TRAFFIC PLANNING CONSULTANTS LTD

PROPOSED RESIDENTIAL SUBDIVISION

6 TEITEI DRIVE
OHAKUNE

INTEGRATED TRANSPORT ASSESSMENT

Prepared By:
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June 2023
Reference: 220846
Rev D - Final

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Project Information:

Client	Kainga Ora Homes and Communities
Job Number	220846
Title	Proposed Residential Subdivision – 6 TeiTei Drive, Ohakune Integrated Transport Assessment
Prepared By	Udit Bhatti & Todd Langwell
Date	June 2023

Document History and Status

Revision	Date Issued	Reviewed By	Approved by	Date approved	Status
A	12/05/2023	T Kear	T Langwell	26/05/2023	Draft
B	26/05/2023	T Langwell	T Langwell	23/05/2023	Draft
C	28/05/2023	T Langwell	T Langwell	28/05/2023	Draft
D	29/06/2023	T Langwell	T Langwell	29/06/2023	Final

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1.0 INTRODUCTION

This report is an integrated transport assessment prepared in accordance with chapter Transport, Infrastructure and Car Parking (TI) of Ruapehu District Plan (RDP). The report examines and describes the traffic and parking effects of a proposal to establish a residential subdivision located at 6 Teitei Drive, Ohakune. The site is located immediately south of Teitei Drive as illustrated in **Figure 1**. The site is currently zoned Residential in the Raupehu District Plan Maps (RDPM).

The proposal is described in more detail within the application. It involves the establishment of 46 residential lots as Stage 1 of a larger subdivision. A new local road network will also be provided connecting to wider transport network via Teitei Drive.

This report describes the nature of the local transport environment around the site; sets out the transport characteristics of the proposal; assesses its likely impacts on the surrounding transport environment, including any mitigation measures that are considered necessary to minimise those impacts; and considers the application in terms of the relevant standards and assessment criteria set out in Section T12 and T13 of the RDC including modelling and analysis of key intersection.

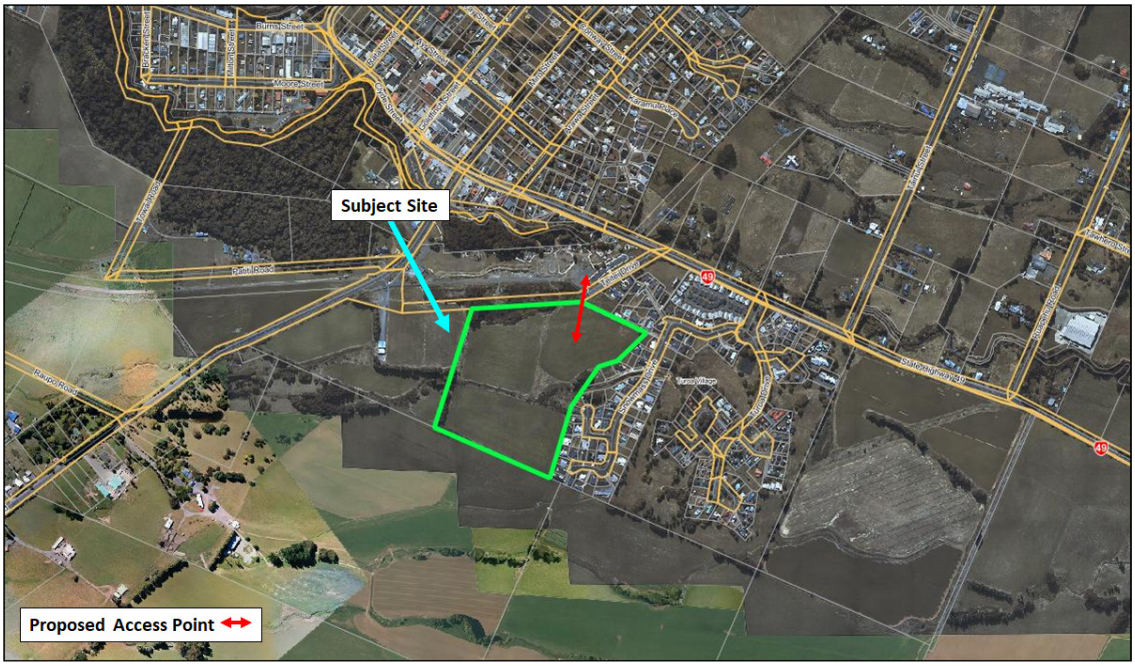

Figure 1: Site Location
Source: https://maps.ruapehudc.govt.nz/intramaps90/?project=Ruapehu

2.0 EXISTING TRANSPORT ENVIRONMENT

2.1 Existing Site Traffic Conditions

The site is currently an unoccupied greenfield site with no vehicle access provided to it.

2.2 The Surrounding Road Network and Activities

The surrounding area is generally rural, recreational, or residential in nature.

The site is bounded by Carrot Park Playground and Teitei Road to the north, by residential properties to the east, farmland to the south and recreational sports fields to the west. Approximately 1.5 km north-east of the site is Raupehu College and approximately 700 metres north-west of the site is the Ohakune town centre where a range of shops and facilities are provided.

2.2.1 State Highway 49 (Rangataua Road)

State Highway 49 (SH49) runs in a general east-west direction past the site and provides a connection between State Highway 1 at Waiouru in the east and State Highway 4 in the west, known as Tohunga Junction.

Near the subject site, SH49 has a carriageway width of some 10.0 metres providing one traffic lane in each direction and a narrow shoulder. There is speed reduction sign provided to the west of the SH49/Teitei Drive intersection indicating an advised speed of 70 km/h for eastbound vehicles and 50 km/h for westbound vehicles. On-street parking is only permitted along the southern side of the carriageway and 'No Stopping Lines at All Times' are marked along the northern side of the carriageway.

Information from NZTA State Highway Traffic Monitoring[1] database suggests that near the subject site (ID: 04900011) SH49 carries a flow of 2,467 vehicles per day and an estimated peak hour flow of some 250 vehicles per hour.

2.2.2 Teitei Drive

Teitei Drive is a local road providing access to abutting properties and to a public carpark associated with The Carrot Park Playground. Teitei Drive has a carriageway width of some 6.5 metres providing one traffic lane in each direction and on-street parking along both sides of the carriageway. Teitei Drive has a speed limit of 50 km/hr with no footpath provided within the road reserve however pedestrian paths are provided within Carrot Park for the length of Teitei Drive.

