Northlake and Hikuwai residential subdivisions further north.

4.1.10. State Highway 84 continues westwards and terminates at a roundabout at the eastern edge of Wānaka town centre.

4.1.11. Riverbank Road forms the southern leg of the State Highway 6 / State Highway 84 / Riverbank Road roundabout. It is also subject to an 80km/h speed limit, and provides one lane in each direction, but the alignment of the road is generally straight and flat, and the shoulder width is minimal. Approximately 1.8km south of the roundabout, the road descends and meets Ballantyne Road at a newly-constructed roundabout. Around 4.7km to the east, Ballantyne Road connects to State Highway 6, and 2km to the west, it provides a route into Wānaka town centre.

4.1.12. South of this roundabout, Riverbank Road continues for a further 2.9km and connects to Cardrona Valley Road, which in turn provides a route over the Crown Range towards Arrowtown, Frankton and Queenstown.

4.2. Non-Car Modes of Travel

4.2.1. As this environment is presently zoned rural older roads and highways typically do not have footpaths immediately adjacent, although there are grassed berms which can be used by pedestrians.

4.2.2. However the State Highway 6 / State Highway 84 / Riverbank Road roundabout has been designed to provide off-road routes for non-car modes of travel. Notably, cyclists are moved from the highway carriageway and onto a small network of shared walking/cycling paths around the roundabout, so that they can move between the different legs of the roundabout without having the potential for conflict with vehicles that are entering the roundabout or on the circulating carriageway of the roundabout.

Photograph 2: Cycle Lane Directing Cyclists off State Highway 84 and onto the Adjacent Path

Photograph 3: Shared Walking and Cycling Route Across Junction Road

4.2.3. The design of roundabout therefore means that pedestrians and cyclists are provided with dedicated routes that mean they are separated from motorised traffic, other than in those locations where they need to cross the approaches (which they are able to do using the deflection islands).

4.2.4. Junction Road has footpaths on each side and a shared walking/cycling route on its western side (discussed further in a separate report). This shared route connects to the off-road routes around the roundabout.

4.2.5. There is also a network of footpaths and a shared cyclepath within Three Parks. The shared path is on the western side of Sir Tim Wallis Drive, delineated with suitable symbols and green surfacing at major vehicle crossings.

Photograph 4: Shared Walking and Cycling Route, Western Side of Sir Tim Wallis Drive

4.2.6. In a similar approach to the State Highway 6 / State Highway 84 / Riverbank Road roundabout, the State Highway 84 / Sir Tim Wallis Drive roundabout provides off-road walking and cycling routes that enable cyclists and pedestrians to circulate around the roundabout, and separate cyclists from motorised traffic.

Photograph 5: Walking and Cycling Routes, State Highway 84 / Sir Tim Wallis Drive Roundabout

4.2.7. The shared routes around the roundabout are not extensive and there is formal signage and markings that direct cyclists back onto the main carriageway of the state highway. However,

there are formed footpaths that provide linkages further afield. Of note is that there is an underpass beneath the state highway approximately 120m east of the State Highway 84 / Sir Tim Wallis Drive roundabout, which enables pedestrians to move between the northern and southern sides of the highway.

Photograph 6: State Highway 84 Underpass (Three Parks in Background)

4.2.8. On the southern side of the highway, the footpath extends to Puzzling World where it terminates. On the northern side, the footpath forms part of a shared walking and cycling path route (the Mount Iron Track) which passes around the southern side of Mt Iron[4].

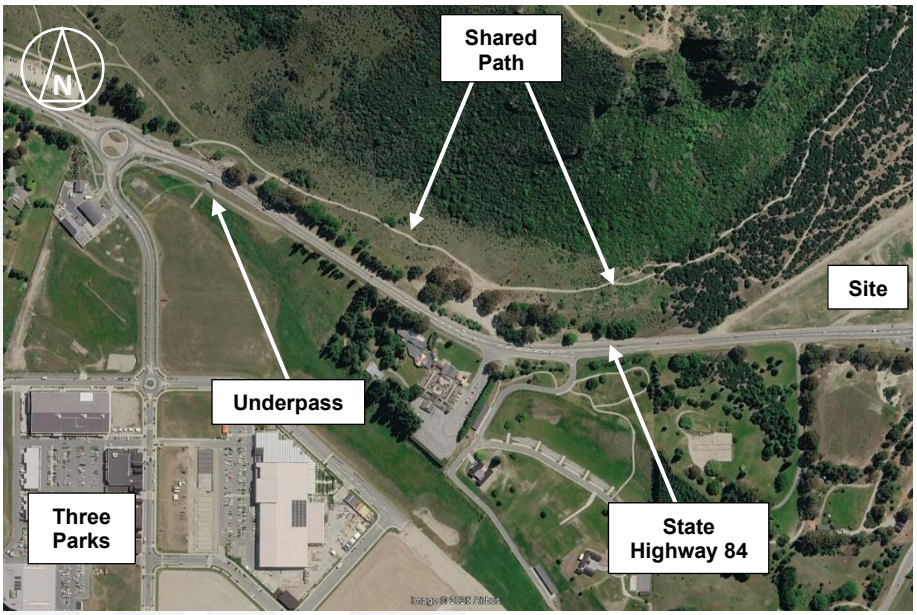


Figure 3: Shared Route Between the Site and Three Parks

[4] This a confirmed as a shared route by the Department of Conservation: https://www.doc.govt.nz/parks-and-recreation/places-to-go/otago/places/wanaka-area/things-to-do/mount-iron-track/

4.2.9. The Mount Iron Track is formed with a 2.5m to 3m wide gravelled surface, but with occasions pinch-points to a 1.8m width. The track has gentle gradients with no sharp horizontal curves.

Photograph 7: Mount Iron Track

4.2.10. The formal Mount Iron Track deviates around the base of Mt Iron, with signage provided on the track towards the north of the site to indicate one route towards Albert Town and another towards Mt Iron.

Photograph 8: Signage on Mount Iron Track

4.2.11. There are already informal pathways that connect the main part of the track with the western side of the site. This then means that it is possible to move between the site and Three Parks without using a motor vehicle, on a route that is separated from the main state highway, and only needing to cross one, slow-speed road[5] at-grade (Sir Tim Wallis Drive). The masterplan allows for a connection to be formed between the site and the track, and a travel time survey

[5] The speed limit on Sir Tim Wallis Driveis 40km/h, with this reinforced through road humps

showed that it is possible to walk between from the site boundary at the proposed connection, to the New World supermarket, in less than 20 minutes. However observations showed that the majority of current users of the track were using bicycles, an allowing for an average speed of 13km/h[6], this journey could be undertaken in around 8 minutes.

4.2.12. To the west of Sir Tim Wallis Drive, the shared route continues on the northern side of the highway, past a car park serving visitors to Mt Iron, and terminates at Anderson Road, approximately 3.5km west of the site. Anderson Road provides access to the Anderson Heights business area.

4.2.13. There are presently no public transport services in Wānaka.

4.3. Future Changes

4.3.1. At the time of preparation of this report, there are no known proposals to change the roading environment in the immediate area of the site that are set out in any overarching strategies or guides.

[6] https://www.bicycling.com/training/a70112860/average-cycling-speed-by-age-strava/

5. Current Transportation Patterns

5.1. Traffic Flows

5.1.1. NZTA carries out regular traffic counts on the state highway network throughout the country. The closest counter sites to the development site, and the recorded Annual Average Daily Traffic flows, are:

- 00600894: State Highway 6 around 1.1km east of the site: 6,312 vehicles per day;
- 00600892: State Highway 6, northeastern corner of the site: 10,899 vehicles per day; and
- 08400002: around 1.2km west of the site on State Highway 84: 14,133 vehicles per day

5.1.2. As part of this commission, a traffic survey was carried out at the State Highway 6 / State Highway 84 / Riverbank Road roundabout in the morning and evening peak hours. These were undertaken on Wednesday 30 and Thursday 31 July 2025 via a video recording method, with the recordings subsequently processed to identify traffic volumes and turning movements. No inclement weather nor any other issues were reported on the survey day that could have given rise to unusual traffic volumes. The results are summarised below

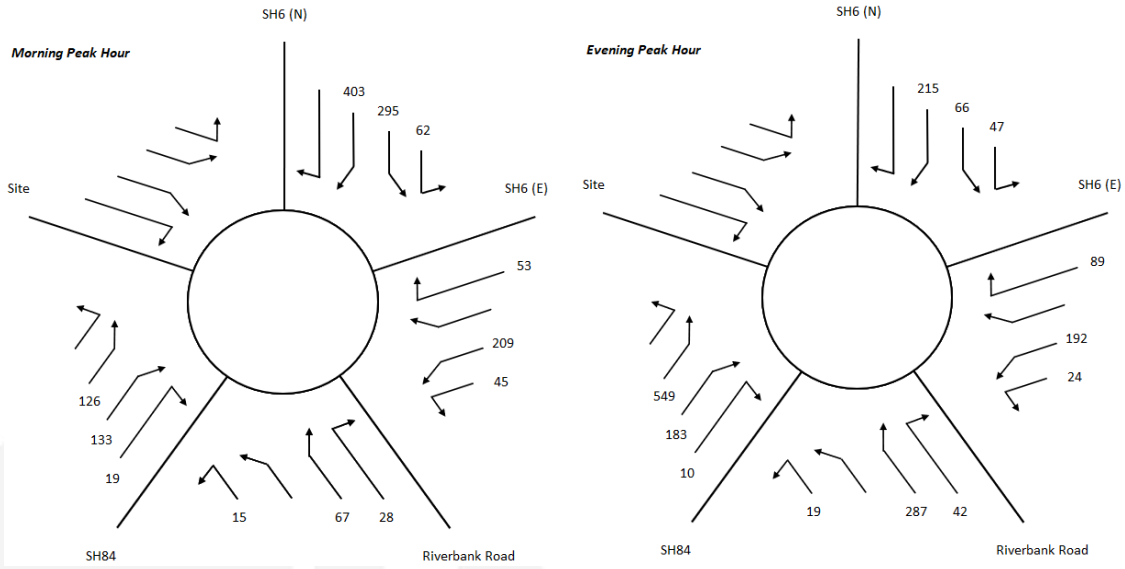


Figure 4: Observed Peak Hour Traffic Volumes, State Highway 6 / State Highway 84 / Riverbank Road Roundabout, 30 July 2025

