In reply, please quote: 12760

8 April 2022

Energy Farms Ltd s 9(2)(a) Attention: Steve Hawkins

<u>TRAFFIC IMPACT ASSESSMENT – PROPOSED SOLAR PLANT</u> <u>WELLINGTON ROAD, MARTON - LOTS 4 & 5 DP 10517</u>

Hawthorn Geddes

engineers & architects ltd

Introduction

The purpose of this letter is to assess the traffic effects associated with the construction and ongoing operation of a utility solar generation plant at the abovementioned address. This letter is suitable for inclusion in a resource consent application.

Proposal

Energy Farms Ltd proposes to construct a solar plant at Wellington Road/Read Road/Kilkern Road, Marton, within a development area of approximately 194Ha across two titles.

Background

We have used baseline data from mobileroad.org for traffic flow volumes. We have not undertaken a site visit; this letter is limited to a desktop study of capacity and safety effects.

For our assessment, we have assumed that all containerised materials are delivered from Whanganui Port Te Pūwaha via SH3, Pukepapa Road and Kilkern Road. We have assumed that all hardfill material for access roads and laydown areas are delivered from one of the Rangitikei River quarries, via SH1 and Wellington Road. These assumed routes use State Highway intersections with existing turning treatments in place.

Access to the site will be via three new vehicle crossings located on Kilkern Road, Wellington Road and Whales Lane.

Table 1 shows the current width and traffic data along the assumed hardfill freight route, and Table 2 shows the current width and traffic data along the assumed container freight route.

7 Selwyn Avenue Whangarei 0110 09 438 7139



Road	RP no.	Surface	Width (m)	ADT (VPD)	% HGV	No. HGV
SH1, north of Wellington Road	-	Sealed	10.8	6329	15.72%	995
SH1, south of Wellington Road	-	Sealed	10	6399	14.80%	948
SH1, at the Wellington Road intersection	-	Sealed	10	6329	15.72%	995
Wellington Road, at the site access	RP 6.41 - RP 8.86	Sealed	7.5	1414	7.00%	99
Wellington Road, at the SH1 intersection	RP 6.41 - RP 8.86	Sealed	7.5	1210	10.00%	121

Table 1 Road Data Along Proposed Hardfill Route

Table 2 Road Data Along Proposed Container Route

Road	RP no.	Surface	Width (m)	ADT (VPD)	% HGV	No. HGV
SH3, north of Wanganui Rd	-	Sealed	10.6	8206	20.95%	1719
SH3, at the Makirikiri Rd intersection	-	Sealed	10	5951	11.46%	682
SH3, near the Pukepapa Rd intersection	-	Sealed	9.5	5951	11.46%	682
Pukepapa Road	RP6.47 - RP6.57	Sealed	7.6	1362	6.00%	82
Kilkern Road, at the site entrance	RP0 - RP3.23	Sealed	4.5	86	11.00%	10

Estimated Vehicle Movements

Construction Traffic

The date for construction commencement is estimated as October 2022. The estimated construction duration is 14 months, with three months for hardfill delivery and 11 months for container delivery.

Referencing Beca's drawings, "Solar Farm Site Layout, Marton" for Energy Farms Ltd, the estimated volume of imported hardfill to construct internal access roads (4085m, 3.5m wide) and construction laydown areas (20,000m²) is 10,289m³ (assuming 300mm thick pavements), requiring approximately 1288, 16m³ HGV movements. An estimated 700 containers of supply items will be delivered to the site, requiring 1400 HGV movements. Applying a factor of 1.5, to allow for mobilisation/demobilisation & unknowns, the estimated total HGV movements is 4032.

The container and hardfill movements were assessed against the separate routes, the estimated movement breakdown shown in Table 3.

Route	HGV movements	HGV movements* 1.5
Container deliveries	1400	2100
Hardfill deliveries	1288	1932

Table 3 Road Data Along Proposed Container Route

Vehicle movements associated with earthworks activities for the development are minimal (trenches, cut to fill within site, topsoil stripping for construction of internal access roads) as these works do not require vehicle movements to/from the site.

The additional vehicle movements associated with construction activities are negligible (0.5%) when compared with the ADT of SH3 (5900 VPD) and SH1 (6400 VPD).

Day-to-Day Plant Operation & Maintenance

Staff expected to access the site daily include:

- Cleaners and general building maintenance staff (e.g. plumbers, air conditioning technicians and general maintenance workers),
- Delivery drivers,
- Grounds staff (e.g. for lawn mowing and weed eradication),
- People tending livestock or managing wildlife or vermin,
- People entering high voltage substation areas such as telecommunications repairers, meter readers and ground staff.

