

MEMORANDUM

To: Thomas Keogh
Reyburn and Bryant Ltd

From: Simon Cocker
Simon Cocker Landscape Architecture

Date: 31 January 2023

Subject: Energy Farms, 574 and 575 Kina Road, Opunake – landscape executive summary

Ref #: 21157_03

Dear Thomas,

As requested, I provide below an executive summary of my landscape assessment for the above application.

Energy Farms Limited (EFL) is seeking consent to construct and operate 74 MW solar farm consisting of approx. 237,000 bifacial panels that will produce approx. 181,000 MWh of energy per year.

The Site is identified as 574 and 575 Upper Kina Road in the South Taranaki District. The proposed solar farm is for utility-scale renewable energy generation (188.6ha in area), which can be co-located adjacent to a substation for supply into the local electricity transmission network. The Site comprises two farms located opposite each other on the northern and southern sides at 574 and 575 Upper Kina Road. The northern property has an area of 112.04ha, and the southern property, 76.54ha.

The solar panels will not be static - they will be able to rotate to maximise the solar resource. They will be attached to metallic racking systems arranged in rows. A small motor located at the end of each row will facilitate the rotation of the panels. The panels will have a maximum height of approximately 2.35m when in a horizontal position, which will increase to approximately 4.8m when fully tilted.

The panels will be connected to approximately 11 inverter stations located across the site via underground cabling. Each inverter will have an approximate area of 30m² (i.e. a forty foot container). The inverters will be connected to an on-site substation via underground cabling. The substation will consist of a range of typical electrical infrastructure and will serve as the interconnection point for the solar farm into the Transpower network.

A battery storage facility will also be established near the substation area. The facility will consist of up to seven Tesla megapack battery storage units located within an enclosed building, and will provide the ability to store electricity generated by the solar farm with a controlled and optimised release back into the grid.

The area below the panels is to be retained in grass. It is understood that an adaptive management is proposed to ensure that the grass is retained, noting that this is important for the management of stormwater.

There will be a fence around the portions of the site that accommodate infrastructure. My understanding is that the fence will be approx. 2.2m high.

The landscape mitigation strategy encompasses the following:

1. Adopting the existing landscape patterning within the Site and wider landscape. The ring plan landscape is structured by field boundaries – defined by fences, or hedges / shelterbelts – or farm races. These anthropomorphic patterns overlay the natural patterns derived from the hydrology. The main access road will follow the existing alignment of the main central races and the watercourses, ponds and wetlands will remain unaffected, with the panels set back from these features.
2. Locally appropriate riparian along the margins of the watercourse which defines the northern edge of the northern portion of the Site. This planting is intended to provide an ecological benefit as well as offering buffer of views from Ngariki Road to the north.
3. 3.0m wide planting strips / screens are proposed along the Kina Road frontage, and along a portions of the western and eastern boundaries. These plantings will screen views of the solar farm from external locations. The plantings shall comprise *Cryptomeria japonica*, planted as a staggered double row and maintained as a hedge which will be maintained to a height of 4m.

Landscape description / existing environment

The Site is bisected by Kina Road. To the north of the road, it has a long and rectangular shape aligned perpendicular to the road. To the south, the Site is square in shape. The primary patterning of the landscape is principally afforded by the drainage patterns, where watercourses adopt a radial pattern reflecting the volcanic cone shape of Taranaki. The same radial patterning is assumed by the roading network

At a local level, the patterning imposed by the watercourses is manifest in a gently undulating landform which indicate the alignment of overland flow paths or old river alignments. Watercourses are contained in small and shallow valleys. The Site occupies two separate hydrological catchments. Along the northern edge of the Site, the Oaoiti Stream has its headwaters on the lower slopes of the Taranaki cone and drains the northern half of the portion of the Site to the north of Kina Road. The balance of this northern portion, and the portion of the Site to the south of Kina Road are situated within the upper catchment of the of the Manganui Stream and two tributaries, as well as two straightened intermittent streams.

