

East Cape Consulting Limited

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Hastings 4130

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30 March 2021

Issued via email: karl.carew@developmentnous.nz

Dear Karl

RE: TRANSPORTATION ASSESSMENT REPORT, SPRINGHILL SUBDIVISION

East Cape Consulting (ECC) has been asked to prepare a Transportation Assessment Report (TAR) to accompany a Resource Consent Application for a residential subdivision on the northern corner of Wakarara Road and State Highway 50 (SH50), north of Ongaonga.

This TAR describes the existing transportation environment, assesses the expected level of traffic generation and the distribution of the new movements to the surrounding transport network, and assesses the ability of the network to accommodate those movements.

By way of summary, it is concluded that subject to intersection improvements on SH50 along the site frontage, and a review of the speed environment on Wakarara Road, the proposed subdivision can be appropriately integrated with the surrounding transport network.

1. SITE LOCATION

The site is located on the north-eastern corner of the intersection between Wakarara Road and SH50, approximately 2.6km north of Ongaonga. It is with the Rural Zone of the Central Hawke's Bay District Council (CHBDC) Operative District Plan.

The site location is shown as Figure 1 below. Figure 2 shows the local area and existing land use context.





Figure 1 – Site Location (Wide View) (Base Map Source: Open Street Maps)



Figure 2 – Site Location (Local View) (Source: CHBDC GIS Maps)



East Cape

By road, the site is approximately 17km west of Waipawa, 19km north-west of Waipukurau, 50km north of Dannevirke, and 60km south of Hastings and Havelock North.

2. EXISTING TRANSPORT ENVIRONMENT

SH50 is managed by Waka Kotahi (formerly the New Zealand Transport Agency, NZTA). As can be seen in Figure 1, it provides an inland alternative to State Highway 2 (SH2), it starts in Napier and joins SH2 near Takapau.

Along the frontage of the site, SH50 provides one traffic lane in each direction. It has a painted centreline, edge lines and sealed shoulders that are typically 0.5m wide. An open road speed limit of 100km/h applies. The road is generally flat, and the site sits on the outside of a large radius horizontal curve.

Views looking north and south from along site frontage are shown as Figure 3 and Figure 4.



Figure 3 – SH50, looking north along site frontage





Figure 4 – SH50, looking south along site frontage

Wakarara Road is a Council road managed by CHBDC. It runs from Wakarara, in the Ruahine Forest Park to Ongaonga Road, to the east of Ongaonga township. Along the site frontage it provides one traffic lane in each direction. The sealed width is approximately 6m and the carriageway is marked with a painted centre line. An open road speed limit of 100km/h applies. The existing form of Wakarara Road is shown as Figure 5.





Figure 5 – Wakarara Road looking from opposite site towards SH50.

Wakarara Road is generally straight and flat along the site frontage with no impediments to sight distance. At least 170m of sight distance is available from the western extent of the site and along the full frontage in accordance with the Operative District Plan (ODP) requirement for Council roads with 100km/h speed limits.

The intersection between Wakarara Road and SH50 operates as two staggered T-intersections with Give Way control on both Wakarara Road approaches. The centrelines of the two Wakarara Road approaches are offset by approximately 40m. Views of the intersection are shown as Figure 6 and Figure 7 below.





Figure 6 – Wakarara Road /SH50 intersections viewed from SH50 looking south



Figure 7 – Wakarara Road /SH50 intersections viewed from Wakarara Road (East), looking north-west towards site



Sight distance in excess of 500m is available in both directions, the surrounding topography is generally flat to rolling however in the vicinity of the site SH50 is straight and flat. This exceeds the requirement of 282m in the Waka Kotahi Planning Policy Manual (PPM) Part 5B.

Consistent with the rural nature of the region, there are no public transport services operating in the area and no formal walking or cycling infrastructure is present.

3. TRAFFIC VOLUMES

3.1 Daily Volumes

Data from the Mobileroad website indicates that Wakarara Road carries an average daily traffic volume (ADT) of 280 vehicles per day (vpd)¹ north of SH50 and 325 vpd south of SH50.