The traffic movements associated with the above activities are negligible; they are not considered further in this assessment.

Traffic Assessment

The 14 month construction period equates to 290 working days (allowing 15 days for Christmas shutdown and public holidays). Breaking down to 59 working days for hardfill delivery and 231 working days for container delivery.

During the hardfill delivery period a total of 1932 HGV movements gives an average of 34 daily vehicle movements: 3-4 vehicles per hour. We assumed an average of twenty additional light-vehicle movements per day during construction. Table 4<u>Table</u> shows the relative increase in traffic volumes on the southern portion of Wellington Road and on SH1, from importing hardfill to the site.

Road	New heavy	% HGV increase	New ADT	% Increase ADT
SH1, north of Wellington Road	1029	3.4%	6383	0.9%
SH1, south of Wellington Road	982	3.6%	6453	0.8%
SH1, at the Wellington Road intersection	1029	3.4%	6383	0.9%
Wellington Road, at the site access	133	34.3%	1468	3.8%
Wellington Road, at the SH1 intersection	155	28.1%	1264	4.5%

Table 4 Antici	ipated Effect or	n Roads Along	Proposed Hardfi	II Import Route
	-	-	-	-

The percentage increase of heavy vehicles on SH1 is not significant. The percentage increase of heavy vehicles on Wellington Road is significant, but the total number of movements is low.

During the container delivery period a total of 2100 HGV movements gives an average of 10 daily vehicle movements: 1-2 vehicles per hour. We assumed an average of twenty additional light-vehicle movements per day during construction. Table_ 5 shows the relative increase in traffic volumes on SH3, Pukepapa Road and Kilkern Road.

Road	New heavy	% HGV increase	New ADT	% Increase ADT
SH3, north of Wanganui Rd	1729	0.6%	8236	0.4%
SH3, at the Makirikiri Rd intersection	692	1.5%	5981	0.5%
SH3, near the Pukepapa Rd intersection	692	1.5%	5981	0.5%
Pukepapa Road	92	12.2%	1392	2.2%
Kilkern Road, at the site entrance	20	100.0%	116	34.9%

Table 5 Anticipated Effect on Roads Along Proposed Container Import Route

Kilkern Road has low vehicle volumes, at 86ADT, so the relative increase in traffic movements and HGV movements is high. The effect of the additional HGVs may be noticeable but is characteristic for the area (due to the already high proportion of HGVs associated with rural production in the area).

We expect most light-vehicle movements to occur during the AM/PM peaks.

Intersection Capacity

SH3/Pukepapa Road and SH1/Wellington Road intersections have existing auxiliary lane turn treatments (AUL) as warranted by current peak hour flows (15% ADT). Referencing AUSTROADS Guide to Traffic Management Part 6 Figure 3.25, the increased vehicle movements, primarily during the interpeak hours, do not warrant any further upgrades. Interpeak movements (7% ADT), warrant only a short lane AUL(s) treatment, so no further upgrade is required.

Environmental

The existing road network is sealed, the additional traffic is not expected to cause any environmental nuisance.

Crash History

We have assessed anonymised data from the Crash Analysis System (CAS) database at points of interest along the proposed route.

Points of interest were:

- SH3/Pukepapa Road intersection
- Wellington Road/SH1 intersection
- Pukepapa Road/Kilkern Road intersection
- Wellington Road site access
- Kilkern Road site access

SH1, Pukepapa Road, Wellington Road and Kilkern Road have open-road speed limits.

Sight distances at the SH3 and Pukepapa Road intersection is 400m in both directions (NZTA planning policy manual requires 282m). There are existing turning treatments; an auxiliary left turn and an auxiliary right turn are on the major road. There have been 13 crashes recorded here (nine non-injury, three minor and one serious) between 2001 and 2018. The crash types and severity are included in Table 6.

