BEFORE THE SELWYN DISTRICT COUNCIL

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a resource consent application to establish a solar array at 150 and 115 Buckleys Road, Brookside, Selwyn District
RC235464

RURAL PRODUCTION EVIDENCE OF JAMES WILLIAM GORDON
For Selwyn District Council

January 2024

1.0 INTRODUCTION

1 My full name is James William Gordon.

2 I hold the position of Director of Macfarlane Rural Business (MRB). I have been in this position since 2018. I have been employed by MRB since 2016. MRB is a multi-faceted farm consultancy company providing independent advice to farmers and industry stakeholders, primarily in the pastoral and arable sectors. I work primarily in the sheep and beef sector with key expertise in farm system analysis, business management, strategic advice and supply chain management. I also have specialised skills in nutrition, genetics and intensive livestock production systems.

3 Prior to joining MRB, I was General Manager of Agriculture, ANZCO Foods (2011 to 2016), General Manager, ANZCO Farms (2008 to 2011) and General Manager of Five Star Beef Feedlot (2004 to 2008). I also held the roles of Operations Manager and Livestock Procurement Manager at Five Star Beef prior to 2008. Five Star Beef was a subsidiary of ANZCO Foods.

4 I hold a Bachelors of Agricultural Science degree (Hon) from Lincoln University. I am a member of the NZ Institute of Primary Industry Management (NZIPIM).

5 I have previously provided Rural Production Advice to the Selwyn District Council (2017), the Waimakariri District Council (2018 & 2021), the Waitaki District Council (2023) and the McKenzie District Council (2023).

6 I have read the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. I have complied with it in preparing this evidence and I agree to comply with it in presenting evidence at the hearing. The evidence that I give is within my area of expertise except where I state that my evidence is given in reliance on another person's evidence.

2.0 SCOPE OF EVIDENCE

7 In my evidence I comment on factors that could impact the ability to maintain the use of Highly Productive Land (HPL) for land based primary production as described in policies 1,4, and 8 of the National Policy Statement for Highly Productive Land 2022.

8 I also consider the written submissions where I focus on those concerns relating to rural production.

9 In preparing my evidence I have read:

a. The AEE prepared by the applicant.

b. Appendix 13 – Landscape and Visual Effects Assessment".

c. Appendix 16 - "Effects on HPL".

d. National Policy Statement for Highly Productive Land 2022.

e. A number of international literature reviews on solar farming.

f. The submissions.

g. The 'Mangamaire Solar Farm Decision Report Reference'

10 I have not visited the site at 150 Buckley's Road.

3.0 EXECUTIVE SUMMARY

11 The Solar panels to be installed are single axis tracker (SAT) panels. The dimensions of the panels provided in the AEE are:

6.5m between rows of panels

1.6-1.8m to top of pile (panel pivot point)

500mm above ground when the panel is tilted to the maximum angle of 60%.

4m between panels when they are horizontal.

12 These parameters are important as they will impact the movement and management of livestock and the operation of agricultural machinery.

13 The farm is currently an irrigated dairy farm. The most probable pastoral enterprise once the solar farm is established will be sheep breeding or finishing as well as conserving or selling silage or baleage.

14 International literature reviewed shows that sheep are currently being farmed under solar panels but these are often in less intense farming programmes.

15 International literature reviewed suggests that for cropping or horticulture, crop yields are more sensitive to solar radiation reduction and typically the solar panels are higher off the ground and often have gaps between the panels.

16 The AEE or associated appendices did not contain detail on how the property, pastures, crops and livestock would be managed.

4.0 PASTORAL PRODUCTION

18 I agree that pastoral production could continue in conjunction with the solar panels. It is most likely that this would be sheep breeding or finishing alongside the conservation or removal of silage or baleage.

19 Information regarding the impact of solar panels on pasture growth is variable and is impacted by external factors such as the degree of shading and the climatic environment. However, it is likely SAT solar panels will reduce the impact of shading and could possibly provide a micro-climate to support growth.

20 Despite any direct impact of the solar panels on pasture growth, of potentially greater importance will be the ability to undertake good pastoral management practises under the solar panels. These could include:

- Pasture renewal, including spaying, drilling and cultivation if required.
- Weed Control.
- Feed Conservation, including raking, mowing, baling and carting.
- Fertilising to maintain soil fertility.
- Subdivision for grazing management.
- Irrigation systems.