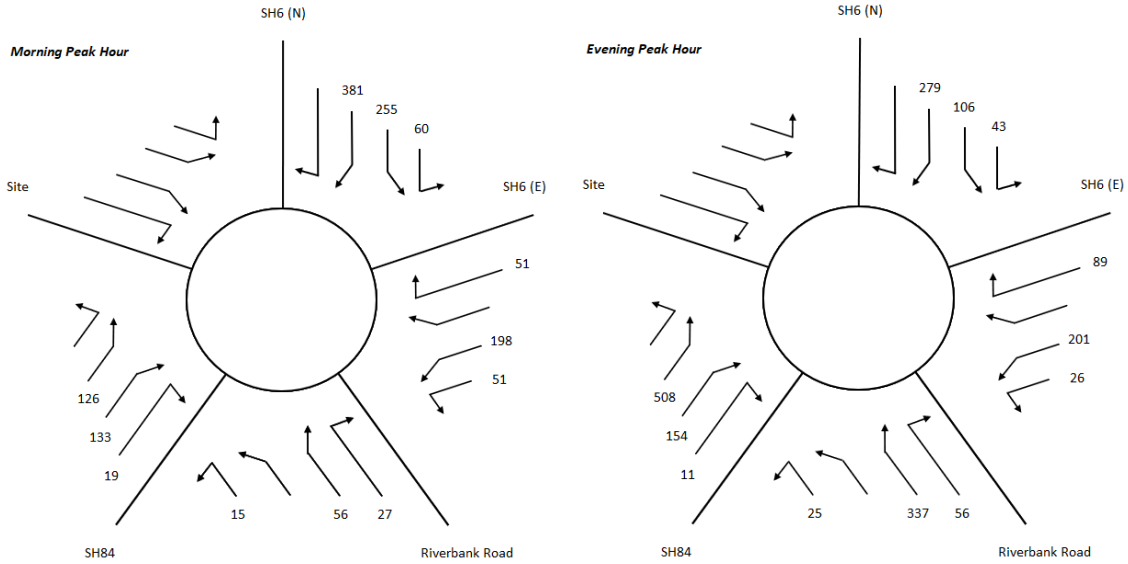


Figure 5: Observed Peak Hour Traffic Volumes, State Highway 6 / State Highway 84 / Riverbank Road Roundabout, 31 July 2025

5.1.3. It can be seen that on both survey days, there is a strong flow from Albert Town in the direction of Wanaka in the morning peak hour, with the reverse seen during the evening peak hour. This is commensurate with people living in Albert Town and Hawea, but working in Wānaka, which it is understood is indeed the case.

5.1.4. However there is also a strong flow observed to and from Riverbank Road. This was not seen in surveys previously carried out at this location in 2017 (for the then-proposed development as discussed in Section 2.3 above). One potential explanation for this is that in 2017, drivers turning right from State Highway 6 (north) in the morning or right from Riverbank Road in the evening, may have rescheduled their trip to be outside the peak hours in order to avoid the extensive queuing on those movements at the time. The additional capacity provided by the roundabout has meant that drivers can now travel at the times of their choosing.

5.1.5. Overall, the total number of vehicles observed on each day differed:

- Morning peak hour:
  - 30 July 2025: 1,455 vehicle movements;
  - 31 July 2025: 1,387 vehicle movements; and
  - 4.9% difference;
- Evening peak hour:
  - 30 July 2025: 1,723 vehicle movements;
  - 31 July 2025: 1,835 vehicle movements; and
  - 6.5% difference.

5.1.6. The highest volumes on both days were observed during the evening peak hour, where volumes on 31 July 2025 were 6.5% greater than on 30 July 2025. In view of this, in order to assist in determining which of the data sets was likely to be the more typical, a short duration survey was undertaken in October 2025 of the traffic flow circulating past the State Highway 84 approach. This showed the following results:

Location on Circulating Carriageway	Traffic Volume in Evening Peak Hour		
	Observed on 30 July 2025	Observed on 31 July 2025	Observed in October 2025
Circulating Past SH84	418	479	487
Circulating Past Site	1,156	1,155	1,191

Table 1: Comparison of 2025 Evening Peak Hour Peak Circulating Traffic

5.1.7. It can be seen that the better alignment with the October volumes is achieved with the survey of 31 July 2025, and this is therefore the survey that has been taken forwards for further analysis.

5.1.8. The roundabout has been modelled using the computer software program Sidra Intersection using the traffic flows above, and the results are summarised below.

Approach	Morning Peak Hour			Evening Peak Hour		
	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Riverbank Road	11.5	0.8	B	11.0	3.7	B
State Highway 6 (East)	11.7	3.0	B	10.0	2.2	B
State Highway 6 (North)	10.8	4.5	B	11.5	2.6	B
State Highway 84 (West)	6.8	1.4	A	12.3	8.9	B
All	10.2	4.5	B	11.4	8.9	B

Table 2: Current (2025) Peak Hour Levels of Service at the State Highway 6 / State Highway 84 / Riverbank Road Roundabout

5.1.9. It can be seen that the roundabout is presently operating with low queues and delays. However, in the evening peak hour, the queue of vehicles departing Wānaka reaches 9 vehicles. The modelling shows that this approach is currently operating at 70% saturation.

5.2. Traffic Growth

5.2.1. An assessment has been made of annual growth on the highways. Volumes were affected by travel restrictions due to Covid-19 during 2020 and to ensure that this short-term change does not affect the analysis, a ten-year period has been evaluated:

Year	Counter Location and Recorded Traffic Flows		
	00600894 (East of Site)	00600892 (North of Site)	08400002 (West of Site)
2015	4,187	5,998	8,388
2016	4,771	6,201	8,926
2017	5,202	7.523	9,478
2018	5,552	8,283	10,447
2019	5,778	8,016	9,596
2020	5,295	7,895	8,116
2021	5,687	8,648	10,766
2022	5,265	8,483	11,271

2023	5,977	10,028	12,768
2024	6,312	10,899	14,133
Annual growth, 2015 to 2024 (as a proportion of 2024 volumes)	3.7%	5.0%	4.5%

Table 3: Traffic Volumes on State Highway Network Proximate to the Site

5.2.2. It can be seen that over this timeframe, annual growth has been significant, and on State Highway 6 (north), traffic flows have almost doubled in the past ten years. One reason for this may be the extent of development in Hāwea that has occurred since 2015.

5.2.3. Helpfully, a traffic count was undertaken in 2017 at this intersection and a comparison can therefore be made between the observed 2025 and 2017 peak hour volumes. The annual growth, as a proportion of the 2025 observed volume, is summarised below.

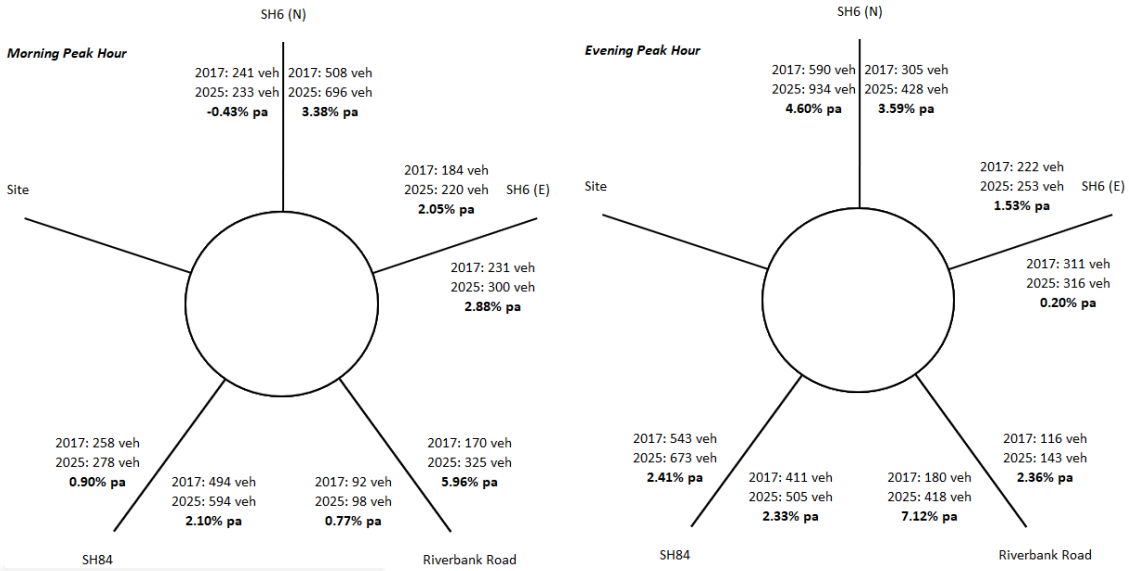


Figure 6: Peak Hour Traffic Annual Growth (2017 to 2025) as a Proportion of the 2025 Observed Volumes, State Highway 6 / State Highway 84 / Riverbank Road Roundabout

5.2.4. The Figure above shows that growth in the peak hours on each approach has slightly lower growth than the overall growth on the highway. It is of note that growth of traffic exiting the roundabout onto Riverbank Road in the morning, and entering Riverbank Road in the evening, has been higher than on the other approaches.

