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3 September 2021

Copy via email: hari@goodland.co.nz

Dear Hari

TRAFFIC ASSESSMENT FOR PROPOSED RESIDENTIAL SUBDIVISION – 2127 KAIPARA COAST HIGHWAY, KAKANUI

Further to your instruction, we are pleased to provide this traffic assessment in respect to the proposed rural residential subdivision at 2127 Kaipara Coast Highway, Kakanui.

1 INTRODUCTION

Commute Transportation Consultants have been engaged to review the transportation effects of a proposed rural residential subdivision at 2127 Kaipara Coast Highway in Kakanui (the “site”). We understand that the subdivision proposes a total of 25 residential lots varying in size from 0.14 ha to 0.42 ha. All lots are proposed to be served by an internal access network that follows existing farm tracks. A single two-way access will provide connectivity to Kaipara Coast Highway.

The subdivision scheme plan is shown in **Attachment A**. A site visit was undertaken on Thursday 26 November 2020.

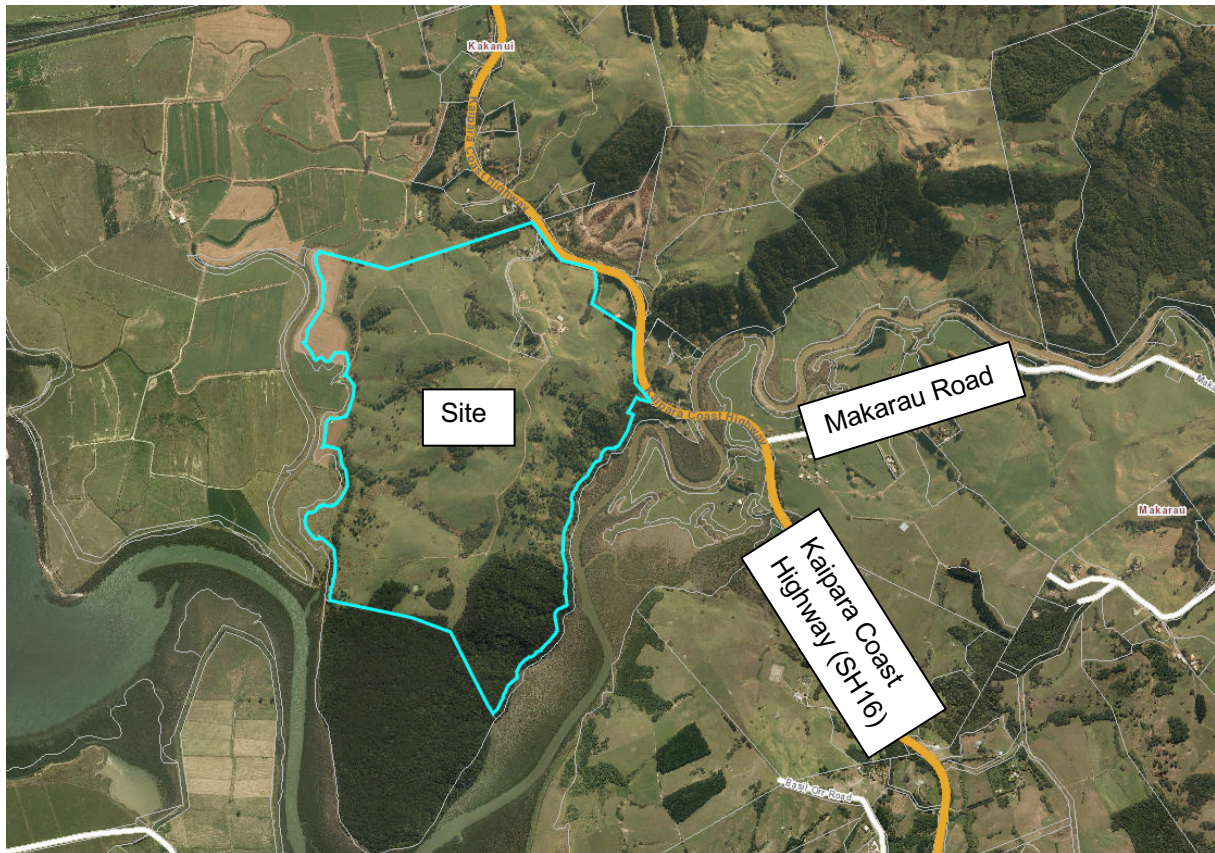
2 SITE DESCRIPTION

The site is located at 2127 Kaipara Coast Highway in Kakanui. The site is located on the western side of Kaipara Coast Highway (SH16). The site has two zones: a smaller area of vehicle access and adjoining land zoned ‘Rural – Rural Production Zone’, and the majority of land zoned as ‘Rural – Rural Coastal Zone, Kaipara South Head and Harbour coastal area’ in the Unitary Plan¹. Kaipara Coast Highway has a posted speed limit outside the site of 100 km/hr². Figure 1 shows the site location.