No survey data is available for Teitei Drive; however, it is estimated that Teitei Drive has a traffic flow of some 200 vehicle movements per day and a peak hour traffic flow of some 20 vehicle movements per hour during peak holiday periods.

[1] Traffic flow estimation – https://maphub.nzta.govt.nz

2.3 Road Safety

Information from the New Zealand Transport Agency's 'Crash Analysis System' for the most recent five-year+ period from January 2018 to present (2023 data subject to reporting delays) along the entire length of Teitei Drive, the SH49/Teitei Drive intersection and 150 metres on SH49 from the intersection shows that three crashes were reported. The crashes are summarised as follows:

- One minor injury crash was reported in December 2022 midblock along SH49 when an intoxicated driver of a vehicle lost control, went off-roadway, and collided with the bridge barrier.
- One minor injury crash occurred in September 2019 midblock along SH49 when a vehicle failed to notice another vehicle in front (stopped to turn into a driveway) and failed to slow/stop in time causing a rear end collision.
- One non-injury crash occurred in June 2019 midblock along SH49 when a vehicle lost control and collided with a vehicle parked on-street.

Although, there is one crash reported related to driveway manoeuvre over five+ years, it does not specify any trend related to the unsafe operations of turning vehicles along this part of SH49. Therefore, there is nothing to suggest an inherent road safety issue near the subject site.

2.4 Pedestrian & Cyclist Facilities

Footpaths are not provided along Teitei Drive, however, a network of footpaths are provided circulating the public parking area (located west of the SH49/Teitei Drive intersection) from SH49 providing access to the playground and other community areas. It is expected that this footpath will link with any future footpath provided on the northern side of TeiTei Drive extension along the site frontage.

A footpath is also provided along the northen side of the SH49 which continues east providing pedestrian access to abutting properties and to the local centre, which is located some 600 metes northwest of the site.

No dedicated cycle lanes or shared lanes are provided near the subject site. However, SH49 has a typical width of 8.5 – 10.0 metres inclusive of 1.0 metre-wide hard shoulder on both sides which is considered sufficient for a cyclist and vehicle to co-exist.

2.5 Public Transport Accessibility

The closest bus stop to the site is located in the Ohakune town centre some 700 metres northwest of the site providing services between Auckland – Ohakune – Palmerston North. Ohakune rail station is located some 3.0 kms northeast of the site providing services from Auckland and Wellington. The Northern Explorer train between Auckland and Wellington departs southbound on Monday, Thursday and Saturday and northbound trains Wellington to Auckland depart northbound on Friday, Sunday, and Wednesday.

3.0 THE PROPOSAL

3.1 Overview

The proposal comprises of the establishing a subdivision for 46 residential lots as part of Stage 1 of a wider subdivision. The proposed site layout is illustrated in **Figure 3**.

Figure 3: Proposed Site Layout
Source: Isthmus

Access to the site will be provided via Teitei Drive with a new intersection at its western end of the street.

A network of new public local roads and pedestrian accessways are also proposed to provide access to each of the activities from the wider road network. All formed intersections will be designed to meet the requirements of AUSTROADS. Further discussion of the appropriateness and formation of the new roads is included later in this report.

Other elements that form part of the proposal include a series of enhancements that are identified as mitigation of effects or to address drainage, and streetscape requirements. The applicant expects to discuss them in more detail with the relevant stakeholders including Ruapehu District Council and as part of any conditions imposed on any consents and engineering approvals. This will allow these measures to be refined appropriately and implemented in an integrated manner with other enhancements/mitigations in the area. These measures include:

- New footpaths, street trees and street furniture within the road berms; and
- Traffic calming and pedestrian and cycling enhancement measures throughout the site including, intersection controls, signage, and pram ramps.

3.2 Road Design Principles

Best-practice residential area design aims to produce liveable residential neighbourhoods that contribute to safety, good health, efficiency, and sustainability while having good levels of amenity.

Street patterns that allow good access through and around the area and to local services by walking and cycling are beneficial, and guidelines generally talk about connectivity and permeability as being desirable attributes. Legibility is another desirable attribute and the creation of self-explanatory roads.

It is desirable for residents to be within easy walking distance of public transport services and local service centres to assist in reducing demand for private vehicle travel. Pedestrian walkability catchments are generally based on good access being provided within 800 metres or about 10-minutes' walk.

Any land development will need to provide high quality walking and cycling infrastructure to minimise the need to use private vehicles and for trips within the site. By providing a high standard of pedestrian and cycle facilities, pedestrians and cyclists of all ages can move safely within the area with minimal risk. This will be an important function of any future development. The proposed development will not preclude making the most of opportunities to promote walking and cycling.

3.3 Proposed New Roads

Five new local roads (Road A, Road B, Road C, Road D and Road E) are proposed to be vested to the Ruapehu Council as part of the overall subdivision. Their location is identified in **Figure 3**. All new or extended roads are considered as local roads.

The new roads proposed will be formed with a typical road reserve width of 12 – 18 metres. Details of the crossing section are provided in the infrastructure report within the application. Indicative cross sections are provided in **Figures 4, 5 and 6** below. Each new road generally has a straight alignment with bends included along Road A and Road E. The proposed development has adopted the following road design principles:

- Road A within the site will be two-way, with a typical road reserve width of 18.0 metres and a carriageway width of some 7.0 metres;
- Road B, Road C and Road D within the site will be two-way, with a typical road reserve width of 14.0 metres and a carriageway width of some 6.0 metres;
- Road E within the site will be two-way, with a typical road reserve width of 12.0 metres and a carriageway width of some 6.0 metres;
- All the local roads will include footpaths with a minimum width of 1.5 metres;
- Typical cross-sections for the public roads will include back berms to optimise sight lines between drivers reversing out across the footpath and pedestrians.
- All new local roads in the development are no steeper than 1 in 8 (12.5%) and comply with the AUSTROADS