In the vicinity of the Site, the elevation is some 130m, with the elevation rising gradually toward the east. The Site and its context are principally underlain by Holocene lahar deposits (OS1 debris avalanche deposits (Opua Formation) of Egmont Volcanic Centre. This is described as a lahar deposit comprising andesite blocks and boulders in a clay-rich matrix, forming a prominent hummocky surface. Within the north western corner of the Site, a small area of the Warea Formation is described as poorly consolidated andesitic conglomerate with sand derived from pyroclastic flows. There is little surface evidence in the terrain to distinguish these differing geologies. To the east of the Site, the terrain assumes a more broken and eroded character with an elevation in excess of 160m.

Soils within the context of the Site are mainly deep, friable, well drained volcanic ash soils from andesitic ashes, with significant areas of shallow and bouldery soils from laharc deposits, poorly drained, gleyed soils where watertables are high, and well drained alluvial soils along rivers and streams.

The landform in the vicinity of the Site affords long views across the landscape, although relatively minor undulations, or features such as hedges have the ability to contain views. The landscape is dominated however, by the rising slopes of Taranaki to the east and imparts a unique and unmistakable character on the landscape.

The Site is located within the Egmont Ecological District. Historically, lowland vegetation in the area would have consisted of tawa, kohekohe, rewarewa, hinau, podocarp forest, and kahikatea, pukatea forest¹. However, the site and surrounds have been largely cleared for agriculture and few areas of indigenous vegetation remain.

Both the portion of the Site to the north and south of Kina Road are grazed by cattle and contain limited native vegetation. This is mostly confined to shelterbelts or riparian margins with the exception of one area of remnant podocarps located in the north west corner of the northern portion of the Site. This comprises 10-20m tall kahikatea

(*Dacrycarpus dacrydioides*), rimu (*Dacrydium cupressinum*), and pukatea (*Laurelia novae-zelandiae*) with rātā (*Metrosideros sp.*) and Astelia sp. growing on some trees. The understory is open and grazed.

Various shelter belts planted across the sites consists of crack willow (*Salix fragilis*), poplar (*Populus sp.*), bamboo (*Pseudosasa japonica*), Cypress sp., karo (*Pittosporum crassifolium*), Banksia sp., and kāpuka (*Griselinia littoralis*).

Riparian vegetation located along the various watercourses includes a mix of native and exotic vegetation including *Pinus radiata*, karo (*Pittosporum crassifolium*), kāpuka (*Griselinia littoralis*), Barberry (*Berberis sp.*), harakeke (*Phormium tenax*), bamboo (*Pseudosasa japonica*), tutu (*Coriaria arborea*), karamū (*Coprosma robusta*), Montbretia, māhoe (*Melicytus ramiflorus*), blackberry, pampas (*Cortaderia selloana*), mamaku (*Cyathea medullaris*), silver fern (*Cyathea dealbata*), Dicksonia sp., māpou (*Myrsine australis*), gorse (*Ulex europeaus*). The riparian vegetation is typically patchy, and – as evidenced by the list above – invaded by weeds. Overall, the vegetated character of the landscape displays a patchy, sporadic and scrubby mien.

The cadastral patterning of the landscape is strongly influenced by the topography associated with the Taranaki maunga. Roads radiate outwards from the maunga and this patterning is reflected in the cadastral pattern where rectangular blocks are aligned perpendicular to the roads.

The land use is predominantly dairy pastoral with large paddocks under grass. Paddock boundaries are defined by hedgerows, shelterbelts or post and wire fences, and the structure afforded by these elements reflects the patterning of the lot boundaries.

Dwellings are, for the most part, located close to the roads. These tend to be situated sporadically along the road frontage and in the vicinity of the subject Site a cluster of two single storey dwellings are located some 260m to the south west (504 and 511, and a second cluster some 800m to the south west (435, 442, 447, and 456. To the north east, a

¹ Beca. Ecological Constraints Assessment – Proposed Solar Farm at Upper Kina Road. Prepared for Energy farms Ltd. 23 February 2022. Section 2.

cluster of dwelling is separated by some 440m (647, 654 and 661. The adjoining property to the west (511) also contains two additional residences which are set back from the road (150m and 480m respectively).

