BASELINEGROUP

Appendix 5: Transportation Assessment

Kirwee Central Properties Limited

Proposed Private Plan Change Kirwee

Transportation Assessment

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1. Introduction

1.1. Kirwee Central Properties Limited has submitted a private plan change request to Selwyn District Council for rezoning an area of land in the settlement of Kirwee. If the plan change is adopted, it will result rezone the site from Living 2A (which requires a minimum lot size of 1ha, or 2ha where the lots abut a Rural Zone) to Living 1 (which requires a minimum lot size of 800sqm).

1.2. This Transportation Assessment sets out an evaluation of the transportation issues associated with the development of the plan change area including changes in travel patterns that are likely to arise. Where potential adverse effects are identified, possible ways in which these can be addressed are set out.

1.3. This report is cognisant of the guidance specified in the New Zealand Transport Agency's '*Integrated Transport Assessment Guidelines'* and although travel by private motor vehicle is addressed within this report, in accordance with best practice the importance of other transport modes is also recognised. Consequently, travel by walking, cycling and public transport is also considered.

2. Site Overview

2.1. Location

2.1.1. The development site is located on the eastern side of Kirwee and is presently zoned as Living 2A in the Selwyn District Plan ('*District Plan*').

2.1.2. The location of the site in the context of the local area is shown in Figure 1 and in more detail in Figure 2.

Figure 1: General Location of Development Site

Figure 2: Aerial Photograph of Site and Environs

2.2. Road Hierarchy

2.2.1. The District Plan classifies Courtenay Road as a Collector Road, being a "*low to medium capacity road … that has an increased degree of access compared to other roads higher in the hierarchy*" (Policy B2.1.5, Explanation and Reasons).

2.2.2. This section of Hoskyns Road and School Lane are both classified as Local Roads. These are roads whose function "*is almost entirely to provide for access to properties and adjoining land uses"* and which *"are not intended to act as main through routes for traffic and generally have lower traffic volumes*" (Policy B2.1.5, Explanation and Reasons).

3. Current Transportation Networks

3.1. Roading Network

3.1.1. The proposed roading connection into the plan change area towards the north is via the end of an existing stub which has been constructed as part of a resource consent (RC175578) for a 45-lot residential subdivision. For clarity, this area is also subject to the proposed plan change request such that the underlying land zoning will be amended (rather than the development relying on the consent). Details of the consented development are discussed subsequently.

3.1.2. The access road is presently formed with kerb and channel on both sides and a carriageway of 9m width. The formed road is presently 25m long but serves no development. At its northern end it links to Hoskyns Road at an intersection where there are no priority signs or carriageway markings. Sightlines for vehicles emerging from the un-named road onto Hoskyns Road are excellent.

Photograph 1: Un-Named Road Intersection with Hoskyns Road

Photographs 2 and 3: Sight Distances along Hoskyns Road from Un-Named Road

3.1.3. In this location, Hoskyns Road is subject to a 70km/h speed limit. It has a flat and straight alignment with a 6m wide sealed carriageway that has neither edgelines nor a centreline. There are grassed verges / swales on each side of the road.

Photograph 4: Hoskyns Road Looking East

3.1.4. Towards the east of the un-named road, Hoskyns Road continues with the same formation for a distance of around 670m. Beyond this point, the carriageway is unsealed and the speed limit increases to 100km/h. Hoskyns Road turns towards the south and meets State Highway 73 around 7km southeast of Kirwee, and also intersects with a number of local roads over this distance.

3.1.5. Approximately 130m west of the un-named road, the speed limit on Hoskyns Road reduces to 50km/h and 460m west of the un-named road Hoskyns Road meets Courtenay Road at a priority ('give-way') intersection. The intersection does not have any auxiliary turning lanes, but sight distances for turning drivers are excellent.

Photograph 5: Courtenay Road / Hoskyns Road Intersection Looking West

Photographs 6 and 7: Sight Distances along Courtenay Road from Hoskyns Road

3.1.6. Courtenay Road is the main north-south road through Kirwee, providing one traffic lane in each direction and is subject to a 50km/h speed limit. It has a flat and straight alignment with a carriageway width which varies, being 9m towards its southern end and 6m towards its northern end, and which has numerous private driveways on each side. There are grassed verges on each side of the carriageway.