¹ Auckland Unitary Plan Operative in part

² <https://data-atgis.opendata.arcgis.com/datasets/speed-limits>

Figure 1: Site Location



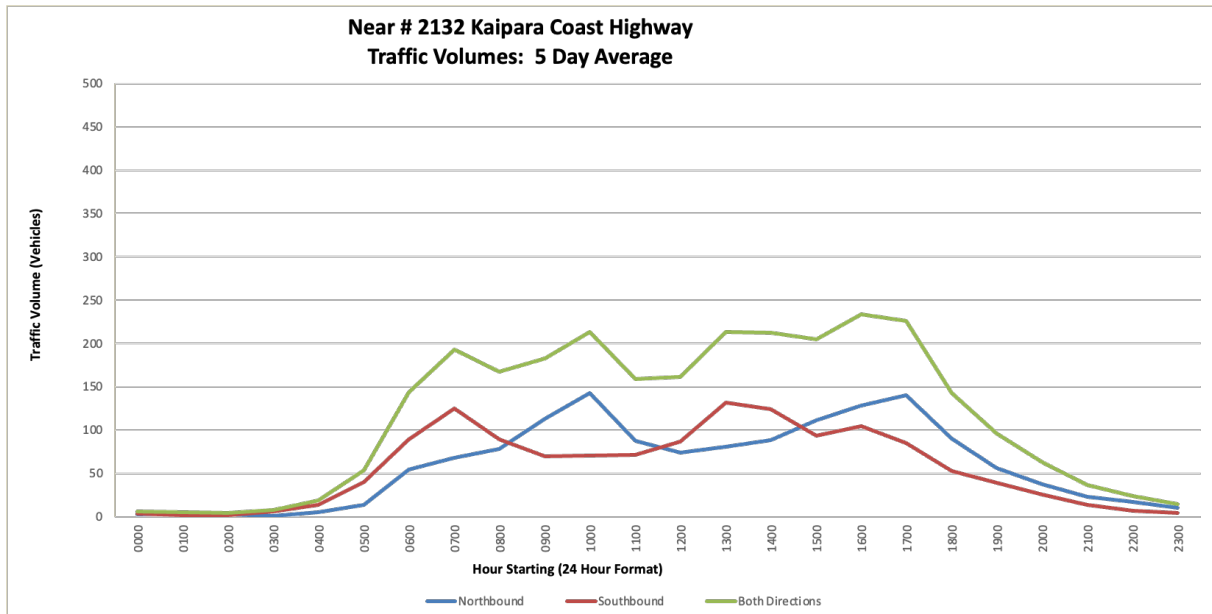
3 TRAFFIC VOLUMES

Automatic tube counters were installed on Kaipara Coast Highway outside #2132 Kaipara Coast Highway to understand traffic volumes and vehicle speeds past the site. In summary, the tube count data showed the following:

- 1,432 vehicles per day (vpd) in the northbound direction (5-day average);
- 1,352 vpd in the southbound direction past the site (5-day average);
- 2,784 vpd in both directions past the site (5-day average);
- 10.9% heavy vehicles in both directions (5-day average);
- 143 vehicles per hour (vph) in the northbound direction (5-day average peak hour);
- 132 vph in the southbound direction (5-day average peak hour);
- 85th percentile speed of 92.2 km/hr in northbound direction (7 days), and
- 85th percentile speed of 88.8 km/hr in southbound direction (7 days).

Figure 2 shows the traffic volume profile outside the site.

Figure 2: Traffic Volume Profile (5-day Average)