5.2.5. One further assessment has been made of traffic growth, using the Council's Wānaka transportation model. The approach used has been to:

- Identify the traffic flows on each turning movement in 2024 (one of the years that has been modelled);
- Subtract the traffic flows expected on each turning movement in 2039 (another of the years that has been modelled); and
- Divide by 15 (the number of years between 2024 - 2039) to get the increase in the number of vehicles each year.

5.2.6. At the outset, it is worth noting that the Council's transportation model is based on the surveys carried out at the intersection in 2017. Consequently, it does not take into account the change

in travel patterns that appears to have occurred subsequent to this, and in particular the increase in the movement between State Highway 6 (north) and Riverbank Road. By way of examples:

- Morning peak hour, State Highway 6 (north) to Riverbank Road:
  - 2025 survey: 255 vehicles; and
  - 2024 model: 146 vehicles.
- Evening peak hour, Riverbank Road to State Highway 6 (north):
  - 2025 survey: 337 vehicles; and
  - 2024 model: 151 vehicles.

5.2.7. Any model results must therefore be interpreted with care, as the model does not represent the current circumstances particularly well. In turn this means that any changes to the modelled volumes are similarly unlikely to be accurate. In other words, as the base traffic volumes are different to what is currently seen, so the future growth in those volumes may be different to what the model shows.

5.2.8. However, subject to this caveat, the observed and modelled traffic growth is summarised below:

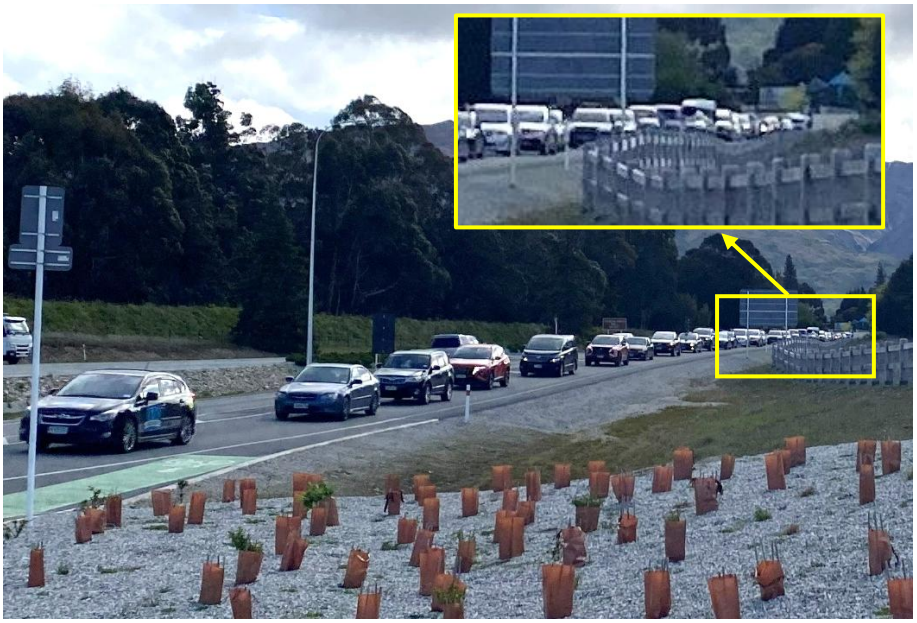
Location	Annual Traffic Growth (Two-Way Traffic Flows)				
	Daily (from NZTA Data)	Morning Peak Hour		Evening Peak Hour	
		From Surveys	From Model	From Surveys	From Model
State Highway 6 (East of Site)	3.7%	2.5%	2.7%	0.8%	2.0%
State Highway 6 (North of Site)	5.0%	2.4%	1.5%	4.3%	2.5%
State Highway 84	4.5%	1.7%	0.7%	2.4%	0.6%
Riverbank Road	-	4.8%	4.5%	5.9%	4.6%
Average	4.4%	2.9%	2.4%	3.4%	2.4%

Table 4: Growth in Traffic Volumes on Road Network Proximate to the Site

5.2.9. It can be seen that the observed data and the model both show that annual traffic growth on Riverbank Road is expected to be the highest of each approach. The modelled volumes fall within the range of 0.6% to 4.6% (an average of 3.1%) compared to the surveyed volumes of 0.8% to 5.9% (an average of 2.4%), indicating that on balance, the forecast modelled growth is lower than has been seen to date in the surveys. This matter is evaluated further below.

5.3. Assessment of Available Roundabout Capacity

5.3.1. In view of the saturation of State Highway 84 in the evening peak hour presently being 70%, the observational survey in October 2025 also observed queue lengths. This showed a queue of more than 30 vehicles on this approach for approximately 30 minutes of the peak hour. Anecdotally, this extent of queuing has been observed on previous occasions.



Photograph 9: Queue Length on State Highway 84, Evening Peak Hour, October 2025

5.3.2. Given this, an assessment has been carried out of the residual capacity of the roundabout in the evening peak hour.

5.3.3. As set out above, there is a consented (and partially implemented) development at the site, comprising:

- A service station with associated signage, retail store, car wash and laundromat;
- Worker accommodation buildings, with nine units providing a total of 54 bedrooms; and
- 13 residential terraced housing units, with a mix of 2 and 3 bedrooms.

5.3.4. This development was assessed (and consented) on the basis of the following traffic generation:

- Service station:
  - 5% of the traffic passing the site;
- Laundromat:
  - Assumed to be undertaken as part of another trip, hence zero traffic generation;
- Worker accommodation buildings (54 bedrooms):
  - 0.5% vehicle movements per bedroom in the peak hours;
  - Hence 22 vehicles exiting plus 5 vehicles entering in the morning peak hour;
  - And also 9 vehicles exiting plus 18 vehicles entering in the evening peak hour;
- Residential units (13 units):
  - 1 vehicle movement per unit in the peak hours;
  - Hence 10 vehicles exiting plus 3 vehicles entering in the morning peak hour;
  - And also 5 vehicles exiting plus 8 vehicles entering in the evening peak hour.

5.3.5. In order to test the remaining capacity of the roundabout, the annual growth shown in Table 4 above for the observed survey data (that is, the NZTA growth rates which are higher have not been used), has been added to the traffic volumes observed in 2025, plus the consented development (service station, worker accommodation and residential units). Growth has been applied incrementally, and the Sidra Intersection model has been re-run for each year. The following traffic volumes are expected with five years of traffic growth:

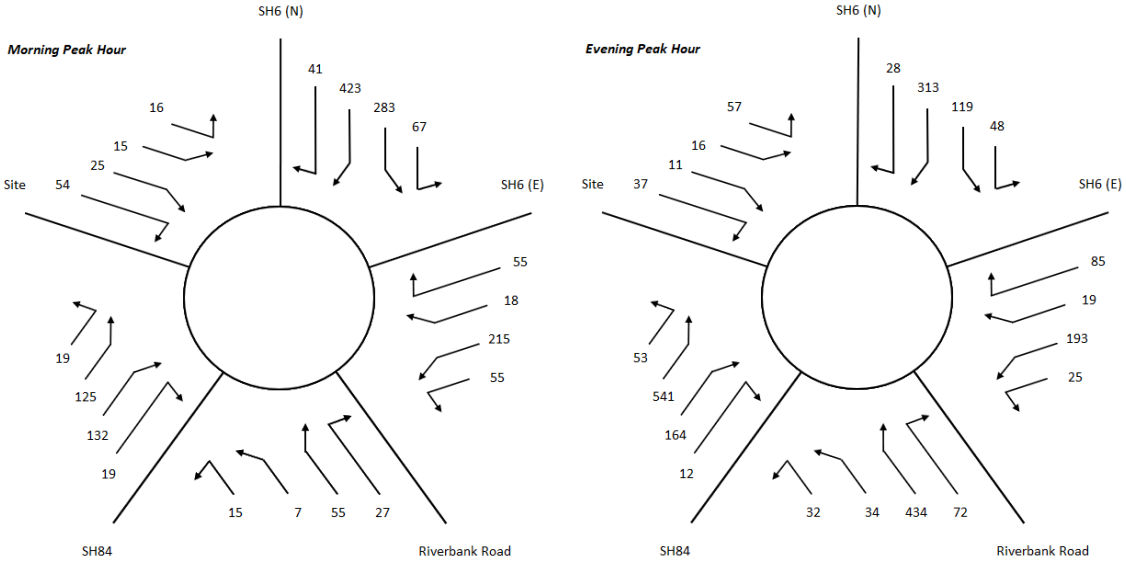


Figure 7: Peak Hour Traffic, 2025 Plus Five Years Growth from Surveys Plus Consented Development, State Highway 6 / State Highway 84 / Riverbank Road Roundabout

5.3.6. The Sidra Intersection modelling is summarised below:

Approach	Morning Peak Hour			Evening Peak Hour		
	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Riverbank Road	13.4	1.1	B	18.2	9.3	B
State Highway 6 (East)	19.6	6.4	B	11.1	2.7	B
State Highway 6 (North)	12.8	7.2	B	12.5	3.5	B
Site	6.5	0.7	A	34.9	4.2	C
State Highway 84 (West)	7.3	1.5	A	70.5	46.3	F
All	12.9	7.2	B	34.4	46.3	C

Table 5: Peak Hour Levels of Service at the State Highway 6 / State Highway 84 / Riverbank Road Roundabout Plus Consented Development, Five Years of Ambient Traffic Growth (from Surveys)

5.3.7. At this point, the modelling shows that the saturation of State Highway 84 exceeds 100% in the evening peak hour, indicating that more vehicles are arriving than are departing. For context, the queue length is forecast to be 329m, which is mid-way between the roundabout and the entrance to Puzzling World.

