

# TOKO MOUTH SUBDIVISION

## TRANSPORT ASSESSMENT REPORT

# INTRODUCTION

1. Toko Developments Limited (the Developer) has commissioned the preparation of a Transport Assessment Report for the proposed subdivision of Lot 9 DP416455 and Lot 13 DP 512557, Coombe Hay Lane, Toko Mouth.
2. The proposed development involves creation of 18 new residential allotments, construction of a new road to vest and associated intersection with Coast Road, and upgrade of the existing road to the east of the site from the Toko Mouth Settlement. The proposed development is shown in Figure 1.
3. This report describes the transport and road safety environment in the vicinity of the site, provides an assessment of the proposed intersection location to Coast Road, and provides an appraisal of transport infrastructure serving the development site.

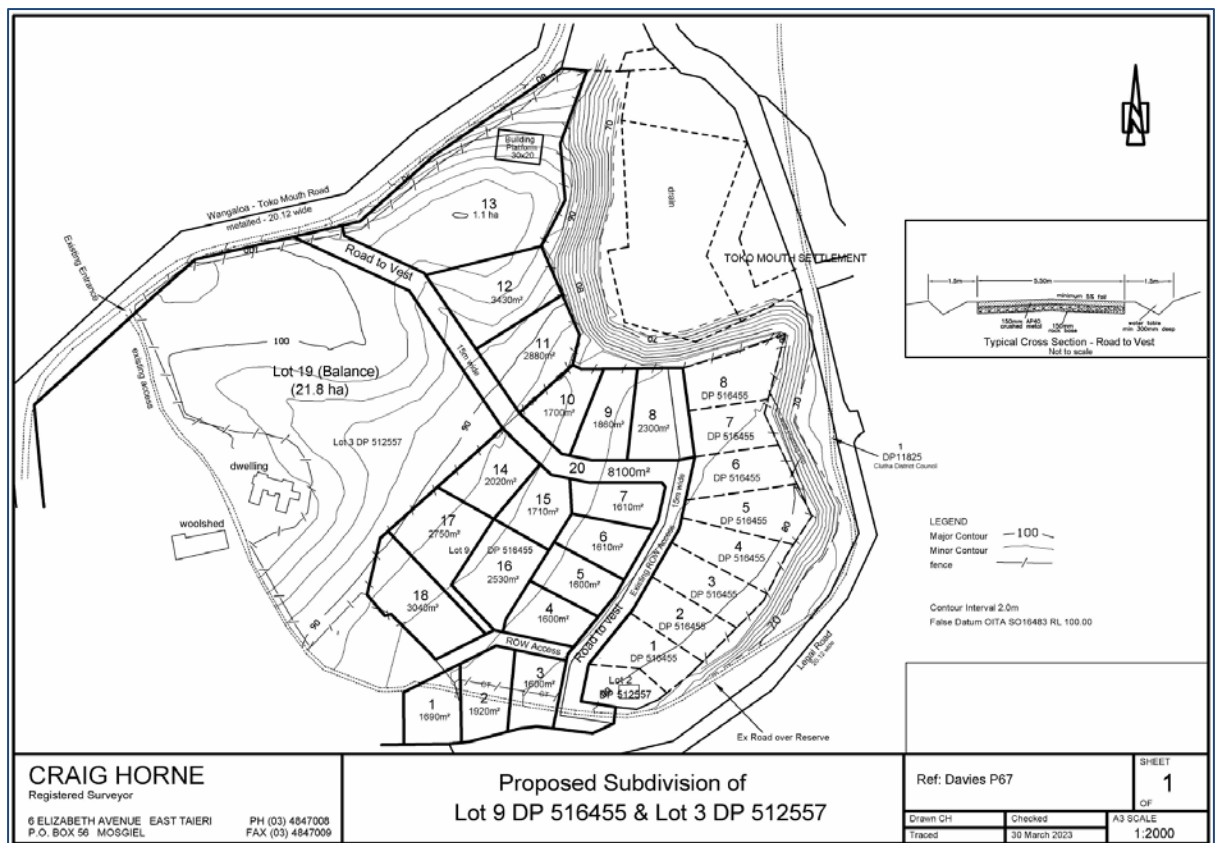


Figure 1 - Scheme plan of the proposed subdivision

# TRANSPORT ENVIRONMENT

## SITE LOCALITY AND ZONING

- The site is defined as Lot 9 DP416455 and Lot 13 DP 512557, with the area to be developed and the existing homestead generally shown in Figure 2. It is contained within the Coastal zone of the Clutha District Plan and has access to Coast Road, Toko Mouth Domain Road, and Coombe Hay Lane.