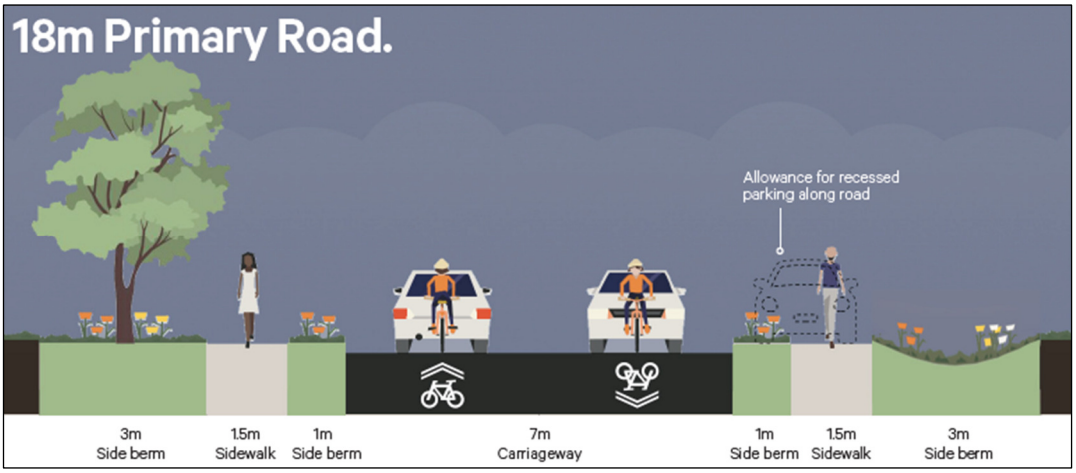

Figure 4: Proposed Cross Section – 18m – Road A
Source: Isthmus

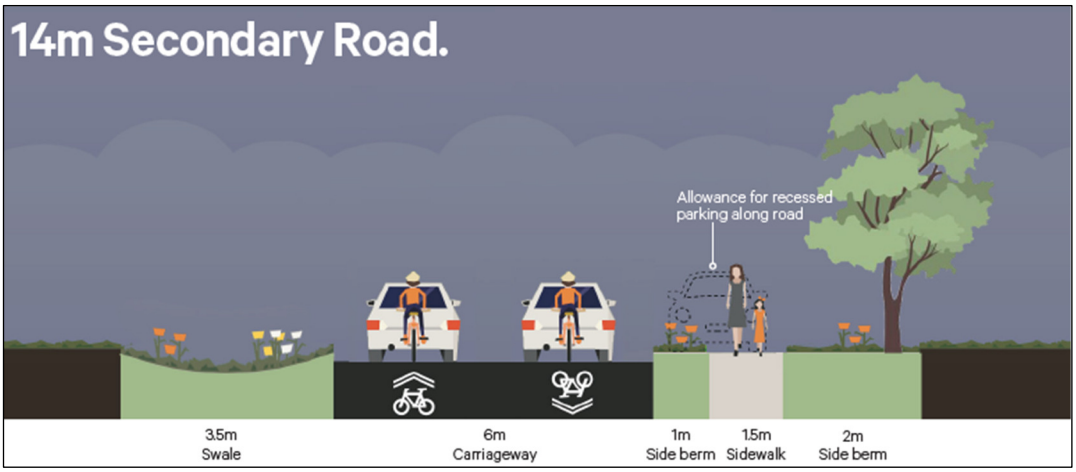

Figure 5: Proposed Cross Section – 14m – Road B, Road C and Road D
Source: Isthmus

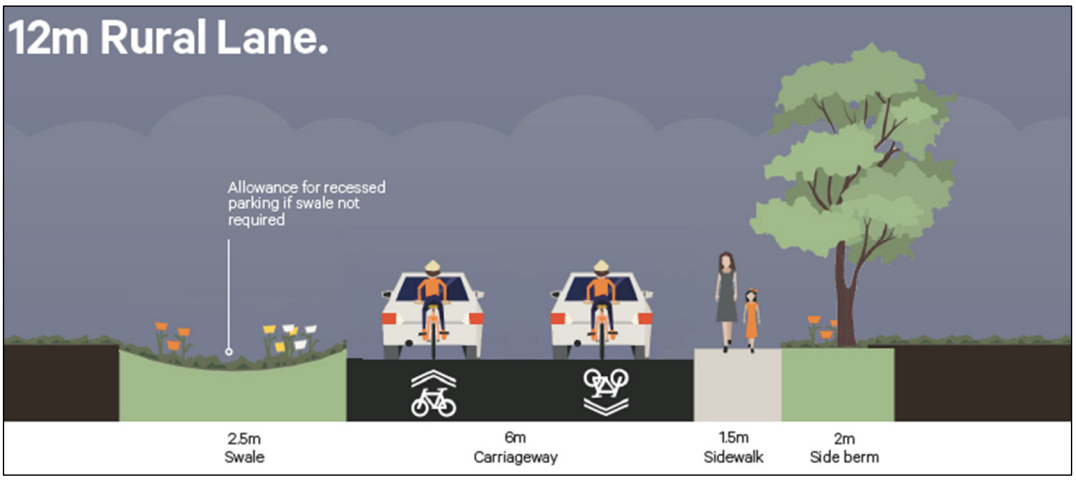

Figure 6: Proposed Cross Section – 12m – Road E
Source: Isthmus

3.4 Vehicle Tracking

During the design stage, design vehicles at each intersection have been taken into consideration. At each new intersection, 10.3-metre refuse trucks can make the turn. In addition, all new intersections can accommodate a delivery van while another van is turning.

3.5 Traffic Calming Strategy

The traffic calming strategies will be in line with good design practice. Those include the consideration of following measures within the subdivision:

- Installing traffic calming devices with suitable intervals targeting operating speed of 40km/hr on local roads;
- Avoiding long straight continuous roads that will invite higher speeds;
- Narrower carriageway width of 6.0 metres for local roads with parking bays, street trees and on-street parking, which is likely to assist in reducing operating speed; and
- Creating intersections with small radii, priority controls and clear definition of behaviour.

By providing a lower speed environment, the proposal aims to provide better safety for road users including drivers, pedestrians and cyclists and reduces noise and traffic volume throughout the subdivision.

3.6 Pedestrian & Cycle Facilities

The proposal is designed to promote walking and cycling. It aims to provide for the daily needs of pedestrian and cyclist movements by:

- Creating footpaths along both sides of the new street alignments of the Primary Road;
- Providing a footpath along one side of the Secondary and Local/Rural Road;
- Connecting new footpaths within the subdivision with the public footpath provided onto Teitei Drive i.e., via the footpath provided within the public car park;
- Providing a low-speed street network within the subdivision that allows cyclists and vehicles to share the same carriageway on an equal basis.

By providing a high standard of pedestrian and cycle facilities, pedestrians and cyclists of all ages can safely move through the area with minimal risk.