4 ROAD SAFETY ASSESSMENT

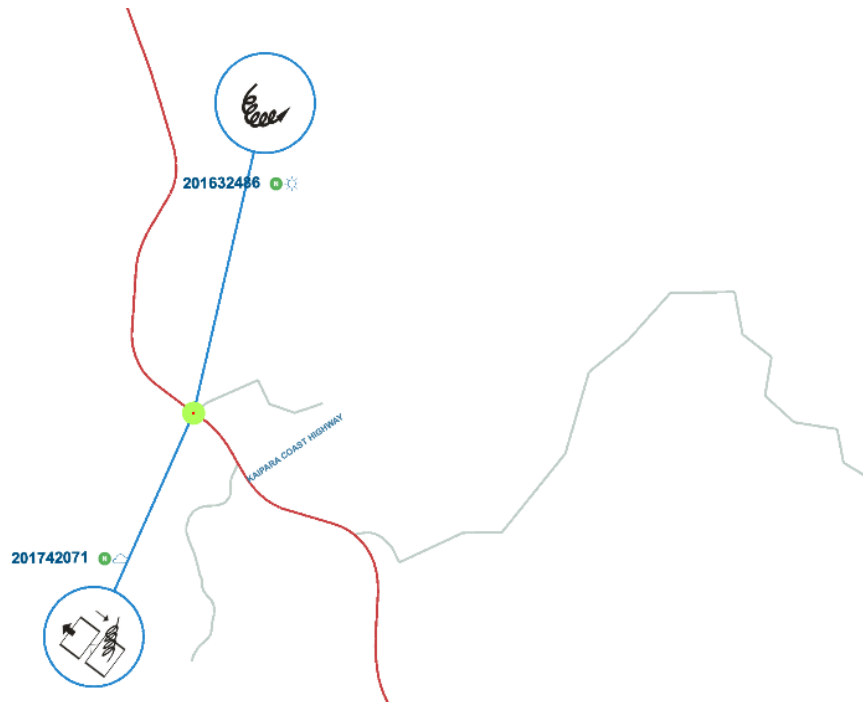
An assessment of the surrounding area’s safety record has been carried out using the CAS database, for the five-year period between 2016 and 2020 inclusive. The search also included any available data for 2021. The study area included Kaipara Coast Highway within 500 m of the existing site access.

A total of two crashes were identified:

- One loss of control crash (non-injury) of a southbound vehicle into a fence. The crash occurred north of the site access in January 2016. This crash occurred in fine weather on a dry road on a weekday afternoon, and
- One unsecured load crash (non-injury) involving a northbound vehicle. The crash occurred north of the site access in March 2017. This crash occurred in fine weather on a dry road on a weekday morning.

Figure 3 shows the collision diagram.

Figure 3: Collision Diagram



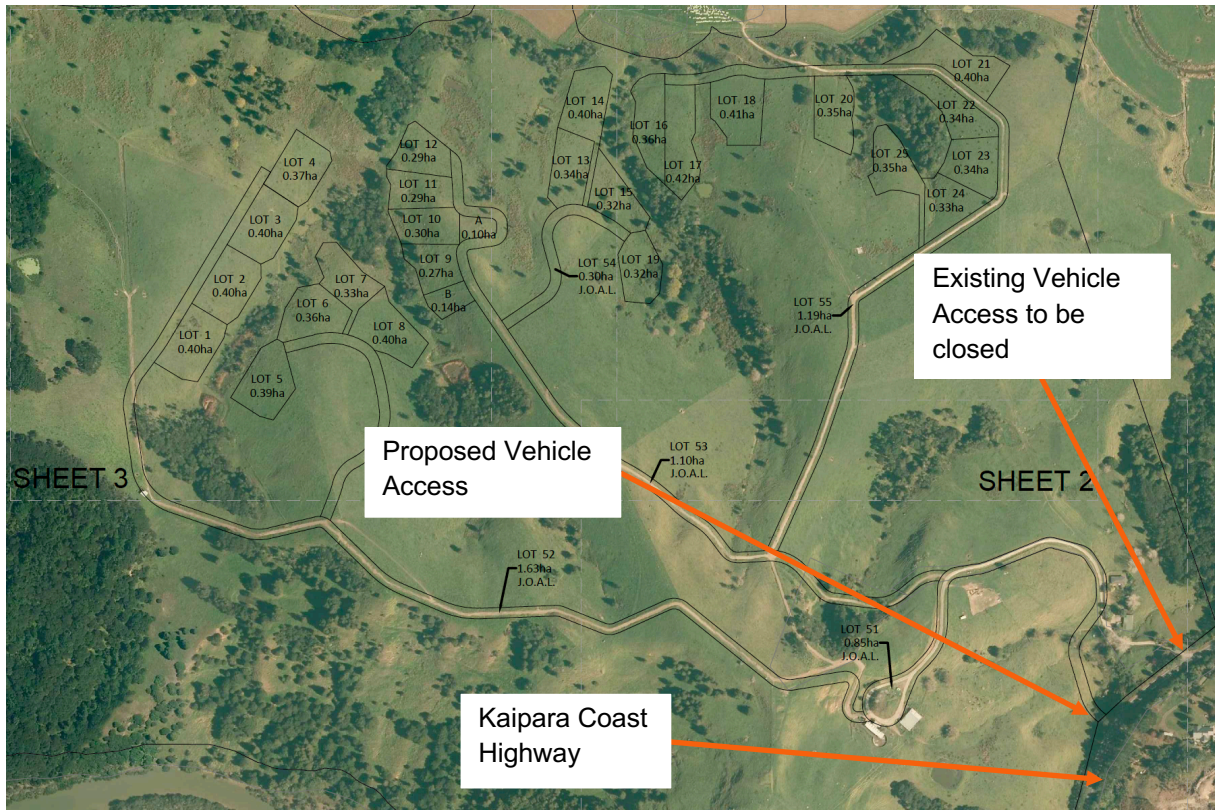
The crash history does not suggest any particular crash patterns, as loss of control crashes are the most common crash type on mid-block sections of rural roads. Both crashes occurred north of the existing and proposed site accesses.