Photograph 8: Courtenay Road Looking South

3.1.7. Approximately 280m south of Hoskyns Road, School Lane joins Courtenay Road from the east at an uncontrolled intersection (which has neither signs nor carriageway markings). Sight distances for turning drivers are excellent. Although there are no auxiliary lanes at the intersection, the northbound traffic land is widened by around 2.5m on the immediate approach such that if a vehicle was turning right into School Lane, another vehicle could pass.

Photograph 9: Courtenay Road / School Lane Intersection Looking North

Photograph 10: Widening at Courtenay Road / School Lane Intersection

3.1.8. School Lane is a cul-de-sac which provides an access into Kirwee Model School (that has around 150 students) but it also connects to the western side of the plan change area and serves 11 lots created through resource consent RC175578. The road is flat and straight with a carriageway width of 8.5m, but this widens to 14m outside the school where 90-degree on-street parking is provided.

Photograph 11: School Lane Looking East

3.1.9. At its eastern end, School Lane has been extended to form an access into part of the subdivision created by RC175578. There is a short (50m) section of road extending from the previous end of the road which has a 7m wide carriageway. There is then a section of road with 14 90-degree spaces along the southern side, and immediately east of this, a turning head.

Photograph 12: Eastern End of School Lane Looking West

3.2. Non-Car Modes of Travel

3.2.1. There are 1.5m wide footpaths on each side of the un-named road and on the southern side of Hoskyns Road from the eastern boundary of the plan change area (and the extent of the RC175578 site) to Courtenay Road. There are also 1.5m footpaths on the eastern side of Courtenay Road and the southern side of School Lane.

Photograph 13: Footpath on Southern Side of Hoskyns Road Looking West

3.2.2. There is also a Kea Crossing provided on School Lane, at the western boundary of the school site. This links to an off-road pedestrian route on the northern side of School Lane which in turn connects to residences accessed via St Andrews Lane and Glen Oak Drive further north.

Photograph 14: Kea Crossing on School Lane

3.2.3. There is no specific infrastructure provided for cyclists or buses in the immediate area.

3.3. Future Changes

3.3.1. As noted above, resource consent RC175578 permits a 45-lot residential subdivision and this occupies the northern part of the plan change area. The approved subdivision plan is shown below.

Figure 3: Approved 45-Lot Subdivision

4. Current Transportation Patterns

4.1. Traffic Flows

Prevailing Traffic Flows

4.1.1. Selwyn District Council carries out regular traffic counts on the key vehicle routes throughout the district. Data recorded in the NZTA Crash Analysis System, which in turn is sourced from Council RAMM databases, shows that the traffic flows are:

- Hosykns Road: 150 vehicles per day;
- Courtenay Road: 1,000 vehicles per day; and
- School Lane: 120 vehicles per day.

4.1.2. The peak hour traffic flows on a road are typically no more than 15% of the daily volume, which suggests that in the peak hours the likely volumes are:

- Hosykns Road: 25 vehicles;
- Courtenay Road: 150 vehicles; and
- School Lane: 20 vehicles.

4.1.3. The extent of development served by Hoskyns Road and Courtenay Road are commensurate with the traffic flows, but the volumes on School Lane appear low given the presence of the school. With 150 students, traffic flows of 90 vehicles (that is 45 vehicles arriving and 45 vehicles departing) would be expected at the start and end of the day, equating to 180 vehicle movements per day. In addition the road serves 22 existing residences which would be expected to generate 176 vehicle movements per day plus 20 vehicle movements in the peak hours. Thus the more likely traffic flow on School Lane is a daily volume of 350 vehicle movements with peak flows of 110 vehicle movements. These latter figures have been used within this report.

Proposed (Confirmed) Traffic Flows

4.1.4. As set out previously, there is a consented subdivision (RC175578) that is located within the northern part of the plan change area. This has 11 lots served by School Lane and the balance served from Hoskyns Road via the un-named road. The lots are undeveloped but form part of the receiving environment, meaning that the expected traffic generation should be taken into account.

4.1.5. Traffic generated by residential developments is known to vary for a variety of reasons, with one such reason being the proximity (or otherwise) to employment and community facilities. Where a dwelling is some distance from these types of facilities, the traffic generation rates tend to be lower than for residences that are closer due to ‘trip chaining’, that is, the tendency of a resident to carry out multiple visits to different destinations during the same trip away from the dwelling.