Figure 2 - Site locality. Note existing Toko Mouth township to the east of the site

## ROAD NETWORK

- The operational characteristics of the transport network in the vicinity of the site is summarised below:

COAST ROAD	COMMENTARY
<b>Road Classification</b>	Local
<b>Cross section</b>	Unsealed road formation generally 6m wide.
<b>Traffic Volumes</b>	AADT = 50vpd, with 13% of the AADT classified as heavy traffic (obtained from Mobileroad RAMM data).
<b>Speed</b>	Posted speed limit is 100km/h. Operating speed is discussed later in this report.
<b>Pedestrians and cyclists</b>	There are no dedicated provisions for pedestrians or cyclists.

TOKO MOUTH DOMAIN ROAD	COMMENTARY
<b>Road Classification</b>	Local
<b>Cross section</b>	Unsealed road formation generally 3-4m wide, with localised areas of widening or shoulders allowing for vehicles to pass.
<b>Traffic Volumes</b>	AADT = 100vpd, with 6% of the AADT classified as heavy traffic (obtained from Mobileroad RAMM data).
<b>Speed</b>	Posted speed limit is 100km/h (note: operational speeds are likely to be very low given existing road widths and adjoining land use). 15km/h speed advisory signs are present along its formation.
<b>Pedestrians and cyclists</b>	There are no dedicated provisions for pedestrians or cyclists.

COOMBE HAY LANE	COMMENTARY
<b>Road Classification</b>	Local
<b>Cross section</b>	Unsealed road formation 3m wide.
<b>Traffic Volumes</b>	AADT = 10vpd, with 2% of the AADT classified as heavy traffic (obtained from Mobileroad RAMM data).
<b>Speed</b>	Posted speed limit is 100km/h (note: operational speeds are likely to be very low given existing road width/geometry and adjoining land use).
<b>Pedestrians and cyclists</b>	There are no dedicated provisions for pedestrians or cyclists.

6. Photos showing the general formation of the surrounding road network are shown in Figures 3 to 8 below:



Figure 3 – Coast Road



Figure 4 – Coast Road

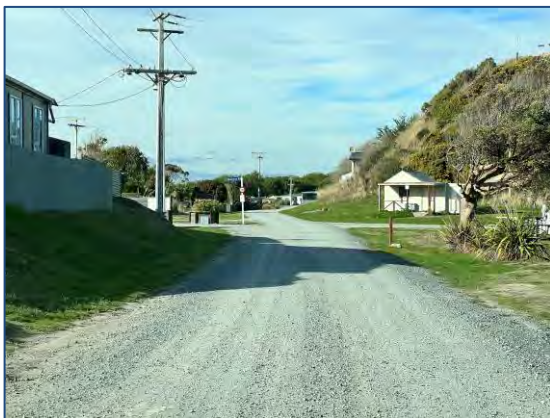


Figure 5 - Toko Mouth Domain Road



Figure 6 - Toko Mouth Domain Road



Figure 7 – Coombe Hay Lane



Figure 8 - Coombe Hay Lane

## CRASH HISTORY

7. The NZTA Crash Analysis System (CAS) has been reviewed to identify any crashes that have been reported in the vicinity of the site, from 2013 to 2023 inclusive. The area investigated for crashes is shown shaded in blue in Figure 9 and includes the intersection immediately to the north of the site.