5 PROPOSED DEVELOPMENT

As noted, the subdivision proposes a total of 25 residential lots varying in size from 0.14 ha to 0.42 ha. All lots are proposed to be served by an internal access network that follows existing farm tracks. A single two-way access will provide connectivity to Kaipara Coast Highway.

Figure 4 shows the proposed subdivision layout.

Figure 4: Proposed Subdivision



6 TRIP GENERATION

Rule E27.6.1 'Trip Generation' of the Unitary Plan sets out trip generation limits as to when resource consent for a restricted discretionary activity is required. For residential dwellings, this limit is 100 dwellings (or generally 100 vehicle movements per hour). The proposal is for 25 lots with a single dwelling per lot.

Based on the RTA Guide³, standalone dwellings typically generate 0.85 trips in the morning and evening commuter peak hours, and 9 trips per day. We consider the RTA rates appropriate for assessment purposes given the NZTA RR453⁴ data states the following:

"As the surveys show, lower trip generation rates have typically been found in more rural subdivisions. Surveys near Queenstown and Christchurch indicated daily rates of between 6 and 8vpd (in + out) per household reflected the increased trip linking which occurred when the primary employment trip was longer, eg greater than 20 minutes, as with rural lifestyle properties located in the outskirts of an urban area."

Overall, the RTA therefore suggest 21 trips, or vehicle movements, in the morning and evening commuter peak hours, and 225 trips per day. This is well below the dwelling and vehicle movements thresholds of the Unitary Plan and no traffic modelling is required.

For completeness however, and to assist NZTA and Council in understanding the operation of the proposed access, we have undertaken a SIDRA modelling as per the following intersection.

³ Roads and Traffic Authority of NSW, Guide to Traffic Generation Developments, Version 2.2, October 2002

⁴ New Zealand Transport Agency, Research Report 453,

7 EFFECTS ON ROAD NETWORK

The performance of the Kaipara Flats Highway access has been using the tube count data summarised in Section 3. The morning and evening peak hour volumes on Kaipara Coast Highway used for analysis are summarised as follows:

- Morning peak hour – 70 vph northbound and 125 vph southbound, and
- Evening peak hour – 140 vph northbound and 105 vph southbound.

In terms of development trips, we have assumed that there are 80% outbound, and 20% inbound in the morning peak hour and the reverse in the evening peak hour. This equates to 17 outbound and 4 inbound trips in the morning peak hour and vice versa in the evening peak hour. In terms of directional assignment of development trips, we have assumed 35% to/from the north and 65% to/from the south in the morning peak hour, and 40% to/from the north and 60% to/from the south in the evening peak hour.

The results of the traffic modelling for the morning and evening peak hours are summarised in Table 1 and Table 2 respectively.

Table 1: Kaipara Coast Highway Access Performance – Morning Peak Hour

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: Kaipara Coast Highway														
1	L2	3	5.0	3	5.0	0.002	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
2	T1	70	5.0	74	5.0	0.039	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		73	5.0	77	5.0	0.039	0.2	NA	0.0	0.0	0.00	0.02	0.00	49.8
North: Kaipara Coast Highway														
8	T1	125	5.0	132	5.0	0.070	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
9	R2	1	5.0	1	5.0	0.001	4.9	LOS A	0.0	0.0	0.17	0.49	0.17	46.0
Approach		126	5.0	133	5.0	0.070	0.1	NA	0.0	0.0	0.00	0.00	0.00	49.9
West: Site Access														
10	L2	6	5.0	6	5.0	0.019	4.9	LOS A	0.1	0.5	0.24	0.53	0.24	46.0
12	R2	11	5.0	12	5.0	0.019	6.1	LOS A	0.1	0.5	0.24	0.53	0.24	45.8
Approach		17	5.0	18	5.0	0.019	5.6	LOS A	0.1	0.5	0.24	0.53	0.24	45.8
All Vehicles		216	5.0	227	5.0	0.070	0.5	NA	0.1	0.5	0.02	0.05	0.02	49.6