The nearest Waka Kotahi count sites on SH50 are some distance from the subject site. Approximately 41km to the north of the site, on the outskirts of Hastings, SH50 was recorded as carrying an ADT of 3,850 vpd² in November 2020. Approximately 19km south of the site, near SH2 and Takapau, SH50 was recorded as carrying an ADT of 1,200 vpd in November 2020³.

3.2 Intersection Counts

ECC arranged classified intersection turning movement counts at four locations around the site during March 2021. The purpose of these counts was to establish existing traffic patterns on SH50 and Wakarara Road in the immediate vicinity of the site, and to inform the likely distribution of new traffic movements generated by the proposed subdivision.

Figure 8 and 9 show the surveyed morning (AM) and evening (PM) peak hour volumes. The timing of the peak hour varied between intersections, within the overall surveyed periods of 7-9am and 4-6pm. The figures show the peak hour at each individual intersection. Full results are attached as Attachment 1.



¹ Estimated 2019 ADT

² Site ID: 05000030, 120m north of Valley Road (November 2020)

³ Site ID: 05000089, 500m south of Makaretu River Bridge (2020)



Figure 8 – AM Peak Hour Intersection Volumes



Figure 9 – PM Peak Hour Intersection Volumes

The surveys showed that peak hour volumes on SH50 past the site reached up to 95 vph and 112 vph (two-way) during the AM and PM peak hours, respectively.

On Wakarara Road, peak hour volumes north of SH50 reached 40 vph and 48 vph during the AM and PM peak hours. South of SH50 the volumes were similar, at 48 vph and 55 vph.



With the capacity of a traffic lane being typically upwards of 900 vph each way, it can be concluded that the road network in this area is operating well below capacity.

4. ROAD SAFETY

The Waka Kotahi Crash Analysis System (CAS) was used to review the road safety history of the area surrounding the site. The search area included:

- Wakarara Road from 1.5km north of SH50 to its end at the Wakarara Road/Ongaonga Road intersection; and
- SH50 within a 1km radius of the Wakarara Road intersection.

The search included the five-year period from 2016 to 2020 inclusive, as well as any available data from 2021.

One crash was reported in 2019. It involved a car travelling southbound on SH50 leaving the road approximately 900m south of Wakarara Road. The driver was suspected to have fallen asleep and was not injured in the crash.

No crashes were reported on Wakarara Road or at the SH50/Wakarara Road intersections.

5. SUBDIVISION PROPOSAL

5.1 Existing Use

The site is made up of two properties which are both used for rural activities at present. The eastern property has two dwellings and various farm buildings. This property has three accesses to SH50 located approximately 500m (dwelling driveway), 1000m (farm driveway) and 1,700m (dwelling driveway) north of the Wakarara Road intersection.

The western property has one access to Wakarara Road, located approximately 1.3km north of the SH50 intersection.

5.2 Proposed Subdivision

The proposed subdivision layout is shown below as Figure 10. It includes 312 residential lots ranging in size from 4,060m² to 1.5 hectares, with an average size of approximately 6,800m².





Figure 10 – Proposed Subdivision Layout (Prepared by Development Nous)

The proposed access arrangements are:

- Lots 1 to 12 have direct access to Wakarara Road (Lots 7 and 8 are to be confirmed);
- Lots 146 to 149 have access to Wakarara Road via shared driveway (12.5m wide);
- Lot 26 and Lot 129 (existing dwellings) will retain their existing accesses to SH50; and
- All other lots are accessed from the internal subdivision network.

The internal network is made up 20m and 15m wide transport corridors and private access lots. These provide for vehicle, pedestrian and cycle access and movement around the subdivision.

These corridors are expected to have operating speeds of 50km/h and be formed with single carriageways and grass swales either side.

Other than accesses serving less than 10 lots, roads are expected to be vested to Council.

A new intersection is proposed on SH50, approximately 980m north of Wakarara Road. A new intersection is also proposed on Wakarara Road, approximately 500m north of SH50.

6. **TRAFFIC GENERATION**

References has been made to Waka Kotahi Research Report 453 (RR453) 'Trips and parking related to land use'. According to this guide, the 85th percentile trip generation rates of rural dwellings are:

- 1.4 vph/household during peak hours of the day; and
- . 10.1 vph/household over the course of the day.

