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Dear Marc

Northlake Plan Change Request: Assessment of Transportation Matters

Further to our meeting with consultants for Queenstown Lakes District Council, we understand that additional assessment is required for the potential for traffic associated with the plan change to use the roading network within the Northlake subdivision.

Background

The extent of development within Northlake was included as Table 1 of the Transportation Assessment accompanying the plan change request, and part of this is replicated below.

Stage	Residential Yield	Comment
1-12 & 15	523	100% constructed
14	46	100% constructed
16	55	ODP & subdivision RC approved. Stage under construction
17	48	ODP approved
18	54	Existing zoning for area of plan change request
C1 islands	10	
Retirement village	40	100 residential apartments, equivalent to 40 standard residences
Lot 1005	27	27 townhouses, construction commences 2022
Lot 1006	25	25 Apartments, construction commences 2022
AA-A	64	1 acre subdivision. 100% constructed.
Total	892	

Table 1: Northlake Subdivision, Current Overall Yields

Figure 4 of the Transportation Assessment showed the consented roading network.

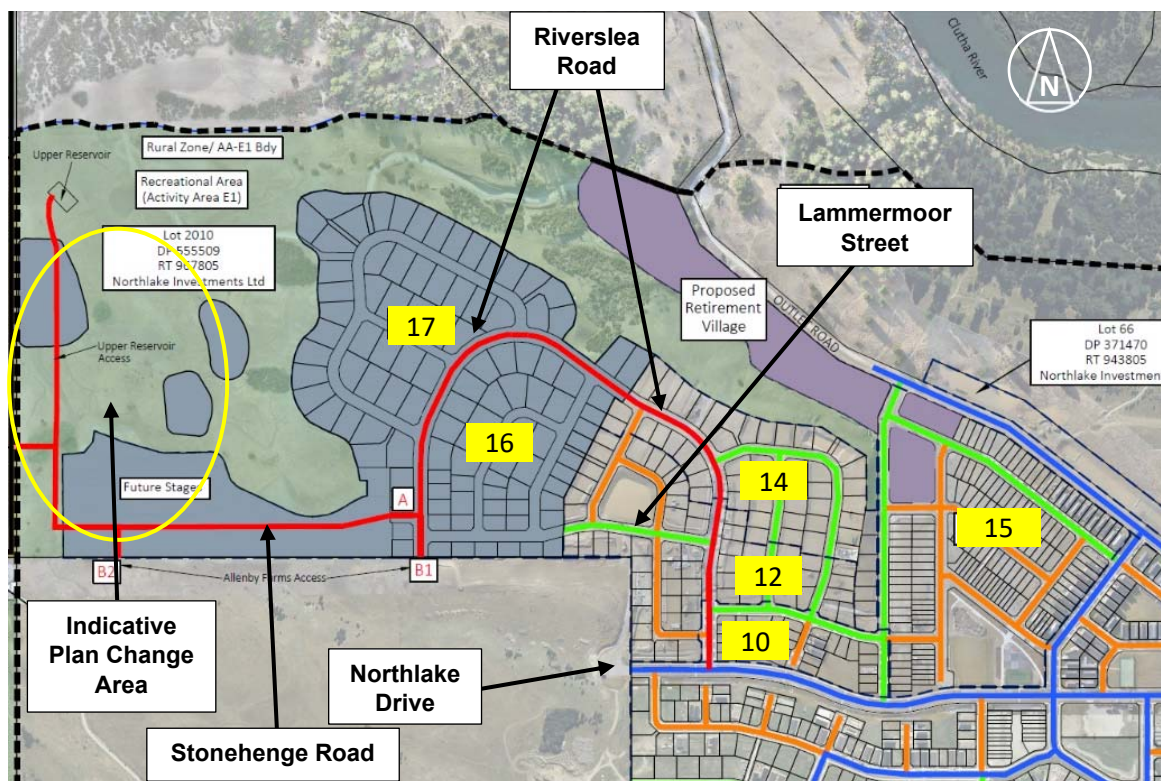


Figure 1: Consented Roding Network

In the Transportation Assessment, it was also noted that due to recent changes to the speed limits, it was likely that there would be an increased traffic loading onto Northburn Road. This was because initially, Northburn Road was expected to have an operating speed in the order of 40km/h due to having a winding alignment and multiple driveways on each side. At this time, Northlake Drive was subject to a 50km/h speed limit with limited direct access, and this in turn connected to Outlet Road and Aubrey Road which had a 70km/h speed limit. Thus although Northburn Road provided a shorter route, it was slower than the route via Northlake Drive / Outlet Road / Aubrey Road, and so the latter was the fastest route.

Recent changes mean that Northburn Road, Northlake Drive and Outlet Road are all now posted with a 40km/h speed limit, with Aubrey Road posted at 60km/h. As such, the speed environments of the two routes are more similar and therefore the shorter route (via Northburn Road) is likely to become more popular. We discuss this in detail below. However it is relevant that Outlet Road was significantly improved as part of the wider Northlake development, and at the time of design and construction, was expected to carry the traffic associated with 1,600 lots.

Additional Assessment: Riverslea Road and Lammermoor Street

As can be seen in Figure 1 above, there are only two routes available for traffic associated with the northwestern parts of Northlake:

- Either Stonehenge Road, south onto Riverslea Road, east along Lammermoor Street, south on Riverslea Road to Northlake Drive
- Or Stonehenge Road, north onto Riverslea Road, then follow the road as it turns east and then south, and then south onto Northlake Drive

Confirmed subdivision plans for the easternmost part of Stonehenge Road show that the legal width is 20m, and as such, we consider that it is reasonable a Road Type E13 could be constructed under



