

Before the Independent Hearing Panel

Under the Resource Management Act 1991
In the matter of the Proposed Waimakariri District Plan
Hearing Stream 12C: Large Lot Residential
MacRae Land Company Limited
Submission Number: 409

Supplementary Traffic Evidence of Andy Carr

5 July 2024

Submitter's solicitor:

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Qualifications and experience

1. My name is Andrew (“Andy”) David Carr.
2. My qualifications and experience remain the same as set out in my evidence in chief.
3. I have been requested by the submitter, Macrae Land Company Limited (submitter #409), to review the s 42A report of Mr Mark Buckley with regard to the issues raised at its site (**the site**) and to provide comment on these. The s 42A report has a number of appendices and I am aware that comment was also made regarding the site by Council’s Senior Transportation Engineer, Mr Binder (Appendix F Part 1). I therefore also refer to Mr Binder’s comments as appropriate.

Code of conduct for expert witnesses

4. I have read the Code of Conduct for Expert Witnesses contained within the Environment Court Practice Note 2023 and agree to comply with it. This evidence is within my area of expertise, except where I state that I am relying on information I have been given by another person. I confirm that I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed herein.

Response to s 42A Report

5. In Appendix F, Mr Binder sets out that he is of the view that a new tee intersection onto Threlkelds Road could be relatively safely managed provided that it is located a safe distance from existing intersections and driveways and met relevant Council and best practice standards.
6. In my evidence in chief, I concluded that there are no reasons why a road that complied with Council standards could not be formed in the proposed location to serve the site. Mr Binder states that he does not have any concerns with this conclusion.
7. In respect of the removal of the requirement for a character road, Mr Binder sets out that he considers that a “*character street with landscape and planting*” would have a number of transportation benefits such as “*speed reduction, stormwater interception, pollution reduction, and heat mitigation*” and increased amenity for the pedestrian and cycle route along this roadway.

8. As a traffic engineer, I have focussed on speed reduction as the other issues appear to be related to amenity or to areas outside traffic engineering.
9. The principle behind using trees to reduce speed relies upon the trees creating an illusion of a narrower carriageway, which means drivers react by slowing down¹. This is described in the Austroads Guide to Traffic Management Part 8 as a “*subtle*” level of restraint² and it appears that most studies of this effect have been on higher speed roads. However there is one study³ (based on a driving simulator where participants ‘drove’ roads with and without trees) and this showed an average reduction in speed of 5km/h.
10. Unfortunately though, the speeds themselves are not recorded and so it is not possible to say what speed was recorded without any trees. Further the graphics within the paper show that the ‘without trees’ scenario is a misnomer. The comparison is between smaller trees (the graphics suggest a height of about 7m) that are set back from the edge of the carriageway, against larger trees (around 10m in height, noted as representing 20 years of maturity) that have a considerably greater canopy and planted at the edge of the carriageway.
11. On my reading of the paper, it does not appear to be street trees per se that create the effect, but rather, their size, density, canopy size and position relative to the driver. Given these factors, in my view the reduction of 5km/h is likely to be the maximum achievable due to street trees within the context of the character road. It also follows that the speed reducing effect would not arise for several years after the trees are planted (unless they are planted as mature specimens).
12. By way of comparison, Standard NZS4404:2010 (‘Land Development and Subdivision Infrastructure’) sets out⁴ that this same speed reduction could also be achieved through reducing the carriageway width by 1m (while still maintaining a viable carriageway width). However the provisions of the District Plan require that certain minimum carriageway widths are achieved, precluding this approach. These carriageway widths are in excess of those set out in the Standard. In other words, Council appears to be arguing that

¹ <https://www.treesforstreets.org/how-street-trees-help-make-our-roads-safer/> which references https://depts.washington.edu/hhwb/Thm_SafeStreets.html

² Page 158

³ Naderi, J.R., B.S. Kweon, and P. Meghalel. 2008. The Street Tree Effect and Driver Safety. *ITE (Institute of Transportation Engineers) Journal* 78, 2:69-73.

⁴ Figure 3.2

street trees should be planted for their speed-reducing features while also requiring carriageway widths that support higher speeds.

