ENGINEERING MEMO

TO: **Nigel Bryce**

FROM: Michael Wardill

DATE: 12/09/2017

SUBJECT: **Plan Change 52 – Roading Engineering**

Plan Change 52 (PC52) sixth and seventh hearing minutes sought an engineering assessment of the proposed internal roading design. This memo provides an assessment from the Council land development engineering team against relevant standards.

The external intersection with Cardona valley Road has been reviewed by TDG for the Requestor, and independently by Stantec for Council, and a summary is provided towards the end of this memo.

PC18 - Roading Design

The existing layout was approved under PC18 and Council standards for the time were NZS4404:2004 with local amendments.

The tabled format below provides a comparative basis for PC52 of what was approved under PC18 against the Council adopted standards at the time of the plan change. The format utilises 4 vehicle movements per day from each dwelling unit versus the 8 traffic movements/day required by Council standards.

Approved under PC18							
	Road A	**Road B**	**Road C**	**Road D1/D2**	**Road E**	**Road F**	**Road H**
Description	Primary road link from Cardona Valley Rd with dwelling units (du) either side. Max 4000 vehicles per day (vpd)	Connection to ski field road with no du either side	Primary road link from Cardona Valley Rd with no du either side. Max 4000 vehicles per day (vpd)	Village centre roading through high density areas. Likely to be greater than 1500vpd	Secondary roads servicing residential areas. Likely to be greater than 1500vpd	Residential through Road servicing up to 900vpd	Residential cul-de-sac Road servicing up to 400vpd
Legal width (m)	20	20	20	18	16-20	10	6
Carriageway width (m)	6.5	6.5	6.5	7	7	5.5	4.5 + passing
Parking	1x2.5	-	-	2x2.5	1x2.5	-	-
Pedestrian	1x1.4	-	-	2.2.2	1x2	1x2.2	-
Main differences as required by NZS4404:2004 with Council amendments, being Council standards for the time of PC18							
Legal width (m)				20	20	18	
Carriageway (m)	7 plus 2m **flush median	7	7 plus 2m**flush median			6	
Parking	2x2.5				2x2.5	1x3	1x3
Pedestrian	2x1.4				2x1.4	1x1.4	1x1.4

Conclusions of PC18 in regard to internal roads

From the above table there appears to be accepted shortfalls in the current PC18 Design Guideline Plan against the NZS4404:2004 for both parking and pedestrian provisions along/through Road A and Roads E-F. The geometric requirements of the roads were otherwise largely compliant with requisite standards. I am unable to provide further advice regarding the rationale for the original pedestrian and parking omissions and whether the designs were subject, at the time, to expert traffic engineering assessment. In any case the detailed design of development in the PC18 areas would have been subject to future consent assessments that would typically involve expert transport assessments and safety audit processes prior to design and construction including any potential vesting process of roads and services in Council.

** The 2m hatched median required under NZS4404:2004 would not have been required under PC18 with a proposed roundabout controlling the main intersection leading into development areas.

Proposed Plan Change 52 – Roading Design

The proposed roading layouts provided under PC52 are high level only with little detail provided to permit exact comparison to Council and national design standards. The assessment below is based on the Mount Cardrona Station Design Guidelines 2017 and traffic volumes are either contained or inferred from the TDG assessment dated 29Nov 2016. Whilst I have tried to determine the actual development units and associated traffic volumes on each road this remains uncertain based on the application and greater surety in this respect would permit greater confidence in the table and conclusions below.

Proposed under PC52				
	Road A	**Road B**	**Road C**	**Road D**
Description	Primary road link from Cardona Valley Rd passing through Hotel/Village Green area. 4000 vehicles per day (vpd)	Secondary road through and around development areas and linking to ski field road. 2000- 4000 vehicles per day (vpd)	Secondary residential through roads, being local road up to 2000vpd	Tertiary road linkage servicing residential access with up to 20du and servicing up to 200vpd
Legal width (m)	20	20	15	10
Carriageway width (m)	5.7	5.7	5.7	3
Parking	2x2.5	2.2.5	1x2.5	1x2.5
Pedestrian	1x1.5	2x1.5	1x1.5	1x1.8
Main differences as required by <u>NZS4404:2010 with Council amendments</u>, aka QLDC Land Development and Subdivision Code of Practice				
	Figure E13 COP	Figure E13 COP	Figure E12 COP	Figure E11 COP
Speed environment	50km/hr	50km/hr	40km/hr	20km/hr
Legal width (m)				9
Carriageway (m)	8.4	8.4		5.7
Parking				
Pedestrian	2x2	2x2		

Conclusions of PC52 in regard to internal Roads

1. From the above there appears to be a relatively high level of compliance with NZS4404:2010 except for some minor dimensional variations and the pedestrian and parking shortfalls of PC18 are not duplicated. To ensure roading networks are appropriately and safely designed in due course it is desirable for the development to comply with NZS4404:2010 with Council amendments at the time of detailed design/development and I recommend PC52 commissioners consider inclusion of such compliance means.

2. The formed width of the main access roads A & B do not appear wide enough to cater for the volume of traffic under NZS4404:2010 and the increased number of intersections proposed directly from the primary linkages over those originally provided under PC18 create uncertainty whether unsafe traffic outcomes could now result. The extra width afforded by the 8.4m movement lane would provide greater turning provisions and I therefore recommend PC52 commissioners and/or applicant consider amending Roads A&B to instead provide an

8.4m formed width or obtaining expert traffic advice in regard to any deviations from Council and national standards.

3. Road D appears to be catering for up to 20 du based on the Mount Cardrona Station Design Guidelines 2017 and should therefore cater for 2-way traffic as recommended by NZS4404:2004. I therefore recommend PC52 commissioners consider increasing the Road D movement lane formation from 3m to 5.7m or obtaining expert traffic advice in regard to any deviations from Council and national standards. It is noted that this concern may simply arise from a discrepancy between pages 2-6 and 2-7 of the Mount Cardrona Station Design Guidelines 2017. Page 2-6 details a 3m carriageway width for Road D whilst page 2-7 show a 5.7m carriageway width for road D. This discrepancy should be resolved.

Stantec and TDG expert assessments

Traffic Design Group (TDG) acting on behalf of the Requestor submitted a transport assessment titled: *Mount Cardona Station Plan Change, TDG ref: 14202, 29th November 2016*. This assessed traffic volumes generated by the proposal and the relocated main intersection on Cardona Valley Road. They concluded: "*Overall, it has been concluded that the proposed changes to the Mount Cardrona Station Special Zone will not generate adverse effects on road safety or efficiency."*

Stantec acting on behalf of the Queenstown Lakes District Council reviewed the TDG assessment and submitted 'Technical Notes' dated 8th August 2017 and 12th September 2017. They accepted the statements made by TDG and initially raised concerns surrounding the proximity of the relocated intersection with other road intersections. In their latter 'Technical Note' they however confirm agreement there is enough flexibility in the location of intersections as laid out in the Requestors '*Memorandum of Counsel Responding to Seventh Minute and Directions of Hearing Commissioners*' to provide a safe safety and efficient road environment.

I accept the expert advice from both parties that the changes are unlikely to generate adverse effects on road safety and efficiency and I make no recommendations over those volunteered by the Requestor, in this regard.

Within PC52 there does also not appear to be any material change with the Plan Change 18 (PC18) intersection onto the Cardrona Ski field access road and no further assessment or expert comment is necessary, in this regard.

Prepared by:

Michael Wardill
ENGINEER