Table 2: Kaipara Coast Highway Access Performance – Evening Peak Hour

Vehicle Movement Performance														
Mov ID	Turn	INPUT VOLUMES		DEMAND FLOWS		Deg. Satn	Aver. Delay	Level of Service	95% BACK OF QUEUE		Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed
		[Total veh/h]	[HV %]	[Total veh/h]	[HV %]				[Veh. veh]	[Dist m]				
South: Kaipara Coast Highway														
1	L2	10	5.0	11	5.0	0.006	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.6
2	T1	140	5.0	147	5.0	0.078	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
Approach		150	5.0	158	5.0	0.078	0.3	NA	0.0	0.0	0.00	0.04	0.00	49.7
North: Kaipara Coast Highway														
8	T1	105	5.0	111	5.0	0.059	0.0	LOS A	0.0	0.0	0.00	0.00	0.00	50.0
9	R2	7	5.0	7	5.0	0.006	5.2	LOS A	0.0	0.2	0.26	0.51	0.26	45.8
Approach		112	5.0	118	5.0	0.059	0.3	NA	0.0	0.2	0.02	0.03	0.02	49.7
West: Site Access														
10	L2	2	5.0	2	5.0	0.005	5.2	LOS A	0.0	0.1	0.30	0.52	0.30	45.8
12	R2	2	5.0	2	5.0	0.005	6.5	LOS A	0.0	0.1	0.30	0.52	0.30	45.6
Approach		4	5.0	4	5.0	0.005	5.8	LOS A	0.0	0.1	0.30	0.52	0.30	45.7
All Vehicles		266	5.0	280	5.0	0.078	0.4	NA	0.0	0.2	0.01	0.04	0.01	49.6

As shown above, the intersection works well in both peak hours with no movement having a level of service worse than LOS A. The maximum queue on any approach is less than one vehicle. Given this performance, we do not anticipate any operational effects to the performance of Kaipara Coast Highway as a result of the development.

8 ACCESS

8.1 GENERAL

As noted, all 25 lots will be served by a new two-way access on Kaipara Coast Highway. The existing access to the site is proposed to be closed and reinstated as berm and landscaping to match the surrounding roadside.

A preliminary layout for the new access was prepared and sent to Waka Kotahi for review. An 'approval in principle' was received by letter on 21 February 2021. The letter stated:

"Full details are yet to be finalised however, Waka Kotahi acknowledges that the proposed location of the new crossing place could achieve the required NZTA PPM (2007) Diagram E standard required to accommodate the proposed 25 lots as shown in the provided drawing "Concept Design for Crossing Place" attached.

Once a final scheme plan and crossing place design is supplied and agreed upon, Waka Kotahi will be able to provide the applicant with a Section 95E affected party approval.

The following details are still to be provided:

- *The detailed design of the proposed crossing,*
- *Details on the effects of the crossing on the existing swale, and*
- *A scheme plan."*

A copy of the NZTA letter is shown in **Attachment B**.

8.2 UNITARY PLAN REQUIREMENTS

8.2.1 WIDTH

Table E27.6.4.3.2 of the Unitary Plan outlines rules regarding vehicle crossing and vehicle access widths.

For accesses serving 10 or more parking spaces (each lot is assumed to provide at least two parking spaces), the Unitary Plan (T151) requires the following:

- A minimum crossing width of 5.5 m at the site boundary;
- A maximum crossing width of 6.0 m at the site boundary, and
- A minimum formed access width of 5.5 m (the formed width is permitted to be narrowed to 2.75 m if there are clear sight lines along the entire access and passing bays at 50 m intervals are provided).

The proposed access is 6.0 m wide at the proposed vehicle crossing on Kaipara Coast Highway (measured at the road boundary), and remains at 6.0 m wide for the majority of the length of the access.

There are four main 'roads' internally within the site referred to as Road 1, Road 2, Road 3 and Road 4. All of these roads have a 6.0 m wide carriageways. There are two smaller accessways (Accessway 1 and Accessway 2) which serve 4 lots each. These accessways are generally 3.5 m wide with passing bays at intermittent locations.

The indicative cross-section of the four roads is shown in Figure 5 and the indicative cross section of the two accessways is shown in Figure 6.