4.0 PREDICTED MODE SHARE & VEHICLE TRIP GENERATION

The Roads and Traffic Authority (RTA), New South Wales – 'Guide to Traffic Generating Developments' publication provides an average trip rate of 11 daily person-trips per household.

When assessing trip generation and mode share, the provision of different transport facilities will affect trip generation and mode split. If a frequent and efficient public transport service is provided for example, the proportion of public transport trips is likely to be higher with a corresponding lower proportion of private vehicle trips. Similarly, if there are limited activities within a suitable walking or cycling distance such as schools, recreational activities, or employment opportunities, you may expect a higher proportion of private vehicle trips. Also, if a development provides limited parking, the use of other modes is likely to be higher.

Considering the surrounding land use activities and accessibility for active modes and public transport discussed in above, the following mode shares and trips are anticipated for the proposed development:

Mode	Predicted Share	Average Trips per day per household	Total Predicted Trips
Walking	20%	2.2	101
Bicycle	10%	1.1	51
Public Transport	0%	0	0
Private Car	70%	7.7	354

4.1 Predicted Vehicle Trip Generation

An indication of the potential trip generation for the proposal can be derived from survey data set out in the Roads and Traffic Authority (RTA), New South Wales – 'Guide to Traffic Generating Developments' publication. The trip generation rates of residential households can vary depending on the type of unit and location of the development. It indicates daily vehicle trip generation rates of 7.7 vehicles per day per household and weekday peak hour trip generation rate of 0.85 vehicles per hour per household.

Based on these rates, the proposed development with 46 will generate approximately 39 vehicle trips per peak hour and 354 vehicle trips per day. Further discussion of the trip generation effects will be provided later within this report.

4.2 Vehicle Trip Distribution

The proposed site has one access option provided via Teitei Drive and will be distributed to the wider transport network through the SH49/ Teitei Drive intersection.

As is typical with most residential activities, flow to and from households will be tidal with most vehicle movements in the AM peak leaving the site and then returning in the PM peak. For this assessment, a typical AM peak hour is considered where 80% of residential traffic will leave the site and 20% will enter the site, whereas the opposite will occur in the PM peak period.

The predicted origins and destinations of the vehicle trips generated by the proposal have been based on observations of the surrounding area and directional flows on SH49. It has been assumed that 80% of the trips generated would be westbound to/from the site, and 20% of trips generated would be to/from the east.

The assignment of turning movements at each of the key intersections is shown in modelling results in **Attachment 1**.

4.3 Predicted Active Mode Distribution

Considering the likely destinations for active modes surrounding the site, there are several external routes pedestrians and cyclists may take. The key destinations will be Ohakune Town Centre, nearby schools, and local recreational areas. These locations in relation the site are illustrated in **Figure 7**.

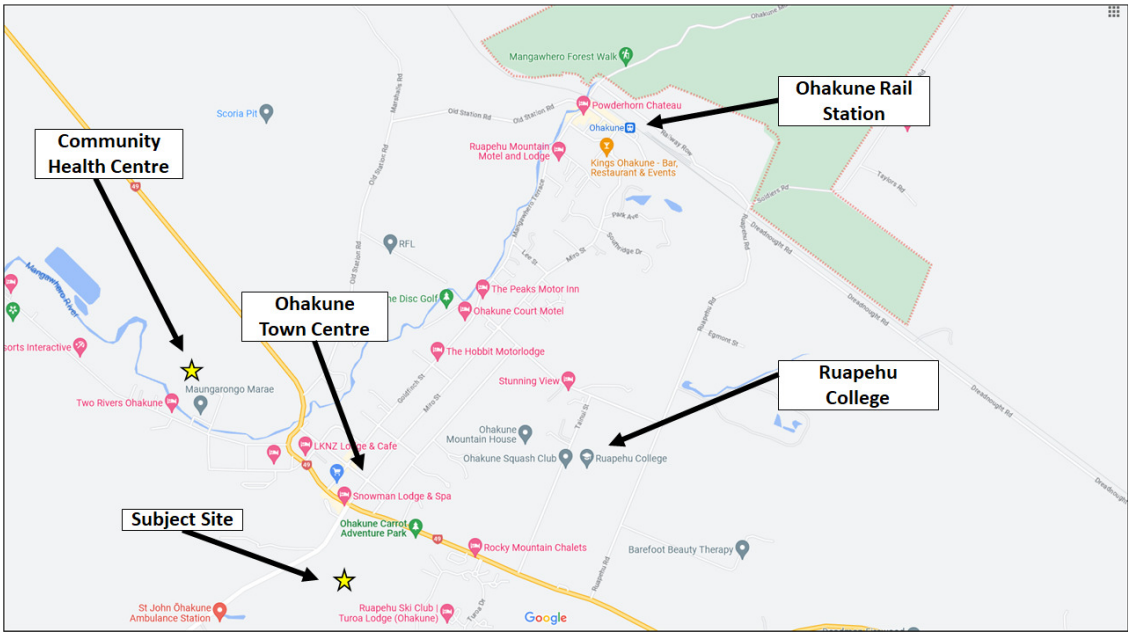

Figure 7: Active Mode Destinations
Source: Google Maps

5.0 ASSESSMENT OF TRANSPORT EFFECTS

From a transport perspective, the potential effects on the surrounding transport environment relate to the following elements:

- The impacts of additional traffic on intersection capacity;
- The impacts on road safety for all users;
- The impacts of establishing new roads, walkways, and transport infrastructure; and
- The impacts of construction traffic and activity.

5.1 Traffic Generation Effect (Intersection Performance)

The ability for roads to accommodate two-way flow and the performance of the intersections are both key considerations when assessing traffic generation effects. To assess the likely effects of the generated traffic from the development of the site, a SIDRA-9 traffic model has been run for the SH 49/Teitei Drive intersection. The SIDRA outputs for the modelled intersection is included in **Attachment 1**. The following key assumptions have been made in developing the model:

- All the default settings are adopted for the purpose of analysis.
- The AM peak hour has been utilised for this assessment as this is the period that will generate the highest volume of exiting vehicles turning from the side road onto SH49 and likely to show the largest levels of congestion.
- There is no recent traffic count data available for SH49 in the vicinity of the site within the NZTA database and to calculate traffic flows in the area traffic counts for SH1 and SH4 were utilised, along with some on-site survey data on vehicle distribution, to determine existing peak hour traffic flows along SH49.
- It is also assumed that the public parking area at the Carrot Park Playground will be 80% occupied with a traffic flow of 50% vehicles entering and 50% exiting. This is considered to be a conservative position give that the park will typically be busiest in the off-peak times.
- Given the sites proximity to ski fields existing flows have been factored to consider peak holiday months which has been determined by utilising data from SH1 and SH4 and was applied to SH49.

