IPC - Glanmire Action Group Submission 08.12.2023

EXECUTIVE SUMMARY:

The Glanmire Action Group prepared a comprehensive response to Elgin Energy's Environmental Impact Statement dated 14 December 2022.

Our prior submission, "*Objection to Proposal*" *14 December 2022*, included the following:-

1. Who the Glanmire Action Group are (page 5);

2. Integrity and Fair Dealing (page 5);

3. State Planning Authority Guiding Principles (page 6);

4. The Land (Page 7);

5. Background (Page 8-18);

6. The Glanmire Action Group's case (page 19-40); and

7. Glanmire Impact Study Claims – Glanmire Action Groups Response (page 41 -66).

The Glanmire Action Group ("AG") continues to rely upon our prior submissions, which we respectfully suggest, remain uncontested.

Integrity and Fair Dealing

The AG further confirms its desire for candour, consultation, and frankness.

The AG accepts that mere gratuitous criticism of a proponent, or anyone else is unhelpful, however, issues of credibility may arise, and may be important when assessing evidence.

The AG refers to its *Objections to Proposal: Integrity and Fair Dealing* on page 5 and now adds:-

1. The proponents soil testing and results;

2. The proponent's response to insurance issues.

The group suggests the responses are inconsistent with what one ought to expect from a responsible proponent, and the second response in particular could be regarded as an attempt to mislead.

On both land usage and insurance/ fire etc, the AG invited the DPE to contact our AG if it was left wondering on any issue. Regrettably, no such contact, dialogue or exchange of intelligence occurred, and so the DPE made, with respect, glaringly erroneous observations of fact (example "grazing and some cropping") and of conclusions (e.g. fire mitigation measures to satisfy insurance companies).

The group confirms its desire to continue to participate in this process as a 'model participant' and so continue to offer consultation and frankness to the DPE and the IPC. By illustration, when asked to assist the DPE as to possible changes to the process, the AG on invitation, forwarded a letter to a Mr Quinlivan dated 23 May 2022.

The fact is that the AG did not receive any acknowledgement or otherwise in relation to the thoughtful letter.

When the IPC asked the Proponent whether the insurance issue had arisen overseas, the response was, the commission may think, not helpful. Our group was not asked. Our group will, however, make enquiries and assist the Commission if it can.

At this stage our group expects the issue may have not arisen in England because, particularly those projects that Elgin have been involved in, seem to be restricted to small holdings in the middle of land surrounded by land owned by the same landowner. In addition, of course, the land is of low fire risk.

It must also be noted that following the lodgement of our objection to the proposal, six (6) months went by without hearing from the DPE. The writer thereafter contacted the DPE and was advised that the DPE had unilaterally extended the time for Elgin's Response to conduct further soils tests and respond to Public Submissions.

The DPE advised "not to worry" because we could make a submission upon those further soil results to the Commission. The Group suggests this response is indicative of the level of interest the DPE had in what our group, our witnesses, and indeed our experts had to say. The DPE, without our input, published its recommendation.

We will now proceed with our submissions.

SUBMISSIONS IN RESPONSE

In respect of the Department of Planning and Environment's (DPE's) Assessment Report, we respond as follows, adopting the numbered headings of the Assessment Report.

2. STRATEGIC CONTEXT

2.1 Sight & Surrounds

6. The site is comprised of largely cleared cropping and grazing lands Zone RU1 (Primary Production) as indicated by the DPE.

7. It is also accepted that the land is classified as soil and land capability Class 3 (high capability land) and 4.

8. The Glanmire Action Group ("AG"), and the local community know this land to be prime cultivation land, that is to say, cropping, with intermittent grazing between crops. The quality of the land is high.

9. The Glanmire/ Brewongle community is a tight-knit group of families and farmers who have a strong, multigenerational connection to the land. The three future residences proposed, referred to at paragraph 11, are all family members of existing landholders. All residences will be impacted.

2.3 Renewable Energy Context

10. The Glanmire Action Group is not opposed to the installation of solar plants nor any large scale renewable energy projects in principle, but rather opposes in the strongest terms, the imposition of such solar plants on prime cultivation land.

    The AG understands the principles to be applied by the DPE and IPC, but submits that a proper application of those principles ought to result in the Proponents proposal being rejected.

3 STATUTORY CONTEXT

11. The Action Group rely on their submissions at pages 59-64 of our original response to Elgin Energy Pty Ltd.'s EIS.

4 ENGAGEMENT

4.2 Summary of Advice from Government Agencies

12. In respect of the responses of the Government Agencies we comment as follows:-

Biodiversity Conservation Division:	Noted
Department of Primary Industries – Agriculture:	See Response Below at Paragraph 71.
Department's Water Group:	Noted

Fire and Rescue NSW:	See Response Below at Paragraph 89.
Heritage NSW:	Noted
Transgrid:	Noted
Essential Energy:	Noted
NSW Rural Fire Service:	See Response Below at Paragraph 87-96.
Transport for NSW:	Noted

4.3 Summary of Council's Submission

13. We note our comments in respect of the Voluntary Planning Agreement are set out below at paragraphs 108 – 110.

4.4.2 Summary of Public Submissions

14. It is noted that the issue of neighbours being unable to obtain public liability insurance is not explicitly stated in this section. This is despite 48 (of the 143) public submissions identifying this issue.

15. We invite you to view the cavalier response by the DPE to this critical issue raised by the AG in writing and orally.

16. It is also with some concern that the observations and assessments of Mr Richard Ivey in respect of the productivity of the land were not considered, or indeed rebutted. We therefore set out these two matters for the Independent Planning Commissions consideration.

Quality of the Land

17. The AG provided a comprehensive response to Elgin Energy's assessment of the quality of the subject land.

18. The relevant sections of the AG Response are set out from page 19, paragraphs 64 to 79.

19. The DPE's finding at paragraph 83 of "*grazing and some cropping*" is directly contrary to all of the evidence and so, is unsupported.

20. The AG continues to rely on those "objections to proposal" submissions.

21. The DPE reported "public response" provoked further soil testing. It must surely be, however, that our Mr Harbison's report, together with the Department of Agriculture's Classification of class 2 and 3 land, and the clear and uncontradicted evidence of the subject land being, for at least the last 70 years, utilised as cultivation land, contributed to the DPE requiring soil tests to be redone.

22. Though the AG was not told of the redoing of the soil tests, nor were they, or their Mr Harbison were invited to attend the soil testing, the results clearly discredited the proponent's earlier soil tests.

After 6 months we were finally advised the proponent had been given an extension of time to do the further tests. Our opportunity to respond before the DPE recommendation was published was mere days. But DPE advised us "not to worry" because we could make submissions to the commission. The group suggests this response is indicative of the DPE's level of interest in what our group, our experts, and our lay witnesses had to say.

An Important Reservation:

Mr Harbison, for the purpose of his reasoning "accepts" the Minesoils results see (paragraph 23 hereunder). Please note however, that he does this in a setting in which our AG was given no appropriate time to consider the reports of all other experts, or indeed speak directly with the experts in this matter so as to provide further comment/ criticism/ and/or statement in support.

We further note there has been no opportunity to consider Mr McMahon's observations, which indicate quite favourably, that the quality of the soil is to be considered BSAL.

Of course, if there was a mature and timely exchange between experts, any issue may have disappeared. However, the DPE totally prohibited dialogue between our Mr Harbison, and his colleague Dr McKenzie.

In any event, the results of the soil tests were closely aligned with Mr Harbison's initial report and the Department of Agriculture. The difference appears to have been as a consequence of a change to the classification methodology.

Of course, nothing changes the history of the land as highly productive cultivation land, a conclusion supported by Mr Harbison.

23. The AG's expert, Mr David Harbison in his further report dated 24 November 2023, accepts the land classification having regard to the updated soil tests and comments of Dr McKenzie. Nevertheless, this land remains prime cultivation land, that is to say high quality cropping land.

Again, Mr Harbison's view stands uncontradicted.

24. We note Mr Harbison's comments with respect to the quality of land. In particular, Mr Harbison indicates;

> "*The lands productivity is not limited by the [LSC] classification*".
>
> *"Within the Bathurst LGA, 93% of agricultural land is used for grazing, with a further 6% used for cropping. This site can be used for both. From a production perspective, the district average stocking rate is that of 8 DSE/ha (Behrendt & Eppleston, 2011). This site, with testament to earlier reports was estimated to have a productivity stocking rate of 13 DSE/ha (Tremain Ivey Advisory, 2021) and 16 DSE/ha (Minesoils,*

2023). These figures are 60% to 100% higher than District Practice and reflect just how productive this site is, irrespective of LSC".[1]

25. We note in addition to the above, Mr Mark Ryan (local farmer) and former farmer of the subject land, provided a statement in the Action Groups earlier submissions indicating his high regard for the high productivity of the land.

26. Mr Ryan has since provided an updated statement which is annexed to this submission.

27. We note in particular Mr Ryans comments:

> "*I note that in that report [DPE Assessment Report] the subject land is described as "occasional cropping land", I disagree with this statement entirely.*
>
> *I used the property for the purpose of grain production over the years that I leased the land from the 1980's to early 2000's, and for the most part, it has been used for cropping ever since. The description of the land as "occasional cropping land" is in direct contradiction to my personal experience while I occupied the land. Further, it is a direct contradiction of my observations of land in the intervening years between the end of my occupancy of the land and now.*
>
> *If you are to look at the land as at the date of this statement, there appears to be the remains of a crop and insofar as there is grazing occurring, there appears to be grazing on leftovers and stubble. I confirm the remarks in my earlier statement that this land is equal to any land I have farmed in the greater tablelands region and that this land is regarded as the most productive land in the region*".[2]

We also refer to our most informative video documentary lodged with our objections to proposal.

We remind the reader of the statements by so many residents as to the use of the land for grain production for at least the last 70 years. All of this was lodged with our "objections to proposal".

28. We also note at pages 30 and 31 of the Action Groups response to the EIS the Action Group relied upon the expert opinion of Mr Richard Ivey, Agronomist, who assessed the productivity of the land.

29. Mr Ivey's observations and calculations have not been addressed by either Elgin Energy Pty Ltd, or the Department of Environment & Planning. That is to say that the positive economic impact of the farm in its current production (i.e. cropping), has not been compared against the potential economic benefit of a solar plant.

We submit the solar plant represents a net loss to the community having regard to the expert opinion of Mr Richard Ivey set out below, in addition to the expert opinion of Ms Erika Dawson at paragraph 108 below.

[1] Report of David Harbison dated 24 November 2023 page 3.
[2] Statement of Mark Ryan dated 29 November 2023.

30. We reiterate the observations or Mr Ivey in respect of the land, which is as follows:-

    (a) Tremain & Ivey Advisory agree with the assessment of the agricultural potential of the proposed solar project as assessed my Mr David Harbison. The area is "*capable of supporting intensive mixed crop and livestock farming system. Such a farming system is typical of that utilised by farm businesses on the lands of similar agricultural potential surrounding the solar project area and generally within the Bathurst region*";

    (b) The operating expenses are estimated as being $126,664.00;

    (c) The net cash surplus/deficit of the productive land is estimated to be $102,050.00;

    (d) Due to the combination of climate and soils, New South Wales far west generally has significantly lower agricultural production potential to that of the proposed solar plant site. The New South Wales far west has a number of renewable energy projects for this reason;

    (e) It is concluded that the annual gross agricultural income of the proposed solar project area is that of $228,714.00 compared to the $4,512.00 for land of the same size from the NSW far west and the gross income for 186 ha in NSW far west is less than 2% of the solar project area.[3]

    It is therefore concluded by Mr Ivey that the loss of this income turnover, coupled with the loss of production, is a significant loss to the immediate Bathurst region.

31. On this basis, the proposed solar plant inappropriately removes high quality cultivation land from the Bathurst community.

Public Liability Insurance Issues

32. It is noted with some concern that the DPE has failed entirely to address the issue of public liability insurance. This is despite 48 of the 147 public submissions citing public liability insurance as an issue. It is also despite the AG's "Objection to Proposal", paragraphs 119 - 146.

33. Accordingly, for the Independent Planning Commission (IPC)'s benefit, we set out the issue below, which we note was communicated in our initial response to Elgin Energy's Environmental Impact Statement:

    (a) We submit the conflict with surrounding land use by the introduction of estimated $152,000,000 asset, at or near, the surrounding land, renders the surrounding landowner **unable**, in reality, to obtain public liability insurance to protect him/her/it at all, or sufficiently, thus resulting in effectively putting the surrounding land use out of business.

    (b) In a rural enterprise, particularly a rural enterprise that includes harvesting activities, the risk of fire is real. We note the expert report of Erika Dawson dated 7 December 2022 which states:

[3] Report of Richard Ivey dated 19 January 2021 page 4 – 5.

> "*In my opinion the solar farm site and its surrounds should be classified as Category 3 Vegetation as it comprises grasslands that if not maintained in a major scale (for the purpose of considering bushfire hazard) and cropping observed as being intermittently carried out and cannot be reasonably excluded from bushfire land on that basis"*.
>
> "*Grasses are fuels that are capable of being ignited by very small embers or particles when the moisture content is below 6%. In the conditions fires can be ignited by activities that would otherwise not cause ignition, such as "glowing carbon particles from defective exhausts… grinding operations and metal striking rock during the operation of slashers or bulldozers.*".[4]

(c) We also note the report of Graham Swain dated 5 December 2022 where he indicates:

> "*Fire has the potential to commence on the land surrounding the site on which approval is being sought to construct the Glanmire Solar Farm. Ignition sources include farm machinery, welding, cutting, grinding, vehicles, cigarettes, and lightening. Catastrophic fire events can result in large scale bush/grassland fires (including standing crops) spreading across the land for many kilometres.*"
>
> "*There is no reason that a similar fire event will not occur in the landscape surrounding the solar farm and cause damage to the solar arrays and associated equipment. The predominant fire paths likely to impact the solar farm site is from the northwest, west, and southwest (refer to figure 1)*".

He further observes in respect of spotting distance:-

> "*Grassland/crop fire produce fast moving, hot fires that fire off burning embers that can travel kilometres ahead of the fire front. The spotting distance depends on windspeed*".[5]

Note: In respect of Mr Swain's observations, we advise that all of those ignition sources quoted by Mr Swain, with the exception of lightning strikes, can give rise to a potential common law action for negligence against the farmer/ occupier.

The writer has been personally involved in common law actions brought by farmers whose properties were being burnt out as a result of each of the types of ignition sources, and all have been successful.

(d) The pursuit of rural activities in a setting where the prospect of fire is real and the liability for damage is so extensive, the health and wellbeing impact upon the farmer and his/her family is likely to be most significant indeed.

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[4] Report of Erika Dawson dated 13 December 2022 page 4 [29].
[5] Report of Graham Swain dated 5 December 2022 page 1.

(e) We invite the IPC to consider the basic facts as follows:

(i) You will note that the two north/south running boundaries are in excess of 2000 metres in length. The east/west boundaries are in excess of 800 metres;

(ii) The landowners on the western boundary and indeed on the southern boundary are rural producers, and the one on the western boundary, places emphasis on grain production;

(iii) The prevailing summer wind is from the west/ northwest/ southwest;

(iv) Harvesting occurs in the heat of summer, normally at a time of high fire danger;

(v) The proposal is to construct, in this rural and in particular grain producing location, a solar plant expressed to be $153,000,000 and expressed to generate 60 megawatts of power.

(f) We ask the IPC to ask itself "If I was an insurance company would I agree to the western neighbour increasing his public liability from $20,000,000 the standard cover for farmers to $153,000,000 or more (to cover not only the risk, but the unknown potential claims for loss and cleanup etc).

(g) The answer must surely be:

(i) As a prospective insurer I am entitled to know the increased value of the adjoining structure; and

(ii) I would not insure the risk, or my premium would be very high indeed.

(h) We note the expert advice of Mr Hayden Fielder, Barrister in his memorandum where he observes that:

> "*An adjoining owner or neighbour of a solar farm would be under a duty of disclosure to inform their insurer about the existence of the neighbouring solar farm. Section 21 of the Insurance Contracts Act, 1984 (Cth) requires disclosure of any matter which may be relevant to an insurer's decision to provide cover, and if so, on what terms.*
>
> *The existence of a $200,000,000 solar farm adjoining an insured's property would require disclosure to an insurer and would most likely result in the insurer increasing its premiums an exorbitant amount or refusing to provide public liability cover at all*".[6]

(i) These questions were asked in first instance of independent insurance broker, Mr Craig Mison in his earlier report received in early 2021 and

[6] Advice of Mr Hayden Fielder dated 4 December 2023 page 1.

provided long ago to the proponent and the DPE, who confirmed the above. That is to say:

(i) An insurance contract is a contract of the upmost good faith. A proposed insured must disclose to a proposed insurer the presence of a solar plant;

(ii) One would be unlikely to locate an insurance company who would take on the public liability risk;

(iii) If one did locate a willing insurance company, the premium would be prohibitively expensive.

34. To assist the IPC through the provision of further independent expert opinion, the AG retained Mr Levi Thurston, of MLT Insurance Brokers Pty Ltd to provide his further expert opinion. We note Mr Thurston is a local insurance broker familiar with the area.

35. Mr Thurston concludes that:

> "*For the properties that neighbour the potential solar farm it would be fair and reasonable for broad form liability with excess layers to be taken out considering the contingent liability exposure. When the above losses are considered (supply chain interruptions, business interruptions, loss of assets, connection and reestablishment fees, environmental and contamination fees) are considered, the neighbouring crop farms would need to insure against a potential liability of $200,000,000 to mitigate risk and future claims*".[7]

36. Mr Thurston indicates the indicative premium for such insurance:

> "*May commence or be in excess of $200,000 plus government charges, underwriting fees and broker's fees*".
>
> He concludes "*This insurance would be cost prohibitive to the continued running of an adjoining cropping farm, without considering or taking into account their outgoings and expenditures*".[8]

37. To date, and in the two years the proponent has had notice of this issue, it has produced no report, and certainly no report to put in issue any of the matters responsibly raised by the AG.

38. The only response provided by Elgin Energy were unsubstantiated statements said to come from the National Insurance Brokers Association and the Australian Insurance Council. These representations by Elgin Energy were outlined in their Submissions Report dated September 2023. They indicate as follows:

> "*The Australian Insurance Council was consulted prior to EIS exhibition and again after, on this issue. They have confirmed there is no further change to their initial statement, which was, they are not aware of any position of escalated risk focus being placed on neighbouring properties solely as a result of solar facilities being established.*

[7] Report of Levi Thurston page 6.
[8] Report of Levi Thurston page 6.