the Council's Land Development and Subdivision Code of Practice (**Code of Practice**). This is able to accommodate the traffic from up to 800 lots. In turn this connects to Riverslea Road which also has a 20m wide legal width and is formed with an 8.4m wide carriageway, on-street parking bays and 2.0m footpath on each side, thereby achieving Road Type E13. The route via Stonehenge Road, north onto Riverslea Road, then following the road around therefore has a high capacity.

However this route is 730m in length, and as shown on Figure 1 above, this is considerably longer than a route using Lammermoor Street. This is 410m long but has only a 15m legal width, 5.7m formed width, a 1.5m footpath on each side and (for the most part) on-street parking within the movement lanes (other than an indented parking bay on the eastern end, between Cambrian Street and Hawkdun Place). This means it meets Road Type E12 and is able to accommodate the traffic of up to 200 residences. However under the Code of Practice a road that has parking within the movement lane is only able to accommodate the traffic generated by up to 100 residences.

In the first instance, we have considered whether drivers will use the Riverslea Road 'loop' or Lammermoor Street. It is evident from Figure 1 that Lammermoor Street is shorter and therefore will be the preferred route, assuming that travel speeds are the same, because the journey time will be shorter. We have considered whether traffic calming or other such measures could be put in place in order to slow vehicle speeds on Lammermoor Street and therefore discourage this route from being used. However our assessment shows that allowing for drivers to travel at the posted speed limit of 40km/h around Riverslea Road, travel speeds on Lammermoor Street would need to be no more than 22km/h for the journey times on both routes to be equal. We do not consider that this would discourage drivers from using Lammermoor Street since journey times would be no longer and the route would still be perceived as being shorter in length.

In due course we expect that Riverslea Road will extend southwards and connect to order to an extension of Northlake Drive. This then creates a high-capacity route as an alternative to Lammermoor Street. However as this is presently not confirmed, we have evaluated the ability of Lammermoor Street to absorb additional traffic. In order to determine the exact traffic volumes on each section of the road, we have assessed which route is the shortest for each consented lot in the area. Basic testing using Sidra Intersection shows that a vehicle turning at a priority intersection when having to 'give-way' gives rise to a geometric delay of around 3.5 seconds. Therefore in order to determine the traffic loading onto each road, we have:

- Found the length of each route travelled by from the lot to the Northlake Drive / Riverslea Road intersection;
- Converted this to a travel time allowing for vehicles to travel at 40km/h; and
- Where a vehicle turns at an intersection, added a further 3.5 seconds.