5.3.8. If the growth applied was to be based on the NZTA data instead of the survey data, the growth rate would be greater. This would then mean that the timeframe at which the capacity of the roundabout is exceeded is brought forwards (that is, it occurs earlier than the five years shown above).

5.3.9. However the growth from the traffic model is lower than observed, and so an assessment has been carried out using these growth factors and applying them to the 2025 observed traffic volumes. When seven years of growth is added, the following outcome is observed:

Approach	Morning Peak Hour			Evening Peak Hour		
	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Riverbank Road	13.4	1.2	B	16.5	7.3	B
State Highway 6 (East)	18.9	6.5	B	11.2	3.0	B
State Highway 6 (North)	12.8	6.7	B	12.5	3.5	B
Site	6.7	0.7	A	37.9	4.6	D
State Highway 84 (West)	7.4	1.6	A	63.1	46.1	E
All	12.7	6.7	B	32.7	46.1	C

Table 6: Peak Hour Levels of Service at the State Highway 6 / State Highway 84 / Riverbank Road Roundabout Plus Consented Development, Seven Years of Ambient Traffic Growth (from Model)

5.3.10. Using the lower growth forecast from the modelling continues to show that the roundabout has limited capacity remaining, with the State Highway 84 approach operating at more than 100% saturation. The queue length is again mid-way between the roundabout and the entrance to Puzzling World.

5.3.11. For the reasons set out above, it is considered that the scenario developed using the Council's transportation model is not as robust as the one developed using the specific observations of turning volumes at the intersection. However it is presented to illustrate that even under this 'best case' assessment, the roundabout capacity is very limited.

5.4. Comparison with Earlier Modelling

5.4.1. The roundabout was completed in 2024, and it is unusual for a recently-constructed roading scheme to run out of capacity within such a short timeframe. In 2018, NZTA commissioned consultants WSP to advise of the expected traffic volumes at the roundabout to assist in understanding whether one circulating traffic lane was required, or two. Helpfully, one of the years that WSP assessed was 2025, the same year as the survey carried out for this commission. The forecast WSP traffic volumes for 2025 are shown below, together with the differences between the WSP volumes and the volumes observed in the recent surveys.

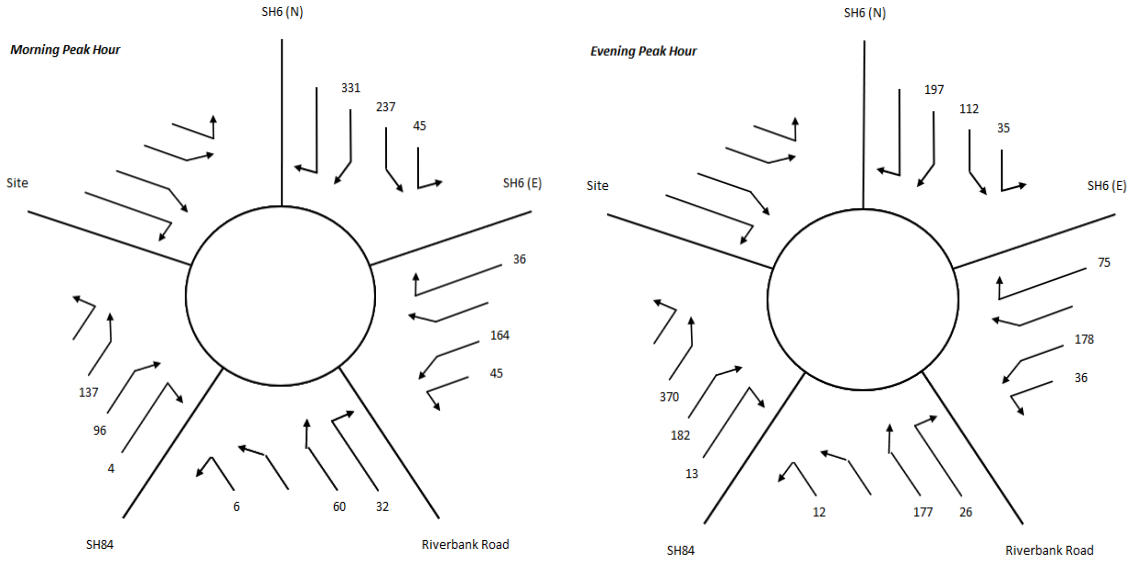


Figure 8: WSP 2018 Forecast Peak Hours for Year 2025 at the State Highway 6 / State Highway 84 / Riverbank Road Roundabout

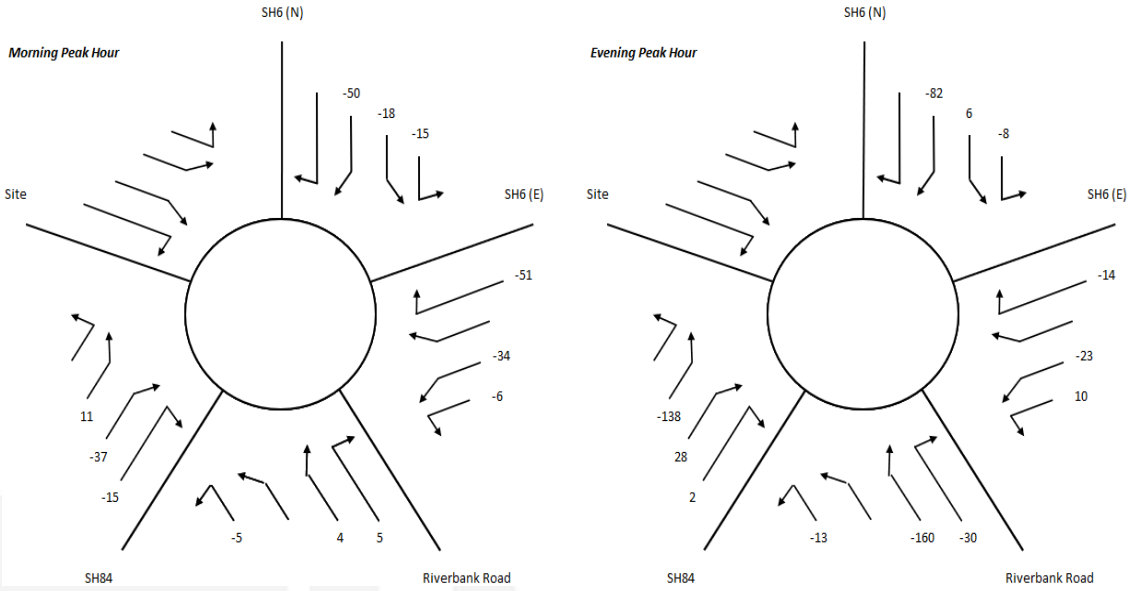


Figure 9: 2025 WSP Forecasts Minus 2025 Observed Peak Hour Traffic Flows

5.4.2. The data shows that the WSP 2025 forecasts are lower on many movements than the observed 2025 traffic volumes, particularly in the evening peak hour. Overall, the WSP forecast of the total traffic volumes through the roundabout is 13.3% lower than observed in the morning peak hour, but 20.0% lower in the evening peak hour. For the critical movement at State Highway 84 in the evening peak hour, the WSP forecast had 565 vehicles approaching the roundabout being opposed by 278 vehicles circulating. The July 2025 survey showed 673 vehicles approaching (19.1% more) being opposed by 482 circulating vehicles (73.3% more).

5.4.3. Ultimately this difference led to WSP reporting that in 2030, the highest degree of saturation would be 90% on State Highway 84, with an average 22 seconds of delay per vehicle, whereas the modelling of current volumes and ambient growth shows that by 2030 the saturation on State Highway 84 will be 102% with an average delay of more than 70 seconds per vehicle (as summarised on Table 5 above).

5.5. *Receiving Environment for the Proposed Development*

5.5.1. For the purposes of assessing the proposed development, the approach taken has been to consider a design year of ten years from the current time. The roundabout has therefore been modelled allowing for ambient traffic growth as discussed above (using the observed traffic growth from the surveys), plus the presence of the service station, but not any other components of the consented development, as these would not progress if the proposed development gains consent)[7]. The results are summarised below.