To the north a number of residences accessed from Ngariki Road are separated from the northern boundary of the Site by a minimum of some 570m (461, 506, 531, and 570. To the south, properties located along Arawhata Road are separated by a minimum of some 820m (569, 590, 605, 606, and 636). The easterly rising gradient affords more distant views from distances of some 2km toward the Site from the south east along Anawhata Road

Wiremu Road, some 3km to the east of the Site skirts the western edge of the Taranaki maunga at an elevation of around 230 – 250m. Glimpse views across the landscape to the west are possible from this road.

Identified values

The Site is not affected by any Outstanding Natural Landscape or Outstanding Natural Feature overlays, but a number of forest remnants are identified as Significant Natural Areas. The Ecology constraints report has identified an area of remnant native vegetation (Podocarp forest) as having potential value, and considered an area of approximately 9ha across the two properties to have a moderate or high likelihood of being classified as a 'natural wetland'.

It is understood that no sites of archaeological or cultural value are situated within the subject Site.

Landscape effects

The Site and its setting has been previously modified with respect to its vegetation cover and hydrology and the proposal will result very limited changes in its biotic and abiotic attributes. The landscape is intrinsically influenced by the presence of Taranaki maunga, and the Site forms a part of the continuum which transitions from the summits of the feature through to the surrounding ring plain.

The proposal will, once the mitigation planting has established, form a unobtrusive activity which will not disrupt the landform continuum and character. The proposed mitigation plantings will be of a character that reflects the existing vegetative features within the landscape.

The assessment has identified that more than minor potential adverse visual amenity effect will be experienced by users of Kina Road when approaching and passing the Site. These effects will be experienced during the construction phase, and in the short term, but in the longer term they will diminish to low.

Minor, or more than minor potential adverse visual amenity effects will be experienced by the occupants of two dwellings but this level of adverse effect will be mitigated to less than minor in the longer term.

The anticipated change in the associative attributes will be very small, and there will be no impact on cultural and archaeological attributes.

Overall it is the opinion of the author that the potential adverse landscape effects will be low

Yours sincerely,





ATTACHMENT 1 – Potential adverse visual amenity effects

Address	Legal desc.	Comment	Distance	Const	Short term	Long term
Users of Users of Kina Road						
		Road frontage on northern and southern road boundaries are currently open and views into the Site are possible from adjacent to, and from a distance of some 400m to the north east, and 350m to the south west.	1km – 20m	Moderate	Moderate	Low
Occupants of dwellings on Kina Road						
681 Kina Road	LOT 5 DP 682 LOTS 2 & 5 DP 15504 BLK III OPUNAKE SD	Single storey dwelling set back some 40m from northern road frontage within an established garden. Outlook to north east and south west. Outlook to Site impeded by intervening vegetation.	720m	Low	Low	Very low
654 Kina Road	LOT 16 DP 682 PT NGATITARA BLK VII OPUNAKE SD	Single storey dwelling located on southern road frontage with orientation to north and east. Visually contained by shelter hedge planting on northern, western and south western sides.	500m to northern portion. 270m to southern portion.	Low	Low	Very low
661 Kina Road	PT LOT 4 DP 682 SEC 63 BLK VI OPUNAKE SD	Single storey dwelling located on northern road frontage with orientation to north and east. Visually contained by shelter hedge planting and riparian vegetation growing along watercourse to west. Glimpse views through riparian vegetation, but longer views impeded by vegetation to south of neighbouring dwelling to west.	530m	Low	Low	Very low
647 Kina Road	PT LOT 4 DP 682 SEC 63 BLK VI OPUNAKE SD	Property adjoins Site on its eastern boundary. Single storey dwelling set back some 120m from road frontage and located on western edge of cluster of agricultural buildings with orientation to north and lawn. Outlook to north, north west and west is contained by existing vegetation (hedge).	360m	Low	Low	Very low
511 Kina Road	LOT 2 DP 16520 LOT 2 DP 488449 LOT 2 DP 20813 LOT 1 DP 682 LOT 1 DP 2262 LOTS 1 2 DP 8750 LOT 2 DP 390208 SECS 9 10 PT SECS 6 8 BLK II SEC 6 BLK VI SEC 12 BLK V SEC 103 BLK I OPUNAKE SD -PT SUBJ TO CONSERVATION COVENANT	<p>Large property adjoining Site on its western boundary. Contains two dwellings, one set back 150m from Kina Road and the second set back some 480m.</p> <p>Southern dwelling is an isolated single storey dwelling with an orientation to the north. Contained on its northern, western and eastern sides by hedge. Views to north and north east fragmented by existing hedges.</p> <p>Northern dwelling forms part of a cluster of accessory buildings. Dwelling is enclosed on its eastern and southern sides by hedge. Views to north are fragmented and partially screened by buildings.</p> <p>Initially, views of the proposal will be possible from the access, but views from the two dwellings will be largely screened by existing vegetation. Views from the access will be screened within some 3 – 5 years by proposed mitigation planting.</p>	300m	<p>Low</p> <p>Low</p>	<p>Low</p> <p>Low</p>	<p>Very low</p> <p>Very low</p>