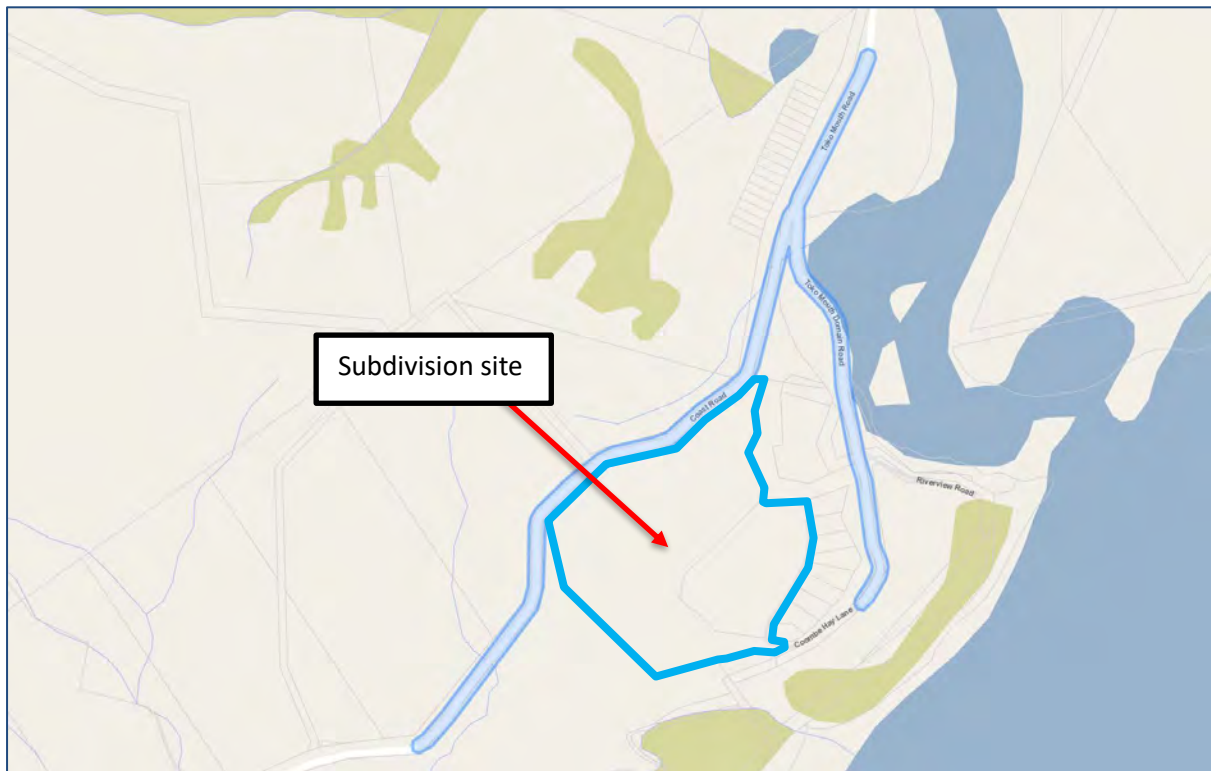


Figure 9 - CAS map showing area of crash investigation.

8. The CAS investigation shows that there have been no reported crashes within this assessment area during the investigated period, suggesting that there are no underlying or significant road safety issues.

## PROPOSED DEVELOPMENT

- The proposed development involves subdivision of Lot 9 DP416455 and Lot 13 DP 512557, Coombe Hay Lane, Toko Mouth, to create 18 new residential allotments. Also proposed is construction of a new road to vest, construction of a new intersection with Coast Road, and upgrade of the existing road to the southeast of the site from the Toko Mouth Settlement. These features are shown on Figure 10.



Figure 10 – Scheme plan of proposed subdivision

## TRAFFIC GENERATION

10. Traffic generation for the proposed development has been assessed based on NZTA Research Report 453 (Table C.1). Application of traffic generation data within this guide provides the following average traffic generation volumes during the peak hour, as requested by the Council in their RFI.

ACTIVITY	TRIP RATE	DWELLINGS	VOLUME
Dwelling (Rural) Peak Hour	1.1 per dwelling	18	19.8

# TRAFFIC EFFECTS ASSESSMENT

## EXISTING ROAD ACCESS

11. The Council states in their Transport RFI 3.i. that *“The prior subdivision RM2229 highlighted concerns from residents regarding transportation issues in relation to expansion of the settlement and the ability of the roading network to safely cope with a likely increase in usage”*. Council requests a more detailed assessment that assesses the ability of the existing roading network to safely and efficiently operate under the additional demand generated by this subdivision.
12. The ARRB Unsealed Roads Best Practice Guide (ARRB) has been adopted in the first instance to assess the adequacy of the receiving road network in the vicinity of the site, and its capacity to cater for traffic generated by the proposed subdivision. ARRB contains a road hierarchy which helps guide the management, engineering design, construction standards, and maintenance practices of unsealed roads. The following ARRB classifications are considered to best fit the road network in the vicinity of the site.

Road Class	Service Function Description	Road Type Description
4B – Minor Road	<b>Coast Road</b> This type of road is used for connection between local centres of population and links to the primary network. Roads may or may not be sealed depending on the importance and function of the road.	<ul style="list-style-type: none"> <li>• All-weather two-lane road formed and gravelled or single-lane sealed road with gravel shoulders.</li> <li>• Operating speed standard of 30–70 km/h according to terrain.</li> <li>• Minimum carriageway width is 5.5 m.</li> </ul>
4C – Access Road	<b>Toko Mouth Domain Road / Coombe Hay Lane</b> Provides access to low use areas or individual rural property sites and forest areas. Caters for low travel speed and a range of vehicles and may be seasonally closed.	<ul style="list-style-type: none"> <li>• Substantially a single lane two-way, generally dry weather, formed road.</li> <li>• Operating speeds standard of &lt; 20–40 km/h according to terrain.</li> <li>• Minimum carriageway width is 4 m.</li> <li>• May be restricted to four-wheel drive vehicles.</li> </ul>

13. The existing road formations in the vicinity of the site are considered to be consistent with the above service and road type descriptions. As their respective service functions will remain unchanged as a consequence of the proposed subdivision, and the volume of traffic generated will be modest, the existing formations are assessed as being adequate to serve the additional traffic generated by the proposed subdivision from an overall perspective.



## PROPOSED ROAD

14. The developer proposes two cross section typologies for the road serving the development site. As shown in the diagrams below, Figure 11 relates to the proposed road to vest within the site, and Figure 12 relates to the proposed upgrade of the existing access road formation along the escarpment linking to Toko Mouth Domain Road.