Crash Type	Severity	Number of Crashes
Single Truck	Minor Crash	1
Single Truck	Non-Injury Crash	1
Two cars	Non-Injury Crash	2
Single car	Serious Crash	1
Single car	Minor Crash	2
Single car	Non-Injury Crash	6

Table 6 SH3/Pukepapa	Road Intersection	Crash Types /	And Severity

Sight distances at the SH1 and Wellington Road intersection exceed 400m south and 200m north, the NZTA planning policy manual requires 282m of site distance. The limited visibility to the north is mitigated by a separate acceleration lane for vehicles that turn south from Wellington Road. There are existing turning treatments; an auxiliary left turn and an auxiliary right turn are on the major road. There have been 18 crashes recorded at the SH1/Wellington Road intersection (12 non-injury, two minor, three serious and one fatal) between 2002 and 2017. The crash types and severity are included in Table 7.

Crash Type	Severity	Number of Crashes
Truck and car	Serious Crash	1
Truck and car	Non-Injury Crash	3
Bus and car Fatal Crash		1
Car and motorcycle	Serious Crash	2
Two cars	Minor Crash	2
Two cars	Non-Injury Crash	4
Single car	Non-Injury Crash	5

Table 7 SH1/Welling	ton Road Intersection Crash	Types And Severity

Sight distances at the Pukepapa Road/Kilkern Road intersection exceed 300m to the North and the SH3/Pukepapa intersection can be seen 100m to the south. There have been two crashes recorded here (one minor and one serious) between 2001 and 2021. The crash types and severity are included in Table 8.

Table 8 Pukepapa Road/Kilkern Road Intersection Crash Types And Severity

Crash Type	Severity	Number of Crashes
Single car	Serious Crash	1
Truck and car	Minor Crash	1

At the Kilkern Road site access point there have been no recorded crashes.

Within 300m of the Wellington Road site access point there have been seven crashes recorded (one fatal, two minor and four non-injury) between 2002 and 2016. All crashes were single vehicle crashes and none involved trucks.

Site Access

The site access points will be on Wellington Road, Kilkern Road and Whales Lane. The Kilkern Road crossing location meets the District Plan spacing and sight distance requirements. The Wellington Road crossing requires the existing neighbouring accessway to be removed to achieve the minimum 200m spacing between accessways as proposed on the Beca site plan. The proposed Whales Lane accessway location *shall* be moved east, so that there is a minimum 200m between accessways and 200m from the accessway to the intersection. Subject to these recommendations there are no constraints to construct appropriate vehicle crossings.

The access vehicle crossings shall be asphalted to the boundary and constructed to the standard specified in the Rangitikei District Council District Plan Addendum; Code of Practice, as a Standard Rural Vehicle Accessway. It is anticipated that an additional access point, on Whales Lane, will be used for permanent access, this will also be constructed to the Standard Rural Vehicle Accessway standard. It is anticipated that the three laydown areas within the site will be metalled, to minimise potential for tracking of mud onto Wellington and Kilkern Roads, in accordance with good practice.

Recommendations

We recommend the following to minimise any potential adverse effects.

- HGV deliveries be made on the assessed routes; via SH3, Pukepapa Road and Kilkern Road for container deliveries, and via SH1 and Wellington Road for hardfill deliveries.
- Schedule HGV deliveries to arrive outside of peak traffic times (i.e. between 10am & 4pm) and spread across the day to minimise adverse effects on safety.
- Provide signage along Kilkern Road and Wellington Road to notify road users of increased HGV movements during the construction period.
- Construct standard rural vehicle accessways in general accordance with Rangitikei District Council District Plan Addendum; Code of Practice, to access the site.
- Ensure at least 200m between accessways by removing the existing accessway located west of the proposed Wellington Road accessway.
- Locate the Whales Lane accessway at least 200m from the neighbouring accessway and 200m from the intersection.

Conclusions

The effect of the additional traffic on SH3 and SH1 is negligible.

Subject to our recommendations, we consider that the construction and operation of the solar plant will not adversely affect the safety or efficiency of the adjacent roading network.

Limitation

This letter has been prepared solely for the benefit of our client Energy Farms Ltd and the Rangitikei District Council in relation to the resource consent application for which this letter has been prepared. The comments in it are limited to the purpose stated in this letter. No liability is accepted by Hawthorn Geddes engineers & architects ltd in respect of its use by any other person, and any other person who relies upon any matter contained in this letter does so entirely at their own risk.

Yours faithfully,

Mat Chiaroni Hawthorn Geddes engineers & architects Itd

Prepared by Vanessa Martinovich

Cc: Thomas Keogh ^{s 9(2)(a)}



Solar Farm Site Layout

Marton

	Solar Panel Layout						
	Inverter Locations Switch Yard						
	House Site						
	Potential Stormwater Management/Attenuation Areas						
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	Site Prop	berty					
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