Communication with the National Insurance Brokers Association (NIBA) resulted in a similar comment. They advise there is no evidence of increasing insurance premiums on sites adjacent to solar farms".

No document from either the Australian Insurance Council or the National Insurance Brokers Association substantiating this comments have been provided.

An overview is that the proponent was suggesting to the DPE that the neighbour, seeking to insure for $200,000,000.00 rather than $20,000,000.00 would experience no difference in premiums. Is this to be regarded as a bona fide attempt by the proponent to help the DPE? Or, as an attempt to mislead?

39. Our Mr Boshier wrote to, and telephoned, the Insurance Council of Australia to seek confirmation or otherwise, of the alleged conversation.

40. Our Mr Boshier was advised, via phone that the council is not in a position to and does not give insurance advice, or policies, or otherwise. At best, it would refer an enquirer to a broker. The writer nevertheless wrote to the both the Australian Insurance Council and NIBA on 23 November 2023 and 9 November 2023.[9]

41. On 16 November 2023, our email to NIBA was acknowledged and it was indicated that their CEO Mr Phillip Kewin would be in touch.[10]

42. On 20 November 2023 we were advised by Mr Nick Thomas, partner at Clayton Utz that they were instructed to act on behalf of the National Insurance Brokers Association and that any further communication should be directed to their office.[11]

43. On or about 22 November 2023 Mr Boshier of Hennessy Dowd Lawyers spoke to Mr Thomas in respect of the matter indicating the closing date for written submissions to the IPC being 8 December 2023, and it would be appreciated if the NIBA's position in respect of this advice could be confirmed.

    <u>As at the date of writing no such response has been received</u>.

44. Despite confirmation of receipt on 24 November 2023, the Australian Insurance Council have also not provided any further comment.

45. Therefore, the representations of Elgin Energy in respect of both the Australian Insurance Council, and the National Insurance Brokers Association are not substantiated and should be disregarded, and certainly not considered determinative on the issue.

<u>Insurance Implications</u>

46. We submit that this issue puts at risk neighbouring rural activity, most certainly grain production, and likely in all other respects. Further, the prospect of obtaining a contractor, who has relevant insurance cover would we suggest, be

[9] Letter to Australian Insurance Council dated 23 November 2023, and Letter to the National Insurance Brokers Association of Australia dated 9 November 2023.
[10] Email of Heidi Shmidt dated 16 November 2023.
[11] Email of Nick Thomas, Solicitor, Clayton Utz dated 20 November 2023.

negligible, and so again, the prospect of obtaining a contractor would be extinguished.

47. Even if one found a landowner so irresponsible as to put his rural property at risk by not having insurance, or adequate insurance, the position is that if in fact the landowner happens to be farming on a property where other family members, for example, have a proprietary interest and/or there is a relationship of trustee and beneficiary between the operator and proprietor, it would be reprehensible, and we would suggest illegal for the operation to continue.

48. We note the advice of Mr Hayden Fielder in respect of this issue where he states:

> "*If the adjoining land is owned by a trustee, which is not uncommon, the second option (running the risk without insurance) may not be viable at all. This is because trustees have a duty to ensure that the property they hold is adequately protected otherwise the beneficiaries are at risk. Accordingly, a trustee owner would be forced into a far more precarious situation by an adjoining solar farm and would likely be required to seek judicial advice so as to whether it is in the beneficiaries' best interest to either:*
>
> *(1) Insure the land at exorbitant cost (and probably cause a net loss for the farming enterprise); or*
>
> *(2) Sell the farm (presumably at a fire sale price because there would be few, if any, willing buyers on the market who would buy land which cannot be viably insured)*".[12]

49. <u>It is respectfully submitted that if this issue is not properly addressed by the IPC, and the solar farm is approved without this issue being addressed, and such a fire from a neighbouring farm cause damage to the solar plant thus incurring liability, it is open to the neighbours of adjoining properties to consider litigation against the DPE and IPC.</u>

50. <u>The basis for such a claim would hinge on the IPC and the DPE owing a duty of care to the local community in assessing the risk factors such as public liability insurance, identifying such risk factor, and subsequently failing to adequately respond to it - leading to breach.</u>

51. <u>The Glanmire Action Group, with respect, implores the IPC to carefully consider the implications of this issue.</u>

<u>Indemnity</u>

52. We note the comments of Mr Levi Thurston speaking, with respect, outside his area of expertise, where he supports recommendation 22 of Elgin Energy's Submission Report where it states:

> "*Recommendation 22: Project applicants in the renewable energy sector should cover any additional public liability insurance costs incurred by neighbouring landholders as a result of proximity and risks to new energy facilities. In cases where suitable insurance cannot be*

[12] Advice of Mr Hayden Fielder dated 4 December 2023 page 2 [11].

> *obtained, the applicant should indemnify the neighbour for reasonable risk in relation to typical public liability cover.*"

53. Unfortunately, the issue of the potential resolution of an indemnity is problematic.

54. We note the observations of Mr Hayden Fielder where he advises:

> "*I foresee an issue with that course, namely, there will be successors in title to both the solar farmland and the adjoining land. It is well established under the common law that positive covenants do not run with the land and therefore will not bind successors in title. Accordingly, it is unclear how any perpetual indemnity mechanism would be put in place*".[13]

55. In other words, an indemnity would not protect the landholder in the event that the solar farm owners change hands, or the neighbouring property is sold or transferred.

56. We therefore submit that this is a significant issue that must be addressed by the Department of Planning and Environment/ or the Independent Planning Commission, **prior** to the approval of this project, or indeed any further projects located adjacent to any cropping/ farming operations.

5. ASSESSMENT

57. At paragraph 5 the DPE indicate they have undertaken a *comprehensive* assessment of the merits of the project including "*detailed discussion of the key assessment issues for the project*".

58. We respectfully disagree as to the comprehensiveness of this assessment for the reasons set out below.

5.1 Energy Transition

59. At paragraph 57 the DPE indicates:

> "*The project aligns with a range of national and state policies, which identify the need to diversify the energy generation mix and reduce the carbon emissions*".

60. We submit the proposed solar plant does not align with the Bathurst Regional Local Environment Plan, the Plan for Bushfire Protection 2019, or the Environment Planning & Assessment Regulation 2000. The reasons are set out below, in particular at paragraph 62 – 67, and 90.

61. It is also submitted that the project does not align with the policy imperatives of protecting prime cultivation land, agricultural enterprise, the maintenance of the scenic quality of rural areas, and food security.

[13] Advice of Mr Hayden Fielder dated 4 December 2023 page 2 [12].

5.2.1 Provisions of the Bathurst LEP

62. While the imposition of a Solar Plant is 'permissible with consent' in the area, in order for the DPE to conclude that the project does not conflict with the *Bathurst Regional Local Environment Plan 2014* it must show that it does not conflict with the objectives of the RU1 Primary Production Zone.

63. Relevant objectives include:

(a) To encourage sustainable primary industry production by maintaining an enhanced and a natural resource based;

(b) To encourage diversity in primary industry enterprises and systems appropriate for the area;

(c) To minimise the fragmentation and alienation of resource lands;

(d) To minimise conflict between land uses within this zone and land uses within adjoining zones;

(e) To maintain the rural and scenic character of the land;

(f) To provide for a range of compatible land uses that are in keeping with the rural character of the locality, do not unnecessarily convert rural land resources to non-agricultural land uses, minimise impacts on the environmental qualities of the land and avoid land use conflicts.

64. Having regard to these factors Mr Anthony Daintith, Town Planner in his report dated 6 December 2023, made the following conclusions:

"*It can be concluded that the proposed solar plant:*

(a) Does not encourage sustainable primary industry production (there will be a loss of 140 hectares of prime Class 3 and 4 agricultural land following further studies which indicates that there will be a loss of 39.5 hectares). The land has historically been cropped with a variety of grain crops along with grazing of livestock (regardless of the land classification, the loss of productive agricultural land remains as a result of the proposed solar farm).

(b) Will lead to conflict between non-compatible land uses.

(c) Is not a compatible land use that is in keeping with the rural and scenic character of the locality.

(d) It will unnecessarily convert rural land resources to non-agricultural land uses.

(e) The scenic quality to the "gateway" entrance to Bathurst will be negatively impacted by the construction of the solar farm. The entry is characterised by open farming land and then the Bathurst urban area with the famous Mount Panorama in the background that provides an ideal backdrop to the landscape that is synonymous with Bathurst.

(f) The picturesque and productive locality is very much a part of Bathurst's beauty and heritage and deserves protection.

(g) The claim in the EIS that there would actually be some improvement to the landscape character in the vicinity of the site due to the revegetation and planting of trees on the site is considered offensive to the large number of surrounding landowners.

(h) It will take a significant period of time for a landscape buffer to take any effect".[14]

65. Despite the above, the DPE conclude, at paragraph 72:-

> "*that the project would not significantly conflict with any of the existing or approved residential developments or agricultural land uses on the surrounding lots, given:*
>
> - *These lots all have a minimum lot size of 100 hectares in accordance with the Bathurst LEP;*
> - *the Bathurst Regional Development Control Plan 2014 requires a boundary set back at 50 metres for all residential developments on lots greater than 20 hectares;*
> - *The project infrastructure would be set back from the boundary of the site (to allow for vegetation screening asset protection zones);*
> - *There would be negligible potential for noise and/or air quality impacts on surrounding lands due to the set back distances, and a large stands of vegetation that would be retained and planted around the site.*"

66. The DPE's conclusion is respectfully disputed having regard to Mr Daintith's expert opinion above.

67. In addition to Mr Daintith's conclusions, the expert opinion of Ms Erika Dawson, Fire Expert and Town Planner observes that "*The assessment has not adequately considered impact from bushfire and compliance with Planning for Bush Fire Protection 2019… in order to reach the above conclusions".*[15]

68. In Ms Dawson's prior report, she observed that Elgin Energy had failed to undertake a formal Bush Fire Assessment Report prepared in accordance with the *Planning for Bush Fire Protection 2019*, nor did they undertake a specific site assessment of the bush fire attack level.

69. Furthermore, the assessment had "*not considered agricultural activities on adjacent lands as a potential bushfire hazard impacting the development*".[16]

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[14] Report of Anthony Daintith dated 6 December 2023 page 6.
[15] Report of Erika Dawson (DPE Assessment Report) dated 7 December 2023 page 3 [16-17].
[16] Report of Erika Dawson dated 13 December 2022 page 2 [16-17].

5.2.3 **Potential Loss of Agricultural Land**

70. At paragraph 83 the DPE indicate that the development footprint area of 159 hectares has been, "*previously cleared and used for agricultural activities including grazing and some cropping*".

71. We note the description of land used by the Department of Planning and Environment has been inconsistent. We note that at paragraph 6 of the DPE's Assessment Report, they describe the land as "*cleared cropping and grazing land*".

72. It is the view of the Glanmire Action Group, and the multigenerational experience of local landowners, that this land is prime cultivation land. That is to say, land primarily used for cropping with intermittent grazing for the purposes of clearing stubble and weeds.

    It is a mis-categorisation to describe the land as "*grazing land with some cropping*".

73. It is not disputed by Elgin Energy Pty Ltd, the DPE or the Glanmire Action Group that this land has been used for and is suitable for cropping. The land is therefore of high productive value.

74. The DPE's misdescription of the land use is against all of the evidence presented. The misdescription of the land use simply caused the DPE to then fall into further error in its assessment.

75. We once again refer the commission to the statement of Mr Mark Ryan annexed to this submission.

Opinion of Dr David McKenize

76. The AG is grateful to the DPE for seeking the independent expert opinion of Dr David McKenzie to review Elgin Energy's SLR soil assessment.

77. It is clear from Dr David McKenzie's letter dated 26 September 2023, that the prior SLR report was wholly inadequate, and indeed, we suggest, misleading.

78. The AG were pleased that following the further preparation of the Minesoils report that our expert, Mr David Harbison's conclusions that large portions of land were Class 3 were confirmed.

79. Nevertheless, the sole reliance upon the land classification methodology, as opposed to overall productivity of the land is inadequate. This land is highly productive cultivation land as set out below in the comments of Mr David Harbison in his updated report.

80. The DPE at paragraph 89 indicate:-

> "*although the project would include disturbance to a small area of class 3 land, the inherent agricultural capability of the land would not be affected given the relatively low scale of the development and Elgin's commitment to return the land back to existing levels of agricultural capability following decommissioning*".

81. It is respectfully suggested that (1) the land will be affected by the development on a permanent basis, (2) that there will be material impacts on the agricultural capability of the land following decommissioning, and (3) the requirement to return the development footprint to existing land and soil capability is not practicable.

Quality of Land

82. In respect of the impact of Class 3 land we note the observations of Ms Erika Dawson where she observes:-

> "*the area of class 3 land directly impacted by the development has been quantified as 40.6 hectares. The area of class 3 land equates to 25.55% of the area impacted by the development. This is not a small area, either in hectares of as a portion of the impact area. An area of 40 hectares equates to nearly half of the minimum lot size in the RU1 zone*".
>
> "*it should be noted that table 6 in the DPE report has an error in the left hand column of the first row. The loss of class 3 land within the development footprint should be the full 40.6 hectares and 25.5 percent as the riparian corridor rehabilitation works to be carried out form part of the development and will remain lost in perpetuity*".[17]

83. In respect of the land's productivity, we note the expert opinion of Mr David Harbison who provided a systematic review of the Minesoils in his report dated 24 November 2023.

84. In that report Mr Harbison indicates:-

> "*whilst the revised scheme has provided slightly different LSC class ratings, provided in Minesoils report as:-*
>
> *(a) 40.6 hectares, class 3, high capability land*
> *(b) 132.9 hectares, class 4, moderate capability land*
> *(c) 12.6 hectares, class 5, moderate-low capability land*
>
> *the sites productivity potential is not limited by this classification. Twenty-five percent of the proposed development footprint in class 3 land the Department of Planning and Environment, Glanmire Solar Farm November 2023 and accordance to the guidelines for large scale solar, should be avoided"*.[18]

85. Taking a broader view of the significance of this prime cultivation land in the Bathurst area, Mr Harbison went on to observe that:-

> "*within the Bathurst LGA, 93 percent of agricultural land is used for grazing, with a further 6 percent used for cropping. This site can be used for both. From a production perspective, the district average stocking range is approximately 8DSE per hectare (Behrendt and Eppleston, to any 11). This site, with testament to earlier reports was estimated to have productive stocking rate of 13DSE per hectare (Tremain Ivey Advisory, 2021) and 16 DSE per hectare (Minesoils,*

[17] Report of Erika Dawson (DPE Assessment Report) dated 7 December 2023 page 3 [19-20].
[18] Report of David Harbison dated 24 November 2023 page 3 [2].

> *2023) these figures are 60 to 100 percent higher than district practice and reflect just how productive the site is irrespective of LSC*".[19]

86. It is submitted that this land is prime cultivation land, and it is entirely inappropriate to take high quality land such as this out of production for a period of a minimum 40 to 50 years, with the significant potential for a further period of time.

Prospects of Further Land Degradation

87. In respect of Elgin Energy's capacity to return the land to its existing levels of agricultural capability and to minimally affect the land in the course of development, Mr Harbison's comments:-

> "*Understanding the future risk of soil dispersion and soil erosion is critical to such a site. With known soil sodicity issues at depth from many sources, disturbing that soil has significant environment risk. Dr David McKenzie in his letters to the Department of Planning and Environment agrees on the importance of soil dispersion management at the Glanmire site. There can be no guarantee that when the proposed trenches are to be dug that mixing of soil layers will not occur.*
>
> *As a consequence, it would be assumed that there would be some sodic material placed at a different level in the soil profile to that where it naturally occurs at the moment. Further, water infiltration in the trenched areas will be altered. Soil bulk density will be changed. This could lead to faster, or slower, infiltration, with consequences of faster, or slower, water movement. Faster would lead to potential greater dispersion and erosive force within the soil profile, slower could mean greater over land flow as less infiltrates. Both can have environmental consequences for the immediate site, and potentially downstream where the water flows. Either outcome has consequential erosion issues or will degrade any LSC further, downing future land use at a lower capability than currently exists*".[20]

88. Additionally, the DPE has been advised by Elgin Energy that there is the potential for grazing to occur under the solar panels as a grazing management method of ensuring there is not overgrown grass and weeds which pose an environmental and relevantly a fire risk.[21]

89. We note Mr Harbison's expert opinion in respect of this issue who notes that:-

> "*grazing management is key to maintaining ground cover, preventing bare ground and erosion. Not at any time in my experience can grazing management be conducted on one "paddock" of 159 hectares without detrimental effects on some areas. There has been no indication in the proposal that paddock fences of manageable land areas will be reinstated post construction, and the development will see the current water sources (dams) fill in. How will stock be watered and better managed from overgrazing/impacting some areas while not grazing*

[19] Report of David Harbison dated 24 November 2023 page 3 [3].
[20] Report of David Harbison dated 24 November 2023 page 3 [5].
[21] NGH Report Prepared for Elgin Energy 'Submissions Report, Glanmire Solar Farm' September 2023 pages xxv, 19, and 186.

> *others? Two outcomes of such are erosion and increase fire risk/fuel load*".[22]

Failure to Consider Alternate Designs or Locations in Order to Avoid Class 3 Land

90. At no point within the Department of Planning and Environment's report, and certainly not at Section 5.2.3 of the Assessment Report, has the Department of Planning and Environment complied with Clause 7(1)(c) of the *Environmental Planning and Assessment Regulations 2000* as required in the issued SEARs. Under this Clause the Applicant must consider alternate designs or locations in order to avoid class 3 land.[23]

91. At paragraph 23 of the report of Ms Erika Dawson's latest report, she observes the New South Wales Department of Primary Industries 2017 document Prime Fact: Agricultural Land use Mapping Resources in New South Wales – Users Guide, NSW DPI, page 3 which states:-

> "*the LSC assessment scheme is suitable for broad scale assessment of land capability, particularly for assessment of lower intensity, dry land agricultural land use. LSC maps provide a guide to the capability of the land and the broad identification of soil management problems.*
>
> *It is less applicable for high intensity land used for non-soil reliant industries*".[24]

92. Ms Dawson observes that:-

> "*the guide states that the methodology used by the mapping that includes both bio-physical criteria and economic and social data are preferred to be used due to the combination of bio-physical, economic, and social impacts at the State, Regional and Local level. It is important that some agricultural industries have no or little reliance on purely bio-physical factors.*
>
> *In this regard it is considered flawed to limit consideration to LSC class 3 land in consideration of impact of agricultural land.*
>
> *It is not clear how the Department can conclude that "the inherent agricultural capability of the land would not be affected" by the development. The land would be removed from production for a period of at least 50 years. Given the recommended conditions enable replacement of infrastructure there is nothing to suggest the solar farm could not feasibly remain on the site for far longer and thus be permanently lost to agricultural land users. In any case, 50 years is a substantial period for the land to be removed from agricultural land use*".[25]

Ensuring Rehabilitation

93. Finally, in respect of the practicalities of ensuring rehabilitation does occur following decommissioning of the project by Elgin Energy, Ms Dawson advises

[22] Report of David Harbison dated 24 November 2023 page 4 [8].
[23] Report of Erika Dawson (DPE Assessment Report) dated 7 December 2023 page 3 [23].
[24] Report of Erika Dawson (DPE Assessment Report) dated 7 December 2023 page 3 [24].
[25] Report of Erika Dawson (DPE Assessment Report) dated 7 December 2023 page 4 [26].

that whilst there is a requirement for rehabilitation of the site in recommended conditioning of consent (No.C34), she states:-

> "*concern is raised as to reality of decommissioning and return to site to existing levels of agricultural capability over a period of 50 years. It is recommended that a security deposit be required from the developer, like required for mining developments, to cover the full rehabilitation costs of the development site to ensure that it is rehabilitated at the end of its life*".[26]

94. The Action Group remains firm in its view that the proposed solar plant be not placed on this site. Nevertheless, in the event the Independent Planning Commission form the, with respect, erroneous view that it was appropriate, the Action Group would seek to have a security deposit a condition of the development consent.