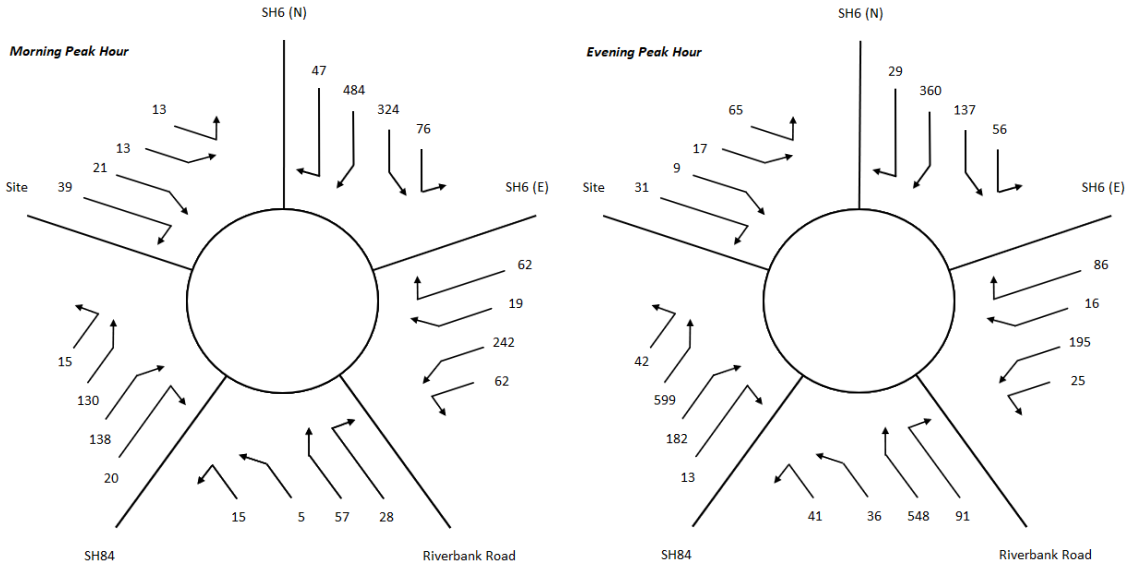


Figure 10: Design Year of 2035 (Traffic Growth from Surveys) Traffic Volumes, with Service Station

Approach	Morning Peak Hour			Evening Peak Hour		
	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Riverbank Road	14.8	1.3	B	43.4	27.6	D
State Highway 6 (East)	38.3	12.8	D	11.6	2.9	B
State Highway 6 (North)	14.1	10.6	B	12.5	4.1	B
Site	6.5	0.5	A	35.1	4.2	D
State Highway 84 (West)	7.5	1.6	A	357.1	169.3	F
All	17.8	12.8	B	133.8	169.3	F

Table 7: Peak Hour Levels of Service at the State Highway 6 / State Highway 84 / Riverbank Road Roundabout Plus Service Station, 'Design Year' of 2035 (Growth from Surveys)

5.5.2. It can be seen that the roundabout operates well in the morning peak hour, but does not have sufficient capacity for this scenario in the evening peak hour when a degree of saturation of 147% arises. The queue length on State Highway 84 is indicated to extend to, and slightly past, the roundabout serving Three Parks. In practice however, this is unlikely to arise – in part because it is likely to be outside the range of volumes for which the software has been validated, and in part because when congestion increases, drivers select alternative routes or

[7] Noting that the service station does not form part of the proposed development for the Fast-Track Approvals Act but is relevant to the cumulative effects assessment.

re-time their journey (as appears to have been occurring prior to the roundabout being constructed) .

5.5.3. A further assessment has been carried out allowing for traffic growth over ten years based on the Council's transportation model (plus the service station) and the results are shown below.

Approach	Morning Peak Hour			Evening Peak Hour		
	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Riverbank Road	13.9	1.3	B	19.0	9.0	B
State Highway 6 (East)	21.4	7.8	C	11.3	3.2	B
State Highway 6 (North)	12.8	7.4	B	12.5	3.7	B
Site	6.6	0.5	A	36.5	4.2	D
State Highway 84 (West)	7.6	1.7	A	141.8	89.6	F
All	13.5	7.8	B	61.7	89.6	E

Table 8: Peak Hour Levels of Service at the State Highway 6 / State Highway 84 / Riverbank Road Roundabout Plus Service Station, 'Design Year' of 2035 (Growth from Model)

5.5.4. The same outcome is observed, of the roundabout operating appropriately in the morning peak hour but having insufficient capacity in the evening peak hour (and a degree of saturation of 112% on State Highway 84). As noted earlier, the growth rate from the Council's model is lower than has been observed to date, and so it is considered that this represents the 'best case' scenario.

5.5.5. Feedback received from NZTA is that it is accepted that the modelling is accurate and it is acknowledged that based on the surveys, the traffic flows on the State Highway 84 approach could exceed capacity within 5 to 7 years. NZTA also acknowledges that the observed volumes are clearly higher than WSP's forecasts for the current year.

5.6. Non-Car Modes of Travel

5.6.1. Given that the area is predominantly rural at present, it can reasonably be expected that it will be relatively infrequently used by pedestrians. Although no formal surveys have been carried out, informal observations indicate negligible pedestrian and cycling movements along the highway or the district roads. The exception to this is that informal observations have identified a small number of walking movements along Sir Tim Wallis Drive, associated with movements to and from the service station. Informal surveys also showed high use of the Mount Iron Track by cyclists (and to a lesser extent, pedestrians) on Saturdays. It can also be expected that this is associated with recreational walking and cycling.

5.6.2. On this basis, the current levels of infrastructure provided for both pedestrians and cyclists are considered to be appropriate for the likely volumes.

5.6.3. There are no regular bus services that service Wānaka. Although several longer-distance services pass nearby on State Highway 6 and 84, there are no bus stops provided within walking distance of the site.

5.7. Road Safety

5.7.1. As the State Highway 6 / State Highway 84 / Riverbank Road roundabout is newly constructed, historic crash records are unhelpful when considering road safety performance. The roundabout has been open for just one year (when a five-year period should be considered) and prior to this, the area operated under temporary traffic management which will have also distorted the crash records.

5.7.2. In this case however, the roundabout has been designed under current standards and guides, and is likely to have been subject to a formal road safety audit. It can therefore be expected to operate safely. The NZTA Crash Analysis System (**CAS**) does not show any reported crashes at the roundabout since it opened.

5.7.3. With regard to the remainder of the roading network, CAS has been used to establish the location and nature of the recorded traffic crashes between 2020 and 2024, plus the partial record for 2025, for a distance of 250m around the site.

5.7.4. This assessment identified 8 reported crashes:

- One crash occurred on State Highway 84, approximately 130m west of the western boundary of the site, when a westbound driver lost control on an icy road surface and left the road. The crash resulted in minor injuries;
- One crash occurred on State Highway 84, just east of the western boundary of the site, when a westbound driver lost control within roadworks due to swerving to avoid a rabbit, and left the road. The crash resulted in minor injuries;
- One crash occurred on Riverbank Road, approximately 175m south of State Highway 6, when a police car undertaking a routine stop drove onto the grass verge and struck tree roots, causing damage to the vehicle. The crash did not result in any injuries;
- One crash occurred on State Highway 6 (north), when a driver carried out a u-turn, and turned in front of another vehicle, colliding with it. The crash did not result in any injuries;
- One crash occurred on State Highway 6 (north), when a driver stopped to turn right into Balneaves Lane, and was struck from behind by another vehicle. The crash did not result in any injuries;
- One crash occurred on State Highway 6 (north), when a driver ran into the rear of another, in a queue of traffic at a police checkpoint. The police report notes that the at-fault driver was looking for their driving license and had taken their eyes off the road. The crash did not result in any injuries;
- One crash occurred at the State Highway 6 (north) / Aubrey Road intersection, when a driver pulled out from Aubrey Road and was struck by a northbound vehicle. The police report notes that the northbound vehicle had been obscured by another vehicle that was turning left into Aubrey Road. The crash did not result in any injuries;
- One crash occurred at the State Highway 6 (north) / Aubrey Road intersection, when a driver pulled out from Aubrey Road and was struck by a northbound vehicle. The police report notes that the northbound vehicle had mistakenly left their left-turn indicator on, which misled the other driver to believe that they could exit Aubrey Road. The crash did not result in any injuries.

5.7.5. No crashes have been reported at the State Highway 6 / State Highway 84 / Riverbank Road roundabout since opening.

5.7.6. The crash rate is not untypical for mid-block locations, and of the 8 crashes, it is considered that the crashes that occurred in roadworks and as a result of the police stops were unusual/untypical situations. Crashes involving u-turns on State Highway 6 (north) will not now occur as drivers are able to turn around the new roundabout. The remaining crashes occurred in different locations and/or for different reasons, and as such it is not considered that there is an inherent road safety deficiency in the roading environment.

6. Proposal

6.1. The proposed development is for 250 residential units in a variety of forms (terraced housing, townhouses and apartments).

6.2. All units have allocated car parking spaces, either provided within garages or on hard-stand areas within the lots themselves, or in communal parking areas. On-street parking is also provided to accommodate additional residents' vehicles and also for residents' visitors.

6.3. A small amount of non-residential development is also proposed, which includes a childcare centre for 65 children, a café (154sqm GFA) and a small retail unit (275sqm GFA). The non-residential elements of the proposal are to assist the site in being self-sufficient for residents' core needs, meaning that, for example, a resident would not be required to leave the site for a small amount of shopping but could instead walk or cycle to the on-site retail tenancy.