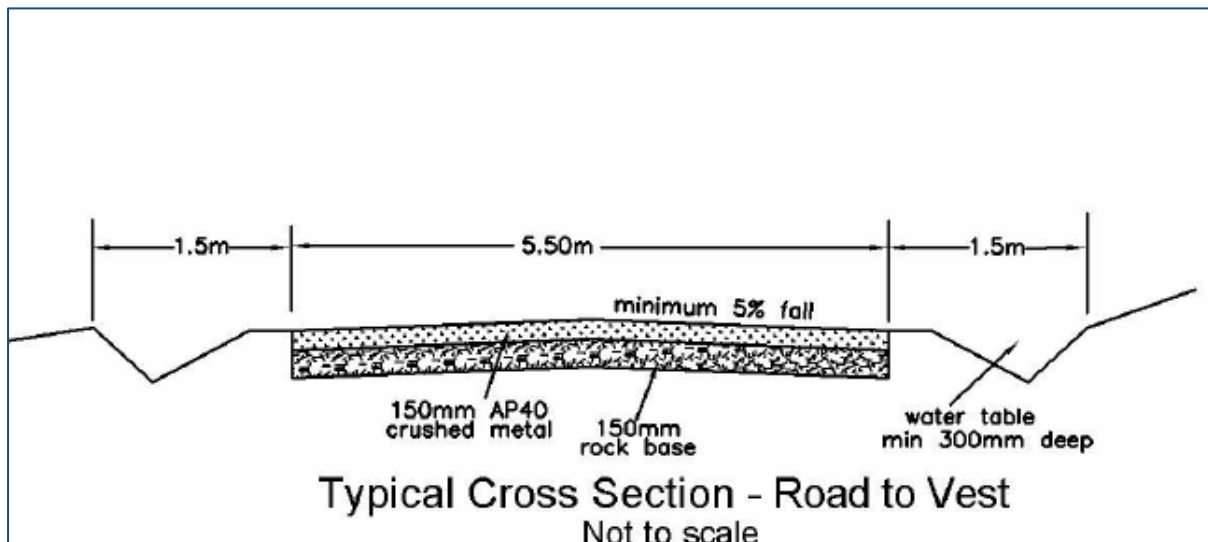


Figure 11 – Typical cross section of road to vest

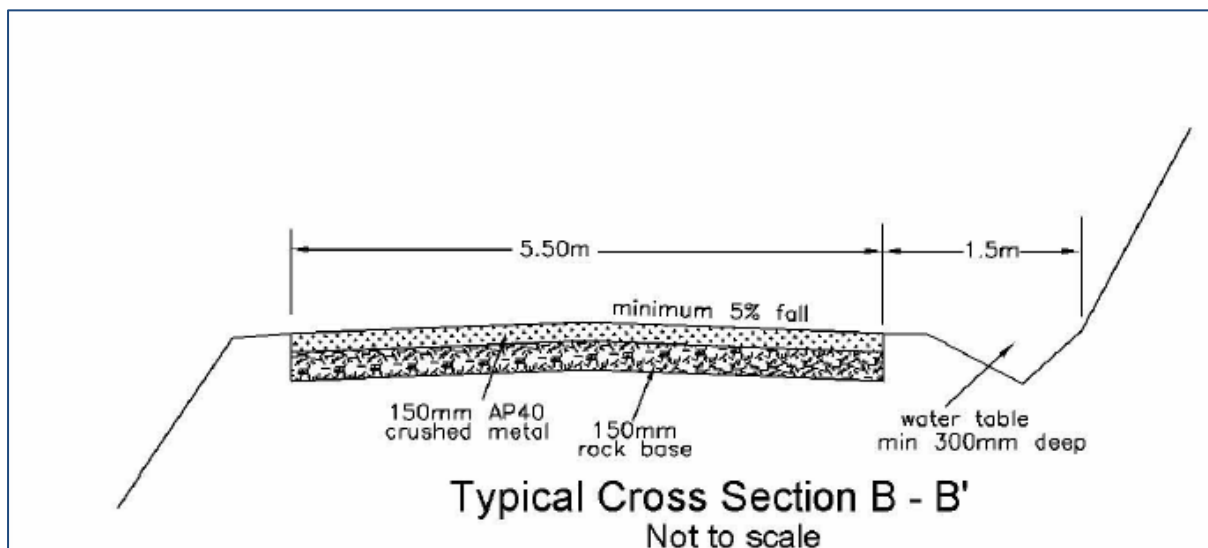


Figure 12 – Typical cross section of upgrade to existing Toko Mouth Domain Road formation south and east of the site.

15. It is noted that these typical cross sections exceed the minimum requirements for a “4C – Access” road under ARRB guidelines, which this road most closely fits with in terms of classification. These cross sections are also compliant with the road widths contained in NZS 4404:2010 under the “Rural – Live and Play” classification, which require a minimum 5.5m formed width. Overall, and in response to Council’s Transport RFI 3.iii., the proposed typical cross sections are assessed as being in accordance with relevant guidelines and are therefore acceptable from a transport perspective.