511A Kina Road	LOT 1 DP 488449	Single storey dwelling situated close to Kina Road with orientation to north. It is set within an extensive lawn with scattered vegetation and bounded by hedge. Views to east are screened by sheds, but views possible toward and into Site to north east. Glimpse views to south east across road to southern portion of Site.	300m	Low to moderate	Low to moderate	Very low
504 Kina Road	Lot 3 DP 389569	Single storey dwelling located adjacent to road. Views to east, south east and south possible across rural landscape. Views to north and north east (toward Site) impeded by buildings and existing vegetation growing along northern edge of road (southern boundary of #511). Direct views to east and south east, fragmented slightly by existing intervening vegetation, to southern portion of the Site. Initially, direct views east to the southern portion of the Site will be possible but will be screened within some 3 – 5 years by proposed mitigation planting.	330m	Moderate	Moderate	Low
455 Kina Road	LOT 2 DP 16520 LOT 2 DP 488449 LOT 2 DP 20813 LOT 1 DP 682 LOT 1 DP 2262 LOTS 1 2 DP 8750 LOT 2 DP 390208 SECS 9 10 PT SECS 6 8 BLK II SEC 6 BLK VI SEC 12 BLK V SEC 103 BLK I OPUNAKE SD - PT SUBJ TO CONSERVATION COVENANT	Single storey dwelling located close to road frontage. Views to east screened by vegetation planted as hedge to east of dwelling, and other intervening vegetation	820	Very low	Very low	Very low
455 Kina Road	LOT 2 DP 16520 LOT 2 DP 488449 LOT 2 DP 20813 LOT 1 DP 682 LOT 1 DP 2262 LOTS 1 2 DP 8750 LOT 2 DP 390208 SECS 9 10 PT SECS 6 8 BLK II SEC 6 BLK VI SEC 12 BLK V SEC 103 BLK I OPUNAKE SD - PT SUBJ TO CONSERVATION COVENANT	Single storey dwelling located close to road frontage. Views to east screened by vegetation planted as hedge to east of dwelling, and other intervening vegetation	890m	Very low	Very low	Very low
442 Kina Road	LOT 1 DP 15114 BLK VI OPUNAKE SD	Single storey dwelling located close to, and on the southern edge of Kina Road. Accessory buildings located to east and views toward Site impeded by built form, and existing vegetation. Distant views to east and southern portion of the Site are slightly fragmented by existing intervening vegetation.	950m	Low	Low	Very low
Users of Ngariki Road						
		Very limited glimpse views across rural landscape to south and south east. Views fragmented by vegetation. Limited views will be screened within some 3 – 5 years by proposed mitigation planting.	700m	Very low	Very low	Nil
Occupants of dwellings on Ngariki Road						
382 Ngariki Road	LOT 2 DP 16520 LOT 2 DP 488449 LOT 2 DP 20813 LOT 1 DP 682 LOT 1 DP 2262 LOTS 1 2 DP 8750 LOT 2 DP 390208 SECS 9 10 PT SECS 6 8 BLK II SEC 6 BLK VI SEC 12 BLK V SEC 103 BLK I OPUNAKE SD - PT SUBJ TO CONSERVATION COVENANT	Single storey dwelling, located close to road frontage on its southern side. Views to south and south east impeded by accessory buildings and vegetation. Limited views will be screened within some 3 – 5 years by proposed mitigation planting	1.3km	Very low	Very low	Nil
461 Ngariki Road	LOT 2 PT LOT 1 DP 565 LOT 1 DP 13323 LOT 1 DP 16520	Two dwellings located close to and on the northern side of the road. Views across road to south east fragmented by garden vegetation / hedges, and riparian vegetation growing along a watercourse / drain to south. Limited views will be screened within some 3 – 5 years by proposed mitigation planting.	870m	Very low	Very low	Nil
506 Ngariki Road	LOT 1 DP 20721 BLK II OPUNAKE SD - SUBJ TO & INT IN ESMTS	Single storey dwelling situated close to road on its southern side. Contained on its western and southern edges of garden by hedge. Views to south east fragmented by intervening vegetation,	700m	Low	Low	Very low