6.4. Non-car linkages are provided between the site and the surrounding walking and cycling networks. The focus of these is generally towards the west, since this is the direction of the Three Parks development, which has large retail and community activities to which residents of the site can be expected to walk and cycle. The Mt Iron Reserve, Wānaka Town Centre and Lake Wanaka are also located towards the west of the site.

6.5. Vehicular access is achieved solely via the fifth leg of the State Highway 6 / State Highway 84 / Riverbank Road roundabout, which connects to a small internal roading network. The roading network is already formed.

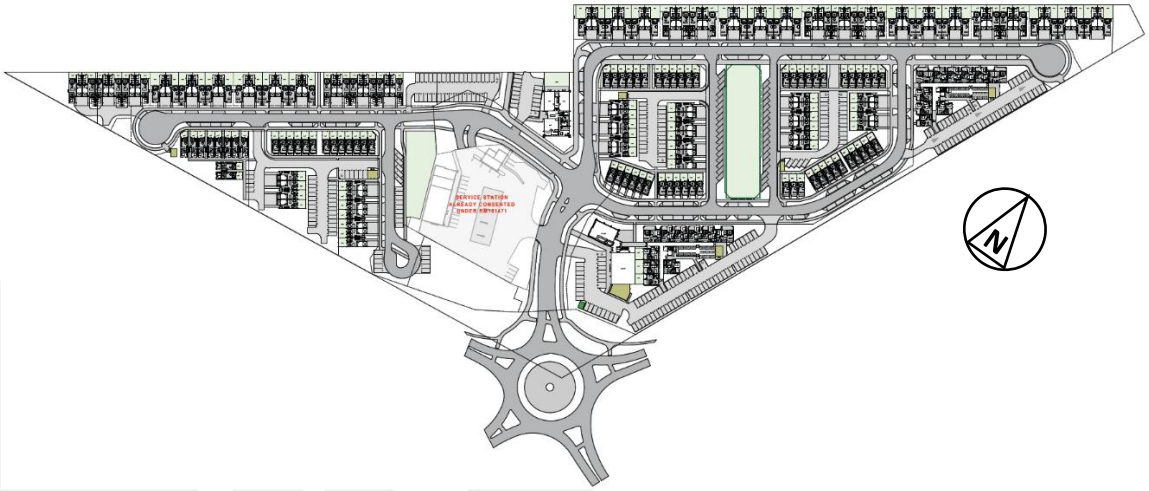


Figure 11: Proposed Site Layout (Extract from Figure & Ground Drawing)

7. Traffic Generation and Distribution

7.1. Traffic Generation

7.1.1. The development comprises several elements, which are discussed separately below. The overarching approach however has been to maintain consistency with the trip rates and assumptions made in the 2017 development, which was reviewed and accepted by NZTA and Queenstown Lakes District Council in 2017.

7.1.2. The service station and laundromat are already consented and no changes are proposed to this as part of the proposal. The traffic generation is discussed previously in this report and form part of the existing environment. For completeness, the laundromat was accepted by both NZTA and the Council as not generating any external trips in previous analyses.

7.1.3. Large residential developments within the district have generally been assessed as generating 0.9 vehicle movements per unit in the peak hours. This rate reflects that there will likely be a need to travel for employment or the 'school run' but that residents have some discretion as to when they will travel, and they may travel outside the peak hours. It also allows for some degree of internal trip-making.

7.1.4. The closest part of the site is located 1.1km from the northern parts of Three Parks, which means that walking and cycling trips to this major commercial and employment area are viable, as discussed previously. Trips made on foot or by cycle will therefore diminish the extent of vehicle use. However, for consistency with the other assessments carried out for this site, a rate of 0.9 vehicle movements per unit in the peak hours has been used. With 250 units proposed, this leads to the following traffic generation:

- Morning peak hour: 45 vehicles enter and 180 vehicles exit; and
- Evening peak hour: 146 vehicles enter and 79 vehicles exit.

7.1.5. Traffic generated by childcare centres can arise from two different sources, trips associated with staff and those associated with dropping off and picking up children. However, staff members typically arrive in advance of the children to prepare for the day ahead, and they also depart after the majority of children have left. Consequently, the peak traffic generation of such developments is dependent upon the number of children arriving and departing rather than staff travel.

7.1.6. NZTA Research Report 422 ('*Trips and Parking Related to Land Use*') sets out that in the peak hours, 1.4 vehicle movements per child can be expected (two-way). Surveys undertaken at the St Kilda preschool in 2010 indicated a slightly lower rate of 1.1 vehicle movements (two-way) per child in the peak hour. Given that the site is not within walking distance for most children, the higher rate has been adopted in this analysis.

7.1.7. In this case, the number of children for which the centre will be licensed is a maximum of 65 children will be present at any one time.

7.1.8. There is little data to differentiate between the traffic generated in the morning and evening peak hours, although informal observations are that more vehicle movements will be associated with the morning. This is because some children will stay for only part of the day, and also because children with older, school-aged siblings may be picked up immediately after school ends rather than at the end of the working day. A conservative approach has been taken in this analysis of allowing for the evening peak hour to be 75% of that in the morning.

7.1.9. This leads to the following traffic generation, which is consistent with that used in the assessment of the previous development:

- Morning peak hour: 45 vehicles enter and 45 vehicles exit; and
- Evening peak hour: 34 vehicles enter and 34 vehicles exit.

7.1.10. The intent of the childcare centre is predominately to meet the needs of residents. That is not to say that children living outside the site will be prevented from attending, but rather than the majority of attendees will be drawn from those living within the site. In practice though, if a child is attending the facility who lives external to the site, this trip would likely already be made on the adjacent road network (as if they were not attending the facility on the site, they would be attending another one instead).

7.1.11. On this basis then, it is not expected that the childcare facility will generate significant numbers of new, external traffic movements. However to ensure a robust assessment, an allowance has been made for one third of trips to be made by residents of the site, one third to be new trips, and one third to be trips already on the network but where caregivers divert into the site before resuming their journey.

- Morning peak hour:
  - 15 entering trips and 15 exiting trips are made wholly within the site;
  - 15 entering trips and 15 exiting trips are new trips on the network; and
  - 15 entering trips and 15 exiting trips are diverted trips that were already passing the site.
- Evening peak hour:
  - 11 entering trips and 11 exiting trips are made wholly within the site;
  - 11 entering trips and 11 exiting trips are new trips on the network; and
  - 11 entering trips and 11 exiting trips are diverted trips that were already passing the site.

7.1.12. In a similar way to the childcare centre, the retail unit and café are expected to meet the needs of residents rather than attracting customers from elsewhere. There are large retail facilities at Three Parks towards the west, and a superette at Albert Town to the north, which means it is highly unlikely that a person travelling past the site would choose to use the on-site retail activity.

7.1.13. On that basis then, a conservative allowance has been made for 50% of trips to be made by residents of the site. Of the remainder, 25% have been anticipated to be trips that are already on the network and divert into the site with 25% being wholly new trips.

7.1.14. Cafés do not generate significant traffic volumes during the morning and evening weekday periods, and so no trip-making activity has been allowed for at these times. The rate for a small shopping centre set out in NZTA Research Report 453 has been used, of 14.6 trips per 100sqm in the evening peak hour (the same rate used in previous analysis), indicating 40 trips in the evening peak hour. Far fewer people travel to commercial activities in the morning peak hour and thus an allowance has been made for 20% of the evening peak hour flow to be present in the morning peak hour.

7.1.15. Therefore the following traffic generation can be expected:

- Morning peak hour:
  - 2 entering trips and 2 exiting trips are made wholly within the site;
  - 1 entering trip and 1 exiting trip are new trips on the network; and
  - 1 entering trip and 1 exiting trip are diverted trips that were already passing the site.
- Evening peak hour.
  - 10 entering trips and 10 exiting trips are made wholly within the site;
  - 5 entering trips and 5 exiting trips are new trips on the network; and
  - 5 entering trips and 5 exiting trips are diverted trips that were already passing the site.

7.1.16. One further matter is the extent to which there will be shared trips. For instance, while dropping off a child at the childcare, a caregiver might also visit the service station, or a trip to the cafe could also be combined with a visit to the retail. This is accounted for within the 'internal' trips but not within the pass-by or new trips to those activities.

7.1.17. There is little information as to the extent to which trips are combined in this was and so a notional 10% reduction has been applied (that is 1 in 10 trips will be combined with a visit to another activity).