16. The Council, at a site meeting in late 2022, also requested assessment of the vertical alignment of the proposed road to vest, particularly in regard to the steeper section climbing from Coast Road. A longitudinal section has been provided for this alignment by the surveyor for the development, shown in Figure 13 below (a larger version is included in Appendix A).

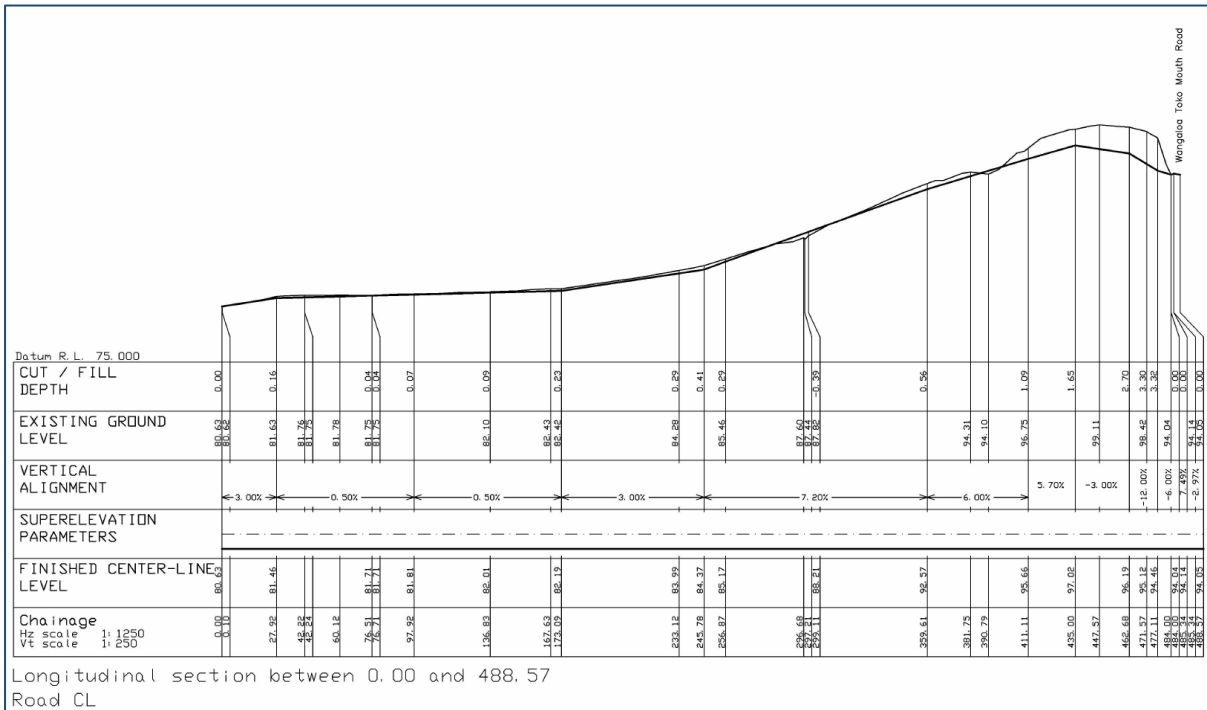


Figure 13 – Longitudinal section of the proposed road to vest. Intersection with Coast Road at the far right of the figure.

17. The key purpose of this Council request was to determine if the gradient of the road will exceed good practice guidelines for an unsealed pavement therefore requiring a sealed section for maintenance purposes (commonly referred to as a maintenance seal). The ARRB guide recommends a maximum gradient of 8%, whereas the longitudinal section shows a maximum gradient exceeding this at 12%.

18. While the steeper section of the road would therefore need to be sealed, the developer wishes to retain the option to lower the road alignment to potentially remove the need for sealing. As either of these options would be appropriate from a transport effects perspective, the recommendations at the end of this report reflect options for either treatment.