5.3 VISUAL

5.3.3 Impacts on Landscape Character

95. The DPE indicate that the views of the project for vehicles travelling both directions along the Great Western Highway is largely shielded due to the 300m setback of the Northern frontage of the highway, the existing vegetation, and supplementing plants on the Northern frontage of the development footprint.

They also indicate the views would be further reduced by its supplementary plantings on the Western boundaries.

96. They also go on to conclude that although impacts along Brewongle Lane, the local road immediately adjacent to the site, are initially predicted to be "moderate", but would be reduced to "low" following the implementation of proposed vegetation screening along the Eastern boundary of the site.[27]

97. The DPE rely heavily upon vegetative screening to mitigate the visual impacts of the development as a sufficient mitigation measure to the visual impact of the project.

98. However, at paragraph 34 of Ms Erica Dawson's report, she cites the case of *Super Studio v. Waverley Council* [2004] NSWLEC 91 paragraph 5 to 7 where it states:

> "*The second principle is that where proposed landscaping is the main safeguard against overlooking it should be given minor weight. The effectiveness of landscaping as a privacy screen depends on the continued maintenance, good climatic conditions, and good luck. While it is theoretically possible for a Council to compel and applicant to maintain landscaping to achieve the height and density proposed in the application, in practice this rarely happens.*"

Ms Dawson concludes:

> "*Whilst in this instance overlooking is not the issue, the effectiveness of landscaping to mitigate visual impacts remains consistent, in that it is*

[26] Report of Erika Dawson (DPE Assessment Report) dated 7 December 2023 page 4 [27].
[27] Department of Planning and Environment Assessment Report November 2023 page 19 [101-103].

> *not an effective safeguard. Additionally, the proposed vegetative screening conflicts with the limited bushfire protection measures proposed.*" [28]

99. In addition to this obvious concern, we note the observations of Mr Anthony Daintith in respect of the visual impact generally who concludes:-

> "*the scenic quality of the surrounding areas is to be diminished to such an extent as to adversely affect land values.*
>
> *It is clear and obvious to any scenic observer that the proposed use of the land is totally incompatible with surrounds. It is a huge waste of land and quite out of place*.
>
> *Any landscaping would take many years to establish and create any form of acceptable barrier*".[29]

100. We further note the reports of Mr Andrew Bickford, Real Estate Agent and Mr Michael Lund, Real Estate Agent and Stock and Station Agent which have been provided in our prior response. Both conclude that the quality of the land is exceptionally high for the area and that the imposition of a solar plant would "*have a significant negative impact on land prices in the surrounding area*".[30]

101. We note that in addition to Ms Dawon's comments, Mr Anthony Daintith reach the same conclusions noting at Section 2.5.1 of Elgin Energy's EIS that:-

> "*the project site was selected through a screening process based on generation capacity, connection capacity, desktop environmental due diligence studies, high level ground truthing and landowner interest*".

102. He observes both in the EIS and indeed the Department of Planning and Environment's response that, "*there is nothing in this Section that indicates that alternative sites with less impact on agricultural and visual amenity were properly considered*".

5.3.5 Glint and Glare

103. Glanmire Action Group has significant concerns in respect of the imposition on residences in relation to glint and glare, particularly for the residence identified with 100 minutes of glare at sunrise. Once again Elgin Energy Pty Ltd and the DPE rely heavily on proposed screening vegetation as a viable solution.

    We refer to our comments above in respect of the inadequacy of these measures.

5.3.7 Cumulative Impact

104. The DPE concludes, having regard to, "*the limited developments within the area, and proposed vegetation screening*" that the cumulative visual impact of the Glanmire solar farm would be minor.

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[28] Report of Erika Dawson (DPE Assessment Report) dated 7 December 2023 page 5 [33-36].
[29] Report of Anthony Daintith dated 6 December 2023 page 8.
[30] Letter of Mr Andrew Bickford, Branch Manager Elders Rural Services Australia Limited, Bathurst dated 2 July 2021.

105. Having regard to the impact on the scenic quality of the land, the inadequacy of vegetation screening (and indeed associated fire risk), and the decrease in land values, it is submitted the cumulative impacts in respect of visual amenity are too high to justify the imposition of a solar plant at this location.

106. It is respectfully suggested that the conclusion of the DPE that the "*cumulative visual impacts for the Glanmire Solar Farm would be minor*" is incorrect.

OTHER ISSUES (TABLE 8)

Bushfire Risk (Page 29)

107. We note that the AG comprehensively set out our concerns in respect of Bushfire Risk on pages 61 – 64 in our Submission in Response to the EIS.

108. We continue to rely on those submissions.

109. In respect of the DPE's conclusions regarding bushfire risk, the DPE identified a number of management measures to manage the risk of bushfire in the solar plant. Namely:-

- "*Establish and maintain a 10m asset protection zone around all critical project infrastructure;*
- *The substation and transformer would be provided with an increased 20m wide asset protection zone APZ;*
- *Comply with the requirements or RFS's planning for bushfire protection 2019 and standards of asset protection zones;*
- *Prepare an emergency plan, consistent with the recommendations of Fire and Rescue NSW*".

110. Having Regard to the above factors the Department concluded that the bushfire risk would be suitably controlled through the implementation of the standard fire management procedures.

111. In addition to the above the DPE go on to provide the following recommended condition "*implement procedures and controls for managing fire hazards, including maintenance of an asset protection zone in accordance with the requirements of the RFF's Planning for Bushfire Protection Guidelines 2019*".

112. As indicated in the earlier report of Ms Dawson:-

> "*the application does not provide adequate consideration of the bushfire risk to the site and by no way demonstrates compliance with the Planning for Bushfire Protection 2019*".
>
> *The Department has failed to give full and proper consideration to the bushfire risk both to and from the development. Neither the development nor the DPE assessment report has demonstrated compliance with the PBP*".

113. Ms Dawson goes on to note that,

> "*simply conditioning compliance with PBP without properly considering whether the development can achieve compliance is a failure and*

statutory obligation under Section 4.15(1) of the Environmental Planning and Assessment Act 1979.

Imposing a condition that requires compliance with PBP would be an unlawful condition as it is uncertain and unclear as to how compliance would reasonably be achieved".[31]

114. Ms Dawson goes on to further take issue with the DPE's conclusion that:-

> "*the risk of fire spreading into the site from adjoining property or from the solar arrays and infrastructure to an adjoining property would be adequately mitigated with implementation of the above management measures and adherence to the recommended consent conditions. While insurance premiums/availability can vary to take into account different factors including where there is increase bushfire risk, the Department considers that the recommended conditions there would not be a significant increase in bushfire risk*".

by stating in reply;

> "*as outlined in our previous opinions, the proposed development has not given adequate consideration to the bushfire risk to demonstrate that the proposed mitigation measures would be sufficient for the proposed development. It is therefore unclear how the Department can reach the conclusion in the absence of full and proper assessment*".[32]

115. By way of assistance to the Commission we note the expert opinion of Ms Dawson in respect of the inadequacies identified in her prior reports are as follows:-

- Bathurst Regional Council has not amended its bushfire prone land mapping to include category 3 vegetation despite a requirement that this was to be completed by November 2018. Ms Dawson concludes that the land under the revised mapping would be categorized as bushfire prone land. Accordingly, if such a categorization had been made in accordance with legislative requirements, it would have provided a legislative trigger for consideration of bushfire as part of the planning and building approval process. That is not the case in this instance.[33]

- The 10m asset protection zone is a minimum requirement and inadequate in this case. Such minimum requirements do not account for riparian zones and vegetive screening. [34]

- Additionally, there is a requirement that all firefighters stay a minimum of 8m clear of any solar panels. This leaves approximately 2m for them to drive through the asset protection zone up against potentially on-fire vegetive screening. Ms Dawson concludes this set back of the asset protection zone of 10m is wholly inadequate.

[31] Report of Erika Dawson (DPE Assessment Report) dated 7 December 2023 page 5 [40-42].
[32] Report of Erika Dawson (DPE Assessment Report) dated 7 December 2023 page 6 [44].
[33] Report of Erika Dawson dated 13 December 2022 page 2 [10-13].
[34] Report of Erika Dawson (Response to Submissions Report) dated 7 December 2023 page 3 [18-27].

- Pursuant to the Design Guidelines and Model Requirements; Renewable Energy Facilities from the Country Fire Authority (Victoria) best practice indicates that a solar farm should have one 45,000 litre static water tank for every 100 hectares of a site; plus, for battery energy storage system protection no less than 288,000 litres flowing for a period of no less than 4 hours a 20 litres per second, whichever is greater.[35]

116. For this reason, the consideration of bushfire risk is wholly inadequate, and any mitigating measures have not been appropriately considered in a site specific context.

Social Impacts (Page 33)

117. The DPE notes that public submissions raise concerns that the project would "*reduce the ability of neighbouring residences to obtain insurance (see hazard and bushfire risk section above)*.

118. We note DPE's comments in respect of insurance (hazard and bushfire risk) which stated:-

> "*submissions also stated for the project were impact insurance premiums, and the ability of neighbouring landowners to obtain insurance. The submissions assert that insurance companies would not provide relevant insurance to joining landowners given – the risk that fire could spread from their properties into the site and cause significant damage to the project infrastructure; or – the project would increase the risk of bushfire adjacent properties*".

The DPE considered that;

> "*the risk of fire spreading into the site from adjoining property, or from the solar rays and infrastructure to an adjoining property would be adequately mitigated within implementation of the above management measures and adherence to the recommended consent conditions. While insurance premiums/availability can vary to take into account different factors including where there is an increase bushfire risk, the Department considers that with the commended conditions there would not be an increase in bushfire risk*".

119. There were no recommended conditions in respect of this issue.

120. We refer to our submissions in respect of insurance set out at paragraphs 28 – 51.

121. The Glanmire Action Group respectfully suggest the DPE's response is wholly inadequate.

122. The conclusions reached by the DPE fail to consider the expert opinions of Mr Craig Mizon in respect of the inability to obtain premiums, which is further supported by the subsequent report of Mr Levi Thurston of NLT Insurance Brokers Pty Ltd.

[35] Report of Erika Dawson dated 13 December 2022 page 8 [59].

123. The Glanmire Action Group has, from the outset indicated significant concerns regarding the implication of neighbouring land holders properly protecting themselves from liability in the event a bushfire, ignited from their property subsequently travelling into the solar plant.

124. The Department Planning and Environment and indeed Elgin Energy are, and have for a long time, been aware of this concern but have not provided evidence of (a) insurance broker, or association indicating that premiums will not rise in circumstances where a solar farm neighbour's cropping/agricultural property, and (b) any report refuting the conclusion of Mr Craig Mizon, the Glanmire Action Group, and indeed the same conclusions of Mr Levi Thurston.

Land Value (Page 34)

125. The DPE conclude in relation to property values that "*the project would not result in any significant or widespread reduction in land values in the areas surrounding the solar farm*".

126. The DPE provide no evidence as to how this conclusion has been reached.

127. In contrast, the Action Group provided the DPE in its response to the EIS two letters from Mr Andrew Bickford and Mr Michael Lund, Local Stock and Station Agents and Real Estate Agents who are familiar with the land, its productivity and relevantly, its significantly high value.

Both experts conclude that the imposition of a solar array would have a "*significant negative impact on land prices in the surrounding area*".[36]

Community Benefit (Page 35)

128. Elgin Energy propose a benefit sharing agreement with Council consisting of an annual payment of $18,000 for the life of the project which is consistent with the upper limit of $300 per megawatt per annum provided in the Revised Live Scale Solar Energy Guidelines for Community Benefits.

129. We note the expert opinion of Ms Erika Dawson in respect of this contribution who observes:-

> "*the local community should not be burdened by any ongoing cost related to the development, including (but not limited to) increased fire risk and response obligations, and road maintenance. The burden should remain with the developer and be adequately compensated for its contributions as part of any VPA*"…
>
> "*the annual contribution of $18,000 would seem quite low when distributed over 8 items, resulting in $2,250 on average per item. It certainly would not provide any meaningful annual contribution to any of the listed items, considering the annual bachelor's degree costs upwards from $15,000 per year*".[37]

[36] Letter of Mr Andrew Bickford, Branch Manager Elders Rural Services Australia Limited, Bathurst dated 2 July 2021; and Letter of Mr Michael Lund, Sales Manager, PR Master Stephens & Co Pty Ltd dated 8 December 2023.
[37] Report of Erika Dawson (Response to Submissions Report) dated 7 December 2023 page 14 [83-84].

130. Having regard to the unacceptable imposition on neighbours in respect of insurance premiums, the loss of land values, the loss of prime cultivation land, the economy, and the cost associated with increased fire risk and response obligations and road maintenance, the proposal represents a net negative to the community which is entirely and adequately compensated for through the community benefit sharing scheme.

Decommissioning and Rehabilitation (Page 36)

131. The DPE note that the following:-

> "*The operational life of the project is 40 years, however there is potential to operate for a longer period of time….*
>
> *The Departments revised Large Scale Solar Energy Guidelines identifies four key decommissioning and rehabilitation principles for circumstances where an Applicant ceases operating a project, which are removal of the project infrastructure, returning the land to its pre-existing use, including rehabilitating and restoring the pre-existing LSC class where previously used for agricultural purposes, and the owner/operator of the project should be responsible for the decommissioning and rehabilitation and this should be reflected in the agreement with host landowners".*

132. We reiterate the observations of Ms Erika Dawson, and Mr David Harbison which conclude:-

- The operational life extension allows for the prime cultivation land to be out of production for an indefinite period of time;
- The quality of the land will be significantly impacted where trenches are dug leading to potential erosion and soil dispersion;

- That a security deposit for the cost of rehabilitation be provided to the Department of Planning and Environment to ensure rehabilitation occurs.

6. EVALUATION

The Department makes the following conclusions:

133. At paragraph 126 the DPE indicates, "*The project is permissible with consent in accordance with the Bathurst LEP and is located on agricultural land, most of which has been historically cleared and modified for grazing.*".

This description of the land is disputed. Elgin Energy and the DPE have failed to provide evidence in respect of the validity of this description of the land.

134. This description of the land is directly contrary to local experience, the report of Mr David Harbison, experienced real estate agents in the area, in addition to those who have worked the land for many decades. The description is contrary to all of the evidence.

135. At paragraph 29 the DPE conclude, "*That the project would include disturbance to a small area of Class 3 land (approximately 39.5 hectares).*". The description of this portion of land as "a small area" is disputed.

136. Further, the Department, "*…considers that the inherent agricultural capability of the land would not be affected.*". This is disputed.

137. They further indicate, "*The overall agricultural productivity of the region would not be significantly reduced.*". This is disputed.

138. They further indicate, "*Given the site would be returned to agricultural uses following decommission and rehabilitation.*". This is disputed.

139. At paragraph 130 the DPE conclude, "*The visual assessment concluded that the visual impacts for all residents surrounding the site would be nil to low, due to distance, topography and the extent of intervening vegetation on the project boundary which would be further enhanced by Elgin Energy's property proposed screen planning.*". This is disputed.

140. At paragraph 133 the DPE conclude, "*The project would also provide flow on benefits to the local community, including up to 150 construction jobs and a capital investment of $152,000,000, a VPA involving payments to Council of $18,000 per annum for the life of the project is also proposed.*". The benefit of this inferior to the meaningful contribution that the productive cultivation land has in the local economy.

141. The Department's conclusion that, on balance, the project is in the public interest and is approvable subject to the recommended conditions of consent. Is disputed.

142. It is submitted that an appropriate balance has not been met between maximising solar resource development and minimising potential impacts on surrounding land uses and the environment.

143. The land use conflicts in respect of this proposal are such that the imposition of a solar plant should not proceed.

CONCLUSION

144. To refuse the proponents application, is we suggest, to appropriately respond to the Planning Authorities stated principles of avoiding proximity to identified expanding cities and residential areas, quality cultivation land, and undue interference with neighbouring activities (including through insurance issues).

145. It is, we suggest, appropriately responding to the expressed community concern and indeed, so many issues so well dealt with by the AG gathering together all of the evidence, lay and expert, which is set out in our submissions.

146. The Proponent ought to respond to these requirements and to agency's advice, properly consult, and subsequently find an appropriate location. There is no, or at the very least, insufficient evidence, of this having occurred.

Index

HENNESSY DOWD
Lawyers

Our Ref: JRB:LMH:221755
Your Ref:

16 November 2023

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Dear Sir/Madam,

RE: Glanmire Action Group

We act for certain members of the Glanmire Action Group. The Group was formed a few years ago now to investigate the merits or otherwise of allowing the installation of a solar plant and associated equipment on 200 hectares of cultivation land at 4823 Great Western Highway, Glanmire. The proponent is Elgin Energy.

To assist in familiarising you with the proposed Glanmire Solar Plant and the Glanmire Action Groups/ community opposition, we **attach** the following documents:

(a) A copy of Elgin Energy Pty Limited's brochure;

(b) A copy of Glanmire Action Group's brochure.

The Glanmire Action Group brochure depicts at least part of the proposed solar block and the photo was taken in spring 2022. The crop is canola.

We also **attach** an aerial photo depicting the block proposed for solar. You will note the block is rectangular with north/south length by about 2,300 metres and east/west being about 800 metres.

