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TECHNICAL NOTE

DATE 8 August 2017
JOB No. 80509111-PRF0483

PROJECT: Mount Cardrona Station Plan Change (PC52)
SUBJECT: Review of Transportation assessment of PC52

FOR INFORMATION OF

QLDC	TDG		

FOR ACTION BY

THIS NOTE RECORDS:
- ☐ MEETING
- ☐ PHONECALL
- ☐ THOUGHT/IDEA
- ☑ ASSESSMENT

☐ WITH ☐ ABOUT

☐ CLIENT ☐ CONTRACTOR ☐ SUPPLIER ☐

BY J Enright
AND O Brown
TIME

Detail:

Mt Cardona Station Limited has applied to Queenstown Lakes District Council (QLDC) for a plan change (PC52) for the Mount Cardrona Station (MCS).

The specific direction by the Commissioner stated in the sixth minute and directions of hearing commissioners:
i. Obtain an independent assessment of the transport matters raised in a letter provided by Mr Rossiter dated 29 November 2016. This should be provided to the Commission ***by 9 August 2017****.*

As a consequence of the above direction Stantec has been asked by the QLDC (via Nigel Bryce) to provide an independent assessment of the transport matters raised in a letter provided by TDG (dated 29 November 2016). The following documents were received from QLDC to assist with the review:

- PC52 Mt Cardrona Station Sixth Minute of Hearing Commissioners
- TDG letter by Mr Rossiter, dated 29th November, 2016; also known as Document 12 Transport Assessment
- PC18 Transport Assessment

Plan Change 52 is an amendment to Plan Change 18, which was submitted and approved by QLDC in 2006. This assessment therefore does not assess any of the effects considered as part of Plan Change 18, however in addressing the 29th November 2016 TDG letter there are some statements that we have commented on that pertain to the original Plan Change.

Many detailed design matters are not available at this planning stage. The following comments are based on a desk top review, local knowledge, and the information made available by TDG and the new structure plan provided in the letter. The following section considers and responds to the TDG assessment in the same order presented in the letter.

1. **Existing Transport Infrastructure**
   We agree with all TDG statements regarding the existing transport infrastructure described in this section of the letter.

2. **Existing Travel Patterns**
   We agree with all TDG statements regarding the existing travel patterns described in this section of the letter.

3. **Proposed Development**
   Comments regarding the transport assessment of the proposed development are discussed in Section 5 below.

4. Traffic Generation

It is noted that there is an error in Table 2 and 3 in the TDG letter. The quantity of rounds of golf for winter and summer have been transposed. This means the summer and winter traffic generation totals are also transposed. This does not affect the total traffic generation estimated.

TDG state in their letter (PC52 Transport Assessment) that:

"It is considered that the higher volume of traffic movements would not be noticeable to drivers because it would be distributed across the day and would be within the typical range of variation in traffic volumes that will occur from day to day and across the year."

As stated in the TDG letter the typical average daily traffic volumes on Cardrona Valley Road is in the range of 2,000 to 2,500 vpd at the peak periods of the year. We consider that an increase of up to 4,220vpd (shift from 2,500vpd to almost 7,000vpd, or 280% increase) from this development is significant and could have an effect on traffic safety in the area and will be noticeable to the general public.

5. Effects on the Transport Environment

Intersection of Link road (development access) with Cardrona Valley Road

The revised structure plan includes an intersection to be located approximately 25m north (TDG provided measurements) of the existing Tuohys Gully Road intersection, the current access to the Snow Farm. The purpose of this intersection is to provide the main access to the proposed development.

As noted by TDG (in letter) this is proposed to replace a left-right stagger contained within the Outline Development Plan (ODP) which would not comply with current design standards. The new layout provides a right-left stagger.

The latest (2017) Austroads Guideline (AGTM Part 6, Section 2.2.7) prefers a left-right stagger (with stipulated stagger distances and storage lengths) as there is a higher crash risk associated with right-left configurations compared to the left-right configuration. The guide notes the following:

> ***Right-left staggered T-intersection treatments***
>
> The right-left staggered T-intersection treatment requires drivers to initially turn right into the major road, then left into the opposite minor road leg. This treatment is suitable only for low-volume situations.
>
> A right-left staggered T-intersection treatment may be selected where:
>
> - there is a high risk of high-speed right angle crashes at a basic cross-intersection, and the implementation of a grade separation, roundabout or left-right staggered T is not feasible. The intersection could be expected to operate below capacity throughout the intended design life of the treatment
> - the aim is to minimise land acquisition from abutting property.
>
> The right-left treatment requires less land than that a left-right stagger and it costs less, particularly when treating an existing intersection. However, the higher crash risk associated with the right-left configuration, compared to the left-right configuration, needs to be taken into account when selecting an intersection layout.
>
> Right-left staggered T-intersections store crossing vehicles on the minor legs. As traffic on the minor legs has to give way to both directions on the major route, calculations to establish delay may be necessary. If excessive delay is anticipated an alternative treatment, such as a roundabout, should be considered as drivers may take risks and crashes may result.