Figure 5: Indicative Internal Road Cross Section

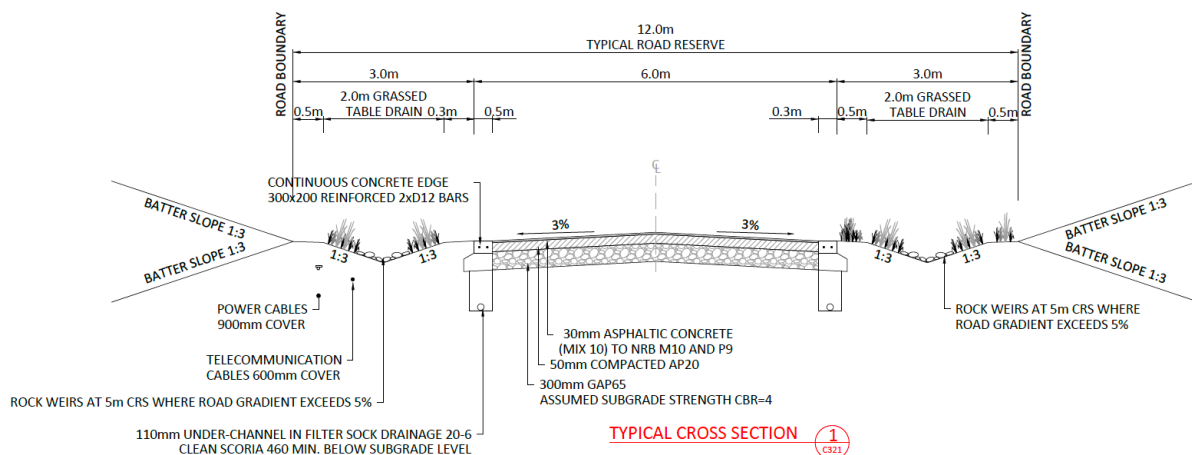
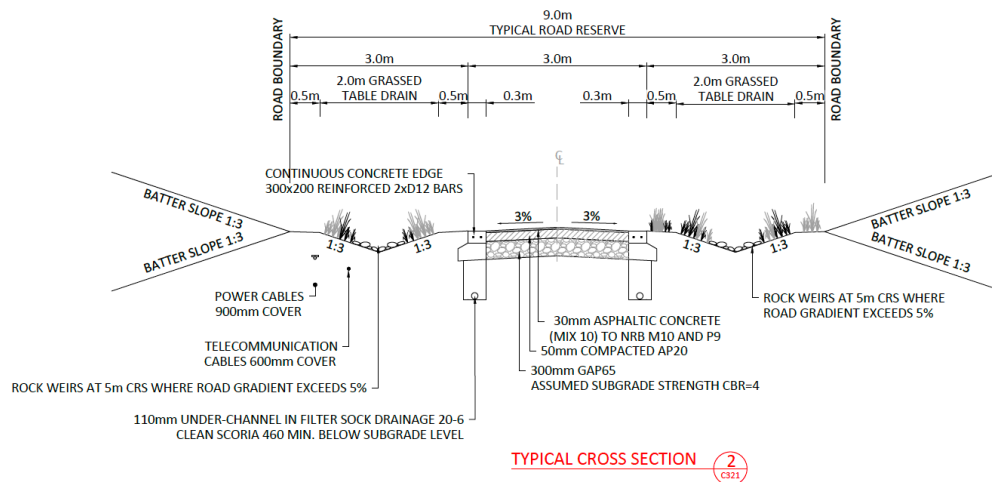


Figure 6: Indicative Internal Accessway Cross Section



8.2.2 DISTANCE TO INTERSECTION

The Unitary Plan E27.6.4.1 (3) requires that vehicle crossings should not be provided within 10 m of an intersection, within ‘vehicle access restriction’ areas identified on the planning maps, on arterial roads or within 30 m of railway crossing limit lines.

The proposed vehicle crossing is located some 1.2 km north of the Kaipara Coast Highway / Makarau Road intersection and 2.2 km south of the Kaipara Coast Highway/ Tuhirangi Road intersection, there are no vehicle access restrictions identified on the planning maps, and there are no nearby railway lines. However, the access is located on an arterial road. As such, we have assessed the access against the criteria in Section E27.8.2 (11) of the Unitary Plan.

Table 3: Crossing Width Unitary Plan Assessment Criteria

Criteria	Comment
(a) this applies where a Vehicle Access Restriction is identified in Standard E27.6.4.1 (2) and Standard E27.6.4.1 (3), other than a Vehicle Access Restriction Level Crossing or a Vehicle Access Restriction Motorway Interchange:	
(i) effects of the location and design of the access on the safe and efficient operation of the adjacent transport network having regard to: <ul style="list-style-type: none"> visibility and safe sight distances; existing and future traffic conditions including speed, volume, type, current accident rate, and the need for safe manoeuvring; proximity to and operation of intersections; existing pedestrian numbers, and estimated future pedestrian numbers 	As discussed in Section 8.4.3, sight distances are considered acceptable. Vehicle speeds in the area were typical of a rural state highway (approx. 90 km/hr). Traffic volumes as noted in Section 3 are low (less than 3,000 vpd), and pedestrian volumes are very low (rural environment) and unlikely to change significantly based on current land use patterns and existing road connectivity. The crash history does not identify any apparent concerns.