4.1.6. In this case, employment opportunities within KIrwee are very limited, and thus residents will need to travel for work. As a result, it is likely that there is a high degree of commuting to/from the township.

4.1.7. Typical residential dwellings each generate 8-10 vehicle movements per day, dwellings and the lower rate has been used within this assessment to account for trip-chaining. An allowance has been made for each dwelling to generate 0.9 vehicles movement in the peak hours.

4.1.8. This would mean that traffic flows change as follows:

Road	Existing Traffic Volumes		Traffic Volumes with RC175578	
	Per Day	Peak Hour	Per Day	Peak Hour
Hoskyns Road	150	25	425	55
Courtenay Road	1,000	150	1,360	190
School Lane	350	110	440	120

Table 1: Traffic Flows on Adjacent Road Network

4.1.9. The Austroads Guide to Traffic Management Part 3 ('*Traffic Studies and Analysis*') sets out a process by which the level of service of a road can be calculated. This shows that under these traffic flows, each of the roads will provide Level of Service B. This is in a zone of stable flow conditions, and represents a very good level of service for roads in the peak hours.

4.1.10. The Austroads Guide to Traffic Management Part 3 ('*Traffic Studies and Analysis*') also sets out thresholds regarding the need for detailed traffic analyses at intersections, and the traffic flows below which detailed analyses of unsignalised intersections are unnecessary. An extract from this is replicated below.

Major Road Type	Traffic Volumes (Vehicles Per Hour)	
	Major Road	Minor Road
Two lane road	400	250
	500	200
	600	100

Table 2: Extract from Table 6.1 of Austroads Guide to Traffic Management Part 3 (Intersection Volumes below which Capacity Analysis is Unnecessary)

4.1.11. Based on this, no analysis has been carried out at any of the intersections since the traffic flows fall below these thresholds and the intersections will therefore operate under free-flow conditions.

4.2. Non-Car Modes of Travel

4.2.1. Given that the area around the site is urbanised, it can reasonably be expected that it will be relatively frequently used by pedestrians and cyclists. However the small size of Kirwee means that volumes of these road users will be small, other than around the school at the start and end of the school day. As such, the current levels of provision are considered to be adequate.

4.2.2. There are no scheduled public transport services that operate within Kirwee, but there is a service which provides a connection to Darfield to the west and Christchurch to the east. This operates twice a day – once in the morning travelling eastbound and departing Kirwee at 7:25am, and once in the evening travelling westbound and arriving at Kirwee at 6:20pm.

4.3. Road Safety

4.3.1. The NZTA Crash Analysis System has been used to establish the location and nature of the recorded traffic crashes in the vicinity of the development site. All reported crashes between 2009 and 2018 were identified, for the following sections of road:

- School Lane (full length);
- Courtenay Road (School Lane to Hoskyns Road); and
- Hoskyns Road (Courtenay Road to 100m east of site access).

4.3.2. This showed that there were no reported crashes. Further assessment showed that there were also no reported crashes in the previous five years (2004 to 2008).

4.3.3. It is therefore considered that there are no safety-related deficiencies in the roading network.

5. Proposal

5.1. The proposed plan change will facilitate a change of activity to enable more intensive residential development to occur.

5.2. The provisions of the Living 1 zoning mean that lot sizes of at least 800sqm are permitted, and therefore those lots towards the north of the site which are already consented through RC175578 and that are more than 1,600sqm in size could be subdivided. From the information provided, this would enable the creation of 27 lots over and above the consented 45 lots (making 72 lots in total). Of these, 4 lots would be served from School Lane and the remainder would be served via the un-named road and Hoskyns Road.

5.3. Land towards the south of RC175578 could be developed to provide 91 lots. These would all be served via an extension of the un-named road towards the south, with no roading connection to School Lane.