## ACTIVE TRANSPORT MODES

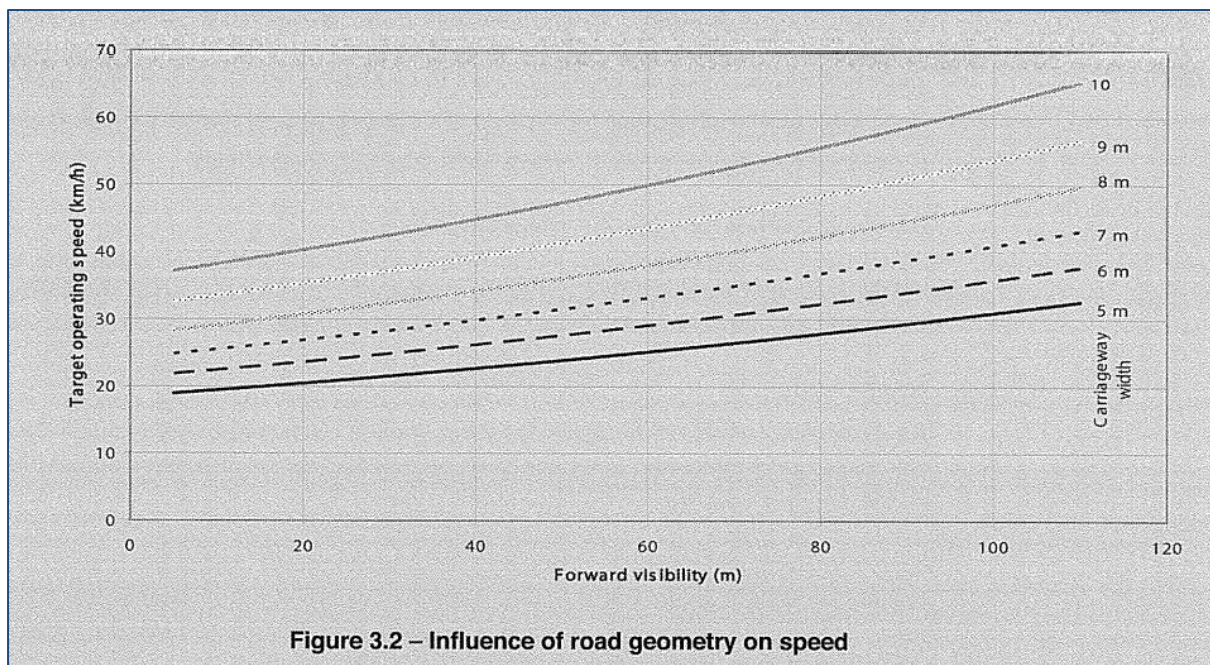
19. The Council state in their Transport RFI 3.iv. that “Future residents will potentially walk to the beach or other locations within the settlement from the proposed sites” and have requested assessment of how pedestrian use will be safely provided for in the design of the proposed road.

20. The proposed roads will essentially operate as a shared use environment, which is common for small rural settlements throughout New Zealand. The road width guidelines contained in New Zealand Standard NZS 4404:2010, under the “Rural – Live and Play” classification, do not require provision of separate/dedicated infrastructure for active road users. Instead, this standard states that it is appropriate for pedestrians and cyclists to use road shoulders/share

the movement lane in this type of road environment. Therefore, based on these guidelines, the shared use nature of the road for active road users is considered to be acceptable from a safety perspective.

## PROPOSED INTERSECTION

21. The developer proposes a new intersection to Coast Road between proposed Lot 13 and the balance lot. The RFI issued by the Council in respect of the proposed subdivision requests comment on safe sightlines at the proposed intersection, and provision of a preliminary design that identifies any works necessary to accommodate the development and the safety of the intersection.
22. The key safety aspect at the proposed intersection is the provision of appropriate sight distance. It is noted that Coast Road is unsealed, with a gradient rising from northeast to southwest. It also features compound horizontal and vertical curves uphill from the proposed intersection location, and more gently contoured horizontal curves east of proposed intersection.
23. These curves have the effect of moderating the speed of traffic on Coast Road, particularly for vehicles approaching the proposed intersection from the west, due to limits on forward visibility. This is consistent with the report writer's experience, that a road geometry with a greater number of curves will result in drivers travelling slower than on a road with a straighter alignment. This influence of forward visibility on operating speed is recognised in NZS 4404:2010 (C3.3.5) Figure 3.2, shown below:



**Figure 3.2 – Influence of road geometry on speed**

*Figure 14 - NZS 4404:2010 (C3.3.5) Figure 3.2*

26. Based on driving of the route (including several passes over the sealed section of Coast Road in both directions), site observations, and application of ARRB guidelines, the following operating speeds have been adopted for assessment of sight distances:

- 50km/h for traffic approaching the proposed intersection from the west (consistent with ARRB guidelines for a “4B Minor” road in rolling terrain). Note that speed is moderated by the horizontal/vertical curves west of the site.
- 70km/h for traffic approaching the proposed intersection from the east. Note that speed is less impacted by road geometry to the east of the proposed intersection. This speed is consistent with ARRB guidelines for a “4B Minor” road in flat terrain.