13. Overall, in my view the argument for the speed-reducing effects of street trees is not particularly persuasive. A high density of large trees would be required to result in lower speeds, and unless the large and mature trees were planted then the reduction would not arise for some time. If lower speeds are an expected outcome then in my view reducing the carriageway width can achieve the same effect, or forming a carriageway that complies with the District Plan but includes suitable traffic calming measures such as build-outs / localised narrowings.
14. In his paragraph 328, Mr Buckley sets out Mr Binder's views. In paragraph 330 however, Mr Buckley states that "*the unnamed accessway is insufficient width to accommodate the traffic and character components*". However Mr Binder does not make any comment to this effect and having reviewed the comments of Council's landscape architect Mr Read, he also does not make any such comment. Rather, this opinion appears to originate with Mr Buckley.
15. The 'unnamed accessway' is proposed to be constructed within Lot 200, as set out paragraph of Ms Winder's statement of evidence. This lot is 16m wide, and under Table 30.1 of the operative District Plan, this is sufficient for a Local Road in a residential area (as is the case here). The legal width is typically expected to accommodate:
 - two 3m wide traffic lanes; plus
 - one 1.5m wide footpath; plus
 - one 2m parking lane.
16. However Rule 30.1.2.9 of the (operative) Plan sets out that no parking lane is required for roads within this particular development area (as there would be no demand for on-street parking). Thus within the 16m legal width, a 6m carriageway and one 1.5m footpath are required, leaving 8.5m for other purposes.
17. I am aware that this route is also noted as being a "*primary*" cycle route, although that term is not defined in the District Plan, Council's Infrastructure Strategy, Walking and Cycling Strategy, or Engineering Code of Practice. Taking into account the maximum amount of development that I understand could occur under the zoning (81 lots) and the associated traffic generation, under the NZTA 'Cycle Network and Route Planning Guide' it is appropriate for cyclists to share the movement lanes with motorised traffic.

18. Because the meaning of “primary” is not defined, it is possible in my view that Council may have in mind that an off-road route is required for cyclists. There is already a shared off-road route on the southern side of Mill Road, which is 1.5m wide. It would be unreasonable in my view for Council to require that the provision of a shared route within Lot 200 was wider than the existing provision along Mill Road, but even if a fully-complying width was sought, this would only be 2.0m (being a lightly-used Local Access Path, under the Austroads Guide to Road Design Part 6A ‘Paths for Walking and Cycling’).
19. Under that scenario, the cross-section of the road would be a 6m carriageway and one 2.0m shared footpath/cycle path, leaving 8.0m for other purposes.
20. Under the proposed District Plan, for the number of residences proposed, an 18m legal width is required. This is expected to accommodate:
 - two 4m wide traffic lanes; plus
 - two 1.8m wide footpaths; plus
 - two 2m parking lanes.
21. I have been unable to identify where the proposed District Plan exempts the road from the provision of parking lanes. From a practical perspective however, I consider there will be little (if any) demand for on-street parking on Lot 200 due to the land development pattern.
22. I also note that the proposed District Plan requires the provision of two footpaths, but this represents an overprovision in my view, because there is only one footpath on Mill Road. The proposed District Plan would lead to a situation where two 1.8m footpaths are provided on a lightly-trafficked road subject to slow traffic speeds, which then connect to one 1.5m shared path on a faster, more heavily-trafficked road. This would result in a highly inconsistent level of provision.
23. With this in mind, if assessed under the proposed District Plan I consider that the road would be constructed as two 4m wide traffic lanes plus one 1.8m wide footpath (or a 2.0m wide shared path), occupying a cumulative width of 9.8m to 10.0m and leaving 6.0m to 6.2m for other purposes.
24. Thus under either the operative or the proposed District Plan, the legal width of 16m can easily accommodate the formed road while retaining sufficient width for non-transportation features.
25. Accordingly, I do not agree with Mr Buckley’s assertion that the width is insufficient. Rather, on my assessment, it is ample.

26. In his paragraph 329, Mr Buckley also reports the views of a submitter (Mr Macdonald) setting out that the “*upgrading*” of the road would have adverse effects. The seal width of the road within Lot 200 is already 5.5m wide, and the operative District Plan only requires that this is widened by 0.5m. If the existing roadway was instead to be upgraded to meet the overarching Standard NZS4404:2010, then this 5.5m width would remain appropriate for the movement of vehicles (albeit that 0.5m shoulders would be added on either side to support the road structure).
27. As I noted above, it would be open to Council to maintain a narrower carriageway width as a way of supporting a lower operating speed. Consequently from a transportation perspective, I do not agree that an ‘upgrading’ would lead to adverse effects on Mr Macdonald.
28. For completeness, I note that I have reviewed the answers provided by Mr Buckley to the Hearing Panel’s questions. However no questions (or answers) relate to the traffic and transportation matters at this site.

Conclusions

29. On the basis of my assessment, I consider that there are no traffic and transportation reasons that mean the ‘character’ aspects of the roadway in Lot 200 must be retained. In my view there is not a strong case for the trees leading to a reduced operating speed, and such a speed reduction can be achieved by other means.
30. I consider that the 16m legal width of Lot 200 is ample to accommodate all the required roles of the road. I am also unable to identify any effects (from a transportation perspective) on Mr Macdonald, noting also that retaining the road in its current formation would be one way of achieving reduced operating speeds.

Andy Carr

5 July 2024