5.4. The Outline Development Plan for the area is shown below.

Figure 4: Outline Development Plan (Extract from Baseline Group Drawing)

6. Traffic Generation and Distribution

6.1. Traffic Generation

6.1.1. An allowance has been made for the same traffic generation as for the consented subdivision. In the morning peak hour, it is considered that 90% of the traffic generated is likely to be exiting the subdivision, with 65% of the generated vehicle movements entering the plan change area in the evening peak hour. With an additional 118 lots permitted under the proposed plan change (that is, an additional 27 lots within RC175578 plus 91 lots towards the south), this would lead to the following traffic generation:

Period	In	Out	Total
Morning Peak Hour	11	95	106
Evening Peak Hour	69	37	106
Daily	472	472	944

Table 3: Traffic Generation of the Proposal

6.2. Trip Distribution

6.2.1. Because of the location of the site, it is considered likely that the bulk of drivers would seek to reach the state highway. For those travelling westwards, using Courtenay Road is the most likely route.

6.2.2. For those travelling toward the east, the two potential routes would be via Courtenay Road or using the eastern section of Hoskyns Road. However the latter is unsealed and this will reduce vehicle speeds. Furthermore the route is slightly longer than using Courtenay Road (3,940m compared to 3,890m). Allowing for likely operating speeds, and anticipating that drivers will choose the shortest travel distance, it is considered that using Courtenay Road would be about 20% faster than using the eastern part of Hoskyns Road, and accordingly for this assessment an allowance has been made for all generated traffic to use Courtenay Road.

7. Effects on the Transportation Networks

7.1. Roading Network Capacity

7.1.1. The traffic flows on the roading network would increase as follows as a result of development of the plan change area:

Road	Traffic Volumes with RC175578		Traffic Volumes with Plan Change	
	Per Day	Peak Hour	Per Day	Peak Hour
Hoskyns Road	425	55	1,340	160
Courtenay Road	1,360	190	2,305	295
School Lane	440	120	475	125

Table 4: Traffic Flows on Adjacent Road Network

7.1.2. The Austroads Guide to Traffic Management Part 3 ('*Traffic Studies and Analysis*') has again been used to assess the level of service allowing for the traffic generated by the proposal. This shows that the roads will continue to provide Level of Service B under the increased traffic loadings, that is, there would be no change to the existing levels of service.

7.2. Intersection Capacity

7.2.1. The traffic volumes continue to fall below the thresholds at which there is a need for detailed traffic analyses, and therefore the intersections will continue to operate under free-flow conditions.

7.3. Upgrading of Existing Roads

7.3.1. The existing roads in the area have the following characteristics:

- Un-named Road: 9m carriageway, two 1.5m footpaths;
- Hoskyns Road: 6m carriageway, one 1.5m footpath;
- Courtenay Road: 6m carriageway towards the north / 9m carriageway towards the south, one 1.5m footpath
- School Lane: 8.5m carriageway, one 1.5m footpath

7.3.2. Since the plan change request will increase the traffic flows on these roads, an assessment has been carried out to ensure that they remain appropriate for the greater volumes.

7.3.3. The un-named road has been constructed to the requirements of a 'Local – Major' road under the District Plan. Despite this, it is understood that no requirements were put in place as part of RC175578 for the widening of Hoskyns Road to achieve the same outcomes. It appears that Hoskyns Road continued to be assessed as a 'Local – Living 2 zone only' road as part of RC175578, and for which a 6m wide carriageway is appropriate (as is provided).

7.3.4. The plan change (if approved) would result in the area being rezoned as Living 1 (meaning a classification of 'Local – Living 2 zone only' would no longer be appropriate), and traffic flows would increase by 105 vehicles in the peak hours. Accordingly, the construction standard of the un-named road remains appropriate, but there is a case that if compliance with the District Plan is required, then Hoskyns Road should be widened to have a 9m carriageway and brought up to the same standard as the un-named road.

7.3.5. In turn, this would then result in a widened Hoskyns Road leading into Courtenay Road which is 6m wide over its northern section. As such, it could be argued that this too should be widened. Consequently adopting this approach would mean that road widening was required over a total distance of 740m on both Hoskyns Road and Courtenay Road, and with revisions required also at the Courtenay Road / Hoskyns Road intersection to accommodate the widened carriageways.

7.3.6. From a transportation effects perspective, it is of note that Courtenay Road presently carries traffic flows in the order of 150 vehicles in the peak hours and appears to operate without difficulty. The traffic flows on Hoskyns Road arising from development of the proposed plan change area are of the same scale. On this basis, there is therefore no reason why a widening the carriageway of Hoskyns Road is required from an efficiency perspective.