The SIDRA results for the SH49/Teitei Drive intersection for a typical AM peak hour during peak winter season are summarised in **Table 1.**

The modelling suggests that the proposed site access intersection (SH49/Teitei Drive intersection) is forecast to operate well within capacity during the peak hour with a maximum degree of saturation of 0.098, a level of service of A and a maximum queue of 0.9 metres along Teitei Drive and as such the impact on the performance of the SH49/Teitei Drive intersection is considered less than minor.

Table 1: SIDRA Results – SH 49/ Teitei Drive Intersection – AM Peak Hour (Peak Season)

	AM Peak Hour Proposed Development + Peak Season				
Movement	Flow (vph)	Degree of Sat.	Average delay (secs/veh)	LOS	95% Queue (m)
Site Access/ Teitei Drive (South)					
Left	30	0.037	5.1	LOS A	0.9
Right	13	0.037	5.9	LOS A	0.9
SH 49 (East)					
Left	9	0.098	6.4	LOS A	0.0
Through	163	0.098	2.2	LOS A	0.0
SH 49 (West)					
Through	144	0.090	0.1	LOS A	0.8
Right	14	0.090	6.7	LOS A	0.8
Intersection	**373**	**0.098**	**2.0**	**NA**	**0.9**

5.2 Intersection Warrant – Main Road Auxiliary Lanes

Notwithstanding the modelling indicating that there is significant spare capacity within the intersection, Waka Kotahi has requested an intersection warrant check using AUSTROADS Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management (2020) criteria to see if an auxiliary lane is warranted for the left or right turn into Teitei Drive.

The critical movements for the AUSTROADS warrant check are through movement volumes on the main road and the turning movements from the main road.

The warrant check has considered peak hour vehicle turning movements during the PM peak hour as this is considered to yield the high turning volumes from the main road. As per the SIDRA analysis above, the volumes assume the peak tourist season and an 80% occupancy of the Carrot Park playground car park. This is considered a very conservative position and it is most likely that turning volumes at the intersection will be lower than this most days.

Based on the information mentioned above, peak hourly traffic flow for the critical movements is calculated and illustrated in **Figure 8**.

Figure 9 below shows these peak-hour turning movement traffic volumes plotted onto the warrant graph using the "Design Speed ≤ 70 km/h" version of Figure 2.26 of AUSTROADS Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management (2020). The design speed of less than 70km/hr is utilised given the proximity of the intersection to the change in speed restriction and the approach speeds being less than the posted speed limit of 70km/hr.

The results indicate that no auxiliary lane is warranted for either left or right turn into Teitei Drive from SH49, either at present or including the development traffic.

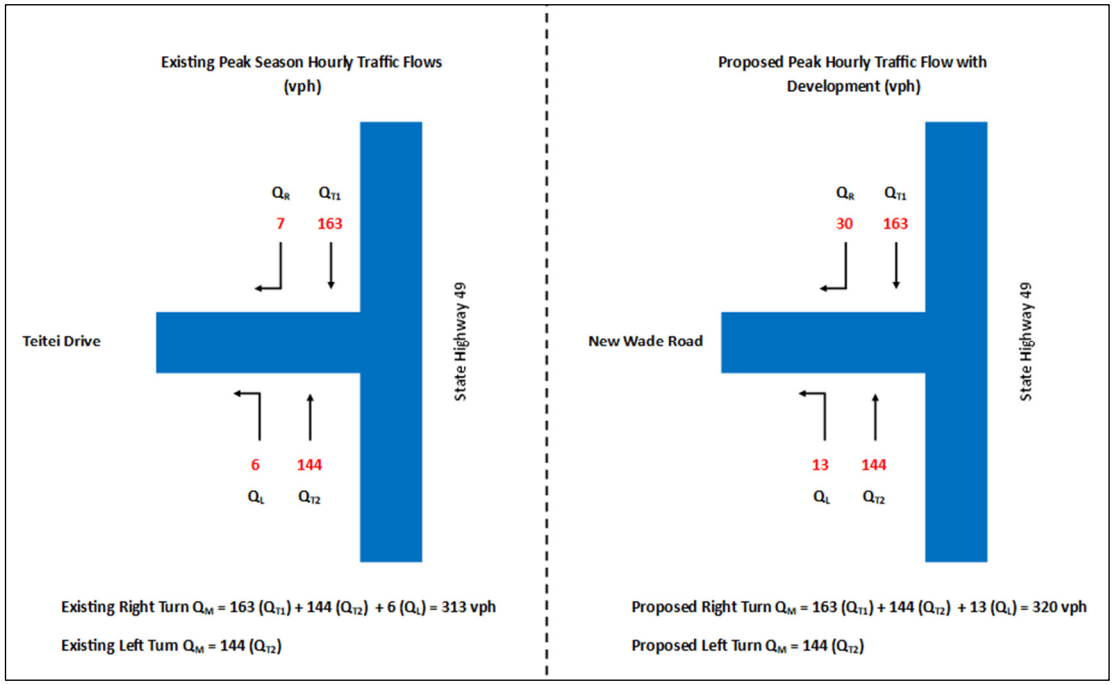

Figure 8: Estimated Peak Hourly Traffic Flows
Source: Traffic Planning Consultants Ltd

