WILLIAMSON
WATER & LAND ADVISORY

Unit 10 | 1 Putaki Drive | Kumeu
Auckland | New Zealand
T +64 21 65 44 22
E jon.williamson@wwla.kiwi
W www.wwla.kiwi

South Wairarapa District Council

Attention: Nick Pollard
Nick.Pollard@boffamiskell.co.nz

11 August 2023 WWLA0589

Dear Nick

Resource Consent Application 415 Moroa Road, Greytown (Planning Application No. 220103) – Response to Further Information Request Following the Close of Submissions

This letter provides a response to your letter dated 27 June 2023 which requested further information following the close of submissions on this application. The requests are presented in *blue* italics, followed by our responses.

1. ***Effects on Electricity Transmission Lines (Transpower assets) Assessment of Effects on the Environment***

   Submitters have raised concerns regarding the access to transmission lines, the heights of shelterbelts, the safe separation of mechanical plan during the construction phase and other construction effects. It is noted that a submitter (Transpower) has recommended conditions be imposed on this application. The limitations set out in those conditions on shelterbelts may be incompatible with the landscape mitigation strategy. The outcome of any consultation with Transpower, including any agreed and offered conditions should be provided. Please provide information on how these effects on transmission lines can be managed.

   Note: The AEE does not include an assessment of the proposal against the National Policy Statement on Electricity Transmission (principally the objective and Policy 10), please provide this.

The Applicant has consulted with Transpower following the receipt of their submission. As a result of these discussions, the Applicant accepts the recommended conditions put forward by Transpower as set out in **Attachment 1**.

The conditions put forward by Transpower will ensure the appropriate setbacks and work practices set out under the NZECP:34 Regulations are adhered to for the duration of the project.

The proposed conditions require vegetation within 12 m of the centreline of the transmission lines and support structures to not exceed 2 m in height and to ensure, for any vegetation outside of these setbacks, that they cannot fall within 4 m of the transmission lines. All vegetation planted will comply with the Electricity (Hazards from Trees) Regulations 2003. This will not impact on the proposed screen planting, as this vegetation is focused around the site boundary and not within 12 m of transmission lines or support structures.

There are no plants to plant screening trees within the site, and at along the site boundary all proposed screening will be maintained to comply with the Electricity (Hazards from Trees) Regulations 2003.

2. ***Glint and Glare on State Highway 2 Users***

   Submitters have identified that the proposed grade of planting for the shelterbelts intended to screen views of the solar farm from State Highway 2 will allow drivers to view

the solar panels in the short term, and until the Cryptomeria japonica shelterbelt, attains a suitable height. This will have an effect on users of the SH2 network through glint/glare during this time. Please provide information on how these effects can be managed.

Refer to the Glint and Glare Assessment provided in **Attachment 2**. The assessment notes that up to 3 minutes of green glare between 5-6am from late January to early February and up to 3 minutes of green glare between 4:30 am and 5:30 am from late October to mid-November on State Highway 2 users can be expected. Overall, the impact of this is assessed as being very low (negligible) and no mitigation is required.

3. *Effect on Aircraft Operations*

Submitters have identified that the panels pose a risk to aircraft use on nearby sites as a climb out obstruction and through glint and glare creating sun strike for aircraft pilots. Whilst the report entitled 'Glint and Glare Considerations for FNSF Solar Farms' prepared by Renewable Energy Group addresses aircraft briefly in the summary noting that "The panels have been re-orientated to minimise the effect." This appears to be a generic comment and it is unclear whether this has been factored into the design and layout of the solar farm. Please provide information on how the effects on aircraft use including potential obstructions and glint and glare can be managed.

Please see the Glint and Glare Assessment in **Attachment 2**.

With regards to the airfield immediately east of the site, this does not appear to be a registered aerodrome according to the Civil Aviation Authority New Zealand's list of Aerodrome Coordinates. On that basis, this has been excluded from the Glint and Glare Assessment.