Criteria	Comment
<p>having regard to the level of development provided for in this Plan;</p> <ul style="list-style-type: none"> • existing community or public infrastructure located in the adjoining road, such as bus stops, bus lanes and cycleways. 	
<p>(ii) the effects on the continuity of activities and pedestrian movement at street level in the Business – City Centre Zone, Business – Metropolitan Centre Zone, Business – Town Centre Zone and Business – Local Centre Zone; or</p>	<p>Not applicable.</p>
<p>(iii) the practicality and adequacy of the access arrangements considering site limitations, arrangement of buildings and activities, user requirements and operational requirements, proximity to and operation of intersections, having regard to:</p> <ul style="list-style-type: none"> • the extent to which the site can reasonably be served by different access arrangements including: <ul style="list-style-type: none"> ○ access from another road; ○ shared or amalgamated access with another site or sites; ○ via a frontage road, such as a slip lane or service road; or • the extent to which the need for access can reasonably be avoided by entering into a shared parking and/or loading arrangement with another site or sites in the immediate vicinity. 	<p>The site has no other road frontage. The access location was selected to maximise visibility along Kaipara Coast Highway. With the Diagram E widening as proposed, the access is considered acceptable.</p>

Based on the above, the proposed access is considered to satisfy the relevant assessment criteria. Overall, the access is considered acceptable.

8.2.3 DISTANCE BETWEEN CROSSINGS

Rule E27.6.4.2.1 specifies that the minimum separation distances are 6 m where crossings serve the same site, and 2 m where they serve adjacent sites (however this can be combined to one crossing if it is 6 m in width or less).

The separation distances from the proposed crossing to neighbouring crossings are 270 m to the nearest crossing to the north (2151 Kaipara Coast Highway) and 170 m to the nearest crossing to the south (2103 Kaipara Coast Highway). Separation distances between crossings on the same site do not apply in this case as only one crossing is proposed.

Overall, the crossing separation distances satisfies the permitted standards of the Unitary Plan.

8.2.4 NUMBER OF CROSSINGS

Table E27.6.4.2.1 (T144) specifies that one driveway per 50 m of frontage (or part thereof) can be provided for sites subject to a Vehicle Access Restriction.

The site has a total frontage to Sunnyside Road of approximately 570 m and therefore 12 vehicle crossings are permitted. As only one crossing is proposed, the development satisfies the permitted standards of the Unitary Plan.

8.3 GRADIENT OF ACCESS

Rule E27.6.4.4.1 of the Unitary Plan the requirement for the gradient of vehicle access. As such, the gradient of the access must not be steeper than 1 in 5 (20 per cent) for residential activities. To avoid the underside of the car striking the ground, access with a change in gradient exceeding 1 in 8 (greater than 12.5 per cent change) at a summit, or 1 in 6.7 (15 per cent change) at a sag must include transition sections to achieve adequate ground clearance. Typically, a transition section requires a minimum length of 2 m.

In terms of the Unitary Plan, all vehicles must be designed so that where the access adjoins the road there is enough space on-site for a platform so that vehicles can stop safely and check for pedestrians and other vehicles prior to exiting. The platform must have a maximum gradient no steeper than 1 in 20 (5 per cent) and a minimum length of 4 m for residential activities.

The proposed gradients are detailed in the civil engineering drawing set⁵ and are summarised as follows:

- The maximum gradient along the access is 1:5.0 (20%), therefore the proposed development complies with the Unitary Plan;
- All transitions are vertical curves and can accommodate cars and 8 m Medium Rigid Trucks (MRTs).

In terms of the safety platform requirement, the first 13 m of the access, as measured from the edge of carriageway, is approximately 3% therefore meeting the safety platform requirements.

⁵ Sunnyside Resort Ltd, 328 Sunnyside Road, Coatesville, Accessway 1 Long Section, Drawings 44430-DR-C-3100 to 3106, Cato Bolam

8.4 SIGHT DISTANCE ASSESSMENT

8.4.1 SUNNYSIDE ROAD OPERATING SPEEDS

Visibility requirements at vehicle accesses are related to the operating speed (85th percentile speed) of the frontage road. Speed data was collected as part of the tube counts summarised in Section 3. The measurements revealed a northbound operating speed of 92.2 km/hr and a southbound operating speed of 88.8 km/hr.