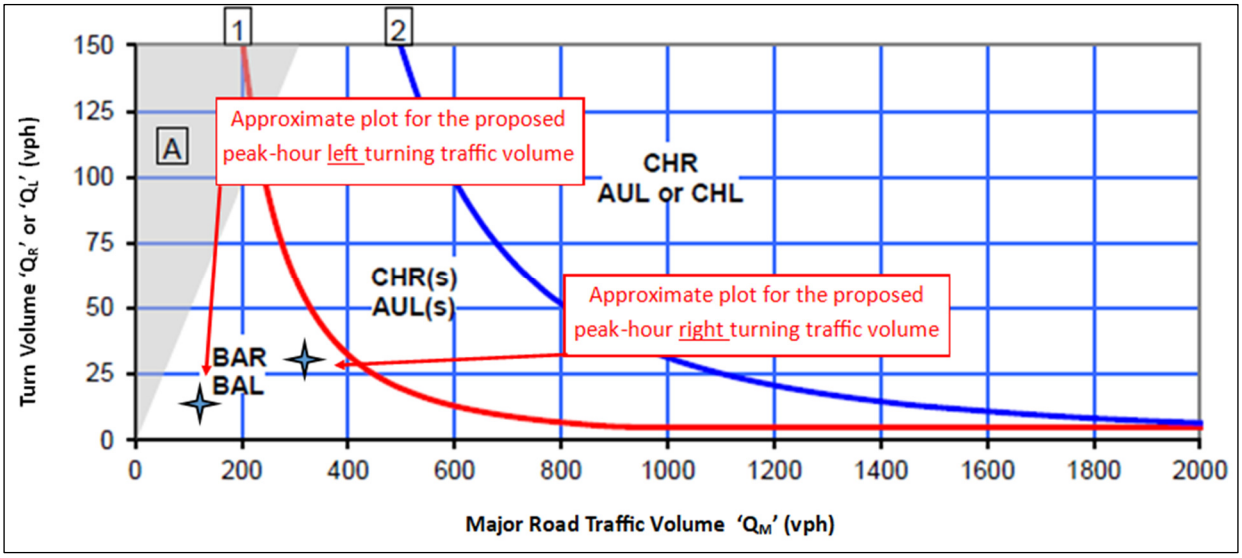

Figure 9: Warrants for Turn Treatment on Major Roads at Unsignalised Intersections
Source: AUSTROADS Guide to Traffic Management Part 6

5.3 Walking and Cycling Effects

The establishment of high-quality local roads and traffic calming measures within the subdivision will ensure that a high standard of pedestrian safety and amenity is provided, and cycling can be accommodated.

Pedestrian trips generated from the site can be accommodated within the existing footpath network. To access the public footpath along SH49, pedestrians will need to cross the carriageway where dedicated pedestrian crossing facilities are not provided. However, this is an existing situation and with good sightlines present along SH49 and with a 'speed change sign' board located to the west of the likely pedestrian crossing desire line, it is expected that the increase in pedestrian trips will not adversely affect the operations along SH 49 or pedestrian safety will be impacted.

5.4 Road Safety Effects

Development of the site should have no detrimental impact on general road safety. The following key points are noted about the proposal:

- The adoption of the road design principles above will promote the safe use of the new roads and intersections; and
- The historical crash statistics of the roads adjacent to the site do not indicate a pattern of crashes that will be exacerbated by the introduction of a small amount of additional vehicle movements relating to the proposal.

In accordance with a request from Waka Kotahi, a Safe Systems Assessment (SSAF) for the Teitei Drive / SH49 intersection has also been undertaken to understand if any safety mitigation is necessary as a result of the increase in turning movements related to the proposed development.

The two Safe System Assessment Matrix scores in **Table 2** are based on the proposed transport demand conditions expected and the exiting road conditions. A more detailed matrix is provided in **Attachment 2**.

Table 2: Safe System Assessment Score Summary Table

Option	Score
Existing Base Line Intersection with peak season traffic conditions	56 / 448
Existing Base Line Intersection with peak season traffic conditions plus development traffic added	64 / 448

It is evident from **Table 2** that with the proposed development in place, the existing road layout will safely accommodate expected transport activity related to the development.

Due to the very low volumes for road users and the lower category of the road, the proposed changes that the development may bring in terms of impact on the road safety risk at this location appears to be negligible. Therefore, it is expected that there will be little adverse impact for safety outcomes at this location regardless of the type of access provided.

5.5 Construction Related Traffic Impacts

Truck and other vehicle movements during the construction phase of any development always have a potential to impact on the surrounding area and road network, but a certain degree of impact for what is normally a relatively short period of time (at least in the context of the life of the proposed development) is inevitable and should not normally be a reason for restricting development.

What is important however, is that measures must be put in place to minimise the potential impacts of construction traffic, and this is generally achieved through a traffic management plan which is prepared and approved prior to work commencing. Where necessary this seeks to stage construction, control the times of operation (e.g., avoiding peak periods), identifies priority truck routes, and addresses all factors associated with construction traffic to minimise any potential impact. This outcome can be achieved through the standard consent condition requiring the provision of a Construction Traffic Management Plan.

In terms of capacity, the adjacent road network can accommodate the traffic volumes associated with the construction phases, and the implementation of a traffic management plan will ensure that any potential impact on the surrounding area is minimised.

6.0 RUAPEHU DISTRICT COUNCIL TRANSPORT STANDARDS

6.1 Section SU3 – Subdivision Rules

Section SU3 of the Ruapehu District Council – Operative Plan sets out the development standards relating to subdivisions. **Table 2** lists the relevant transportation standards that apply to this proposal and comments on compliance. Where there is non-compliance, further assessment has been undertaken against the criteria set out in Section SU3.7 of the RDP.

Table 2: Subdivision Transport Development Controls

Standard	Requirement/Details	Comment
SU3.6.2 (a) Transportation	All activities shall demonstrate compliance with the relevant provisions of the "Transport Infrastructure and Car Parking - Rules" section of the District Plan. Relevant Assessment Criteria: Refer "Transport Infrastructure and Car Parking - Rules" section.	A detailed assessment on the compliance of the proposed development under the relevant criteria of "Transport, Infrastructure and Car Parking – Rules" (Section TI3 of RDP) is provided in Table 2 – **complies**
SU3.6.2 (b) Transportation	No new lot shall obtain access to State Highway 4 between the intersection of Bell Road with State Highway 4 and State Highway 41, Taumarunui, and to State Highway 4 in National Park Township, and to State Highway 49 in Ohakune.	The site will be accessed via an extension of Teitei Drive – **complies**

6.2 Section TI2 – Transport Standards

Section TI3 of the Ruapehu District Council – Operative Plan sets out the development controls relating to Transport Infrastructure and Car Parking. **Table 3** lists the relevant rules that apply to this development and comments on compliance. Where there is non-compliance, further assessment has been undertaken against the criteria set out in the RDC.