Applying these rates to the proposed subdivision gives expected traffic generation of:

- 437 vph (IN+OUT) during peak hours of the day; and
- 3,151 vpd (IN+OUT) over the course of the day.

7. TRAFFIC DISTRIBUTION

The existing traffic movement patterns around Ongaonga (summarised on Figure 8 and Figure 9 above, and in Attachment 1) have been used to inform likely distribution of traffic movements to and from the proposed subdivision. The data indicates that currently, traffic movements to and from Ongaonga are distributed approximately:

- 23% to/from the south-west (SH50 towards Dannevirke);
- 25% to/from the north (SH50 towards Hastings);
- 29% to/from the east (towards Waipawa); and
- 23% to/from the south-east (towards Waipukurau).





The proposed subdivision can be expected to generate some movements to and from Ongaonga which has a school, and other local services. For that reason, the proportion of trips to and from SH50 (south) has been increased. The adopted distribution is:

- 30% to/from the south-west (SH50 towards Dannevirke);
- 25% to/from the north (SH50 towards Hastings);
- 25% to/from the east (towards Waipawa); and
- 20% to/from the south-east (towards Waipukurau).

It has been assumed that there will be no significant traffic generation to and from the west, and this results in a robust assessment of effects on the State Highway network.

The inbound and outbound distribution of trips has assumed that:

- During the AM peak hour, 30% of movements are inbound and 70% are outbound.
- During the PM peak hour, 65% of movements are inbound and 35% are outbound.

The relative use of the external access points has been assessed considering the spatial arrangement of the lots and assessing the most convenient route for trips made from different directions. For example, for trips to and from the north it has been assumed that 80% of trips would use the new intersection on SH50 and only those living very close to Wakarara Road would travel past this intersection and use Wakarara Road instead.

The resulting distributions of new movements (at the new access points and through the SH50/Wakarara Road intersection) during the AM and PM peak hours are shown as Figures 11 and 12 below.



Figure 11 – Generated Traffic Movements (AM Peak Hour)



												SH50 (North)				
	PM Pea	k Hour										0	0				
												57	14				
	IN	284	vph									8					
	OUT	153	vph		Ī	New CL		**	0	31		Ļ	↓				
	Total 437		vph			New SHOU Access		0	69		5	1					
											*						
												128	8				
		New Wakarara Road Access*															
			-	-		_						0	0	0			
			0	0								14	28	41			
			0	54													
					*				0	8		\checkmark		4		77	0
į	0		Y	4		99	0		0	28	\implies		349		<	51	0
6	0					0	0		0	18		5	1	P	C	0	0
											×.	34	51	0	· ·	Wakarara Boad (East)	
												0	0	0	8	KJa	a (cast)
	* includes movements that would be made at individual driveways									SH50 (South)							

Figure 12 – Generated Traffic Movements (PM Peak Hour)

8. TRAFFIC EFFECTS

8.1 Network Effects

The traffic movements expected from the proposed subdivision have been combined with existing traffic movements counted on the network. An allowance of ten years of growth at 4% per annum has been added to the non-subdivision flows, to reflect other background growth. This is the rate observed at the nearest Waka Kotahi count site over the last five years.

The resulting expected total traffic movements during the AM and PM peak hours are shown as Figures 13 and 14 below.





Figure 13 – Network Traffic Movements (AM Peak Hour), Development + 10 Years @ 4%



Figure 14 – Network Traffic Movements (PM Peak Hour) Development + 10 Years @ 4%

With the subdivision in place, volumes on SH50 are expected to reach up to 266 vph (two-way) at peak times. This is approximately equivalent to a daily volume of 2,660 vpd. Volumes on Wakarara Road either side of SH50 are expected to reach a similar level (274 vph and 2,740 vpd. These volumes are well within the carrying capacity of two-lane rural roads.





8.2 State Highway Effects

The proposed access points on SH50 and Wakarara Road, as well as the SH50/Wakarara Road intersection have been assessed against the Austroads warrants for right and left turning treatments⁴. The analysis considered both:

- 'Opening day' which is the expected traffic from the full subdivision combined with the surveyed traffic volumes from 2021; and
- The ten-year horizon, which is the full subdivision plus ten years of growth at 4% per annum.