Elgin's brochure outlines panels to cover about 158.6 hectares. Please assume the proposal includes:

- About 120,000 solar modules;
- A 60MW Battery Energy Storage System
- Approximately 18 Inverters;

- One Maintenance Building;
- Two large transformers; and
- 2m high fencing with barbed wire.

Until now neighbours immediately to the west have for many years grown and harvested grain crops off this cultivation land. Those crops have of course been planted to near the north/south boundary of 4823 Great Western Highway. At 4823 similar activities have been performed.

Typically, of course grain is harvested at the height of summer at Christmas/New Year period. It is done when the grain is ripe, and the grass is high and very dry. This is of course a time of high fire danger.

Typically, a contract harvester supplies and operates the harvester and grain trucks etc. may be supplied and operated by contractors and/or the landowner/occupier. All involved are generally aware of the heightened fire risk of this activity.

The prevailing wind in summer is the hot dry westerly wind. Typically, an owner/occupier has a "rural policy" and public liability cover in the event for example for fire starting and extending the neighbouring properties/buildings. This cover is typically $20,000,000 to $30,000,000. This is deemed quite adequate to cover the risk in a rural setting as indeed the subject area has been until now.

The issue here is rather unusual probably because planning authority policy discourages a solar proposal on cultivated land, that is to say grain producing land and so the elevated risk of fire due to the harvest activities as described coupled with an adjoining solar plant said to be worth $250,000,000 or more may not have arisen, however in this instance the proponent is persisting and so the issue is real indeed.

The proponent estimates that the solar capital to be introduced into 4823 Great Western Highway will total $250 million and it will generate power for 28,000 homes. This would be likely to produce a profit to the proponent which may be destined for overseas. We ask you to assume the adjoining owners/occupiers reasonably require $300 million public liability cover.

You will see therefore that the introduction of the solar plant onto rural cultivation land introduces a whole new risk (in terms of capital worth and potential loss of profits) to the neighbouring farmer engaged in typical rural activities for this land including retaining subcontractors who may not themselves be insured.

Of course, some farmers carry on rural activities as trustees and we expect it would be illegal for a farmer to put trust assets/property at risk by not having sufficient insurance even if a farmer himself was otherwise minded to take the risk of not insuring or under-insuring.

In February 2021 when basic facts were known a member of our Group, Mr P R Hennessy SC forwarded a letter of instruction to Craig Mizon, insurance broker and Mr Mizon thereafter provided to the Group his report. His report addressed the writer's questions asked.

In summary you will see:

1. There is need to disclose to a prospective insurer the existence of such an asset adjoining.

2. Essentially if one could find an insurer the premium would be prohibitively high.

3. Until now the proponent has not relevantly addressed Mr Mizon's report.

4. There will be, of course a need to increase insurance cover from $30 million to $300 million.

The proponent, while not providing us with a report from you or indeed anyone else, purports to deal with the issues accurately and clearly raised by us by stating:

- "*The Australian Insurance Council was consulted prior to EIS exhibition and again after, on this issue. They have confirmed there is no further change to their initial statement, which was, they are not aware of any position of escalated risk focus being placed on neighbouring properties solely as a result of solar facilities being established*".

- *"Communication with the National Insurance Brokers Association (NIBA) resulted in a similar comment. They advised there is no evidence of increasing insurance premiums on sites adjacent to solar farms*".

For the purpose of answering the questions below please assume the accuracy of the facts outlined above. We ask:

1. Did you or someone on your behalf make the statement attributed to you?

2. Were the facts outlined above and/or contained in Mr Hennessy SC's letter of instruction to Mr Mizon adequately outlined to you before you stated as above?

    i. If the answer to 1 is yes do we correctly interpret your view is:

        a. No impact upon duty to disclose – no need to disclose?;

        b. No impact upon risk?;

        c. No impact upon premium in insuring for $300,000,000 instead of $30,000,000?

Please assist by obtaining an insurance quote.

ii. If the answer to 1 is no:

a. In what report were the facts outlined to you not adequate?

b. Were you misled by Elgin Energy Pty Ltd, NGH Pty Ltd, or any of their representatives?

We are keen to ascertain if there is an issue.

It seems to the writer the issue is rather clear, and the matter was largely addressed by Mr Mizon and perhaps if the issue is made clear to you as we hope we have done, the insurance experts may in fact be in agreeance.

Yours faithfully
HENNESSY DOWD LAWYERS

[redacted]

Jonty Boshier
Legal Practitioner

[redacted]

Encl.

Elders Rural Services
150 Russell Street
BATHURST NSW 2795
p | 0263317788
bathurst2@elders.com.au

13/12/2022
To Whom It may concern;

RE: Solar Proposal at 4823 Great Western Highway, Glanmire

I, Andrew Bickford, Branch Manager of Elders Rural Services have been asked to provide a further letter providing my professional opinion on the Elgin Energy Solar Proposal at 4823 Great Western Highway, Glanmire.

My qualification and practical experience include:-

- Stock and Station agent of 23 years, working in Yass, Glen Innes, Millicent (South Australia) and Bathurst (since 2005).
- Branch Manager of Elders Rural Services, Bathurst.
- Licenced Stock and Station agent, Real Estate agent (Licence no. 1081382).
- AuctionsPlus Assessor (Accreditation level 1 for cattle, lambs and sheep) (License no. 032031

On 2 July 2021 I prepared a report for the Glanmire Action Group. I reaffirm my views in that report.

I am very familiar with the subject site and its surrounding properties.

I am aware the Environmental Impact Statement (EIS) for the proposed solar farm is currently open for exhibition and response. I have since reviewed the material and been specifically referred to pages 162 – 164, 170, 189, and 234.

In relation to those pages, I make the following comments:

Land Quality and Value

- This land is located on the perimeter of the growing city of Bathurst and is of the highest quality, both in terms of its long-standing agricultural productivity, and its high residential value.

- Predating, and throughout the entirety of my career, I and professionals within the local and surrounding area have described this area of Bathurst as the "green triangle" - Bathurst's most highly regarded agricultural land.

- Recent residential developments have further increased the value and desirability of these properties.

- I disagree with Elgin Energy's claim that due to lack of data, "*it is not possible to make an evidence-based assessment about the impact of this Project on the property values of the surrounding properties*" (EIS page 189).

  Having regard to my 23 years of experience, familiarity with the area and the local property market, and having viewed the photographs described *as Figure 6-7, 6-8* and *6-9*, it is my professional opinion that the proposal will have a serious negative impact on the rural and scenic quality of the land and consequently, on the value of neighbouring properties.

- In my view it is inappropriate to take out of production prime agricultural land, which significantly contributes to the local economy through leaseholder arrangements, contractors, and local suppliers.

- At page 163 of the EIS, the land is described as class 4 and 5. This assessment is completely at odds with my knowledge and understanding of the quality and productivity of the land.

- I consider this land prime cultivation land.

- I am aware of the significant insurance issue this proposal will impose on neighbours. I hold significant concerns about the impact to the area.

Agricultural Production in the Bathurst Economy

- At page 170 of the EIS, Elgin Energy claim "*Agriculture is not a major employer within the region: with the total of 689 person employed int agriculture, forestry and fisheries sector*", without commenting on the employment in the forestry and fisheries industries, I suggest this statistic minimises the role agriculture plays in the Bathurst economy and to employment more particularly.

- Elders Rural Services in Bathurst deals with over 200 clients in the local area and surrounds. Our business helps out with livestock sales, wool brokerage, farm insurance, real estate, farm supplies, agronomy and financial products.

- Our top 100 clients would employee numerous contractors and staff though out the year.

- Most farming operations in the area have employment in the following capacity:

    - Family member running the farm with siblings;
    - Farm managers and jackaroos;
    - Farming contractors, to name a few duties, include:
        - Fencing, shearing, crutching, sheep drenching, sheep dipping, lamb marking, calf marking, pasture and weed spraying, fertilizer spreading, hay making , contract stock mustering.

- I consider it highly likely most farms would have 20 to 30 people on farm during the year. Out of our 200 clients it reasonable, and indeed a conservative estimate to say that 6000 people are employed or contracted onto these farms in our local area.

- There are another eight agents operating out of Bathurst with similar statistics to our business.

- It is very clear that agriculture in our area employs a large volume of people.

Kind regards,

[redacted]

Andrew Bickford
Branch Manager, Elders Rural Services Bathurst

ANTHONY DAINTITH
TOWN PLANNING

4 Isaac Drive, Orange
195 Russell Street, Bathurst
PO Box 1975
Orange NSW 2800
ABN: 46 121 454 153
[redacted]

Our Ref: 2021-080

6 December 2023

Mr Peter Hennessy
Glanmire Action Group
[redacted]

Dear Peter

RE: PROPOSED SOLAR FARM (60 MW, ASSOCIATED INFRASTRUCTURE AND BATTERY STORAGE)
"WOODSIDE" 4823 GREAT WESTERN HIGHWAY, GLANMIRE
LOT 141 DP 1144786
STATE SIGNIFICANT DEVELOPMENT

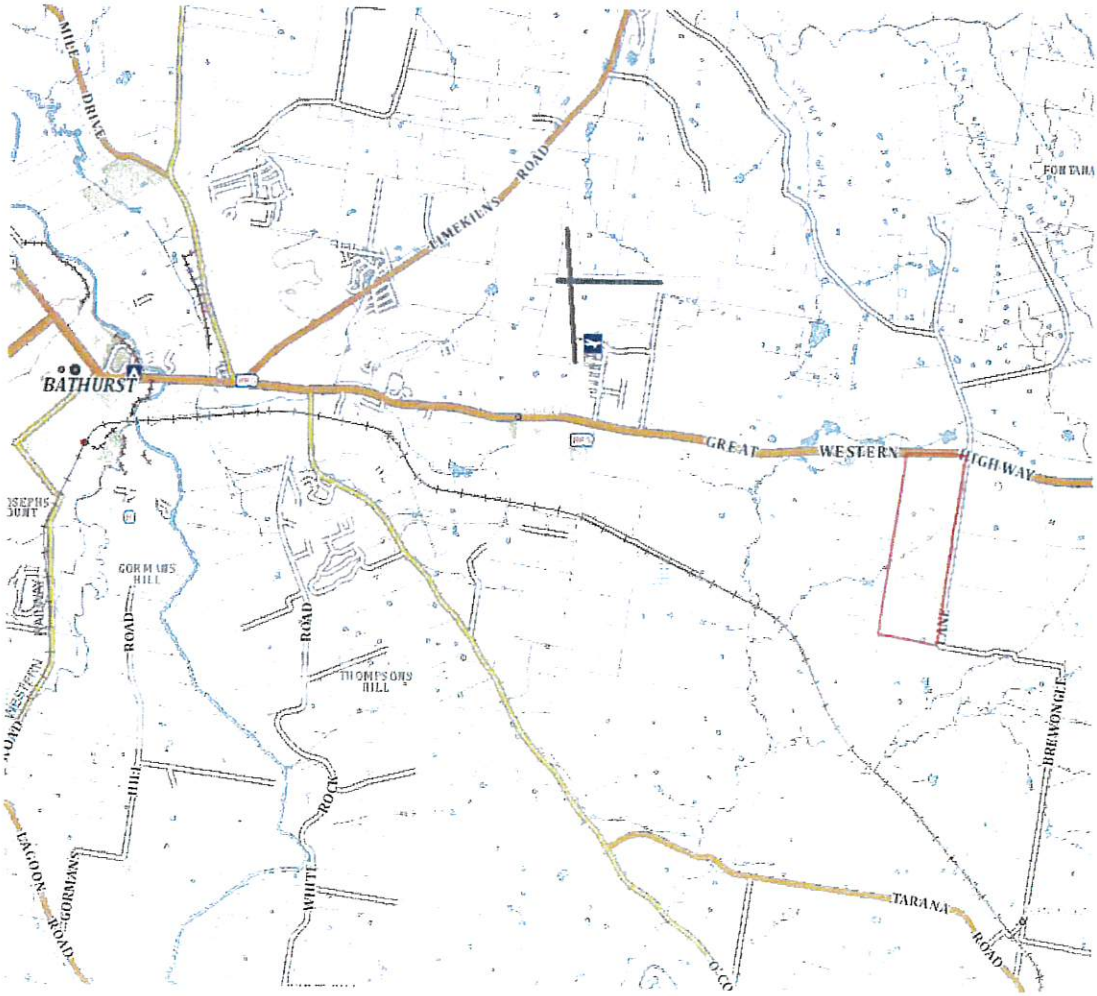
Reference is made to the solar farm proposed on the subject land at Brewongle by the development group "Elgin Energy". The proposed solar farm includes the installation of 60 MW (ac) solar farm on approximately 140 hectares of land. The subject land is located 11 km east of Bathurst and 4.5km east of Raglan. It is noted that the Department of Planning and Environment have completed their assessment of the application and are recommending consent subject to conditions.

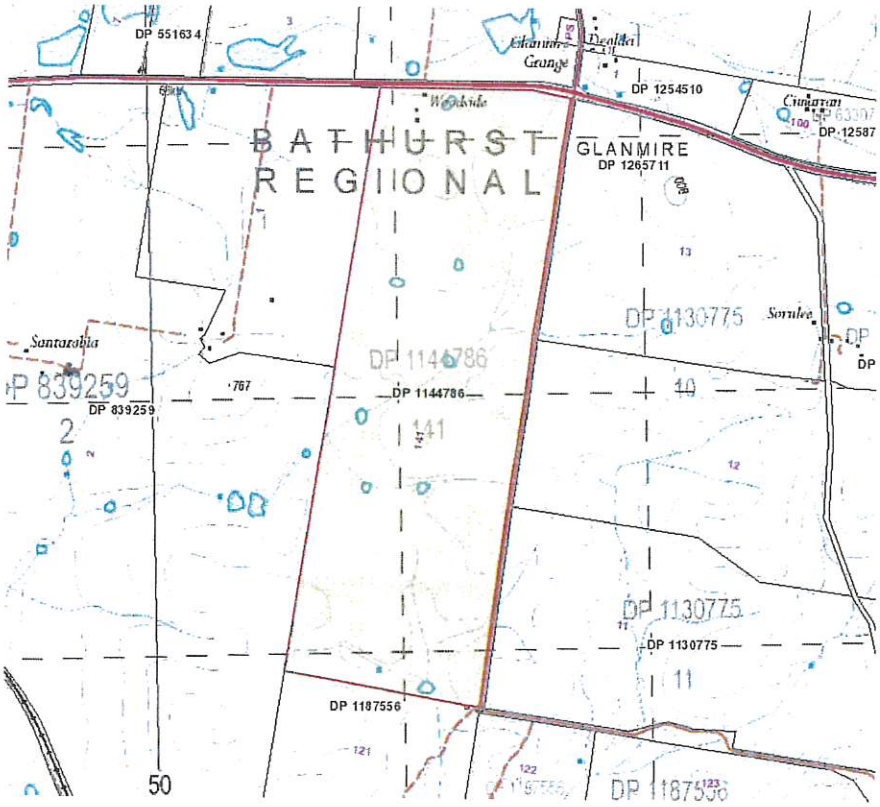
It is noted that the existing 66 kV infrastructure currently operates at 11 kV and would need to be refurbished by Essential Energy for a distance of approximately 7 km so the project can connect to the electricity grid and export energy, and would be subject to separate assessment under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The refurbishment would require replacing of approximately 47 poles and soil disturbance and vegetation clearing works. It is unclear as to what environmental impacts would be for this important connection associated with this proposal – the surrounding neighbours will have to wait and see what further impacts may arise.

"Woodside" consists of:

- The Woodside homestead and associated sheds & infrastructure that fronts onto the Great Western Highway (770m frontage).
- The subject land has a total area of 185.8ha.
- There is 2.4km frontage to Brewongle Lane.
- The land consists of Class 2 and 3 Agricultural Land (*It should also be noted that the past reference to the LSC of the site as Class 2 and Class 3 by the NSW Department of Planning, Industry and Environment's eSpade service, 'Raglan Soil Landscape' (espade.environment.nsw.gov.au) was correct at the time of publication. Since that time, the Office of Environment and Heritage (OEH) reviewed and released the "The land and soil capability assessment scheme" (2012) which built on the earlier version but with more emphasis on a broader range of soil and landscape properties.*)
- The land is generally cleared and is slightly undulating country.

Following are maps of the subject land.




DP 551634
Eskdale Grange
Woodside
DP 1254510
Cimaron
DP 12587
BATHURST REGIONAL
GLANMIRE
DP 1265711
DP 1130775
Sorrulee
Santarabia
DP 839259
DP 1144786
DP 1130775
DP 1187556
50


DP 551634
DP 1254510
DP 1265711
DP 1144786
DP 839259
DP 1130775
DP 1187556

The original submission included the following points and follow up comments in italics:

PROPOSED SOLAR FARM LOCATION

The following plans have been prepared with respect the proposed solar plant on the southern side of the Great Western Highway at Glanmire:

> **Figure 1** – Cadastral plan that indicates the location of the "Woodside" holding and the location of the proposed solar farm. The plan also includes the location of the existing dwellings within a 1km, 2km and 3km radius of the proposed solar farm.
>
> **Figure 2** – Provides a cadastral plan as indicated in Figure 1, but with an aerial photo overlay.
>
> **Figure 3** – Provides a cadastral plan as indicated in Figure 1, but with a topographical plan overlay
>
> **Figure 4** - Provides a cadastral plan as indicated in Figure 1, but with an Agricultural Suitability overlay

As depicted in the **Figures 1-4** as articulated above, there are approximately 57 dwellings within a 3km radius of the proposed solar farm. This is broken down as follows:

Distance from Solar Plant	Number of Dwellings
0-1km	6
1-2km	22
2-3km	29
Total	**57**

Because of the land topography of this proposed site (relatively level open country) the majority of the affected residences will have the 2.5m high fence and solar panels within view.

It is noted that page iv of the assessment report provides the following:

> *"While the introduction of the project would represent a change to the local rural landscape, the Department considers that Elgin's proposed mitigation measures, including screen planting, would adequately reduce the potential visual impacts of the project to an acceptable level, consistent with the Department's revised Large-Scale Solar Energy Guidelines."*

The surrounding land owners are not convinced that the screen planting proposed by Elgin will be satisfactory to adequately reduce the visual impact of the solar farm.

Bathurst Regional Local Environmental Plan 2014

The subject land is zoned RU1 Primary Production under the provisions of the *Bathurst Regional Local Environmental Plan 2014 (LEP)*. The minimum lot size under the LEP is 100ha.