This generates the following assessment of which consented lots would use which route:

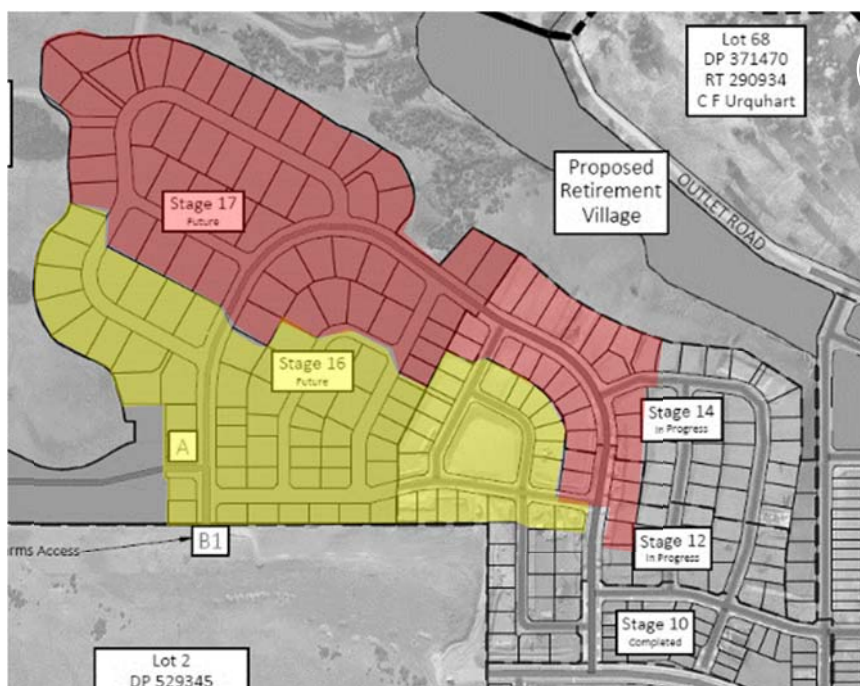


Figure 2: Shortest Routes to each Lot

On this basis, 72 lots would find the Lammermoor Street route to be the fastest (shaded yellow above)¹. Of these, the traffic loadings onto each section of Lammermoor Street will be:

- Riverslea Road to Road 28: 24 lots;
- Road 28 to Road 27: Additional 15 lots (39 lots total);
- Road 27 to Cambrian Street: Additional 14 lots (53 lots total);
- Cambrian Street to Hawkdun Place: Additional 8 lots (61 lots total);
- Hawkdun Place to Riverslea Road: Additional 11 lots (72 lots total).

As set out in the Transportation Assessment, the current zoning of the plan change area would permit the development of a further 64 lots, and these would all use Lammermoor Street. Thus the number of lots that would then use the road would be:

- Riverslea Road to Road 28: 88 lots;
- Road 28 to Road 27: 103 lots;
- Road 27 to Cambrian Street: 119 lots;
- Cambrian Street to Hawkdun Place: 125 lots;
- Hawkdun Place to Riverslea Road: 136 lots.

Under the existing zoning, Lammermoor Street would require the provision of a parking lane from Road 28 eastwards. We note however that parking demand on this part of Lammermoor Street will be very low, with only around a dozen lots having frontage onto it. Furthermore, as noted above, one section of the road presently has an indented parking bay provided.

If the plan change area was to be rezoned, then this would permit the development of a further 63 lots, meaning that the number of lots served by each section of Lammermoor Street would be:

- Riverslea Road to Road 28: 151 lots;
- Road 28 to Road 27: 166 lots;

¹ For completeness, the red shading represents the lots that would use Riverslea Road



- Road 27 to Cambrian Street: 180 lots;
- Cambrian Street to Hawkdun Place: 188 lots;
- Hawkdun Place to Riverslea Road: 199 lots.