The findings of that analysis were:

At the new SH50 intersection:

- A right turn bay for southbound right turns is warranted at opening day.
- An auxiliary northbound left turn treatment is warranted at the ten-year horizon.

At the SH50/Wakarara Road Intersections:

- A right turn bay for southbound traffic is warranted at opening day.
- An auxiliary southbound left turn treatment is warranted at the ten-year horizon.
- Basic right and left turn treatments are appropriate for northbound right and left turns.

On the basis of this analysis, it is recommended that:

- The new access intersection on SH50 be designed, in consultation with Waka Kotahi, to include a right turn bay and basic left turn treatment.
- The intersections of SH50 and Wakarara Road be designed, in consultation with Waka Kotahi, to include a southbound right turn bay and a left turn improvement for southbound traffic.

8.3 Wakarara Road Effects

Direct property access is proposed along Wakarara Road with between 11 and 13 driveways (depending on where Lot 7 and Lot 8 take their access from) indicated over a length of approximately 1,200m.

It is recommended that the posted speed limit be reduced along the frontage of the site, if supported by CHBDC as the road controlling authority.

⁴ Although the SH50/Wakarara Road intersections were counted as a four-leg intersection to accurately capture distribution patterns, they have been assessed for the purpose of Austroads warrants as separate T-intersections.

8.4 Road Safety Effects

The road safety history of the site does not suggest any underlying issues with the transport network in this area.

The proposed new access to SH50 can achieve the minimum sight distance requirement in the PPM (Table App 5B/1) of 282m for a 100km/h posted speed environment. This requirement is also met at the SH50/Wakarara Road intersection which is the other primary access point to the site. The spacing between the existing intersection and the proposed intersection is approximately 980m, which exceeds the minimum of 200m recommended in Table App5B/3 of the PPM.

Intersection upgrade works are recommended to provide for safe and efficient accesses to the site at both the proposed and the existing intersections. The design of these will be subject to consultation and design approvals from Waka Kotahi as the road controlling authority.

The speed limit on Wakarara Road is recommended to be reduced along the frontage of the subdivision, to reflect an increase in access movements to and from driveways and a general increase in the presence of people in the area. This change will be subject to engagement with CHBDC as the road controlling authority for Wakarara Road.

With these changes in place, the proposed subdivision can be expected to integrate appropriately with the surrounding transport network.

9. DISTRICT PLAN

Rule	Requiremer	Comment				
8.5.1(a)	Minimum P	Compliance is				
	Residential	expected. All lots of				
		adequate size to				
			provide on-site			
			parking.			
8.5.2(a)	Vehicle Acc	Compliance is				
	In all zones:	expected.				
	i.	i. Every lot with direct vehicle access to a road or to a vehicle				
		access lot, shall be provided with a complying vehicle	No direct access to			
		crossing.	individual properties			
	ii.	Every vehicle access lot shall be provided with a complying vehicle crossing.	is proposed to SH50.			
	iii.	Every activity requiring access to a road shall have access to	All lots are to be			
		that/those road(s) only by way of a complying vehicle	accessed from either			
		crossing.	Wakarara Road or			
	iv.	A complying vehicle crossing shall meet the following	new subdivision			
		requirements:				
		a. Where a lot has direct vehicle access to a road: a				
		formed and drivable surface shall be provided between				
		the carriageway of the road and the road boundary of the lot.				
		b. Where a vehicle access lot meets the road: a formed				

The relevant rules of Part 8 (Transport) of the CHBDC ODP are summarised in Table 1.