7.1.18. In summary, the trip generation of the proposed development is therefore expected to be:

Activity	Morning Peak Hour			Evening Peak Hour		
	In	Out	Total	In	Out	Total
Residential	45 new	180 new	225 new	146 new	79 new	225 new
Childcare centre	15 internal 13 passby 13 new	15 internal 13 passby 13 new	30 internal 26 passby 26 new	11 internal 10 passby 10 new	11 internal 10 passby 10 new	22 internal 20 passby 20 new
Retail	2 internal 1 passby 1 new	2 internal 1 passby 1 new	4 internal 2 passby 2 new	10 internal 5 passby 5 new	10 internal 5 passby 5 new	20 internal 10 passby 10 new
Total	17 internal 14 passby 59 new	17 internal 14 passby 194 new	34 internal 28 passby 253 new	21 internal 15 passby 161 new	21 internal 15 passby 94 new	42 internal 30 passby 255 new

Table 9: Weekday Peak Hour Traffic Generation of the Proposed Development

7.2. Trip Distribution

7.2.1. For the residential component of the development, travel will be heavily affected by the location of employment opportunities. It can be expected that these predominately will be within Wānaka. The main town and Three Parks (where the greatest extent of commercially zoned vacant land is available) is accessed to/from the west, but Riverbank Road is demonstrably an attractive route for residents who live in Albert Town and Hāwea, and increasingly so on the basis of the most recent survey. It is also of note that there are few attractors towards the immediate east (via State Highway 6) and the Riverbank Road route also provides a connection to the highway further to the southeast (as well as connecting to southern parts of Wanaka, and to Cardrona and Queenstown). It also seems unlikely that there would be a major flow to and from the north and Albert Town / Hāwea, due to these predominately being residential areas rather than locations of employment and education.

7.2.2. Consequently the distribution of vehicles in the morning peak hour has been based on the volumes and directions of traffic approaching the roundabout on each leg.

7.2.3. In the evening, the bulk of traffic approaches the roundabout from the direction of Wānaka town centre. However there is also a relatively large movement from State Highway 6 (north) into Wānaka. This is likely to be residents travelling towards the town or Three Parks for retail or recreational purposes, and this pattern is likely to be present for residents of the proposed site. Accordingly for traffic approaching the site, the generated traffic has been apportioned according to the volumes on each approach. For exit movements however, the same directional pattern has been applied as is presently seen on State Highway 6 (north).

7.2.4. The traffic distribution is shown below. Where negative numbers are shown, this reflects a reduction in the number of trips being made on a particular movement due to a proportion instead diverting into the site.

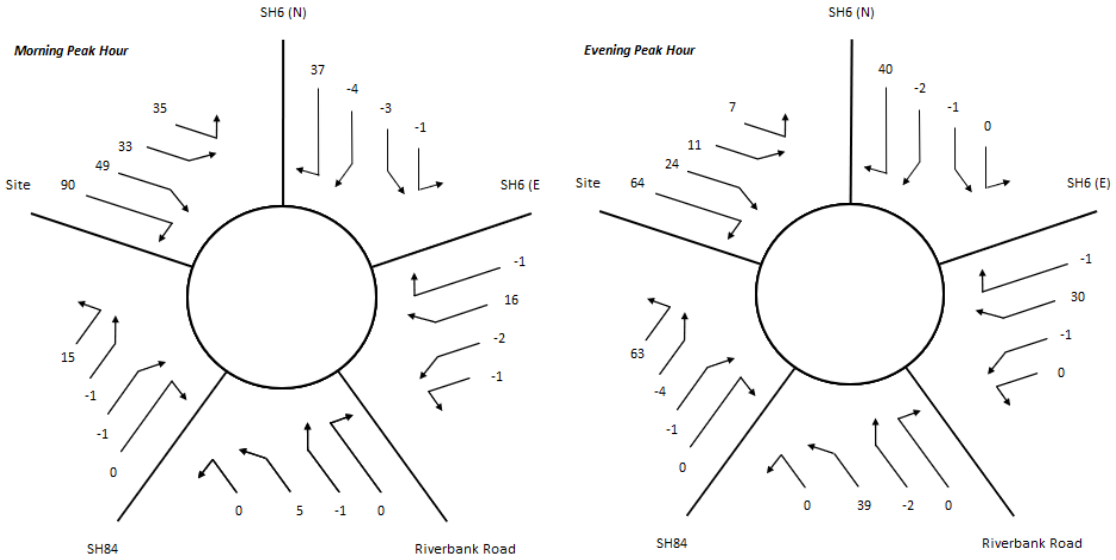


Figure 12: Traffic Generation of Proposed Development

8. Effects on the Transportation Networks

8.1. Roading Network Capacity

8.1.1. As set out previously, the focus of this report is on the external effects of the proposal. Consequently, the roundabout has been remodelled using the computer software program Sidra Intersection, and the results are summarised below. For this assessment, the scenario tested has been the 'design year' of ten years' time allowing for the traffic growth derived from the 2017 and 2025 surveys (Figure 10) plus the development traffic (Figure 12).

Approach	Morning Peak Hour			Evening Peak Hour		
	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Riverbank Road	16.5	1.7	B	170.5	85.0	F
State Highway 6 (East)	225.2	56.5	F	14.7	4.4	B
State Highway 6 (North)	28.5	25.7	C	14.0	5.3	B
Site	6.9	2.1	A	37.8	7.4	D
State Highway 84 (West)	7.7	1.7	A	434.4	198.4	F
All	59.3	60.8	E	189.6	198.4	F

Table 10: Peak Hour Levels of Service at the State Highway 6 / State Highway 84 / Riverbank Road Intersection Plus Service Station, 'Design Year' of 2035 (Growth from Surveys), Plus Proposed Development

8.1.2. In the morning peak period, the queue length on State Highway 6 (east) increases to 57 vehicles. In part, this is due to development-related traffic adding to the volume circulating past this leg, and reducing the number of gaps into which vehicles approaching from the east can emerge. However it also reflects growth on State Highway 6 (north) due to other development.

8.1.3. As set out previously, the roundabout has insufficient capacity to accommodate the traffic flows arising from ambient traffic growth without any development in the evening, and consequently it is unsurprising that queues and delays increase significantly when development traffic is added. A comparison of the scenarios with and without the proposed development is shown below (the latter being the scenario with the consented development).

Approach	Morning Peak Hour	Evening Peak Hour

	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Riverbank Road	+1.7	+0.4	-	+127.1	+57.4	D to F
State Highway 6 (East)	+186.9	+43.7	C to F	+3.1	+1.5	-
State Highway 6 (North)	+14.4	+15.1	B to C	+1.5	+1.2	-
Site	+0.4	+1.6	-	+2.7	+3.2	-
State Highway 84 (West)	+0.2	+0.1	-	+77.3	+29.1	-
All	+41.5	+48.0	B to E	+55.8	+29.1	-

Table 11: Differences in Peak Hour Levels of Service at the State Highway 6 / State Highway 84 / Riverbank Road Intersection Plus Service Station, 'Design Year' of 2035 (Growth from Surveys), with and without Proposed Development

8.1.4. As may be evident from the previous analysis, the outcomes are sensitive to the growth rate used. Accordingly, a scenario using the traffic growth from the Council's model (as shown on Table 4 above) has been modelled, to allow for ten years of traffic growth plus development traffic (as shown on Figure 12), and the results are summarised below.

Approach	Morning Peak Hour			Evening Peak Hour		
	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Riverbank Road	16.2	1.8	B	38.9	18.7	D
State Highway 6 (East)	69.7	21.4	E	14.6	4.9	B
State Highway 6 (North)	19.9	14.3	B	13.5	4.4	B
Site	7.2	2.1	A	38.1	7.4	D
State Highway 84 (West)	7.9	1.9	A	343.9	176.7	F
All	25.7	24.9	C	135.8	176.7	F

Table 12: Peak Hour Levels of Service at the State Highway 6 / State Highway 84 / Riverbank Road Intersection Plus Service Station, 'Design Year' of 2035 (Growth from Model), Plus Proposed Development

Approach	Morning Peak Hour			Evening Peak Hour		
	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service	Avg Delay (secs)	95 %ile Queue (veh)	Level of Service
Riverbank Road	+2.3	+0.5	-	+19.9	+9.7	B to D
State Highway 6 (East)	+48.3	+13.6	C to E	+3.3	+1.7	-
State Highway 6 (North)	+7.1	+6.9	-	+1.0	+0.7	-
Site	+0.6	+1.6	-	+1.6	+3.2	-
State Highway 84 (West)	+0.3	+0.2	-	+202.1	+87.1	-
All	+12.2	+17.1	B to C	+74.1	+87.1	E to F

Table 13: Differences in Peak Hour Levels of Service at the State Highway 6 / State Highway 84 / Riverbank Road Intersection Plus Service Station, 'Design Year' of 2035 (Growth from Model), Plus Proposed Development

8.1.5. It can be seen that overall, the roundabout is able to accommodate the expected traffic volumes with the development in place in the morning peak hour. However as there are already large queues and delays in the evening peak hour, the additional traffic generation by the proposed development leads to increases in queuing and delays. Although the roundabout performs slightly better overall when compared to the assessment based on surveyed growth (as set out in Table 10), the greatest delay on any approach is still nearly six minutes.

8.1.6. The effects of the proposed development arise due to the increase in traffic flows on State Highway 84, and consequently such an increase would arise with the same scale of development (250 houses) located on a hypothetical site served by State Highway 6 to the east or north. They could also arise with other types of development, not just housing. In other words, the effects do not arise as a result of this particular site being developed for this particular purpose, but would also occur from different types of development and/or in different locations. In that regard, it is relevant that the proposed District Plan contemplates a much higher level of activity within Albert Town:

- Under the operative District Plan, parts of Albert Town were zoned as Rural Residential with a minimum lot size of 4,000sqm. These lots are rezoned under the proposed District Plan to Large Lot Residential A with a minimum lot size of 2,000sqm; and
- Under the operative District Plan, other parts of Albert Town were zoned as Township with a minimum lot size of 800sqm. These lots are rezoned under the proposed District Plan to Lower Density Suburban Residential with a minimum lot size of 450sqm.