		but direct distant views possible. Limited views will be screened within some 3 – 5 years by proposed mitigation planting				
531 Ngariiki Road	LOT 2 PT LOT 1 DP 565 LOT 1 DP 13323 LOT 1 DP 16520	Single storey dwelling set back some 40m from the northern road edge. Outlook to north east and east. Views to south blocked by vegetation on southern edge of curtilage and along southern road boundary. Limited views will be screened within some 3 – 5 years by proposed mitigation planting	800m	Very low	Very low	Nil
570 Ngariiki Road	LOT 2 DP 20721	Single storey dwelling situated within grassed curtilage on southern edge of road. Views to south impeded by shelterbelt, but long views to south west possible toward Site. Limited views will be screened within some 3 – 5 years by proposed mitigation planting	730m	Low	Low	Very low
603 Ngariiki Road	LOT 2 DP 393299	Single storey dwelling situated within grassed curtilage on northern edge of road. Views to south impeded by shelterbelt, but long views to south west possible toward Site. Limited views will be screened within some 3 – 5 years by proposed mitigation planting	980m	Low	Low	Very low
Users of Arawhata Road						
		Slightly elevated glimpses across rural landscape from road to south east. Very limited glimpse views from road corridor to south south east.	2.2km. 2.0km	Very low	Very low	Nil
Occupants of dwellings on Arawhata Road						
Various	-	For the most part dwellings are located close to Arawhata Road, either on its northern or southern edge. A dwelling at 685 is set back from the road and is some 1.8km from the Site. These dwellings offer a variety of long views across the gently undulating landscape that are fragmented by vegetation. Limited views will be screened within some 3 – 5 years by proposed mitigation planting	1.7km – 2.5km	Low	Low	Very low
Users of Wiremu Road						
		Long and elevated views across the rural landscape to the west. It is likely that the Farm will be visible, but the prominence of the activity will be moderated by the separation distance.	3.2km	Very low	Very low	Low
Occupants of dwellings on Wiremu Road						
		Few dwellings occupy the elevated land to the east of the Site. Views from these properties encompass a westerly panorama which is likely to include the subject Farm. The prominence of the activity will be moderated by the separation distance	3.0km	Low	Low	Low

Table 1: Potential adverse effects