8.4.2 REQUIRED SIGHT DISTANCE

The required sight distance has been calculated using the Austroads Guide⁶. The sight distance has been calculated using Safe Intersection Sight Distance (SISD) values. The following parameters have been used:

- 2.0 second reaction time;
- Coefficient of deceleration of 0.36 (desirable maximum), and
- 3.0 second observation time.

Based on a northbound operating speed of 92.2 km/hr, the required visibility to the south of the proposed vehicle access is 221 m. Based on a southbound operating speed of 88.8 km/hr, the required visibility to the east of the vehicle access is 210 m.

8.4.3 AVAILABLE SIGHT DISTANCE

The available sight distance at the proposed vehicle access is shown in Photograph 1 and Photograph 2.

Photograph 1: Proposed Vehicle Access – Visibility to North



⁶ Austroads Guide to Road Design Part 4A, Unsignalised and Signalised Intersections, June 2017

Photograph 2: Proposed Vehicle Access – Visibility to South



The visibility in both directions can be achieved. As such, there is sufficient visibility in both directions from the proposed access. **Attachment C** shows the indicative access design showing the required sight distances.

8.5 VEHICLE TRACKING

Attachment D shows vehicle tracking for an 85th percentile vehicle travelling along the proposed access. As can be seen, there is sufficient space for two opposing cars to pass one another. The tracking also demonstrates that there are clear lines of site between opposing vehicles prior to the one-lane sections ensuring there is the ability for drivers to see whether it is safe to proceed before entering the one lane section.

Attachment D also shows vehicle tracking for an 8 m Medium Rigid Truck (8 m MRT) travelling along the accessway. This represents a rubbish collection vehicle, fire appliance or general delivery vehicle.

9 PARKING

9.1 GENERAL

A total of 25 lots are proposed with at least two parking spaces per dwelling. This equates to 50 parking spaces being provided.

9.2 UNITARY PLAN REQUIREMENT

Table E27.6.2.4 of the Unitary Plan set out the parking requirement for various activities. For residential activities within 'All other areas' (for which the site sits) the Unitary Plan requires the following:

- 'A minimum rate of 1 per dwelling', and
- 'No maximum rate'.

Table 4 sets out the Unitary Plan parking requirements.

Table 4: Unitary Plan Parking Requirements

Activity	Unitary Plan Requirement	Number of dwellings	Minimum number of spaces	Maximum number of spaces
Residential (area 2)	A minimum rate of 1 per dwelling & no maximum rate	25	25	-

The Unitary Plan requires a minimum of 25 parking spaces, with no maximum requirement. Each lot is large (over 1,000 m²) and are therefore comfortably capable of accommodating at least two parking spaces per dwelling, therefore meeting the permitted standards of the Unitary Plan.

9.3 PARKING DIMENSIONS

Table E27.6.3.1.1 of the Unitary Plan sets out the minimum car parking space and manoeuvring dimensions.

No dwellings have currently been designed as the application is for a vacant lot subdivision. Due to the size of the lots however, there is considered to be ample space to meet the relevant standards of the Unitary Plan.

10 CONCLUSION

From a review of the proposal to develop a rural subdivision at 2127 Kaipara Coast Highway, the following is concluded:

- There are no apparent road safety issues at the site;
- The site is predicted to generate an additional 21 trips, or vehicle movements, per hour in the commuter peak hours. This is considered negligible and capable of being accommodated by the local road network;
- The crossing width meets Unitary Plan requirements;
- The access is located on an arterial road and therefore a Vehicle Access Restriction applies to the proposed vehicle crossing. The access has been assessed and given the low traffic volumes, compliant sight distances, low pedestrian volumes and no apparent road safety concerns, the vehicle crossing location is considered acceptable;
- The vehicle crossing separation distances, and number of vehicles crossings, satisfies the permitted standards of the Unitary Plan;
- The access gradients satisfy Unitary Plan standards;
- Sight distances from the proposed vehicle access to vehicles on Kaipara Coast Highway are considered acceptable and meet relevant standards;
- Vehicle tracking demonstrates that opposing vehicles can pass one another on the proposed access and at isolated one-lane sections have appropriate visibility to opposing vehicles to make informed decisions to enter one-lane sections safely, and
- While no dwellings are currently proposed, each lot is of sufficient size to accommodate the required number of parking spaces, and parking space dimensions.

Overall, with the recommended access locations, the proposed vehicle accesses are considered acceptable and we see no traffic planning reasons to preclude acceptance of the proposal as currently intended.



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Yours sincerely

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ATTACHMENT A – SUBDIVISION SCHEME PLAN

ATTACHMENT B – WAKA KOTAHI LETTER

ATTACHMENT C – INDICATIVE ACCESS DESIGN

ATTACHMENT D – VEHICLE TRACKING