Based on our assessment, we note that all sections of Lammermoor Street remain below the threshold set out within the Code of Practice for a road within a 15m legal corridor (where the typical maximum number of lots served is 200). However given the volumes, and that the road will increasingly be used by through traffic, we consider that a parking lane will be justified to ensure that through traffic is not obstructed.

That said, we consider that the Code of Practice makes it clear that a 15m width is sufficient to accommodate footpaths, parking lanes/bays and appropriate movement lanes. Accordingly, we do not consider that there are any reasons why the legal width of Lammermoor Street would be insufficient to accommodate an appropriate road design with the development associated with the plan change.

Finally, with regard to the proposed new roads within the plan change area, the total yield of the area (127 lots) means that Road Type E12 is appropriate, and in practice this would provide unused capacity compared to the typical maximum that such roads can serve, of 200 lots. That said, we acknowledge that the eastern end of Stonehenge Road is consented at a 20m legal width, sufficient to accommodate the traffic from up to 800 lots.

Additional Assessment: Routes Towards Wanaka

As noted above, Riverslea Road has a 20m wide legal width and is therefore easily able to accommodate an increase in traffic. Similarly, Northlake Drive (as the main spine road through the development) has been constructed to provide a high-capacity route.

For routes towards Wanaka, in practice there are limited connections towards the south of Northlake Drive and so the critical decision point of drivers towards the west of Northlake is at the Northlake Drive / Mt Nicolas Avenue intersection. At this location, a driver could choose one of the following route options:

- Option 1: South onto Mt Nicholas Avenue, west onto Obelisk Street, south onto Northburn Road;
- Option 2: East on Northlake Drive, south onto Cluden Crescent, onto west onto Obelisk Street, south onto Northburn Road;
- Option 3: East on Northlake Drive, south onto Mt Linton Avenue;
- Option 4: East on Northlake Drive, south onto Outlet Road.

Of these, we note that Cluden Crescent, Obelisk Street and Northburn Road each have a 20m wide legal width and conversely, Mt Nicholas Avenue has only a 15m wide legal width.

With this in mind, we consider that it would not be appropriate for drivers to use Option 1 as their preferred route due to this leading to an outcome of Mt Nicholas Avenue carrying more traffic than contemplated under the Code of Practice. We therefore consider that measures to make the route highly unattractive to drivers (such as traffic calming and changing priority at the Obelisk Street intersection) will be required.



With regard to the remaining three options, travel times from the Northlake Drive / Cluden Crescent intersection (calculated according to the methodology set out above) will be:

- Option 2 (Northburn Road): 118 seconds;
- Option 3 (Mt Linton Avenue): 115 seconds; and
- Option 4 (Outlet Road): 118 seconds.

It can be seen that the travel times are broadly similar. However, the route via Northburn Road is the shortest option (around 13% shorter than the route via Mt Linton Avenue and 20% shorter than the route via Outlet Road). We also consider that for residents, the route via Northburn Road is intuitively the more direct as it does not result in them having to 'double back' on themselves as the remaining two routes do. Moreover, when returning home from Wanaka or surrounds, Northburn Road is the first entry point encountered by residents, which is likely to encourage use of this route.

That said, the similarity between the travel times creates the opportunity to use traffic calming or similar to encourage use of a preferred route (and discourage the use of others). We have therefore evaluated the potential for such a scheme to be implemented in this instance. That is, we have considered how the previous arrangement, of Outlet Road being the faster route, can be re-implemented under the new speed management regime but using different techniques.

The pattern of development means that there are 258 lots to the south of Northlake Drive where there is limited ability to influence driver route choice, because this would require drivers to travel past one route option in order to reach another.

Thus for development to the south of Northlake Drive, the number of lots served would be:

- Northburn Road: 160;
- Mt Linton Avenue: 98; and
- Outlet Road: 0.

Consequently, in order for Northburn Road to remain below the threshold of serving 200 lots, no more than 40 of the 697 lots towards the north of Northburn Road² could use Northburn Road and no more than 102 lots could use Mt Linton Road.