 the carriageway of the road and the road boundary of the vehicle access lot. c. Where the lot has direct vehicle access to a vehicle access lot: a formed and drivable surface shall be provided between the carriageway of the vehicle access
the vehicle access lot. c. Where the lot has direct vehicle access to a vehicle access lot: a formed and drivable surface shall be provided between the carriageway of the vehicle access
c. Where the lot has direct vehicle access to a vehicle access lot: a formed and drivable surface shall be provided between the carriageway of the vehicle access
access lot: a formed and drivable surface shall be
provided between the carriageway of the vehicle access
provided between the carriagental of the vehicle access
lot and the boundary of the lot.
d. An access space shall be established on the lot. This
shall comprise an area of land within the lot 3.5m wide
by 5.0m long, formed and set aside and useable by a
motor car and accessible from the vehicle crossing.
(This access space may be used for any aisles or parking
or loading spaces provided within the site).
Note: Notwithstanding the Rules in this Plan, every person proposing to
construct or modify an accessway onto a State Highway must obtain
permission from Transit New Zealand. Acceptable location and design
details can be obtained from the Transit New Zealand Regional Office
(currently at Napier).
8.5.2(b) Formation and Sealing of Vehicle Crossings Compliance is
i. All vehicle crossings shall be formed with an all weather expected.
surface and shall be drained to the satisfaction of the
Council.
ii. Where the road carriageway adjacent to the vehicle crossing
is sealed, then the vehicle crossing shall be sealed.
iii. Minimum height clearance for vehicle crossings and
common vehicle manoeuvring areas on-site, shall be 3.5
metres for residential units and 4.5 metres for all other
activities.
iv. Venicle crossing gradients be designed in accordance with
8.5.2 Migration of Gravel onto Sealed Roads Compliance is
(c)
All formed and drivable surfaces on any lot with direct access to a sealed
road, and any vehicle crossing, shall be designed and constructed and
maintained in such a way that gravel and/or stones and/or silt shall not
migrate on to any formed public footpath or on to the sealed
carriageway.
8.5.2(d) Location of vehicle crossings with frontage in relation to intersections. Compliance is
i. The following standard applies to sites that have frontage to expected.
State Highway 2 and 50 in the Rural Zone:
a. Where the road frontage of the site lies entirely within The site has frontage
212m of an intersection, the vehicle crossing to the site to SH50 but no
shall be located on the access frontage within 12 metres vehicle crossings are
of the side boundary of the site which is farthest from proposed along this
the intersection. frontage (the site
b. Where the road frontage of the site is greater than will have a new
212m in length, the vehicle crossing to the site shall be intersection
located on the access frontage at least 200 metres from [formed].
The Intersection.
II. The following standards apply to all other sites in the Rural Zone: Unce subdivision ha
a. where the rodu frontage of the site lies entirely within occurred, Lot 12 is 80 metres of an intersection, the vehicle crossing to the list desert lat to the
site shall be located on the access frontage within 12 Wakarara
metres of the side boundary of the site which is farthest Road/SH50
from the intersection.



Rule	Requirement	Comment		
	b. Where the road frontage of the site is greater than 80	approximately 68m		
	metres in length, the vehicle crossing to the site shall be	from the		
	located on the allowed access frontage at least 68.0	intersection and		
	metres from the intersection.	extends another		
	iii. The following standards apply to all sites in all Zones except the	71m, it can		
	Rural Zone:	therefore comply		
	a. Where the entire road frontage of the site lies within 62	with Rule (ii)(b).		
	metres of an intersection, the vehicle crossing to the			
	site shall be located on the access frontage within 12	Corner lots within		
	metres of the side boundary of the site which is farthest	the subdivision are		
	from the intersection.	also expected to be		
	b. Where the road frontage of the site is greater than 62	able to comply with		
	metres in length, the vehicle crossing to the site shall be	either Rule (ii)(a) or		
	located on the allowed access frontage at least 50	(ii)(b).		
	metres from an intersection.			
8.5.2(d)	Width of Vehicle Crossings	Compliance		
0.012(0)	Residential crossings are to be between 3.5m and 6.0m wide.	expected.		
8.5.2(d)	Sight Distances from Vehicle Crossings and Road Intersections	Compliance		
		expected.		
	In a 100km/h zone the minimum sight distance is 170m on local roads			
	and 250m on State Highways	The new access to		
	On a 50 km/h zone the minimum sight distance is 45m on local roads and	SH50 and the		
	85m on State Highways	existing		
	bom on state righways.	Wakarara/SH50		
		intersections both		
		have more than		
		250m available		
		The alignment of		
		Wakarara Boad		
		along the site		
		frontage is such that		
		all driveways and		
		all universays and		
		intersections are		
		expected to be able		
		to provide 170m (or		
		45m if the speed		
		limit is reduced to		
		50km/h).		
		Individual lot		
		ariveways have not		
		yet been designed		
		but these are		
		expected to be able		
		to achieve		
		compliance with the		
		relevant rules.		