As the Austroads guidelines states, the preferred intersection layout is a left-right staggered intersection with complying stagger and storage lengths. A compliant left-right stagger would also provide a future proof layout for any development in the immediate area, for example the potential for Snow Farm to be further developed in the long term. We support the Austroads position, however understand this is outside the scope of the Commissioners query and therefore have limited our assessment to the ODP (PC18) presented left-right stager versus the revised right–left stagger (PC52).

We agree with TDG that the current design (PC18) does not meet current standards. The PC18 left-right stagger is considered unsafe because the stagger and storage lengths do not accommodate the deceleration length

for turning vehicles (slowing from 100km/h) and stacking of right turning vehicles may impede the adjacent intersection. Based on this we do not support provision of PC18 intersection form.

PC52 revised the intersection layout and proposes a right-left stagger. No information has been presented evaluating the higher risk of this proposed layout (compared to PC18 or a compliant left-right stagger) or current data on turning traffic volumes at the existing and proposed intersections. The turning movements survey (of the existing Cardrona Skifield and Snow Farm intersections) in PC18 is 2006 data and is considered no longer relevant.

Our primary concern with the proposed right-left stagger relates to:

1. Right on right turns from side roads (vehicles turning right out of Link Road and Tuohys Gully Road at the same time) with resultant conflict on Cardrona Valley Road.
2. Side road through traffic (from Link Road to Tuohys Gully Road, and vice versa) with associated crash risk of the right turn movement.
3. Limited separation between side roads. Greater separation is safer for bullet points 1 and 2 above.

The proposed limited separation of 25m (Centre Line to Centre Line) results in road boundary separation being in the order of 5m, and edge of seal to seal edge of seal separation of 17m (assuming 8m sealed side roads). This is considered the minimum, and should be increased to improve safety.

The right-left stagger requires a high level of analysis to demonstrate the impacts on traffic safety and how this relates to the expected turning movements. To achieve this the application needs to provide further information being:

4. Updated traffic turning volumes at the Tuohys Gully Road intersection with Cardrona Valley Road.
5. Predicted Origin-Destination (OD) from generated traffic presented in PC52.
6. Safety assessment of the proposed right-left stagger.

Discussions with TDG (Chris Rossiter) provided useful information regarding the above bullets. TDG expect traffic volumes traveling through the side roads and turning right on right (concerns listed above) are expected to be low, and therefore the crash risk of the right-left stager low. TDG noted the likely operational speed through this section of Cardrona Valley Road could be lower than 100km/h as result of curves to the south having a 65km/h advisory speed. We agree with this in principle, and if this is demonstrated to be correct we can support the proposed PC52 layout.

We discussed with TDG potential alternative intersection locations, predominately around a fully compliant left-right stagger, and this indicated that the proposed location was generally appropriate given the Cardrona Valley Road geometry and PC52 site topography. However, the proposed intersection location could be improved if the location of Tuohys Gully Road could be moved further south. This highlighted that sufficient detail is not currently available to lock down the best intersection location and that a degree of flexibility is required to ensure optimisation during design.

<u>Recommendation</u>

Based on review of the information and discussions with TDG it is recommended that the following are provided to demonstrate the expected intersection operation:

1. Updated traffic turning volumes at the Tuohys Gully Road intersection with Cardrona Valley Road.
2. Predicted Origin-Destination (OD) from generated traffic presented in PC52.
3. Confirmation the Cardrona Valley Road 85th percentile speed at the proposed intersection location.
4. Safety assessment of the proposed right-left stagger.
5. Intersection location flexibility is provided in the Structure Plan to permit increased separation (with a minimum of 25m as presented in PC52) at design stage.

It is our opinion that if the above information confirms the TDG discussions then an appropriate right-left stager intersection can be provided, albeit with reduced flexibility to accommodate potential development to the south.

Link road intersection with Cardrona Ski field Road

There is very little detail on this intersection at this plan change stage. Our comments are based on the PC18 and PC52 structure plans and a preliminary design of link road intersecting with the ski road. No intersection layout design was provided. Based on the limited information provided and discussions with TDG, we have the following concerns:

1. Merging of gravel surfacing and sealed surfacing (assuming development roads are sealed). Gravel migrating on the sealed roads can lead to loss of control type crashes.
2. Location of carpark access, and movements generated by proposed carpark.
3. Movements generated at the intersection; right turns and left turn merging.

4. Possibility of ski field traffic (skiers not staying in the development) using the link road (rat-running); from drivers wanting to avoid ski field queues at intersection with Cardrona Valley Road or wanting the opportunity to use a sealed road. This would result in queuing and higher movements at the intersection of the developments link road and Cardrona Valley Road. This would be at a peak traffic time for traffic movements out of Tuohys Gully Road.

Although there is limited information available, it appears a safe intersection could be provided along this length of the Ski Field Road and that concerns can be addressed at the design stage. Given the number of unknowns, some flexibility with the final intersection location is needed at this stage, with the final location to be determined during design.

Recommendation:

It is our opinion that the above concerns can be addressed at the design stage, and therefore our recommendation is that:

1. Intersection location flexibility is provided in the Structure Plan to permit the most appropriate location to be determined at design stage.