The objectives of the RU1 Primary Production zone are:

- *To encourage sustainable **primary industry production** by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To **minimise conflict between land uses** within this zone and land uses within adjoining zones.*
- *To maintain the **rural and scenic character** of the land.*
- *To provide for a range of **compatible land uses that are in keeping with the rural character of the locality, do not unnecessarily convert rural land resources to non-agricultural land uses**, minimise impacts on the environmental qualities of the land and avoid land use conflicts.*

Based on an assessment of the objectives of the zone, it can be concluded that the proposed solar plant:

- Does not encourage sustainable primary industry production (there will be a loss of 140ha of prime "Class 2 & 3" agricultural land *(following further studies which indicates that there would be a loss of 39.5ha of Class 3 land)*. The land has historically been cropped with a variety of grain crops along with grazing of livestock *(regardless of the land classification, the loss of productive agricultural land remains as a result of the proposed solar farm)*.
- Will lead to conflict between non compatible land uses.
- Is not a compatible land use that is in keeping with the rural and scenic character of the locality.
- It will unnecessarily convert rural land resources to non-agricultural land uses.
- The scenic quality to the "gateway" entrance to Bathurst will be negatively impacted by the construction of the solar farm. The entry is characterised by open farming land and then the Bathurst urban area with the famous Mount Panorama in the background that provides an ideal backdrop to the landscape that is synonymous with Bathurst.
- The picturesque and productive locality is very much part of Bathurst's beauty and heritage and deserves protection.
- The claim in the EIS that that there would actually be some improvement in the landscape character in the vicinity of the site due to the revegetation and planting of trees on the site is considered offensive to the large number of surrounding land owners *(as indicated the proposed screen planting proposed by Elgin is considered inadequate)*.

- It will take a significant period of time for any landscape buffer to take any effect.

The minimum lot size under the LEP allows for a 100ha minimum lots in this area for the purpose of a dwelling house (subject to the lodgement of a development application). There has been a number of subdivisions approved in this locality and there is the potential for more (this will have the impact of increasing the number of residential receptors).

David Harbison has reviewed the additional information submitted and has provided the following comments:

My previous views and reports relating to land and soil capability (LSC) class of the proposed site have been, in principle, validated by Minesoils Pty Ltd's (Minesoils) findings (supported by Dr. David McKenzie) of 40.6 ha of Class 3 land. It should also be noted that the past reference to the LSC of the site as Class 2 and Class 3 by the NSW Department of Planning, Industry and Environment's eSpade service, 'Raglan Soil Landscape' (espade.environment.nsw.gov.au) was correct at the time of publication. Since that time, the Office of Environment and Heritage (OEH) reviewed and released the "The land and soil capability assessment scheme" (2012) which built on the earlier version but with more emphasis on a broader range of soil and landscape properties.

Whilst the revised scheme has provided slightly different LSC class ratings, provided in Minesoils report as:

a. 40.6 ha Class 3: high capability land
b. 132.9 ha Class 4: moderate capability land, and
c. 12.6 ha Class 5: moderate – low capability land,

the site's productivity potential is not limited by this classification. 25% of this proposed development footprint is Class 3 land (Dept. of Planning and Environment – Glanmire Solar Farm, Nov. 2023) and according to the Guidelines for Large Scale Solar, should be avoided.

93% of the site is classified as "moderate or high capability land" and from Minesoils report, 179.5 ha (96.5% of the site) is arable - "able to support cultivation to establish fodder crops and pastures and excludes dwelling and surrounds, shedding, waterways and dams".

Within the Bathurst LGA, 93% of agricultural land is used for grazing, with a further 6% used for cropping. This site can be used for both. From a production perspective, the district average stocking rate is approximately 8 dse/ha (Behrendt and Eppleston, 2011). This site, with testament to earlier reports was estimated to have a productivity stocking rate of 13 dse/ha (Tremain Ivey Advisory, 2021) and 16 dse/ha (Minesoils, 2023). These figures are 60 - 100% higher than district practice, and reflect just how productive this site is, irrespective of LSC.

Important Agricultural Land (IAL) is another assessment to be considered in any development on rural land. While LSC is mapped for NSW, maps of IAL have not yet been completed.

t has been noted that should this mixed cropping/grazing land be approved, a potential condition of approval will be to graze under the solar panels. Grazing management is key to maintaining ground cover, preventing bare ground and erosion. Not at any time in my experience can grazing management be conducted on one "paddock" of 159 ha without detrimental effects on some areas. There has been no indication in the proposal that paddock fences of manageable land areas will be

reinstated post construction, and the development will see the current water sources (dams) filled in. How will stock be watered, and better, managed from overgrazing/compacting some areas while not grazing others? Two outcomes of such are erosion and increased fire risk/fuel load.

Visual impact

The scenic quality of the surrounding areas to be diminished to such an extent as to adversely affect land values (refer to separate reports from local Real Estate Agents).

It is glaringly obvious to any scenic observer that the proposed use of the land is totally incompatible with surrounds. It is a huge waste of excellent land and quite out of place.

Any landscaping would take many years to establish and create any form of acceptable barrier.

The surrounding land owners are not convinced that the screen planting proposed by Elgin will be satisfactory to adequately reduce the visual impact of the solar farm.

Economic Impact

The location of the proposed solar project will adversely impact the local community through a reduction of local employment and agricultural production. The suggestion this solar plant will positively impact the local economy is denied on the basis profits produced will not be spent/ distributed in the local economy but will be largely extracted out of the region by both the landlord and the tenant, as well as having an adverse impact on the rural community in the manner described.

The proposed solar project is proposed on a site of some 186 hectares, with a development footprint of 158ha and will take out of production 179.5 hectares of prime cultivation land.

In the course of producing crops, and or grazing while resting soils, the local economy is benefited. This includes the local purchase of grains, fertilisers, additives such as lime, and equipment. Ongoing expenditure includes the employment of local contractors for sowing, harvesting, cutting, and bailing. These benefits are enjoyed locally and annually.

Alternatives Sites

In section 2.5.1, the EIS states that "the project site was selected through a screening process based on generation capacity, connection capacity, desk top environmental due diligence studies, high-level ground truthing and landowner interest".

There is nothing in this section that indicates that alternative sites with less impact on agriculture and visual amenity were properly considered.

Several solar farms have been proposed in NSW for lower rainfall non-cropping sites with agricultural productivity 30 to 50 times lower than the Glanmire site(refer to Tremain Ivey Advisory report 12/12/2022).

The proposed solar farm on the southern side of the Great Western Highway on the proponent's property is sited on productive agricultural land and in complete view of a large number of neighbouring properties. It is considered that the proposal is incompatible with the RU1 Primary Production provisions and objectives. This coupled with the potential heritage, air and road safety and water pollution concerns, the site identified for the future solar farm is far from ideal and the proponents should consider other more suitable locations.

Should you have any questions with respect to this matter, please contact the office on 0408249700.

Yours faithfully
Anthony Daintith Town Planning Pty Ltd

[redacted]

Anthony Daintith
Principal

Integrated Consulting
Planning | Bushfire | Surveying

Our Ref.: 22101-L01_C

Glanmire Action Group
C/- Mr Jonty Boshier
Hennessy Dowd Lawyers
PO Box 697
Bathurst NSW 2795

13 December 2022

Dear Mr Boshier

GLANMIRE SOLAR FARM – OPINION ON BUSH FIRE IMPACTS

1. This opinion has been provided in response to an email request from Hennessy Dowd Lawyers in relation to the bushfire impacts on the proposed Glanmire Solar Farm State Significant Development Application (SSD-21208499) that is on public exhibition from 18 November 2022 to 15 December 2022.
2. This opinion is provided in response to the following specific questions:
    a. The prospect of fire commencing on a neighbouring rural property as described, and its potential for causing damage to the solar plant if permission is granted to install it on the rectangular block to which we have referred.
    b. The speed with which a fire travels or is capable of travelling through, for example a crop ready for harvest, and the speed with which the fire front can extend by the time it reaches the boundary of the proposed solar plant.
    c. The "spotting distance" of embers.
    d. The location from where such a fire can reasonably be feasible to control.
3. I have the following academic qualifications:
    a. Graduate Diploma in Bushfire Protection with Distinction (University of Western Sydney)
    b. Graduate Certificate in Development Planning (Curtin University of Technology)
    c. Graduate Diploma in Natural Resources (University of New England)
    d. Bachelor of Urban and Regional Planning with Honours (University of New England)
4. I am accredited:
    a. by the Fire Protection Association Australia (FPAA) under the Bushfire Planning and Design (BPAD) Scheme (BPAD36371) as a Level 3 Accredited Practitioner in New South Wales and Western Australia. The NSW Rural Fire Service (RFS) recognise this accreditation as "as a person who is qualified consultant in bush fire risk assessment" for the purposes of environmental planning legislation.
    b. By the Planning Institute of Australia (PIA) as a Registered Planner (NSW).
5. I have 22 years' experience working in the planning industry, with the most recent ten years also incorporating bushfire planning. My experience has been both working in the private sector for various consultancies as well as for local government and consulting for both local and state government.

6. I am currently a member of the DPE/RFS Working Group for Recommendation 27[1] from the NSW Bushfire Inquiry.

7. I have reviewed the Environmental Impact Statement prepared by NGH as publicly exhibited on the Major Projects Website[2]. It is understood the application seeks approval for construction, operation and decommissioning of a 60MW solar farm on Lot 141 DP 1144786 (the solar farm site).

8. I have viewed the solar farm site from surrounding public roads and adjoining private properties. This site inspection was carried out on Friday 2 December 2022.

9. Each Council, where a Bush Fire Risk Management Plan applies, is required by section 10.3 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), to prepare a map that identifies bush fire prone land. This map is required to be certified by the Commissioner of the NSW Rural Fire Service (RFS) and is thence known as the "Bush Fire Prone Land Map" (BFPL Map) for the Council. Council is required to update the map at least every five (5) years.

10. The RFS has published the *Guide for Bush Fire Prone Land Mapping*[3] to assist Councils in preparing the BFPL Map. This guide was last updated in November 2015 and introduced a new Category 3 Vegetation which encompasses medium risk bush fire vegetation including *inter alia* grassland vegetation. Councils were provided with a three (3) year period (from the November 2015 publication) by the RFS to update their mapping to include the Category 3 Vegetation. Bathurst Regional Council has not amended its BFPL Map to include Category 3 Vegetation.

11. In my opinion the solar farm site and its surrounds should be classified as Category 3 Vegetation as it comprises grassland that is not maintained in a managed state (for the purposes of considering bushfire hazard) and cropping is observed as being intermittently carried out and cannot be reasonably excluded from being bush fire prone land on this basis.

12. The purpose of the BFPL Mapping is to provide a legislative trigger for consideration of bushfire as part of planning and building approval processes. For SSD applications, developments on mapped BFPL would ordinarily be referred to the RFS for input to the Planning Secretary's Environmental Assessment Requirements (SEARs).

13. A review of the SEARs issued for the project does not identify bushfire as a specific matter to be addressed, apart from in general consideration of risks and hazards "an assessment of potential hazards and risks including but not limited to bushfires, spontaneous ignition, electromagnetic fields..."[4]. No indication was given as to whether the RFS was consulted as part of the preparation of the SEARs.

14. A review of SEARs for other projects where the land has been mapped as BFPL have included more detailed consideration of bushfire such as "identify potential hazards and risks associated with bushfires / use of bushfire prone land including the risks that a solar farm would cause bush fire and demonstrate compliance with Planning for Bush Fire Protection 2019".

15. The absence of a site being mapped as bush fire prone on the BFPL Map does not obviate the consent authority from the need to consider bushfire risks and impacts either from or to a development. Section 4.15 of the EP&A Act necessitates the consideration of bushfire in relation to a proposed development where there is considered to be land comprising bushfire hazard.

16. Section 6.10 of the EIS[5] considers hazards and risks, including *inter alia* bush fire. A more detailed consideration of the impact of bushfire on the development has been provided in Section 6.10.4 of the EIS. This consideration was not based on a Bush Fire Assessment Report (BFAR) prepared in

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[1] Recommendation 27 - That Government commit to shifting to a strategic approach to planning for bush fire, and develop a new NSW Bush Fire Policy similar to the NSW Flood Prone Land Policy in order to accommodate changing climate conditions and the increasing likelihood of catastrophic bush fire conditions; to build greater resilience into both existing and future communities; and to decrease costs associated with recovery and rebuilding.

[2] https://www.planningportal.nsw.gov.au/major-projects/projects/glanmire-solar-farm

[3] NSW Rural Fire Service (2015) *Guide for Bush Fire Prone Land Mapping Version 5b*, Granville NSW

[4] Planning Secretary's Environmental Assessment Requirements SSD-21208499, dated 23/9/2021, p. 4.

[5] NGH (2022) *Environmental Impact Statement: Glanmire Solar Farm*, Version 2 Final.

accordance with *Planning for Bush Fire Protection 2019* (PBP)[6] nor did the consideration document a specific site assessment of the bush fire attack level based on the Methodology outlined in Appendix 1 of PBP.

17. The bushfire consideration has not considered agricultural activities on adjacent lands as a potential bushfire hazard impacting the development.

18. The bushfire consideration has applied "blanket" bush fire protection measures (BFPM) to the development in the absence of consideration of a site-specific bush fire attack assessment based on a detailed site assessment. It has also not contemplated changes in impact through revegetation/ vegetative screening measures required to ameliorate other impacts of the development and thus proposed as part of the development.

19. In order for a fire to occur and sustain, it requires the presence of oxygen, heat and fuel. In terms of a bushfire, the behaviour of the bushfire is influenced by topography, fuel and weather. Thus, in order to be able to consider the impacts of a bushfire on a particular development and vice versa, it is imperative to understand the local context influencing the bushfire behaviour. Vegetation is the only component that can be managed in order to influence bushfire behaviour.

20. In terms of topography, a fire travels faster uphill compared to over flat terrain or downhill. This is due to the flames being able to reach the fuel ahead of the fire more easily as well as the radiant heat preheating the fuel in front of the fire. Typically, the rate of spread of the fire will double for every ten degrees increase in slope. Aspect can also influence fire behaviour with northern and western aspects of hills tending to be dryer due to greater solar exposure.

21. The fuel for a bushfire is vegetation. The type of vegetation, how it is arranged, its compactness and volume, and moisture content all affect how a bushfire behaves.

22. Fire weather considerations include precipitation (or absence of), temperature, relative humidity, and wind. Fire Danger Ratings (FDR) provide an indication of the consequences of a fire should one start[7] or how difficult it will be to suppress the fire. These FDRs are shown on roadside signs and updated daily to reflect the forecast rating and range from Moderate to Catastrophic[8].

23. Measures of bushfire behaviour include rate of spread, intensity, flame length, and radiant heat flux.

24. There are a number of different models that are utilised to determine bushfire behaviour. The vegetation type determines which models are used. This is because bushfires behave differently through different vegetation complexes.

25. The solar farm site and its surrounds are observed to predominately comprise grassland or crop vegetation with scattered trees. The characteristic that most influences the spread of fire in this type of vegetation is the continuity of the fuel bed. The vegetation height will have the greatest influence on flame height and fuel load on fire intensity[9].

26. Improved pastures have a higher fuel load than native grasses and consequentially result in a comparatively greater fire intensity[10].

27. The curing state of grass and crops influence the ability of a fire to spread and the fire's rate of spread[11]. Cheney & Sullivan (2008) state:

    "Once the landscape is more than 90% cured there is potential for widespread devastating grassfires. By this point there are few natural barriers, such as green creek lines and gullies to inhibit the spread of fire"[12].

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[6] NSW Rural Fire Service (2019) *Planning for Bush Fire Protection: A guide for councils, planers, fire authorities and developers*, Granville NSW.
[7] NSW Rural Fire Service (nd) *Fire Danger Ratings*, https://www.rfs.nsw.gov.au/plan-and-prepare/fire-danger-ratings
[8] AFAC (nd) *Australian Fire Danger Rating System*, https://www.afac.com.au/initiative/afdrs/afdrs-overview/afdrs-design
[9] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria.
[10] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria.
[11] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[12] ibid, p. 55.

28. Other hazards, such as flooding, have a much more certain likelihood of occurring when the weather produces certain conditions. Bushfire on the other hand is reliant upon an ignition source. Bushfires can also occur when the weather conditions are less extreme providing there is an ignition.

29. As the moisture content of fuels decreases the ability to ignite becomes easier. Grassy fuels are capable of being ignited by very small embers or hot particles when the moisture content is below 6%. In these conditions fires can then be ignited by activities that would otherwise not cause ignition, such as "glowing carbon particles from defective exhausts, hot metal sparks from clashing power line conductors, grinding operations and metal striking rock during the operation of slashers or bulldozers"[13].

30. Similarly, during crop harvesting, it is not uncommon for fires to occur through metal harvester components contacting with rocks or from the build-up of flammable organic dust within the harvesting machinery[14].

31. Spontaneous combustion of stored natural fuels, such as silage pits and wet baled hay, are also recognised as an important catalyst for fires[15].

32. The *Chifley Bush Fire Risk Management Plan 2020* identifies the main sources of bushfire ignition in the area are:

    a. Lightning activity (mainly associated with late spring and early summer);

    b. Illegal / careless burning activities by private land owners/occupiers;

    c. Most commonly in grasslands and forested areas adjacent to villages.

    d. Escaped fires from legal burning activities by private land owners/occupiers;

    e. Campfires;

    f. Farm Machinery[16].

33. The structure and composition of grasses also affects the ability for ignition. Upright grasses that have recently died with little surface material are less able to be ignited. Conversely material that has partially decomposed is more likely to ignite as embers can make good contact with the fuel[17].

34. Wind can both hinder and assist ignition. Items such as metal sparks will be cooled by wind and thus will hinder ignition. Ignition from embers, cigarette butts, and other glowing combustion sources will be aided by wind. Once ignition has occurred, wind increases the combustion rate of a fire and will result in the rapid development of a fire. Under windy conditions even small fires become difficult to extinguish[18].

35. The land immediately surrounding the solar farm site comprises unmanaged grassland, improved pastures and croplands. These vegetation types are a classifiable type of vegetation pursuant to Appendix 1 of PBP and as such are capable of carrying a bushfire.

36. The solar farm site and its surrounds are characterised by undulating terrain with the landscape generally sloping in a south and south westerly direction towards Saltwater Creek. Consequentially the land to the west of the solar farm site is largely downslope of the site. The land to the south of the solar farm site is partially upslope and downslope of the site. The land to the east of the solar farm site is generally upslope of the site.