Table 1: ODP Compliance

Table 1 shows that although the individual lots have not yet been designed at this stage, the proposed subdivision is expected to be able to comply with the relevant ODP rules.



Road construction standards are set out in Section 9.10(g), (h) and (i). The relevant requirements for residential land use in the rural zone are discussed below.

Access to 2-4 residential lots (applicable to Lots 146, 147, 148 and 149) is required to have a legal width of 6m, a formed width of 3.5m and a turning area. The proposed access to these lots has a legal width of 12m with a turning head radius of 15m. It can therefore comply with this rule.

Access to 5-10 residential lots) is required to have a legal width of 6m, a formed width of 5m and a turning area. Access to more than 10 lots is required to be to a road. Other than for lots 146, 147, 148 and 149 and the lots with direct access to Wakarara Road, all lots have access to either 15m wide or 20m wide subdivision roads. The requirements of Section 9.10(g) are therefore met.

The construction of accesses is expected to comply with the requirements of Section 9.10(h) in relation to all weather surfacing and drainage.

All roads and private roads other than State Highways fronting rural zones are required to provide:

- Between 15m and 20m road width.
- A carriageway of 6.2 to 7.5m
- No kerb and channel; and
- No footpaths.

The design of subdivision roads has not been progressed as yet however the proposed corridor widths are 15m and 20m, which will enable compliance with these standards.

Cul-de-sac heads have 15m diameter. The ODP requires 18m where there is on street parking. In this large lot residential context on-street parking demand is unlikely and is not expected to be provided as part of road cross-sections. A 15m diameter is adequate to facilitate the manoeuvring of large vehicles, such as rubbish trucks or furniture removal trucks, that would visit the site infrequently.

10. CONSULTATION

ECC engaged with Waka Kotahi (as the road controlling authority for SH50) regarding the proposal during March 2021⁵. Information regarding the size and nature of the proposal along with the proposed access arrangements was provided via a draft layout plan.

They noted their interest in understanding existing traffic volumes, the likely traffic generation of the development, and the distribution of those movements around the network. The key issue raised was the assessment of appropriate intersection treatments along the SH50 frontage.

Waka Kotahi expressed a desire to consolidate access at a single new intersection on SH50 and consequently a second intersection that had been contemplated was removed from the concept plan.

No other concerns were raised however a copy of this assessment was requested upon its completion.



⁵ Phone call between George Eivers and Ben Grapes from Waka Kotahi on 9 March 2021.

11. SUMMARY AND CONCLUSIONS

A 312 lot rural residential subdivision is proposed on the north-west corner of Wakarara Road and SH50, north of Ongaonga.

The new land use is assessed as generating up to 437 vph (IN+OUT) during peak hours of the day; and 3,151 vpd (IN+OUT) over the course of the day.

Traffic volumes on the State Highway network and the local road network in this area are well within the practical capacity of the respective roads.

Assessment against Austroads auxiliary turn lane warrants indicate that southbound right turn bays are warranted at the proposed new access to the site on SH50 and at the SH50/Wakarara Road intersection. A southbound left turn improvement, facilitating movement from SH50 into Wakarara Road (East) is also warranted.

With more intense land use and property access along Wakarara Road, a review of the existing 100km/h speed limit is also recommended.

The internal subdivision network has been designed to comply with the relevant CHBDC standards and is intended to operate as a 50km/h environment. The individual lots have not yet been designed however an assessment against the relevant District Plan rules indicates that a high degree of compliance is achievable. These matters can be appropriate assessed as part of subsequent approval processes, involving Council engineering staff.

The proposed changes to SH50 will require further engagement with Waka Kotahi as the road controlling authority.

Overall, it is concluded that with these infrastructure improvements in place, the proposed subdivision can be appropriately integrated with the surrounding transport network.

Yours sincerely,

Principal Engineer
East Cape Consulting Limited

Anna Wilkins (CMEngNZ)

George Eivers (CMEngNZ, CPEng, IntPE)

Principal Engineer / Director **East Cape Consulting Limited**

Attachment 1: Traffic Survey Results