It is likely that specialised vehicles, plant and management techniques will be required to optimise pastoral production under the solar panels. Customised machinery design and GPS technology should enable this.

21 Utilisation and control of pasture during high pasture growth periods of October to December will require extra livestock feed demand and/or mowing and removal of the surplus feed as silage, baleage or hay.

22 Soil compaction could impact pastoral production, although this will repair over time under a pastoral system. It is not known the extent of compaction that will take place during construction and will largely be determined by the size and type of machinery used. Ideally construction would take place during drier soil conditions.

23 I do not have experience or knowledge with regards to contaminants from solar panels and the impact this will have on pasture or crop production.

5.0 SHEEP FARMING

24 It is most likely that sheep would be farmed along with the conservation or removal of silage or baleage. This is supported by international literature, however much of the sheep farming in the international literature cited were more extensive low producing systems, often in arid environments with no irrigation.

25 Sheep farming is undertaken in a range of environments throughout New Zealand so it is highly probable sheep could be farmed successfully on the land class and environment at 150 Buckley's Road. A sheep farming programme could also be designed under a dryland system.

26 It is unlikely that sheep farming will be as profitable as the current dairy farm system.

27 The height of the solar panel above the ground when fully vertical could impact sheep movement if it is too low. I believe the 500mm stated in the AEE is too low for adult sheep to comfortably move under, although this will only be at the start and end of the day.

28 Consideration will need to be given to fencing subdivision that will enable good grazing management and livestock movement. This should be achievable with good planning and the use of temporary fencing.

29 Moving of sheep will be more difficult but should be achievable with the correct fencing.

30 Renewal and maintenance of pasture as well as weed control will be required to optimise pasture and livestock production.

31 I am unable to comment on the likelihood of heavy metal contamination on sheep grazing under the solar panels and the impact this would have on

testing at meat processing, although this matter has been addressed in other evidence.

5.0 VEHICLE AND MACHINARY OPERATION

32 To maintain pasture and livestock production it is probable that larger farm vehicles and machinery will need to access and work within the solar farm for:

- Pasture renewal, including spaying, drilling and cultivation.
- Weed Control.
- Feed Conservation, including raking, mowing, baling and carting.
- Fertilising to maintain soil fertility.

33 The height of the panel above the ground of 500mm when tilted to the maximum angle of 60% could impact agricultural work under the solar panels.

34 There will need to be sufficient turning area at the end of the rows of solar panels to enable the turning of vehicles and machinery.

35 The drive shaft shown in figure 1 will impede the movement of vehicles down the rows between the panels.

36 It is probable that specialised, custom designed vehicles and machinery will be required to undertake agricultural activity within the solar farm.

Figure 1: Drive shaft across rows could impede vehicle movements (Taken from Appendix 16.

6.0 IRRIGATION

37 It would be possible to farm the property without irrigation. However, the potential productivity would be significantly lower than if it was irrigated.

38 The current centre pivot irrigation will not be suitable for the solar farm. A new irrigation system would need to be designed and installed.

7.0 REVERSE SENSITIVITY

39 It is unclear what farm activity on neighbouring farms would cause reverse sensitivity to the proposed solar farm. The most likely causes of reverse sensitivity would be dust from cultivation and drilling or spray drift. However this is unlikely to be any different from normal agricultural practices and could be mitigated to some degree by tree plantings on the boundary.

8.0 CONCLUSION

40 Construction of large scale solar on farms in New Zealand is in its infancy and therefore the impacts on pastoral and/or cropping production is largely unknown. Massey University is currently undertaking a trial to better understand this.

41 Based on the type of solar panels being installed on the site, the grazing of sheep or lambs is the most probable farm system. Some cropping could also take place in conjunction with this, although it is probable investment into specialised tailor-made machinery would be required.

42 Regardless of the farm system, it is important that productivity is maintained on as much of the land as possible, with the greatest risk of lost productivity being close to the piles. Minimising the loss of productivity will require good design and appropriate infrastructure and management practises to farm under the solar panels.

43 Assuming that potential pasture production is not negatively impacted by the solar arrays and that the land could continue to support primary production, the potential productive capacity (as per the definition1) would be maintained.

[1] National Policy Statement for Highly Productive land 2022