37. The following table outlines the bushfire behaviour outputs for a grassland fire with differing slopes characteristic of the locality:

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[13] ibid, p. 31.
[14] Miguel G. Cruz, Richard J. Hurley, Rachel Bessell and Andrew L. Sullivan. (2020), *Fire behaviour in wheat crops – effect of fuel structure on rate of fire spread* in 'International Journal of Wildland Fire' 2020, 29, 258–271.
[15] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria.
[16] Chifley Bush Fire Management Committee (2020) Chifley Bush Fire Risk Management Plan, NSW RFS, Bathurst.
[17] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[18] Ibid, p. 32

Table 1: Bushfire Attack Level Assessment Scenarios

Bushfire Behaviour Measure/Input	Scenario 1	Scenario 2	Scenario 3
Effective Slope	Flat	Downslope 3°	Downslope 5°
Site Slope	Flat	Downslope 3°	Downslope 5°
Asset Protection Zone (m)	10	10	10
Flame length (m)	7.94	8.8	9.43
Rate of spread (km/h)	14.3	17.59	20.19
Fire Intensity (kW/m)	44,330	54,525	62,594
Radiant Heat (kW/m²)	26.19	28.5	30.13

Notes:
Calculated utilising AS3959 (2018) Method 2 Detailed Method, using standard AS3959 and PBP inputs.

38. From the point of ignition, a bushfire continues to develop/grow until it reaches its potential rate of spread (i.e. it is fully developed). The bushfire behaviour outputs as outlined above are based on a fully developed fire.

39. The time a bushfire takes to reach full development will depend on weather conditions. Unstable conditions that are often characteristic of summer weather including hot north westerly winds with frequent and substantial changes in direction will increase the bushfire rate of spread quickly and thus will have a short time period to reach potential maximum rate of spread. Conversely stable weather conditions will result in a much longer time to reach potential maximum rate of spread[19].

40. It is a very real prospect that a bushfire could ignite on surrounding land and travel to impact the solar farm site.

41. The *Chifley Bush Fire Risk Management Plan 2020* identifies that the prevailing weather conditions for the bushfire season (November to January) in the Bathurst Regional LGA are westerly wind patterns[20]. Therefore, it is more likely that during the bushfire season a bushfire would be likely to impact the solar farm site from the west.

42. Assuming a grass fire had reached its potential rate of spread, using the outputs in **Table 1**, it would move at a rate of 4 to 5 metres per second or cover a distance of 100m in 17 to 25 seconds.

43. The residence time of grass fires is between 5-15 seconds (depending on fuel load and compaction)[21]. Whilst grass fires burn hot, the short residence time means that the duration of exposure is lower than other forms of vegetation (e.g., forest fires have a residence time of in the vicinity of 120 seconds).

44. Whilst grass fires have a shorter residence time compared to other vegetation forms, direct attack on a grass fire can only be utilised up to a fire intensity of around 10,000kW/m[22]. As seen in **Table 1**, a fully developed grass fire is expected to have an intensity of 44,330kW/m to 62,594kW/m.

[19] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[20] Chifley Bush Fire Management Committee (2020) Chifley Bush Fire Risk Management Plan, NSW RFS, Bathurst.
[21] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[22] NSW Rural Fire Service
https://nswrfs.atlassian.net/wiki/spaces/TECHNICAL/pages/44502820/Fire+Danger+Index+FDI+and+Fire+Danger+Ratings+FDR

45. Therefore, in order for direct attack to be successful on a grass fire, it would need to occur shortly after ignition and well before full development. Cheney and Sullivan identify that "it is highly unlikely that the head fire will be stopped by any suppression tactics until it runs into a very substantial barrier"[23].

46. Cheney and Sullivan further identify that in order for the barrier, such as a road or firebreak, to be successful, sufficient resources must be available to control the spot fires beyond the break (i.e. in the solar farm) once the fire reaches the break. The break must also be of sufficient width in order for fire fighters to work safely outside of their vehicles and enable spot fires to be suppressed immediately[24].

47. The effectiveness of a firebreak will be lessened when grasses have large seed heads, such as *Phalaris* spp., which enable spotting ahead of the fire[25]. Whilst grassfires typically result in less spotting than fires in other vegetation formations, the amount and distance of spotting would depend on the types of vegetative material and weather conditions.

48. Cheney and Sullivan further identify that when wind speeds exceed 25km/h firebreaks are likely to be ineffective as the winds will blow burning debris along the ground[26].

49. **Plate 1** shows the probability of a firebreak holding, based on width of the fire break and the intensity of the fire. The left-hand scenario assumes no trees within 20m of the firebreak and the right-hand scenario having trees within 20m of the firebreak.

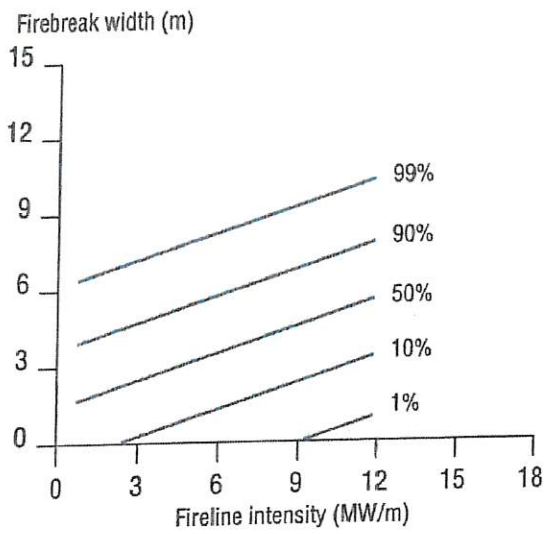

Figure 8.13: Probability of a firebreak holding a head fire in relation to fire intensity and firebreak width, where there are no trees within 20 m of the break. Source: After Wilson (1988).

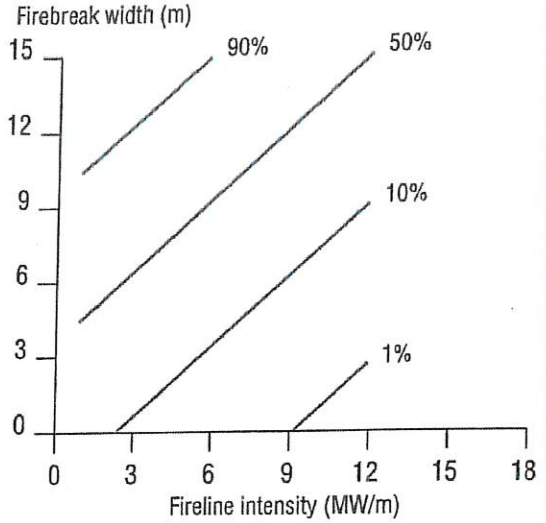

Figure 8.14: Probability of a firebreak holding a head fire in relation to fire intensity and firebreak width, where there are trees within 20 m of the break. Source: After Wilson (1988).

Plate 1: Probability of a firebreak holding under different scenarios[27]

50. The figures shown in **Plate 1** only include scenarios up to 12,000kW/m of intensity, whilst a fully developed fire would be likely to be three (3) to four (4) times that intensity.

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[23] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria, p. 96.
[24] Ibid p.97.
[25] Ibid.
[26] Ibid.
[27] Ibid p.103

51. **Plate 1** shows that a 10m wide fire break (i.e. the Asset Protection Zone (APZ)) with trees located within 20m of the fire break (i.e. the proposed visual screening) would have 20-30% chance of holding a head fire if the fire intensity was one third the intensity of a fully developed fire.

52. The Indicative Site Layout Plan for the proposed Solar Farm shows:

    a. A 10m wide landscape area will abut the western boundary of the site for more than half the length of the boundary, the southern boundary for approximately two thirds of the length of the boundary, and approximately half the length of the northern boundary of the solar farm site.

    b. A 5m wide landscape area will abut the balance of the western boundary of the site, the eastern boundary of the site and the balance of the northern boundary of the site (plus retention of an existing strip of vegetation).

    c. Two (2) watercourses within the site will be fenced off to provide waterway offset area (approximately 40m wide)

    d. The southern part of the site will be fenced off to retain existing scattered trees.

    e. An exclusion zone is to be provided in the northern part of the site and inside of the boundary screen planting. It is understood that will remain as grassland.

    f. An Asset Protection Zone (APZ) 10m wide is generally to be provided on the inside of the boundary screen planting or between the offset/riparian areas and the solar farm infrastructure. The majority of the APZ includes an access road, however, the central part of the western boundary does not and neither does the central riparian corridor.

53. The Landscape Concept Plan shows that the landscape planting, in the 5 and 10m landscape strips, riparian corridors and exclusion/pasture areas will provide significant revegetation and density of vegetation, in some areas introducing a vegetation likely to be consistent with forest classification.

54. This revegetation will introduce a very different bushfire risk to the site compared to the existing grassland vegetation. For example, whilst the rate of spread of the fire would be slower in a forest type vegetation compared to grassland, it would have significantly greater flame lengths, greater radiant heat, longer residence time, and increased chance of spotting. This different bushfire risk resulting from revegetation has not been considered in the assessment and the mitigation measure have not been provided to reflect the different bushfire behaviour.

55. The location of the APZ on the inside of landscape buffers will do little in the way of providing an effective APZ. The APZs will essentially be a narrow corridor between tall forest like vegetation and the solar panels. It will not provide a safe space for fire fighters to operate and will not provide a functional defendable space due to the narrowness and density of vegetation restricting views toward the approaching fire. Furthermore, many of the areas of the APZ do not have access provided.

56. Considering the scenarios in **Plate 1**, it not expected that the proposed APZ would provide for a suitable fire break in order to halt the spread of fire onto the Solar Farm Site nor to provide a suitable, tenable or safe environment in which to defend the Solar Farm site from, particularly given the length of these narrow APZ area.

57. In terms of access, it has not been demonstrated that the required passing bays (every 200m) and turnarounds can be achieved in order to comply with the PBP requirements.

58. The water supply proposed to be provided for firefighting purposes is the equivalent of that required to protect one (1) dwelling house. The solar farm site has a perimeter distance of over 6km and an area of nearly 200 hectares. The proposed water supply would be vastly insufficient to provide any meaningful protection of the site.

59. In the absence of a specific numerical guideline for water supply volume for solar farms in PBP, the recent Country Fire Service *Design Guidelines and Model Requirements: Renewable Energy Facilities*[28] could be utilised as a best practice guide, which requires:

    a. Generally for the solar farm one (1) x 45,000L static water tank for every 100 hectares of a site, plus,

    b. For the battery energy storage system protection, no less than 288,000L or as per the provisions for Open Yard Protection of AS 2419.1-2005 flowing for a period of no less than four hours at 20L/s, whichever is the greater, plus

    c. For the substation.

If you have any questions regarding this opinion, please contact the undersigned on 0400 940 482.

Yours sincerely

Erika Dawson
Director | BPAD Level 3 Accredited Practitioner (NSW & WA) | Registered Planner PIA

[28] Country Fire Authority (2022). https://www.cfa.vic.gov.au/ArticleDocuments/550/220503_Design_Guidelines_Model_Requirements_Renewable_Energy_Facilities_v1.pdf.aspx

Integrated Consulting
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Our Ref.: 22101-L04_A

Glanmire Action Group
C/- Mr Jonty Boshier
Hennessy Dowd Lawyers
PO Box 697
Bathurst NSW 2795

7 December 2023

Dear Mr Boshier

GLANMIRE SOLAR FARM – OPINION ON BUSH FIRE & TOWN PLANNING IMPACTS IN RELATION TO THE DEPARTMENT OF PLANNING AND ENVIRONMENT'S ASSESSMENT REPORT

1. This opinion has been provided in response to an email request from Hennessy Dowd Lawyers in relation to the Department of Planning And Environment's (DPE) Assessment Report and Recommended Consent Condition associated with the proposed Glanmire Solar Farm State Significant Development Application (SSD-21208499) that was published on the Major Project's website[1].

2. I have the following academic qualifications:

    a. Graduate Diploma in Bushfire Protection with Distinction (University of Western Sydney)

    b. Graduate Certificate in Development Planning (Curtin University of Technology)

    c. Graduate Diploma in Natural Resources (University of New England)

    d. Bachelor of Urban and Regional Planning with Honours (University of New England)

3. I am accredited:

    a. by the Fire Protection Association Australia (FPAA) under the Bushfire Planning and Design (BPAD) Scheme (BPAD36371) as a Level 3 Accredited Practitioner in New South Wales and Western Australia. The NSW Rural Fire Service (RFS) recognise this accreditation as "as a person who is qualified consultant in bush fire risk assessment" for the purposes of environmental planning legislation.

    b. By the Planning Institute of Australia (PIA) as a Registered Planner (NSW).

4. I have 23 years' experience working in the planning industry, with the most recent eleven years also incorporating bushfire planning. My experience has been both working in the private sector for various consultancies as well as for local government and consulting for both local and state government.

5. I have previously reviewed the Environmental Impact Statement (EIS) and Response to Submissions (RTS) prepared by NGH as publicly exhibited on the Major Projects Website[2]. It is understood the application seeks approval for construction, operation and decommissioning of a 60MW solar farm on Lot 141 DP 1144786 (the solar farm site).

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[1] https://www.planningportal.nsw.gov.au/major-projects/projects/glanmire-solar-farm
[2] Ibid.

6. I have viewed the solar farm site from surrounding public roads and adjoining private properties. This site inspection was carried out on Friday 2 December 2022.

7. I have previously provided three opinions[3][4][5] on the original SSD Application.

8. I have reviewed the following documents in providing this opinion:

   a. Department of Planning and Environment, 2023. *Glanmire Solar Farm State Significant Development Assessment Report (SSD 21208499), DPE.*

   b. Recommended Development Consent Conditions.

9. For ease of reference, the comments in this opinion are provided in relation to the Sections of the Assessment Report and recommended conditions associated with the SSD Application.

SECTION 4 – ENGAGEMENT

10. In table 4 in relation the NSW Rural Fire Service (RFS) response, the DPE report states:

    NSW RFS raised no objections subject to compliance with Planning for Bush Fire Protection 2019.

11. It should be noted that the RFS does not have a statutory requirement in relation to this DA.

12. The referral response from RFS did not state that the DA was consistent with *Planning for Bush Fire Protection 2019* (PBP).

SECTION 5 – ASSESSMENT

13. At paragraph 56 the report states:

    The key constraints for the project are shown in Figure 2. The Department has also considered the full range of potential impacts associated with the project and has included a summary of the conclusions in Section 5.4.

14. Figure 2 does not reference bushfire hazards, either existing or proposed. The only consideration of bushfire is the Asset Protection Zones (APZ) which have not been sized based on the actual risk of the site.

SECTION 5.2.2 - PROVISIONS OF THE TRANSPORT AND INFRASTRUCTURE SEPP

15. At paragraph 72, the report states:

    The Department considers that the project would not significantly conflict with any of the existing or approved residential developments or agricultural land uses on the surrounding lots, given:

    - *these lots all have a minimum lot size of 100 ha in accordance with the Bathurst LEP;*
    - *the Bathurst Regional Development Control Plan 2014 requires a boundary set back of 50m for all residential developments on lots greater than 20 ha;*
    - *the project infrastructure would be setback from the boundary of the site (to allow for vegetation screening and asset protection zones);*
    - *there would be negligible potential for noise and/or air quality impacts on surrounding lands due to these setback distances, and the large stands of vegetation that would be retained and planted around the site.*

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[3] Integrated Consulting, 2022. *Glanmire Solar Farm – Opinion on Bush Fire Impacts.*
[4] Integrated Consulting, 2022. *Glanmire Solar Farm – Town Planning Opinion.*
[5] Integrated Consulting, 2023. *Glanmire Solar Farm – Opinion on Bush Fire & Town Planning Impacts in Relation To Response To Submissions Report*

16. The assessment has not adequately considered impact from bushfire and compliance with *Planning for Bush Fire Protection 2019* as outlined in our previous opinions, in order to reach the above conclusions.

17. The proposed vegetative screening conflicts with the limited bushfire protection measures proposed, as outlined in our previous opinions.

SECTION 5.2.3 – POTENTIAL LOSS OF AGRICULTURAL LAND

18. At paragraph 89 the DPE report states:

Although the project would include disturbance to a small area of Class 3 land, the inherent agricultural capability of the land would not be affected given the relatively low scale of the development, and Elgin's commitment to return the land back to existing levels of agricultural capability following decommissioning.

19. The area of Class 3 land directly impacted by the development has been quantified as 40.6 hectares. The area of Class 3 land equates to 25.55% of the area impacted by the development. This is not a small area, either in hectares or as a proportion of the impact area. An area of 40 hectares equates to nearly half of the minimum lot size in the RU1 zone.

20. It should be noted that Table 6 in the DPE report has an error in the left-hand column of the first row. The loss of class 3 land within the development footprint should be the full 40.6ha (and 25.5%) as the riparian corridor rehabilitation works to be carried out form part of the development and will remain lost in perpetuity.

21. The application has not contemplated alternative designs or locations in order to avoid the Class 3 land. Alternative layouts to avoid the class 3 land should have been reasonably considered as part of the then clause 7(1)(c) of the *Environmental Planning and Assessment Regulation 2000* considerations as required in the issued SEARs.

22. The NSW Department of Primary Industries provided the following guidance on the use the various Agricultural Land Use mapping products:

Each map is created for a specific purpose. The maps discussed in this user's guide are broken into two themes. The first being maps that are developed using biophysical data only such as soil, climate or topography (eg Biophysical Strategic Agricultural Land or Land and Soil Capability mapping). These types of maps help to identify land where agricultural industries that rely on certain biophysical criteria may be located. The second theme are maps that include biophysical information plus economic and social data too such as infrastructure, access to markets, economic advantages and labour (eg Important Agricultural Land or Critical Industry Cluster mapping). These maps also help those identify industries not reliant of biophysical criteria for their location such as intensive agriculture (eg poultry or protected cropping)[6].

23. In relation to the use of Land and Soil Capability (LSC), DPI advise:

The LSC assessment scheme is suitable for broad-scale assessment of land capability, particularly for assessment of lower intensity, dry-land agricultural land use. LSC maps provide a guide to the capability of the land and the broad identification of soil management problems.

It is less applicable for high intensity land use or non soil reliant industries (eg poultry)[7].

24. The guide states that the methodologies used by the mapping that includes both biophysical criteria and economic and social data are preferred to be used due to the combination of biophysical,

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[6] NSW Department of Primary Industries, 2017. Prime Fact: Agricultural Land Use Mapping Resources in NSW - User's guide, NSW DPI, p. 1.
[7] NSW Department of Primary Industries, 2017. Prime Fact: Agricultural Land Use Mapping Resources in NSW - User's guide, NSW DPI, p. 3.

economic and social inputs at the state, regional and local level. This is important as some agricultural industries have no or little reliance on purely biophysical factors[8].