Table 3: Transport Development Controls

Standard	Requirement/Details	Comment
TI3.3.1 Road Intersections (a) Separation	(i) The minimum separation distance as set out in Table 1 of TI3 shall be provided at new intersections. The separation distance shall be measured between the centrelines of the intersecting roads.	The Teitei Drive/Road A intersection and Road A/Road B/ Road E intersection will have a separation of some 45 metres between them (min 125 m required) – does not comply The Road A/Road B/Road E intersection and Road A/Road E (south) intersection will be separated by some 73 metres (min. 125 m required) – does not comply The Road A/Road B/Road E intersection and Road B/Road C intersection will be

Standard	Requirement/Details	Comment
		separated by some 70 metres (min. 125 m required) – **does not comply** The Road A/Road E (south) intersection and Road A/Road D intersection will be separated by some 108 metres (min. 125 m required) – **does not comply** The Road A/Road D intersection and Road C/Road D intersection will have a separation of some 65 metres (min. 125 m required) – **does not comply** The Road B/Road C intersection and Road C/Road D intersection will be separated by more than 130 metres (min. 125 m required) – **complies**
TI3.3.1 Road Intersections (b) Sight Distance	(i) The minimum sight distance as set out in Table 2 of TI3 shall be available from any new intersection. The sight distance shall be measured in accordance with Diagram TI1 – *Sight Distance Measurement Diagram.* In the event the 85th percentile speed (km/h) has not been determined, the legal road speed limit plus 10% shall be substituted in place of the 85th percentile speed (km/h).	Minimum sight distance will not be available (minimum of 125 m ESD or minimum of 80 m SISD required) – **does not comply**
TI3.3.1 Road Intersections (c)	Where an intersection is proposed with a State Highway, the approval of the NZTA is required. The NZTA has its own standards and rules, and it is recommended that applicants refer to these. The District Plan standards do not apply where they conflict with the standards of NZTA.	No intersection is proposed with a State Highway – **does not apply**

7.0 RUAPEHU DISTRICT PLAN ASSESSMENT CRITERIA

Section TI.3.4 of the Ruapehu District Plan sets out the assessment criteria when there is an infringement in development controls for a proposed development. For this proposal, the following items require consent:

- TI3.3.1 (a) – Separation of the Intersections; and
- TI3.3.1 (b) – Sight Distance at the Intersections.

The following lists the relevant assessment criteria for these infringements and comments as applied to this development.

7.1 (a) Intersections and Rail Level Crossings (TI3.4.1)

i. The extent to which failure to provide adequate separation and or sight distances will give rise to traffic hazards through inadequate visibility and safe stopping distances or conflict with the normal flow of traffic and movement of pedestrians and cyclists.

ii. The extent to which any foreseeable future change in traffic patterns could affect the function of the intersection.

iii. The extent to which failure to provide adequate level crossing sightlines will give rise to level crossing safety risks.

Comment (TI3.3.1 (a)) – Separation of the Intersections

The reason for consent under this standard relates to the non-complying separation distance provided between the intersections within the proposed subdivision development as tabulated in **Table 3** *TI3.3.1 Road Intersections (a) Separation*. Under the RDP, intersections provided on roads posted with a speed limit of 50 km/h should have a separation of 125 metres from each other and with less than 125 metres separation resource consent is required in this regard. The following points are made in support of this non-compliance:

- As the roads within the subdivision will be provided with traffic calming the targeted operating speeds are not expected to be greater than 40 km/h and intersection separation can be closer than required under the RDP;
- Suitable sightlines and intervisibility to/from these intersection will be available which will aid the users to located each other with plenty of warning time prior to any conflict;
- Furthermore, the intersections will be priority sign controlled and users are expected to give-way to oncoming traffic; and
- Users of these intersections will be the residents residing within the subdivision and will be regular users who will be aware of the constraints and will exercise caution.

Therefore, the less separation provided between the intersections will have less than a minor effect on the road network within the subdivision and the wider transport network.

Comment (TI3.3.1 (b)) – Sight Distances at the Intersections

The reason for consent under this standard relates to the sight distance available from the Road A/Road B/ Road E intersection. The RDP suggests that a minimum 'Entering Sight Distance of 125 metres is required, and a minimum 'Sight Intersection Sight Distance' of 80 metres is required from intersections provided on roads with a posted speed limit of 50 km/h. A sight distance of 45 metres is available to the north of the intersection and hence resource consent is required. The following points are made in support of this non-compliance:

- The roads within the subdivision will be provided with a speed calming strategy and the operating speeds within the subdivision are expected to be no greater than 40 km/h;
- Due to the urban residential development and presence of Teitei Drive/Primary Road intersection to the north of this intersection the speeds are not expected to be any greater than 30 km/hr as the vehicles will be negotiating the 90-degree bend. Therefore, the 45 metres of sight distance available is considered to be safe and acceptable.
- Further, the intersection will be priority sign controlled where users are expected to give-way; and
- Most users will be residents and regular users who will exercise caution while turning through the intersection.

Therefore, the less availability of sight distance from this intersection will have less than a minor impact on the surrounding road network.

8.0 CONCLUSIONS

Based on the analyses described in this report, the following conclusions can be made in respect of the proposal to establish a residential development at 6 Teitei Drive, Ohakune:

- The proposed internal vehicle and pedestrian circulating areas are configured to an appropriate standard and will operate in a manner that minimises any potential impacts on safety.
- The estimated traffic generation of the proposal is likely to be about 354 traffic movements per day with peak hour traffic generation of about 39 traffic movements per hour based on 46 residential lots within the subject site.
- The estimated traffic generated by the proposal can be accommodated on the nearby road network with minimal upgrades to existing infrastructure.
- Review of the subdivision and transport standards has identified two items which require consent under the TI3 standards of the Ruapehu District Plan. These have been addressed in this report concluding that the potential adverse effects arising from these infringements on the operation and safety of the surrounding road network will be less than minor

Overall, it is considered that the traffic engineering effects of the proposal can be accommodated on the road network without compromising its function, capacity, or safety. Therefore, from a traffic engineering perspective it is considered that the proposal will have less than a minor impact.