7.3.7. Standard NZS4404:2010 ('*Land Development and Subdivision Infrastructure'*) represents the latest thinking in respect of subdivision design in New Zealand, and it was published after the District Plan became operative. This sets out that a carriageway width of 5.5m to 5.7m is appropriate for serving up to 200 residential lots. In this case, the extent of development that would be permitted under the plan change is considerably less than this. On this basis, it is not considered that there is a case for any significant widening of the carriageway of either Hoskyns Road or Courtenay Road.

7.3.8. However NZS4404:2010 also identifies that in rural areas, 1m shoulders are required (0.5m sealed) on a road. Therefore to achieve compliance with Standard NZS4404:2010, 0.5m sealed shoulders should be provided on Hoskyns Road and Courtenay Road.

7.3.9. The proposed plan change will increase the number of lots served by School Lane to only a very small extent, and therefore it is not considered that any improvement measures are required on that road.

7.4. Non-Car Modes of Travel

7.4.1. It is likely that the development will lead to increased volumes of walking and cycling in the area, but the location of Kirwee means that these trips will either be within the township or for longer-distance recreational purposes. Since the extent of development is modest, any increase in walking and cycling can be accommodated within the existing transportation networks.

7.4.2. The Outline Development Plan shows that roads will have footpaths (as discussed further below) and that there is also a walking/cycling link into the end of the School Lane cul-de-sac. The latter will ensure that a direct route is provided to the school.

7.5. Road Safety

7.5.1. The crash history in the vicinity of the site indicates that there are no particular features or factors that would be affected by the proposed development. It is anticipated that the proposed roads and intersections associated with development of the plan change area will meet current guides and standards, and as such, can be expected to function safely. There are no deficiencies in respect of sight distances at any of the intersections.

8. District Plan Matters

8.1. Introduction

8.1.1. The District Plan sets out a number of transportation-related Rules with which any development is expected to comply. Although this is a plan change request, a review against these has been undertaken in order to ensure that the proposal is able to comply with the relevant Rules, or whether exemptions to the Rules should be considered as part of the plan change provisions.

8.2. Rule 5.1: Road and Engineering Standards

8.2.1. The land is relatively flat and so the slope (Rule 5.1.1.1) and road gradients (Rule 5.1.1.2) will be compliant.

8.2.2. The road formation is required to meet Appendix E13.3.1 and E13.3.2. The first of these relates to the provision of new roads (as is expected to occur) and the 'green field' nature of the plan change area means that these provisions can be achieved. However the Outline Development Plan shows that footpaths are provided on each side of the proposed spine road, whereas Appendix E13.3.1 requires the provision of only one footpath. This can be addressed at the time that subdivision consents are sought, and it does not affect the plan change request per se.

8.2.3. The southern end of the main spine road will be formed as a cul-de-sac and this is more than 150m long, but the formation will be temporary as it will be extended in due course to form a through route. Accordingly it is not considered that this represents a non-compliance with Appendix E13.3.1.4.

8.2.4. Appendix E13.3.2 addresses intersection spacing. In this case only one intersection is proposed, and this is 145m from the nearest intersection, compared to a requirement for a separation of 75m.

8.3. Rule 5.2: Vehicle Accessways

8.3.1. The proposed lots will all have access onto a legal road (Rule 5.2.1.1) and all of the roads onto which access is gained have the same classification meaning that there is no preference as to where the accessways should be located (Rule 5.2.1.2). The site is relatively flat so achieving appropriate gradients should not be problematic (Rules 5.2.1.3 and 5.2.1.4).

8.3.2. The crossing is required to meet Appendix E13.2.1, which stipulates the requirements for the minimum widths. These can all be achieved.

8.3.3. There is no reason why more than six lots should share a private accessway, rather than being accessed by a road (Rule 5.2.1.7).

8.4. Rule 5.3: Vehicle Crossings

8.4.1. Any vehicle crossing is required to meet Appendices E13.2.2, E13.2.3, E13.2.4 and E13.2.5.

8.4.2. Appendix E13.2.2 addresses the separation of accesses and intersections. For intersections between Local Roads, a 10m separation distance is required and there are no reasons why this cannot be achieved.