25. In this regard it is considered flawed to limit consideration to LSC Class 3 land in the consideration of impact on agricultural land.

26. It is not clear how the Department can conclude that "the inherent agricultural capability of the land would not be affected" by the development. The land would be removed from production for a period of at least 50 years. Given the recommended conditions enable replacement of infrastructure there is nothing to suggest the solar farm could not feasibly remain on the site for far longer and thus be permanently lost to agricultural land uses. In any case, 50 years is a substantial period for the land to be on removed from agricultural land use.

27. The requirement for rehabilitation of the site has been reflected in a recommended condition of consent (no.C34). Concern is raised as to the reality of decommissioning and returning the site to existing levels of agricultural capability after a period of 50 years. It is recommended that a security deposit be required from the developer, like required for mining developments, to cover the full rehabilitation costs of the development site to ensure that it is rehabilitated at the end of its life.

28. As outlined in the DR Agriculture Peer Review Letter[9] at paragraph 6, the construction and remediation works will alter the soil structure and have the real potential to adversely alter the land capability as a direct result of the development works.

29. At paragraph 90, the DPE report states:

    To this end, the Department has included requirements to maintain the site's current land capability, including ground cover within the development footprint, where practicable, during the construction and operation of the project. Elgin would be required to fully reinstate the agricultural capability of the land following decommissioning of the project, including the requirement to return the development footprint to existing land and soil capability.

30. The retention of groundcover within the development footprint presents a bushfire risk unless it is maintained in a managed state. This has not been addressed in the report nor recommended conditions of consent.

31. Further as outlined in the DR Agriculture Peer Review Letter[10] at paragraph 8, the actual practicality of grazing the land in a meaningful and non-impactful manner so as to maintain the current land capability is not considered realistic.

32. In summary, the assessment has discounted the loss of agricultural land by making the assumption that the land will be returned to agricultural land use after 50 years. The assessment has not realistically or practically considered the impact of the works on the soil structure and consequentially the impact on land capability. It has not demonstrated that any consideration was given to avoiding the Class 3 land. It has limited assessment to the consideration of LSC and has not considered impact on productivity. The recommended mitigation measures are not practically feasible in maintaining land capability and result in direct conflict with hazards and risk of the development.

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[8] NSW Department of Primary Industries, 2017. Prime Fact: Agricultural Land Use Mapping Resources in NSW - User's guide, NSW DPI, p.1-2.
[9] D R Agriculture Pty Limited, 2023. *Peer Review – Glanmire Solar Farm Minesoils' and DPE's 2023 Reports (sections of).*
[10] D R Agriculture Pty Limited, 2023. *Peer Review – Glanmire Solar Farm Minesoils' and DPE's 2023 Reports (sections of).*

SECTION 5.3.3 - IMPACTS ON LANDSCAPE CHARACTER

33. The development relies upon vegetative screening to mitigate the visual impacts of the development.

34. A Land and Environment Court (LEC) Planning Principle was established in Super Studio v Waverley Council[2004] NSWLEC 91- at paragraphs 5-7. Paragraph 6 is pertinent to this matter:

> 6 *The second principle is that where proposed landscaping is the main safeguard against overlooking, it should be given minor weight. The effectiveness of landscaping as a privacy screen depends on continued maintenance, good climatic conditions and good luck. While it is theoretically possible for a council to compel an applicant to maintain landscaping to achieve the height and density proposed in an application, in practice this rarely happens.*

35. Whilst in this instance overlooking is not the issue, the effectiveness of landscaping to mitigate visual impacts remains consistent, in that it is not an effective safeguard.

36. As outlined in our previous opinions, the proposed vegetative screening conflicts with the limited bushfire protection measures proposed.

SECTION 5.4 – OTHER ISSUES

Historic Heritage

37. The development relies upon revegetation of the northern part of the operational area in order to limit views of the development from the 'Woodside' heritage item. As outlined in our previous opinions, this revegetation will introduce a new bushfire risk to the area and conflicts with the limited bushfire protection measures proposed.

Bushfire Risk

38. The report states:

- *To actively manage risk, Elgin would implement a range of management measures including (but not limited to):*
  - *Establish and maintain a 10 m Asset Protection Zone around all critical project infrastructure;*
  - *The substation and transformer would be provided with an increased 20m wide APZ;*
  - *Comply with the requirements of RFS's Planning for Bushfire Protection 2019 and Standards for Asset Protection Zones;*
  - *Prepare an Emergency Plan, consistent with the recommendations of Fire and Rescue NSW.*
- *The Department considers the bushfire risks can be suitably controlled through the implementation of standard fire management procedures.*

And further provides the following recommended condition:

- *Implement procedures and controls for managing fire hazards, including maintenance of an asset protection zone in accordance with requirements of the RFS's Planning for Bushfire Protection guidelines 2019.*

39. As outlined in our previous opinions, the application does not provide adequate consideration of the bushfire risk to the site and by no way demonstrates compliance with PBP.

40. The Department has failed to give full and proper consideration to the bush fire risk both to and from the development. Neither the development nor the DPE assessment report has demonstrated compliance with PBP.

41. Simply conditioning compliance with PBP without properly considering whether the development can achieve compliance is a failure in statutory obligations under section 4.15(1) of the *Environmental Planning and Assessment Act 1979*.

42. Imposing a condition that requires compliance with PBP would be an unlawful condition as it is uncertain and unclear as to how compliance would be reasonably achieved.

43. Further, the DPE report states:

    - *The Department considers that the risk of fire spreading into the site from an adjoining property, or from the solar arrays and infrastructure to an adjoining property would be adequately mitigated with implementation of the above management measures and adherence to the recommended consent conditions. While insurance premiums/availability can vary to take into account different factors including where there is increased bushfire risk, the Department considers that with the recommended conditions there would not be an increase in bushfire risk.*

44. As outlined in our previous opinions, the proposed development has not given adequate consideration to the bushfire risk to demonstrate that the proposed mitigation measures would be sufficient for the proposed development. It is therefore unclear how the Department can reach the above conclusion in the absence of full and proper assessment.

Community Benefit

45. The comments from paragraphs 83 and 84 of our previous RTS opinion[11] are reiterated in relation to the value of the proposed Community Benefit Scheme.

RECOMMENDED CONSENT CONDITIONS

Length of Approval

46. The consent conditions do not limit the approval to a maximum of 40 years operation. Condition B6 permits upgrading of the solar panels and ancillary infrastructure, which would facilitate a longer life of the development beyond the stated 40 years. It is therefore considered unreasonable to assume that the solar farm would only remove the land from agricultural production for a period of 50 years, and place significant weight on this assumption in discounting the impact to agricultural land and production.

Subdivision

47. Condition B11 permits subdivision as shown on the plan in Appendix 3 of the Recommended Consent conditions. However, the EIS states:

    Essential Energy assets within the substation area will be subject to a formal subdivision application through Bathurst Regional Council.

48. As the application did not seek consent for subdivision, it is questioned as to why condition B11 has been included.

49. Furthermore, it is not evident that the relevant statutory provisions relating to subdivision have been addressed within the assessment report or EIS.

[11] Glanmire Solar Farm – Opinion On Bush Fire & Town Planning Impacts In Relation To Response To Submissions Report.

Vegetation Buffer

50. Condition C8 relates to the requirement for a vegetation buffer (landscape screening) which *inter alia* requires:

> *... The landscape screening must:*
>
> ...
>
> *(c) be designed and maintained in accordance with RFS's Planning for Bushfire Protection 2019 (or equivalent); and*
>
> ...

51. There are no provisions of PBP that relate to landscape screening. Therefore, the condition cannot be reasonable applied/enforced as it provides no standards to be complied with.

52. Furthermore, the very nature of the landscape screening as proposed, means that it could never constitute an Asset Protection Zone nor a low threat exclusion. Thus, the landscape screening cannot comply with PBP.

Land Management

53. Condition C9 states:

> *The Applicant must maintain the agricultural land capability of the site, including:*
>
> *(a) establishing the ground cover of the site within 3 months following the completion of any construction or upgrading;*
>
> *(b) properly maintaining the ground cover with appropriate perennial species and weed management; and*
>
> *(c) maintaining grazing within the development footprint, where practicable,*
>
> *unless the Planning Secretary agrees otherwise.*

54. Whilst the condition identifies that the ground cover needs to be grazed, there is no requirement to maintain the vegetation in a low threat state that would not constitute a bush fire hazard. This condition would permit and actually require the vegetation cover over the site to be a bush fire hazard.

55. As outlined in the DR Agriculture Peer Review Letter[12] at paragraph 8, the proposed grazing to maintain the agricultural land capability of the site cannot be realistically achieved.

Hazards

56. Condition C27 requires the preparation of a Fire Safety Study (FSS) to the satisfaction of Fire and Rescue NSW. Given the hazards interrelate with bushfire, the FSS should also consider bushfire risk and also be to the satisfaction of the RFS.

57. The FSS is likely to require changes to the development in order to adequately consider the hazard and bushfire risks and provide for appropriate mitigation measures (i.e. separation to hazards (APZs), access (only one access point from a public road), and water supply or other suppression requirements). For example, is 10m or 20m (proposed APZs) separation sufficient to achieve acceptable risk reductions in radiant heat impact from the bush fire prone vegetation. In this regard, this assessment should not be conditionally required and should be carried out prior to determination of the application.

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[12] D R Agriculture Pty Limited, 2023. *Peer Review – Glanmire Solar Farm Minesoils' and DPE's 2023 Reports (sections of).*

58. Condition 29 states:

The Applicant must:

(a) minimise the fire risks of the development, including managing vegetation fuel loads on-site;

(b) ensure that the development:

(i) complies with the relevant asset protection requirements in the RFS's Planning for Bushfire Protection 2019 (or equivalent) and Standards for Asset Protection Zones; and

(ii) is suitably equipped to respond to any fires on site including provision of a 20,000 litre water supply tank(s), fitted with a 65 mm Storz fitting and a FRNSW compatible suction connection;

(c) ensure that the development, including battery storage area:

(i) includes a minimum 10 metre defendable space around the perimeter that permits unobstructed vehicle access assist the RFS and emergency services as much as practicable if there is a fire in the vicinity of the site; and

(ii) is managed as an asset protection zone (including the defendable space);

(d) assist the RFS and emergency services as much as practicable if there is a fire in the vicinity of the site; and

(e) notify the relevant local emergency management committee following construction of the development, and prior to commencing operations.

59. As outlined in paragraphs 37 to 40 above the measures proposed within the EIS do not demonstrate compliance with PBP, and the measures proposed have not been demonstrated to be commensurate with the level of bushfire risk.

60. Furthermore, the RFS's own Operational Protocol for incidents involving Photovoltaic (Solar) Arrays and Battery Electric Storage Systems[13] states:

Firefighting activities will not occur within 8m of any generation infrastructure (such as panels, batteries, or transmission infrastructure), or by accessing a fenced-off area, without explicit assurance from the facility manager of de-energisation of the infrastructure.

61. Therefore, providing a 10m wide APZ will leave 2m strip for the RFS to operate within which will be directly adjacent to the screening vegetation/rehabilitated areas.

62. Apart from not having demonstrated that the APZs are of a sufficient width to provide for adequate separation to the hazard in terms of the effects of bushfire (i.e. radiant heat and flame contact), it is clearly evident that the proposed APZs are deficient for the required function of defendable space.

Decommissioning and Rehabilitation

63. As outlined in the DR Agriculture Peer Review Letter[14] at paragraph 6, the earthworks required for construction and demolition of the solar farm will result in soil structure alteration which has a real likelihood of adversely affecting land capability.

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[13] NSW Rural Fire Service, 2022. *OP 1.2.22 Operational Protocol for Incidents Involving Photovoltaic (Solar) Arrays And Battery Electric Storage Systems*, NSW RFS.

[14] D R Agriculture Pty Limited, 2023. *Peer Review – Glanmire Solar Farm Minesoils' and DPE's 2023 Reports (sections of).*

If you have any questions regarding this opinion, please contact the undersigned on 0400 940 482.

Yours sincerely

[redacted]

Erika Dawson
Director | BPAD Level 3 Accredited Practitioner (NSW & WA) | Registered Planner PIA

Attachments:
1. Integrated Consulting, 2022. Glanmire Solar Farm – Opinion On Bush Fire Impacts.
2. Integrated Consulting, 2022. Glanmire Solar Farm – Town Planning Opinion, p. 12.

Integrated Consulting
Planning | Bushfire | Surveying

Attachment 1

Glanmire Solar Farm – Opinion On Bush Fire Impacts.

Integrated Consulting
Planning | Bushfire | Surveying

Our Ref.: 22101-L01_C

Glanmire Action Group
C/- Mr Jonty Boshier
Hennessy Dowd Lawyers
PO Box 697
Bathurst NSW 2795

13 December 2022

Dear Mr Boshier

GLANMIRE SOLAR FARM – OPINION ON BUSH FIRE IMPACTS

1. This opinion has been provided in response to an email request from Hennessy Dowd Lawyers in relation to the bushfire impacts on the proposed Glanmire Solar Farm State Significant Development Application (SSD-21208499) that is on public exhibition from 18 November 2022 to 15 December 2022.
2. This opinion is provided in response to the following specific questions:
    a. The prospect of fire commencing on a neighbouring rural property as described, and its potential for causing damage to the solar plant if permission is granted to install it on the rectangular block to which we have referred.
    b. The speed with which a fire travels or is capable of travelling through, for example a crop ready for harvest, and the speed with which the fire front can extend by the time it reaches the boundary of the proposed solar plant.
    c. The "spotting distance" of embers.
    d. The location from where such a fire can reasonably be feasible to control.
3. I have the following academic qualifications:
    a. Graduate Diploma in Bushfire Protection with Distinction (University of Western Sydney)
    b. Graduate Certificate in Development Planning (Curtin University of Technology)
    c. Graduate Diploma in Natural Resources (University of New England)
    d. Bachelor of Urban and Regional Planning with Honours (University of New England)
4. I am accredited:
    a. by the Fire Protection Association Australia (FPAA) under the Bushfire Planning and Design (BPAD) Scheme (BPAD36371) as a Level 3 Accredited Practitioner in New South Wales and Western Australia. The NSW Rural Fire Service (RFS) recognise this accreditation as "as a person who is qualified consultant in bush fire risk assessment" for the purposes of environmental planning legislation.
    b. By the Planning Institute of Australia (PIA) as a Registered Planner (NSW).
5. I have 22 years' experience working in the planning industry, with the most recent ten years also incorporating bushfire planning. My experience has been both working in the private sector for various consultancies as well as for local government and consulting for both local and state government.

6. I am currently a member of the DPE/RFS Working Group for Recommendation 27[1] from the NSW Bushfire Inquiry.

7. I have reviewed the Environmental Impact Statement prepared by NGH as publicly exhibited on the Major Projects Website[2]. It is understood the application seeks approval for construction, operation and decommissioning of a 60MW solar farm on Lot 141 DP 1144786 (the solar farm site).

8. I have viewed the solar farm site from surrounding public roads and adjoining private properties. This site inspection was carried out on Friday 2 December 2022.

9. Each Council, where a Bush Fire Risk Management Plan applies, is required by section 10.3 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), to prepare a map that identifies bush fire prone land. This map is required to be certified by the Commissioner of the NSW Rural Fire Service (RFS) and is thence known as the "Bush Fire Prone Land Map" (BFPL Map) for the Council. Council is required to update the map at least every five (5) years.

10. The RFS has published the *Guide for Bush Fire Prone Land Mapping* [3] to assist Councils in preparing the BFPL Map. This guide was last updated in November 2015 and introduced a new Category 3 Vegetation which encompasses medium risk bush fire vegetation including *inter alia* grassland vegetation. Councils were provided with a three (3) year period (from the November 2015 publication) by the RFS to update their mapping to include the Category 3 Vegetation. Bathurst Regional Council has not amended its BFPL Map to include Category 3 Vegetation.

11. In my opinion the solar farm site and its surrounds should be classified as Category 3 Vegetation as it comprises grassland that is not maintained in a managed state (for the purposes of considering bushfire hazard) and cropping is observed as being intermittently carried out and cannot be reasonably excluded from being bush fire prone land on this basis.

12. The purpose of the BFPL Mapping is to provide a legislative trigger for consideration of bushfire as part of planning and building approval processes. For SSD applications, developments on mapped BFPL would ordinarily be referred to the RFS for input to the Planning Secretary's Environmental Assessment Requirements (SEARs).

13. A review of the SEARs issued for the project does not identify bushfire as a specific matter to be addressed, apart from in general consideration of risks and hazards "an assessment of potential hazards and risks including but not limited to bushfires, spontaneous ignition, electromagnetic fields..."[4]. No indication was given as to whether the RFS was consulted as part of the preparation of the SEARs.

14. A review of SEARs for other projects where the land has been mapped as BFPL have included more detailed consideration of bushfire such as "identify potential hazards and risks associated with bushfires / use of bushfire prone land including the risks that a solar farm would cause bush fire and demonstrate compliance with Planning for Bush Fire Protection 2019".

15. The absence of a site being mapped as bush fire prone on the BFPL Map does not obviate the consent authority from the need to consider bushfire risks and impacts either from or to a development. Section 4.15 of the EP&A Act necessitates the consideration of bushfire in relation to a proposed development where there is considered to be land comprising bushfire hazard.

16. Section 6.10 of the EIS[5] considers hazards and risks, including *inter alia* bush fire. A more detailed consideration of the impact of bushfire on the development has been provided in Section 6.10.4 of the EIS. This consideration was not based on a Bush Fire Assessment Report (BFAR) prepared in

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[1] Recommendation 27 - That Government commit to shifting to a strategic approach to planning for bush fire, and develop a new NSW Bush Fire Policy similar to the NSW Flood Prone Land Policy in order to accommodate changing climate conditions and the increasing likelihood of catastrophic bush fire conditions; to build greater resilience into both existing and future communities; and to decrease costs associated with recovery and rebuilding.

[2] https://www.planningportal.nsw.gov.au/major-projects/projects/glanmire-solar-farm

[3] NSW Rural Fire Service (2015) *Guide for Bush Fire Prone Land Mapping Version 5b*, Granville NSW

[4] Planning Secretary's Environmental Assessment Requirements SSD-21208499, dated 23/9/2021, p. 4.

[5] NGH (2022) *Environmental Impact Statement: Glanmire Solar Farm*, Version 2 Final.

accordance with *Planning for Bush Fire Protection 2019* (PBP)[6] nor did the consideration document a specific site assessment of the bush fire attack level based on the Methodology outlined in Appendix 1 of PBP.

17. The bushfire consideration has not considered agricultural activities on adjacent lands as a potential bushfire hazard impacting the development.