Prepared by,

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Traffic Engineer

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Director

ATTACHMENT 1

Trip Generation Predictions

Distribution from Survey	0.47	0.53
	146	164

AFTER DEVELOPMENT

Carpark 6 Split

	0.8	0.2
	30	7

Distribution	80/20		Out	In	
	0.8	0.2	0.8	0.2	
	24	6	6	1	

Trip Distribution

Total Through Trips	2583.4			
Total Peak Time trips	3100.08	(Avg of 5 yr AADT taken from NZTA maphub)		
Hourly Traffic	0.1	310		
			Daily Rate	
No of Dwellings	44		9	396
			Peak Rate	
			0.85	37
Swell Factor			1.2	
No. of Parking spaces for Playground			30	
Assuming 80% Occupied at Peak Time			24	
	0.8			
Assuming 50% IN and out from East and Wes			6	(out of 24 vehicles 12 coming in and 12 going out then Equal split for LT and RT)
	0.25			
Out trips from Public Parking Not Considered				

ATTACHMENT 2

Safety Systems Assessment
(Matrix)

Safe System Assessment Matrix – Teitei Drive / SH49 Intersection Existing Road Conditions

	Run-off-Road	**Head-On**	**Intersection**	**Other**	**Pedestrian**	**Cyclist**	**Motorcyclist**
Exposure Comments:	Combined AADT = 2,700	Combined AADT = 2,700	Combined AADT = 2,700	Combined AADT = 2,700	Unknown – assume 10/day	Unknown – assume 10/day	Unknown – assume 2% of AADT = 54/day
Exposure Score:	2/4	2/4	2/4	2/4	2/4	2/4	2/4
Likelihood:	Factors that increase the likelihood include: - 70km/h speed limit on SH49 - Presence of intersection Factors that decrease the likelihood include: - Straight road - Sealed shoulders on SH49 - Flat gradient - Street lighting	Factors that increase the likelihood include: - 70km/h speed limit on SH49 Factors that decrease the likelihood include: - Centre line - Straight road - Flat gradient - Street lighting	Factors that increase the likelihood include: - Priority control - No auxiliary lanes - 70km/h speed limit on SH49 Factors that decrease the likelihood include: - Good sight lines - Low volume roads - Street lighting	Factors that increase the likelihood include: - High traffic volumes on SH49 - 70km/h speed limit on SH49 Factors that decrease the likelihood include: - Street lighting - Good sight lines - No parking on SH49	Factors that increase the likelihood include: - 70km/h speed limit on SH49 - No crossing facilities on SH49 or TeiTei Drive Factors that decrease the likelihood include: - Good sight lines Street lighting - No parking on SH49 - Low traffic volumes on SH49	Factors that increase the likelihood include: - 70km/h speed limit on SH49 - No off-road cycle facilities – cyclists must ride on road shoulder - No crossing facilities on SH49 or TeiTei Drive Factors that decrease the likelihood include: - Street lighting - No parking on SH49 - Sealed shoulders on SH49 - Low traffic volumes on SH49	Factors that increase the likelihood include: - 70km/h speed limit on SH49 Factors that decrease the likelihood include: - Straight road - Sealed shoulders on SH49 - Flat gradient - Street lighting - Low traffic volumes on SH49
Likelihood Score:	2/4	2/4	2/4	2/4	2/4	2/4	2/4
Severity:	Factors that increase the severity include: - 70km/h speed limit on SH49 - No barriers - Power poles on SH49 - Roadside trees and drains Factors that decrease the severity include: - Frangible lighting columns	Factors that increase the severity include: - 70km/h speed limit on SH49 - Heavy vehicles	Factors that increase the severity include: - 70km/h speed limit on SH49 - Right angle conflicts - Heavy vehicles	Factors that increase the severity include: - 70km/h speed limit on SH49	Factors that increase the severity include: - 70km/h speed limit on SH49	Factors that increase the severity include: - 70km/h speed limit on SH49	Factors that increase the severity include: - 70km/h speed limit on SH49
Severity Score:	2/4	2/4	2/4	2/4	2/4	2/4	2/4
Product	8/64	8/64	8/64	8/64	8/64	8/64	8/64
						TOTAL	**56/448**

Safe System Assessment Matrix – Teitei Drive / SH49 Intersection Existing Road Conditions Plus Development Traffic

	Run-off-Road	**Head-On**	**Intersection**	**Other**	**Pedestrian**	**Cyclist**	**Motorcyclist**
Exposure Comments:	Combined AADT = 3,150	Combined AADT = 3,150	Combined AADT = 3,150	Combined AADT = 3,150	Unknown – assume 40/day	Unknown – assume 20/day	Unknown – assume 2% of AADT = 63/day
Exposure Score:	2/4	2/4	2/4	2/4	3/4	3/4	2/4
Likelihood:	Factors that increase the likelihood include: - 70km/h speed limit on SH49 - Presence of intersection Factors that decrease the likelihood include: - Straight road - Sealed shoulders on SH49 - Flat gradient - Street lighting	Factors that increase the likelihood include: - 70km/h speed limit on SH49 Factors that decrease the likelihood include: - Centre line - Straight road - Flat gradient - Street lighting	Factors that increase the likelihood include: - Priority control - No auxiliary lanes - 70km/h speed limit on SH49 Factors that decrease the likelihood include: - Good sight lines - Low volume roads - Street lighting	Factors that increase the likelihood include: - High traffic volumes on SH49 - 70km/h speed limit on SH49 Factors that decrease the likelihood include: - Street lighting - Good sight lines - No parking on SH49	Factors that increase the likelihood include: - 70km/h speed limit on SH49 - No crossing facilities on SH49 or TeiTei Drive Factors that decrease the likelihood include: - Good sight lines Street lighting - No parking on SH49 - Low traffic volumes on SH49	Factors that increase the likelihood include: - 70km/h speed limit on SH49 - No off-road cycle facilities – cyclists must ride on road shoulder - No crossing facilities on SH49 or TeiTei Drive Factors that decrease the likelihood include: - Street lighting - No parking on SH49 - Sealed shoulders on SH49 - Low traffic volumes on SH49	Factors that increase the likelihood include: - 70km/h speed limit on SH49 Factors that decrease the likelihood include: - Straight road - Sealed shoulders on SH49 - Flat gradient - Street lighting - Low traffic volumes on SH49
Likelihood Score:	2/4	2/4	2/4	2/4	2/4	2/4	2/4
Severity:	Factors that increase the severity include: - 70km/h speed limit on SH49 - No barriers - Power poles on SH49 - Roadside trees and drains Factors that decrease the severity include: - Frangible lighting columns	Factors that increase the severity include: - 70km/h speed limit on SH49 - Heavy vehicles	Factors that increase the severity include: - 70km/h speed limit on SH49 - Right angle conflicts - Heavy vehicles	Factors that increase the severity include: - 70km/h speed limit on SH49	Factors that increase the severity include: - 70km/h speed limit on SH49	Factors that increase the severity include: - 70km/h speed limit on SH49	Factors that increase the severity include: - 70km/h speed limit on SH49
Severity Score:	2/4	2/4	2/4	2/4	2/4	2/4	2/4
Product	8/64	8/64	8/64	8/64	12/64	12/64	8/64
						TOTAL	**64/448**