4. *End of Life*

Submitters have raised concerns regarding the end of the life disposal of the panels. The AEE notes:

The panels themselves are warranted for 30 years with an expected lifespan in excess of the consent duration. At the end of the consented period, the solar farm is decommissioned and all materials are removed for recycling.

Please provide more information regarding the process of decommissioning and what protocols can be adopted to ensure that actual and potential effects of discharges of contaminated material can be suitably managed.

Note: at section 1.4 the AEE notes that an 'unlimited duration' is sought as the application is for a land use consent under section 9 of the Resource Management Act 1991. This is not consistent with section 3.7 that implies a 'consented period' and that this is less than 30 years. Please clarify whether a specified duration is sought.

With regards to decommissioning, all site reinstatement is assured in the lease agreement with the property owner which includes a decommissioning bond. At the end of the solar farm operation, the Applicant will removal all energy facility, structures and equipment including subsurface wires and footings. Any access tracks within the site will be removed and re-planted with vegetation and grassland species, as appropriate. The solar panels and all other equipment removed from the project site, unless being reused or repurposed for another project, shall be recycled in accordance with all applicable policies and procedures in effect at the time of decommissioning.

In addition to this, the Applicant would accept a condition of consent that would require a Decommissioning Plan to be prepared and implemented.

With regards to the consent duration, it is noted an unlimited consent was sought in the application. However, the Applicant would like to amend this to a consent duration of 35 years which will be in line with the decommissioning plan for the solar farm.

5. Soil and Water Contamination from Panel Run-Off and Breakdown

Submitters have raised concern that over time the panels will breakdown and discharge contaminated material to land and water. Submissions also identify risk associated with panel damage releasing contaminated material. Please provide information on how, if any, adverse effects can be managed.

The panels are warranted for a duration of 35 years, with an expected lifespan in excess of the duration of the consent. The panels are designed to weather the elements for this period of time and there is no expected leachate of contaminants over the consent duration.

During the operation of the solar farm, the panels will be regularly checked and repaired (as required). At the end of the consented period, the panels will be decommissioned and all material and associated materials (i.e. cabling) will be removed off-site for recycling.

6. Noise Effects During Construction and Operational Phase

A number of submitters have raised concerns regarding the noise effects that may be generated during the construction phase and within the operational phase of the solar farm. It is noted that the AEE asserts that: "The proposed construction works will comply with the New Zealand Standard NZS 6803:1999…" and 'Operational noise effects are minimal and will not be noticeable from the boundary of the site…Average maximum sound pressure at 1m distance was measured at 62dBA'. Noting the permitted standard which excludes mobile sources associated with primary production at the notional boundary is:

Daytime	7.00am – 7.00pm	55dBA L10
Nighttime	7.00pm – 7.00am	45dBA L10
	9.00pm – 7.00am	75dBA L10

Please provide an acoustic assessment, prepared by a suitably qualified person to confirm that both during the construction and operational phase of the activity adverse noise effects will be managed to within acceptable limits, with reference to the permitted standards. Submissions have noted that there are already other noise generating activities that may contribute to noise effects, and the proposal may generate a cumulative effect or exacerbated noise effects on amenity by the introduction of the panels themselves.

Please see the Acoustic Assessment in **Attachment 3**.

With regards to construction noise, the assessment notes that the majority of dwellings are well beyond 100 m from the piling and therefore compliance with the Wairarapa Combined District Plan construction noise rules will be complied with at most dwellings. However, there are some dwellings that will be closer to the piles than this. These are identified as:

- 489 Moroa Road;
- 56 Settlement Road; and
- 312 Bidwills Road.

Mitigation measures are proposed to ensure compliance with the NZS 6803:1999 noise limits at all dwelling facades. This includes limiting the use of unattenuated Vermeer or drop hammer piling occurring in close proximity to dwellings. In the event that a Vermeer-type or drop hammer piling rig was used, that a suitable dolly or shroud (or similarly effective method) is used to mitigate noise from the piling.