In order to evaluate this, we have initially assumed more realistic operating speeds, of:

- 35km/h on the local roads towards the south of Northlake (to take into account slowing for parked cars, encountering vehicles turning to/from driveways, etc),
- 45km/h on Northlake Drive (as it has limited driveways but has a flat and straight alignment)
- 50km/h on Outlet Road (as it has no driveways and a flat/straight alignment over much of its length).

This then results in the following journey times:

- Option 2 (Northburn Road): 131 seconds;
- Option 3 (Mt Linton Avenue): 123 seconds; and
- Option 4 (Outlet Road): 108 seconds.

When considered in this manner, Outlet Road becomes the more attractive route.

² 828 lots approved as per Table 1, minus 258 lots to the south of Northlake Drive, plus 64 lots enabled under current zoning, plus 63 lots sought through current plan change request = 697 lots



We assume that the Council would not wish to formally increase the speed limit on Outlet Road in order to make this route even more attractive. Consequently, we have considered the implementation of modest traffic calming measures on Northburn Road and Mt Linton Avenue in order to reduce the operating speed even further. A reduction to 30km/h operating speed from the 35km/h operating speed allowed for previously, shows the following:

- Option 2 (Northburn Road): 149 seconds;
- Option 3 (Mt Linton Avenue): 136 seconds; and
- Option 4 (Outlet Road): 108 seconds.

On this basis, the journey time via Outlet Road would be around 30-40 seconds shorter than via Northburn Road and Mt Linton Avenue. At such a difference, plus the perceived inconvenience of negotiating traffic calming measures, we anticipate that drivers will choose to use Outlet Road.

The Hikuwai development also uses Outlet Road, and as set out in the Transportation Assessment, this presently has a consented yield of 200 lots. It is also possible that it would be used by the traffic generated by the Allenby Farms subdivision (354 lots) plus the Urquhart land (23 lots). Thus if all of this traffic, plus the 697 lots associated with the Northlake subdivision were to use Outlet Road, the resulting traffic loading would be 1,274 lots. However this remains well below the expected capacity of the road (which as noted above was designed for 1,600 lots) and consequently no additional improvement measures would be required for the road.

Sticky Forest Development and Allenby Farms

We have been asked to comment on the suitability of the Northlake roading network to accommodate traffic associated with Sticky Forest. As this is not part of the plan change request, and as we do not know the extent of development which might be enabled within Sticky Forest, we can only make an approximate assessment.

We assume that the development of the Allenby Farms Limited land would precede Sticky Forest development and therefore that Sticky Forest would have access through Allenby Farms. Once the roading network of Allenby Farms is put in place, and the southwestern part of Riverslea Road is extended to connect to an extension of Northlake Drive, then this becomes the more attractive route. Riverslea Road, Northlake Drive and Outlet Road are both able to accommodate significant extra traffic, meaning that these roads no longer form a constraint for development of Sticky Forest. Rather, it would be the formation of Stonehenge Road and the connection into Sticky Forest that would potentially be a limitation. Provided that they were formed with a 20m legal width then we estimate that the development yield of Sticky Forest could be potentially up to 325 residential lots.

Conclusions

On the basis of our assessment, we confirm the Transportation Assessment finding that the traffic associated with the plan change area can be accommodated on the roading network within Northlake. We also confirm that speed limit changes in the area mean that Northburn Road and Mt Linton Avenue have become attractive routes for drivers, rather than the intent for development traffic to be directed to Outlet Road, which was designed and constructed to accommodate higher traffic flows. However, through reducing the speeds of Northburn Road and Mt Linton Avenue (such as through traffic calming), in our view, traffic can again be focussed onto Outlet Road.

When considering possible development in Sticky Forest, and assuming Allenby Farms is developed first, the development yield of Sticky Forest could be up to 325 lots.



Please do not hesitate to contact me if you require anything further or would like clarification of any matters.

Kind regards

Carriageway Consulting Limited

A handwritten signature in purple ink, appearing to read 'Andy Carr'.

Andy Carr

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