8.4.3. Appendix E13.2.3 addresses sight distances from vehicle crossings, and in this case 45m is required since the roads will be subject to a 50km/h speed limit. It is possible that compliance with this provision will not be achieved, because in some locations the sight distance will be constrained by the presence of intersections or curves in the road geometry, which limit the sightline. However the intersection or curve will also mean that drivers have to slow (and in the case of an intersection, potentially stop) which will result in speeds that are much lower than the maximum permitted. Accordingly, it is considered that the plan change provisions could seek to exempt certain lots from complying this this particular provision.

8.4.4. Appendix E13.2.4 addresses the design and siting of vehicle crossings. One crossing per site can be achieved (Appendix E13.2.4.2), and the distance between crossings and the crossing width can be achieved (Appendix E13.2.4.5).

8.4.5. Appendix E13.2.5 addresses the standard of vehicle crossings. Since residential activity is proposed, standard vehicle crossings are required and these can be provided.

8.4.6. The crossings can be sealed (Rule 5.3.1.2) and will not gain access directly onto a state highway or arterial road (Rule 5.3.1.4).

8.5. Rule 5.4: Traffic Sight Lines – Road/Rail Crossings

8.5.1. The site is not in close proximity to a road/rail crossing.

8.6. Rule 5.5: Vehicle Parking and Cycle Parking

8.6.1. The number of parking spaces per lot can be achieved and the spaces can be designed to be accessible at all times (Rule 5.5.1.1 / Appendices E13.1.1 and E13.1.2).

8.6.2. Regarding the design of the parking spaces and maneouvring areas (Rule 5.5.1.2), there are no reasons why pedestrian areas will be obstructed (Appendix E13.1.5.2), garages can be of the appropriate size (Appendix E13.1.6), and the site is relatively flat and so gradients will not be exceeded (Appendices E13.1.7 and E13.1.8).

8.6.3. For on-site maneouvring, the layouts are able to be designed to ensure that vehicles do not reverse from the site unless this is a permitted activity, and the parking spaces can be designed to be accessed with just one reverse movement (Appendix E13.1.9). Queuing space can be provided (Appendix E13.1.10) and illumination is not required (Appendix E13.1.11).

8.7. Summary

8.7.1. The layout of the plan change area is capable of complying with the requirements of the District Plan, although it is likely that lots adjacent to intersections and curves in the roads will not be able to comply with the required sight distance of 45m. That said, vehicles speeds will be much lower than the assumed 50km/h due to drivers having to slow to negotiate the intersection (or curve) geometry, and hence it is unlikely that adverse effects would arise from this particular part of the layout.

8.7.2. It would therefore be possible (if desired) to exempt the plan change area from this particular Rule, by introducing a new Rule that if the 45m distance is not achieved then the vehicle crossing is permitted to be sited in the position that achieves the maximum sight distances. In this regard, it is noted that the requirement to achieve the minimum 10m spacing from an intersection would still apply and thus there is no possibility that the vehicle crossing to a corner lot would be directly onto an intersection.

9. Conclusions

9.1. This report has identified, evaluated and assessed the various transportation matters of a proposed plan change to facilitate residential development within the settlement of Kirwee.

9.2. Overall it is considered that the traffic generated by the development arising from the plan change can be accommodated on the adjacent roading network without capacity or efficiency issues arising, even when allowing for another consented subdivision in the area. Traffic volumes remain below the thresholds at which a detailed traffic analysis is required of intersections, meaning that the intersections will operate under free-flow conditions.

9.3. The crash history in the vicinity of the plan change area does not indicate that there would be any adverse safety effects from the proposal. New transportation infrastructure which will be provided will meet appropriate guides and standards (or exemptions from the District Plan will be sought when land use and subdivision consents are applied for).

9.4. The Outline Development Plan will meet (or is capable of meeting) the transportation requirements of the District Plan. With regard to sightlines at each lot access, appropriate distances are likely to be achieved for the prevailing vehicle speeds but in locations close to intersections or curves, this may not be the full 45m required under the District Plan. It would therefore be possible to include provisions within the plan change request to exempt lots from complying with this, provided that the access is located such that the sight distances are maximised.

9.5. Overall, and subject to the preceding comments, the proposed plan change can be supported from a traffic and transportation perspective.

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