To address this, a Noise Management Plan (NMP) is proposed to be prepared as part of the resource consent conditions. The key matter that the NMP will address are maps that will illustrate the "pilling zones" where noise levels may be above the NZS 6803:1999 noise limit without attenuation. For the wording of the proposed conditions, please refer to Section 9 of the Acoustic Assessment.

The operational noise limits have been found to comply with the permitted daytime limits as set out in the Wairarapa Combined District Plan.

7. Heating Effects

Submitters have also raised concerns that panels will generate localised changes to temperature as a 'heat island'. Please provide information on how, if any, adverse heating effects can be managed.

Most of the world's largest solar farms, and therefore a large proportion of solar farm studies, are located in savannah or desert environments (Aman et al., 2015; Barron-Gafford et al., 2016; Fthenakis and Yu, 2013; Montag et al., 2016; Nordberg et al., 2021; Taylor et al., 2019; Turney and Fthenakis, 2011). In these systems, PV panels are typically placed directly on bare ground. One such solar farm observed that temperatures were 3 to 4°C higher 2.5 metres above the ground compared to a natural desert control site. This was likely due to the combined effects of a lack of vegetation at the site, little room for convective cooling beneath the panels, and the low albedo of solar panels, as well as potential effects from the desert environment (Barron-Gafford et al., 2016). It is difficult to apply these findings to the proposed Greytown site as these panels will be 2-2.5 metres above pasture and the site has a very different climate from the Barron-Gafford study.

Agrivoltaic systems - wherein solar energy collection is undertaken on the same land as agricultural activities - affect temperature and soil moisture in very different ways than PV systems where panels are placed directly on bare ground. In a study of 18 soybean farms, areas shaded by panels were up to 10°C cooler than sun-exposed areas due to the combined effects of the lower albedo of crops, evapotranspiration from crops, and convective cooling under the raised panels (Williams et al., 2023). Similar results, showing lower ground temperatures and higher relative humidity and soil moisture, were also found by Dutch (Vervloesem et al., 2022) and American (Adeh et al., 2018) studies. Of particular relevance to the proposed Greytown site, sheep grazing in agrivoltaic systems in Oregon showed a 90% increase in late-season pasture productivity and 328% increased water efficiency compared to pastures without solar panels (Adeh et al., 2018).

Based on the combined results from several studies in more extreme environments than the proposed Greytown solar farm site, no evidence was found to indicate that a Heat Island Effect would be produced by raised solar panels installed over grazed pasture in the Wairarapa.

8. Highly Productive Land

Submitters have raised concerns that the solar farm will dimmish the productive capacity of the land by establishing a use on the land that is not 'land-based primary production' and 'primary production' activities. It is noted that essential parts of the solar farm proposal being the substation and switchyard and also part of the 'Extended Plot Area' are located on land identified as LUC2 on the soil maps. An assessment in respect of the National Policy Statement for Highly Productive Land 2022 has been included in the AEE that states that there are 'functional and operational requirements for it to be located on the subject site'. Please provide further details on this functional and operational need assessment.

The functional and operational need to locate the proposed solar farm in this specific location relates to the proximity of the grid connection point that is provided by the Transpower's substation on the corner of Moroa Road and Bidwills Cutting Road. This enables the solar farm to

connect to the National Grid with minimal cabling / connection works required, which avoids electricity losses.

Furthermore, the site is of a suitable topography (i.e. relatively flat), not in prominent view of sensitive visual receptors and receives well-above average sunlight hours / irradiance, making it suitable for solar panels to be erected.

In addition to this, the Soil Assessment (**Attachment 4**) confirms the proposal will not adversely impact the productive potential of the site's soil and will actually be potentially more beneficial to soil structure and long-term potential productivity than many farming operations.

Conclusion

We trust that there is now sufficient information available for you to continue processing the application. Please do not hesitate to contact Laila Alkamil on 027 266 8405 if you require further clarification of any aspects of this letter.

Yours sincerely,

Laila Alkamil
Planner | 027 266 8405
Laila.Alkamil@wwla.kiwi | www.wwla.kiwi

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