27. These adopted operating speeds, and road features, are shown on Figure 15.

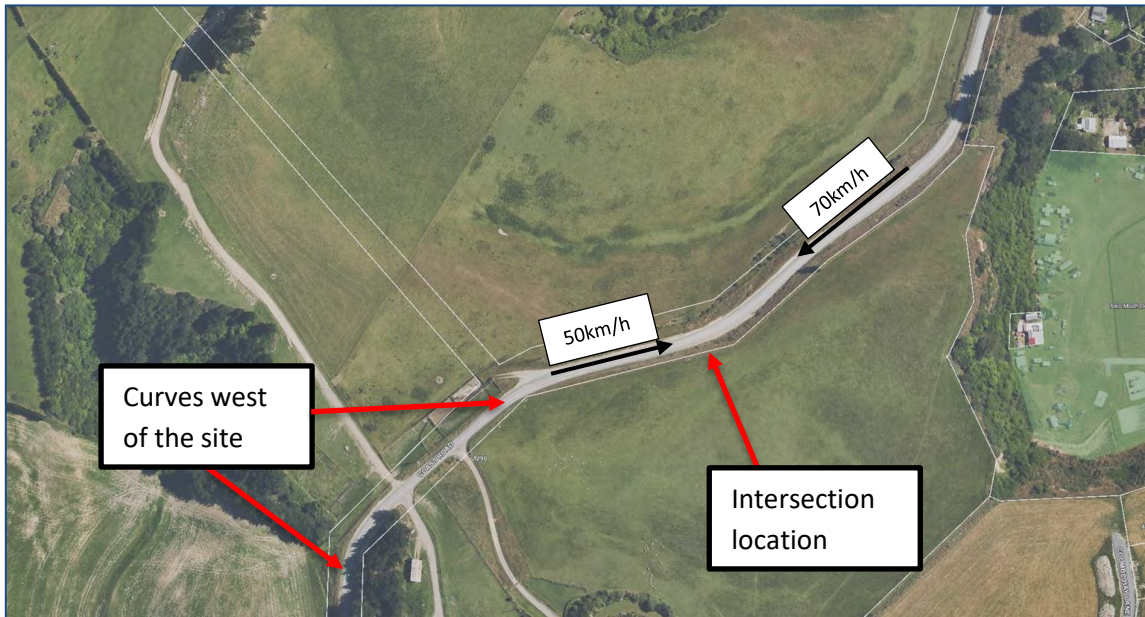


Figure 15 – Adopted operating speeds and road features in the vicinity of the site (Coast Road)

28. Measurements taken at the location of the proposed intersection show the following available sight distances. To assess the adequacy of the available sight distances, stopping sight distances (SSD) have been adopted due to the constrained roading environment and low average traffic volumes. SSD is defined as the distance to enable a driver to perceive, react and brake to a stop before reaching a hazard on the road ahead. The following table shows SSD requirements based on ARRB, and available sight distances at the proposed intersection location:

INTERSECTION	AVAILABLE SIGHT DISTANCE	
	To East (m)	To West (m)
Coast Road/Lot 20 (Road to Vest)	190+*	115
Minimum required SSD	90**	80**

\*May require minor sight benching.

\*\*Values corrected for uphill/downhill grades based on approach direction.

29. It was noted that available sight distances may benefit from minor sight benching at the horizontal curve immediately to the northeast of the proposed intersection, shown in Figure 16. The requirement for any sight benching can be addressed at the detailed design stage and is covered by recommended consent conditions at the end of this report.



*Figure 16 – Location of potential sight benching for SSD requirements*

30. Overall, the available sight distances are assessed as being acceptable for the proposed intersection location given the transport environment in the vicinity of the site, and compliance with the required SSD requirements. Any earthworks required to achieve sight distances are minor and can be dealt with at the detailed design stage for the intersection. It is therefore assessed that the intersection location will be able to operate safely.
31. The Council has also requested a preliminary design for the proposed intersection in their Transport RFI 3.ii. In this instance it is considered that as the available sight distances can easily meet the SSD requirements shown above, a concept design for the intersection is not required at this stage to ensure that provision of appropriate safety (i.e. sight distances) is feasible as such parameters can be incorporated into any future design. For a relatively simple T-intersection such as the one proposed it is acceptable to address this via consent condition requiring detailed design to be submitted to and approved by the road controlling authority, prior to physical works commencing. Nevertheless, in terms of a general concept it is expected that the intersection would be configured similar to Figures 17 and 18 below (reproduced in an amended form from Waka Kotahi NZTA guidelines), which is assessed as being appropriate for the expected use.