8.1.7. It is therefore not unreasonable that the intensification of Albert Town as anticipated under the proposed District Plan will give rise to the same (or worse) outcomes as those anticipated under the proposed development.

8.2. Non-Car Modes of Travel

8.2.1. It is unlikely that the development will lead to an increase in the extent of walking or cycling on the state highway network towards the east, south or north due to distances involved meaning that these non-car modes of transport are unlikely to be attractive. However walking and cycling movements towards the west are likely due to this being the direction of the retail and commercial activities at Three Parks. It is also of note that while the typical distances for walking and cycling are 1km and 3km respectively, the advent of micromobility and e-bikes

means that these distances are now greater (for example, e-scooters averaged a journey distance of 1.9km in the district[8]). It is therefore considered that Three Parks is easily within a viable, non-car travel distance and time.

8.2.2. As set out above, the site provides for connections on its western side to the Mount Iron Trail, which is a shared, off-road route about the base of Mt Iron. This route is able to be used by both pedestrians and cyclists, with travel times to the New World supermarket of around 8 minutes for the latter. Users travelling between the site and Three Parks only need to undertake one at-grade crossing on a 40km/h district road, due to the underpass beneath the highway.

8.2.3. On this basis, it is considered that the provision made for non-car road users is already excellent, and this will continue to remain the case even with some degree of increased use by residents of the site. The Austroads Guide to Road Design Part 4A ('*Paths for Walking and Cycling'*) indicates that the current width of the shared route is able to accommodate increased use without the need for any improvements.

8.2.4. Overall, the site provides for more opportunities to travel by non-car modes than residential development in locations that are further afield, where journey distances are greater and thus walking and cycling is less likely.

8.2.5. It is not considered that the small size of the development will give rise to the need for a scheduled public transport service in Wānaka, noting that the township already has over 7,000 dwellings and no scheduled service has yet been progressed.

8.2.6. In the event that a service was to be implemented in future, it is likely that this will connect the main destinations in the area such as Hāwea, Albert Town, Three Parks and Wānaka. That being the case, the service is likely to run directly past the site on State Highway 6 and 84. The size of development (250 houses) is unlikely to justify a service that enters the site, but it would be possible for bus stops to be constructed on either state highway, with walking and cycling linkages provided into the site by way of the existing road crossing opportunities and shared routes near to the roundabout.

8.3. Road Safety

8.3.1. The crash record does not suggest that the development will exacerbate any current adverse road safety effects, with the newly-constructed design of the State Highway 6 / State Highway 84 / Riverbank Road roundabout presently operating with an excellent road safety record.

8.3.2. However and irrespective of the proposed development, as congestion increases through ambient traffic growth, it is likely that drivers will start to accept shorter gaps in the circulating traffic, and this then increases the potential for crashes as some gaps they accept are unsuitable. Similarly, because queues will be longer, there is an elevated potential for nose-to-tail collisions on the approaches. Additionally, crash numbers are proportional to traffic volumes. Overall then, it can be expected that the number of crashes at the roundabout will increase in future. These outcomes will arise irrespective of the development.

8.3.3. With the development in place, it can be expected that the increase in queuing and delays will contribute to the increased risk of a crash. However this is difficult to forecast with certainty

[8] https://www.qldc.govt.nz/media/mllluyf3/1-beam-e-scooter-trial.pdf

because, as set out previously in this report, the same effect may arise with a comparable number of residences elsewhere (paragraphs 7.1.6 and 7.1.7).

8.3.4. With regard to non-car modes of travel, the most likely destinations lie to the west and these can be accessed via an off-road route, and an underpass eliminates the need to cross State Highway 84 at-grade. The only at-grade crossing needed to access Three Parks is towards the north of Sir Tim Wallis Drive, and a formal crossing is provided within the deflection island on the roundabout approach. This road is subject to a 40km/h speed limit, which provides an enhanced ability to for pedestrians and cyclists to cross. The refuge means pedestrians and cyclists are able to cross the road in two movements, rather than waiting for a suitable gap in both directions.

8.3.5. As set out in the second report, the linkages for walking and cycling within the site are also excellent. Consequently it is not considered that further road safety measures are required to support non-car road users.

9. Conclusions

9.1. This report has identified, evaluated and assessed the various transport and access elements of a proposed residential development at 237 Wānaka Luggate Highway on the adjacent state highway network.

9.2. The analysis shows that at the current time (2025), the adjacent State Highway 6 / State Highway 84 / Riverbank Road roundabout has sufficient capacity to accommodate existing traffic flows. However a further assessment of the State Highway 84 approach in the evening peak hour shows that when the consented development at the site plus traffic growth is considered, large queues and delays are observed in five years' time (using the rate of growth seen in the traffic surveys) or seven years' time (using the rate of growth from the Council's transportation model. The conclusion of the roundabout approaching capacity is confirmed through consultation with NZTA.

9.3. For clarity, the critical approach is State Highway 84 exiting Wānaka in the evening, where delays of around a minute and queues of 46 vehicles are seen in five (or seven) years' time. In the morning peak hour, the roundabout continues to have sufficient capacity.

9.4. Further review shows that traffic volumes at the roundabout are higher than was expected when the roundabout was designed in 2018. In particular, the expected traffic flows in 2030 set out by WSP in a memorandum to NZTA are now being seen in 2025. Put another way, in the morning peak hour, traffic flows are 13% greater than was forecast and in the evening peak hour, traffic flows are 20% greater than forecast. Rates of past traffic growth seen in surveys (2017 and 2025) are also larger than forecast by the Council's transportation model.

9.5. For the purposes of assessing the referred Fast-Track application, a 'design year' of ten years' time has been used. At this point, making allowance for the consented service station plus ambient traffic growth but without any traffic associated with the development, queues in the evening peak hour on State Highway 84 increase to:

- 169 vehicles and delays of nearly six minutes, using the rate of growth seen in the traffic surveys; and
- 90 vehicles and delays of nearly 2.5 minutes in the evening peak hour, using the rate of growth from the model).

9.6. The traffic generation of the proposed development has been calculated based on the trip rates used for a previous development on this site. When these are added to the 'design year' volumes, queues in the evening peak hour on State Highway 84 increase to:

- 200 vehicles and delays of more than seven minutes, using the rate of growth seen in the traffic surveys; and
- 180 vehicles and delays of nearly six minutes, using the rate of growth from the model).

9.7. Additional observations show that from time to time, the queue of vehicles on State Highway 84 are already extending for some length, indicating that the approach is already experiencing a poor level of service on occasions.

9.8. The crash history in the vicinity of the site does not indicate that there are presently any adverse road safety effects which may be exacerbated by the proposed development, although a degradation in road safety performance can be expected as queues and delays increase (as with any growth that increases congestion).

9.8.1. The effects of the proposed development arise due to the increase in traffic flows on State Highway 84, and consequently such an increase would arise with the same scale of development located on a hypothetical site served by State Highway 6 to the east or north, or through the intensification of Albert Town as anticipated under the proposed District Plan.

9.9. The site is well-connected to the Three Parks commercial / mixed use area towards the west. Notably, there is a well-formed off-road walking and cycling track, and an underpass on State Highway 84, such that residents of the site only need to undertake one at-grade crossing of a road. This is across Sir Tim Wallis Drive, where there is a formal pedestrian (and cyclist) crossing provided via the deflection island of the roundabout. A journey on cycle between the site and the New World supermarket would take around 8 minutes.

Carriageway Consulting Limited
February 2026

Appendix A

Qualifications and Experience of Report Author

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Qualifications and Experience

Report Author: Andy Carr

Professional Qualifications

1988	Bachelor of Science with Honours (Computing Science), University of Newcastle upon Tyne
1989	Master of Science (Transport Engineering and Operations), University of Newcastle upon Tyne
1998	Master of Business Administration (Distinction): University of Newcastle upon Tyne
2006 - present	Chartered Professional Engineer (Practice field: Transportation engineering)
2006 - present	International Professional Engineer (NZ)
2006 - present	APEC Engineer
2006 - present	Chartered Member, Engineering New Zealand

Employment Profile

2014 - present	Director and Owner, Carriageway Consulting Limited – involved in numerous transportation engineering projects from transportation assessments for new developments and plan changes, to roading design, road safety audits, and independent peer reviews for local authorities and government departments. Preparation and presentation of expert evidence to Council Hearings and the Environment Court.
2012 - 2014	Associate Principal, Abley Limited - leading a range of transportation assessments for land-use projects throughout the country, and provision of expert evidence.
2005 - 2012	Senior Transport Planner and progressing to Senior Associate / Office Manager, Traffic Design Group - responsible for sourcing, managing and overall technical direction of the transportation assessments for land use development projects throughout the South Island.
2004 - 2005	Senior Transport Planner, Beca - assisting in a variety of roading projects with particular responsibility for writing the first New Zealand Pedestrian Planning Guide.
1990 - 2004	Traffic engineer in various private sector roles in the UK, ranging from Graduate (1990-1992) to Principal (2000-2004) with a range of roles, initially assisting with a variety of projects assessing land use changes, road safety and strategic transportation studies, and ultimately managing a local team with technical oversight of all work carried out, client liaison and sourcing commissions.

Additional Information

Member, Resource Management Law Association

Member, Engineering New Zealand Transportation Group

Associate Member, New Zealand Planning Institute

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