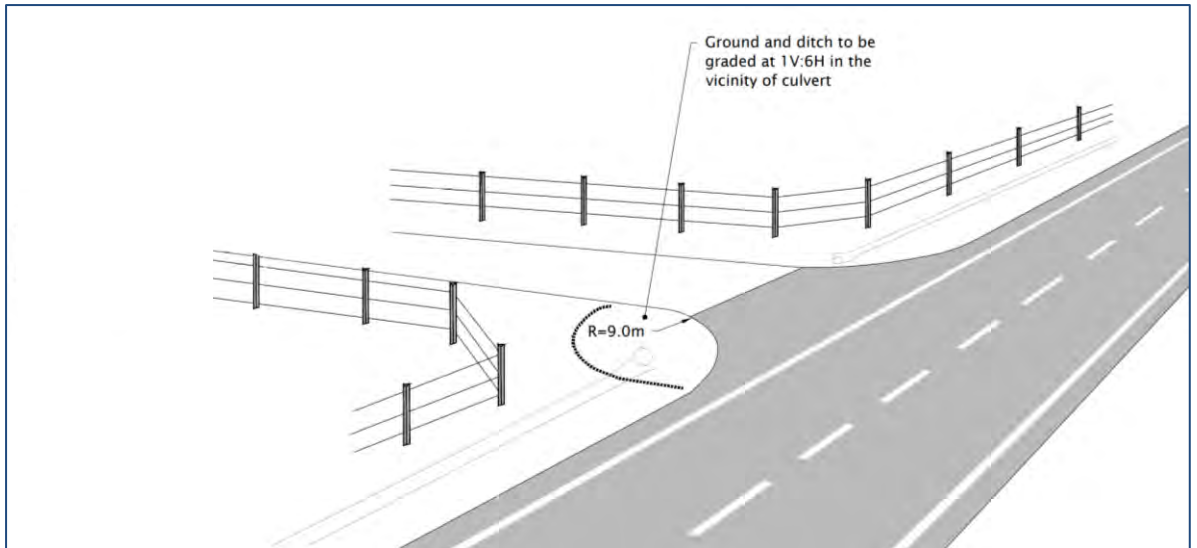


Figure 17 – General concept for proposed T intersection (perspective view)

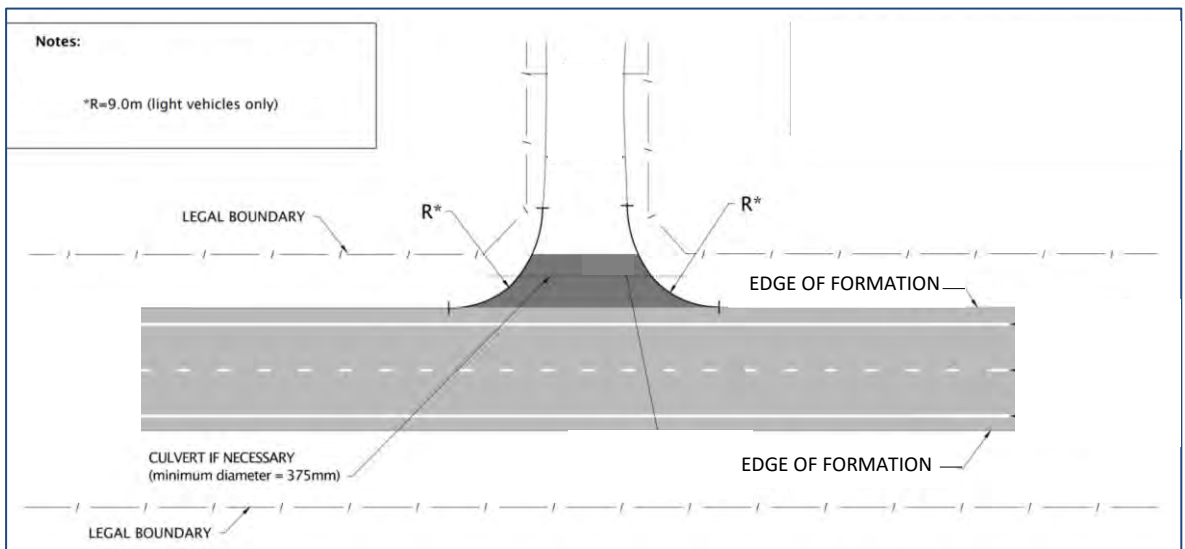


Figure 18 – General concept for proposed T intersection (plan view)

32. Overall, it is considered that traffic generated by the proposed subdivision will have no more than minor adverse effect on the safety of Coast Road as a consequence of the proposed intersection location, subject to the recommendation for detailed design of the intersection being submitted to the road controlling authority for approval prior to works commencing.

## CONCLUSION AND RECOMMENDATIONS

33. Based on the assessments undertaken in this report it is concluded that the proposed subdivision of Lot 9 DP416455 and Lot 13 DP 512557, Coombe Hay Lane, Toko Mouth, can be supported from a transport perspective, and that vehicle movements generated by the development can be safely and efficiently accommodated within the transport network.
34. The following requirements are recommended:
- i. Detailed engineering design plans, showing all proposed construction details for the new road to vest, new intersection to Coast Road, and upgrade of the existing road formation between Toko Mouth Domain Road and the development site, shall be submitted to and approved by the Council prior to construction. The plans must specifically include:
    - Typical cross section details in accordance with Figures 9 and 10 of this report.
    - Provision of minimum Safe Stopping Distances at the proposed intersection in accordance with the ARRB Unsealed Roads Best Practice Guide.
    - A vertical alignment of the new road where:
      - a. The vertical gradient does not exceed 8%; or
      - b. If the vertical gradient exceeds 8%, a sealed road pavement is constructed.
  - ii. All works required by condition (i) are completed prior to issue of titles for the subdivision.

APPENDIX A – Road Longitudinal Section