18. The bushfire consideration has applied "blanket" bush fire protection measures (BFPM) to the development in the absence of consideration of a site-specific bush fire attack assessment based on a detailed site assessment. It has also not contemplated changes in impact through revegetation/ vegetative screening measures required to ameliorate other impacts of the development and thus proposed as part of the development.

19. In order for a fire to occur and sustain, it requires the presence of oxygen, heat and fuel. In terms of a bushfire, the behaviour of the bushfire is influenced by topography, fuel and weather. Thus, in order to be able to consider the impacts of a bushfire on a particular development and vice versa, it is imperative to understand the local context influencing the bushfire behaviour. Vegetation is the only component that can be managed in order to influence bushfire behaviour.

20. In terms of topography, a fire travels faster uphill compared to over flat terrain or downhill. This is due to the flames being able to reach the fuel ahead of the fire more easily as well as the radiant heat preheating the fuel in front of the fire. Typically, the rate of spread of the fire will double for every ten degrees increase in slope. Aspect can also influence fire behaviour with northern and western aspects of hills tending to be dryer due to greater solar exposure.

21. The fuel for a bushfire is vegetation. The type of vegetation, how it is arranged, its compactness and volume, and moisture content all affect how a bushfire behaves.

22. Fire weather considerations include precipitation (or absence of), temperature, relative humidity, and wind. Fire Danger Ratings (FDR) provide an indication of the consequences of a fire should one start[7] or how difficult it will be to suppress the fire. These FDRs are shown on roadside signs and updated daily to reflect the forecast rating and range from Moderate to Catastrophic[8].

23. Measures of bushfire behaviour include rate of spread, intensity, flame length, and radiant heat flux.

24. There are a number of different models that are utilised to determine bushfire behaviour. The vegetation type determines which models are used. This is because bushfires behave differently through different vegetation complexes.

25. The solar farm site and its surrounds are observed to predominately comprise grassland or crop vegetation with scattered trees. The characteristic that most influences the spread of fire in this type of vegetation is the continuity of the fuel bed. The vegetation height will have the greatest influence on flame height and fuel load on fire intensity[9].

26. Improved pastures have a higher fuel load than native grasses and consequentially result in a comparatively greater fire intensity[10].

27. The curing state of grass and crops influence the ability of a fire to spread and the fire's rate of spread[11]. Cheney & Sullivan (2008) state:

    "Once the landscape is more than 90% cured there is potential for widespread devastating grassfires. By this point there are few natural barriers, such as green creek lines and gullies to inhibit the spread of fire"[12].

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[6] NSW Rural Fire Service (2019) *Planning for Bush Fire Protection: A guide for councils, planers, fire authorities and developers*, Granville NSW.
[7] NSW Rural Fire Service (nd) *Fire Danger Ratings*, https://www.rfs.nsw.gov.au/plan-and-prepare/fire-danger-ratings
[8] AFAC (nd) *Australian Fire Danger Rating System*, https://www.afac.com.au/initiative/afdrs/afdrs-overview/afdrs-design
[9] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria.
[10] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria.
[11] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[12] ibid, p. 55.

28. Other hazards, such as flooding, have a much more certain likelihood of occurring when the weather produces certain conditions. Bushfire on the other hand is reliant upon an ignition source. Bushfires can also occur when the weather conditions are less extreme providing there is an ignition.

29. As the moisture content of fuels decreases the ability to ignite becomes easier. Grassy fuels are capable of being ignited by very small embers or hot particles when the moisture content is below 6%. In these conditions fires can then be ignited by activities that would otherwise not cause ignition, such as "glowing carbon particles from defective exhausts, hot metal sparks from clashing power line conductors, grinding operations and metal striking rock during the operation of slashers or bulldozers"[13].

30. Similarly, during crop harvesting, it is not uncommon for fires to occur through metal harvester components contacting with rocks or from the build-up of flammable organic dust within the harvesting machinery[14].

31. Spontaneous combustion of stored natural fuels, such as silage pits and wet baled hay, are also recognised as an important catalyst for fires[15].

32. The *Chifley Bush Fire Risk Management Plan 2020* identifies the main sources of bushfire ignition in the area are:

    a. Lightning activity (mainly associated with late spring and early summer);

    b. Illegal / careless burning activities by private land owners/occupiers;

    c. Most commonly in grasslands and forested areas adjacent to villages.

    d. Escaped fires from legal burning activities by private land owners/occupiers;

    e. Campfires;

    f. Farm Machinery[16].

33. The structure and composition of grasses also affects the ability for ignition. Upright grasses that have recently died with little surface material are less able to be ignited. Conversely material that has partially decomposed is more likely to ignite as embers can make good contact with the fuel[17].

34. Wind can both hinder and assist ignition. Items such as metal sparks will be cooled by wind and thus will hinder ignition. Ignition from embers, cigarette butts, and other glowing combustion sources will be aided by wind. Once ignition has occurred, wind increases the combustion rate of a fire and will result in the rapid development of a fire. Under windy conditions even small fires become difficult to extinguish[18].

35. The land immediately surrounding the solar farm site comprises unmanaged grassland, improved pastures and croplands. These vegetation types are a classifiable type of vegetation pursuant to Appendix 1 of PBP and as such are capable of carrying a bushfire.

36. The solar farm site and its surrounds are characterised by undulating terrain with the landscape generally sloping in a south and south westerly direction towards Saltwater Creek. Consequentially the land to the west of the solar farm site is largely downslope of the site. The land to the south of the solar farm site is partially upslope and downslope of the site. The land to the east of the solar farm site is generally upslope of the site.

37. The following table outlines the bushfire behaviour outputs for a grassland fire with differing slopes characteristic of the locality:

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[13] ibid, p. 31.
[14] Miguel G. Cruz, Richard J. Hurley, Rachel Bessell and Andrew L. Sullivan. (2020), *Fire behaviour in wheat crops – effect of fuel structure on rate of fire spread* in 'International Journal of Wildland Fire' 2020, 29, 258–271.
[15] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria.
[16] Chifley Bush Fire Management Committee (2020) Chifley Bush Fire Risk Management Plan, NSW RFS, Bathurst.
[17] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[18] Ibid, p. 32

Table 1: Bushfire Attack Level Assessment Scenarios

Bushfire Behaviour Measure/Input	Scenario 1	Scenario 2	Scenario 3
Effective Slope	Flat	Downslope 3°	Downslope 5°
Site Slope	Flat	Downslope 3°	Downslope 5°
Asset Protection Zone (m)	10	10	10
Flame length (m)	7.94	8.8	9.43
Rate of spread (km/h)	14.3	17.59	20.19
Fire Intensity (kW/m)	44,330	54,525	62,594
Radiant Heat (kW/m²)	26.19	28.5	30.13

Notes:
Calculated utilising AS3959 (2018) Method 2 Detailed Method, using standard AS3959 and PBP inputs.

38. From the point of ignition, a bushfire continues to develop/grow until it reaches its potential rate of spread (i.e. it is fully developed). The bushfire behaviour outputs as outlined above are based on a fully developed fire.

39. The time a bushfire takes to reach full development will depend on weather conditions. Unstable conditions that are often characteristic of summer weather including hot north westerly winds with frequent and substantial changes in direction will increase the bushfire rate of spread quickly and thus will have a short time period to reach potential maximum rate of spread. Conversely stable weather conditions will result in a much longer time to reach potential maximum rate of spread[19].

40. It is a very real prospect that a bushfire could ignite on surrounding land and travel to impact the solar farm site.

41. The *Chifley Bush Fire Risk Management Plan 2020* identifies that the prevailing weather conditions for the bushfire season (November to January) in the Bathurst Regional LGA are westerly wind patterns[20]. Therefore, it is more likely that during the bushfire season a bushfire would be likely to impact the solar farm site from the west.

42. Assuming a grass fire had reached its potential rate of spread, using the outputs in **Table 1**, it would move at a rate of 4 to 5 metres per second or cover a distance of 100m in 17 to 25 seconds.

43. The residence time of grass fires is between 5-15 seconds (depending on fuel load and compaction)[21]. Whilst grass fires burn hot, the short residence time means that the duration of exposure is lower than other forms of vegetation (e.g., forest fires have a residence time of in the vicinity of 120 seconds).

44. Whilst grass fires have a shorter residence time compared to other vegetation forms, direct attack on a grass fire can only be utilised up to a fire intensity of around 10,000kW/m[22]. As seen in **Table 1**, a fully developed grass fire is expected to have an intensity of 44,330kW/m to 62,594kW/m.

[19] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[20] Chifley Bush Fire Management Committee (2020) Chifley Bush Fire Risk Management Plan, NSW RFS, Bathurst.
[21] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[22] NSW Rural Fire Service
https://nswrfs.atlassian.net/wiki/spaces/TECHNICAL/pages/44502820/Fire+Danger+Index+FDI+and+Fire+Danger+Ratings+FDR

45. Therefore, in order for direct attack to be successful on a grass fire, it would need to occur shortly after ignition and well before full development. Cheney and Sullivan identify that "it is highly unlikely that the head fire will be stopped by any suppression tactics until it runs into a very substantial barrier"[23].

46. Cheney and Sullivan further identify that in order for the barrier, such as a road or firebreak, to be successful, sufficient resources must be available to control the spot fires beyond the break (i.e. in the solar farm) once the fire reaches the break. The break must also be of sufficient width in order for fire fighters to work safely outside of their vehicles and enable spot fires to be suppressed immediately[24].

47. The effectiveness of a firebreak will be lessened when grasses have large seed heads, such as *Phalaris* spp., which enable spotting ahead of the fire[25]. Whilst grassfires typically result in less spotting than fires in other vegetation formations, the amount and distance of spotting would depend on the types of vegetative material and weather conditions.

48. Cheney and Sullivan further identify that when wind speeds exceed 25km/h firebreaks are likely to be ineffective as the winds will blow burning debris along the ground[26].

49. **Plate 1** shows the probability of a firebreak holding, based on width of the fire break and the intensity of the fire. The left-hand scenario assumes no trees within 20m of the firebreak and the right-hand scenario having trees within 20m of the firebreak.

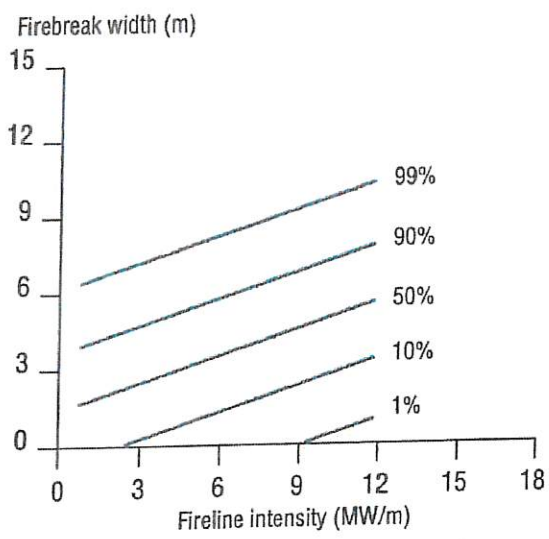

Figure 8.13: Probability of a firebreak holding a head fire in relation to fire intensity and firebreak width, where there are no trees within 20 m of the break. Source: After Wilson (1988).

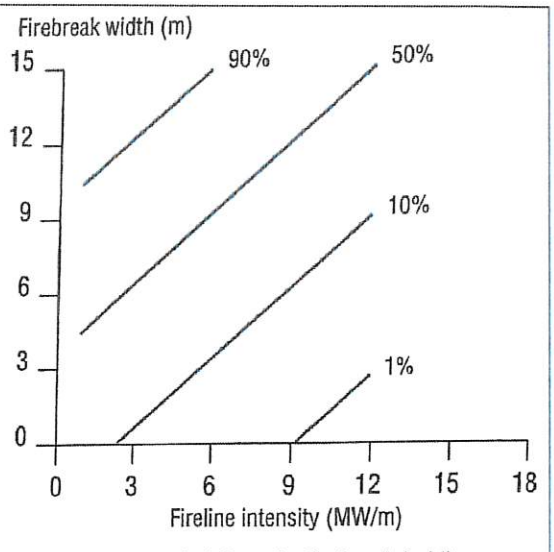

Figure 8.14: Probability of a firebreak holding a head fire in relation to fire intensity and firebreak width, where there are trees within 20 m of the break. Source: After Wilson (1988).

Plate 1: Probability of a firebreak holding under different scenarios[27]

50. The figures shown in **Plate 1** only include scenarios up to 12,000kW/m of intensity, whilst a fully developed fire would be likely to be three (3) to four (4) times that intensity.

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[23] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria, p. 96.
[24] Ibid p.97.
[25] Ibid.
[26] Ibid.
[27] Ibid p.103

51. **Plate 1** shows that a 10m wide fire break (i.e. the Asset Protection Zone (APZ)) with trees located within 20m of the fire break (i.e. the proposed visual screening) would have 20-30% chance of holding a head fire if the fire intensity was one third the intensity of a fully developed fire.

52. The Indicative Site Layout Plan for the proposed Solar Farm shows:

    a. A 10m wide landscape area will abut the western boundary of the site for more than half the length of the boundary, the southern boundary for approximately two thirds of the length of the boundary, and approximately half the length of the northern boundary of the solar farm site.

    b. A 5m wide landscape area will abut the balance of the western boundary of the site, the eastern boundary of the site and the balance of the northern boundary of the site (plus retention of an existing strip of vegetation).

    c. Two (2) watercourses within the site will be fenced off to provide waterway offset area (approximately 40m wide)

    d. The southern part of the site will be fenced off to retain existing scattered trees.

    e. An exclusion zone is to be provided in the northern part of the site and inside of the boundary screen planting. It is understood that will remain as grassland.

    f. An Asset Protection Zone (APZ) 10m wide is generally to be provided on the inside of the boundary screen planting or between the offset/riparian areas and the solar farm infrastructure. The majority of the APZ includes an access road, however, the central part of the western boundary does not and neither does the central riparian corridor.

53. The Landscape Concept Plan shows that the landscape planting, in the 5 and 10m landscape strips, riparian corridors and exclusion/pasture areas will provide significant revegetation and density of vegetation, in some areas introducing a vegetation likely to be consistent with forest classification.

54. This revegetation will introduce a very different bushfire risk to the site compared to the existing grassland vegetation. For example, whilst the rate of spread of the fire would be slower in a forest type vegetation compared to grassland, it would have significantly greater flame lengths, greater radiant heat, longer residence time, and increased chance of spotting. This different bushfire risk resulting from revegetation has not been considered in the assessment and the mitigation measure have not been provided to reflect the different bushfire behaviour.

55. The location of the APZ on the inside of landscape buffers will do little in the way of providing an effective APZ. The APZs will essentially be a narrow corridor between tall forest like vegetation and the solar panels. It will not provide a safe space for fire fighters to operate and will not provide a functional defendable space due to the narrowness and density of vegetation restricting views toward the approaching fire. Furthermore, many of the areas of the APZ do not have access provided.

56. Considering the scenarios in **Plate 1**, it not expected that the proposed APZ would provide for a suitable fire break in order to halt the spread of fire onto the Solar Farm Site nor to provide a suitable, tenable or safe environment in which to defend the Solar Farm site from, particularly given the length of these narrow APZ area.

57. In terms of access, it has not been demonstrated that the required passing bays (every 200m) and turnarounds can be achieved in order to comply with the PBP requirements.

58. The water supply proposed to be provided for firefighting purposes is the equivalent of that required to protect one (1) dwelling house. The solar farm site has a perimeter distance of over 6km and an area of nearly 200 hectares. The proposed water supply would be vastly insufficient to provide any meaningful protection of the site.

59. In the absence of a specific numerical guideline for water supply volume for solar farms in PBP, the recent Country Fire Service *Design Guidelines and Model Requirements: Renewable Energy Facilities*[28] could be utilised as a best practice guide, which requires:

    a. Generally for the solar farm one (1) x 45,000L static water tank for every 100 hectares of a site, plus,

    b. For the battery energy storage system protection, no less than 288,000L or as per the provisions for Open Yard Protection of AS 2419.1-2005 flowing for a period of no less than four hours at 20L/s, whichever is the greater, plus

    c. For the substation.

If you have any questions regarding this opinion, please contact the undersigned on 0400 940 482.

Yours sincerely

[redacted]

Erika Dawson
Director | BPAD Level 3 Accredited Practitioner (NSW & WA) | Registered Planner PIA

[28] Country Fire Authority (2022).
https://www.cfa.vic.gov.au/ArticleDocuments/550/220503_Design_Guidelines_Model_Requirements_Renewable_Energy_Facilities_v1.pdf.aspx

Integrated Consulting
Planning | Bushfire | Surveying

Attachment 2

Glanmire Solar Farm – Town Planning Opinion

Integrated Consulting
Planning | Bushfire | Surveying

Our Ref.: 22101-L02_B

Glanmire Action Group
C/- Mr Jonty Boshier
Hennessy Dowd Lawyers
PO Box 697
Bathurst NSW 2795

13 December 2022

Dear Mr Boshier

GLANMIRE SOLAR FARM – TOWN PLANNING OPINION

1. This opinion has been provided in response to a letter request from Hennessy Dowd Lawyers in relation to the town planning considerations of the proposed Glanmire Solar Farm State Significant Development Application (SSD-21208499) that is on public exhibition from 18 November 2022 to 15 December 2022.
2. I have the following academic qualifications:
    a. Graduate Diploma in Bushfire Protection with Distinction (University of Western Sydney)
    b. Graduate Certificate in Development Planning (Curtin University of Technology)
    c. Graduate Diploma in Natural Resources (University of New England)
    d. Bachelor of Urban and Regional Planning with Honours (University of New England)
3. I am accredited:
    a. by the Fire Protection Association Australia (FPAA) under the Bushfire Planning and Design (BPAD) Scheme (BPAD36371) as a Level 3 Accredited Practitioner in New South Wales and Western Australia. The NSW Rural Fire Service (RFS) recognise this accreditation as "as a person who is qualified consultant in bush fire risk assessment" for the purposes of environmental planning legislation.
    b. By the Planning Institute of Australia (PIA) as a Registered Planner (NSW).
4. I have 22 years' experience working in the planning industry, with the most recent ten years also incorporating bushfire planning. My experience has been both working in the private sector for various consultancies as well as for local government and consulting for both local and state government.
5. I have reviewed the Environmental Impact Statement (EIS) prepared by NGH as publicly exhibited on the Major Projects Website[1]. It is understood the application seeks approval for construction, operation and decommissioning of a 60MW solar farm on Lot 141 DP 1144786 (the solar farm site).
6. I have viewed the solar farm site from surrounding public roads and adjoining private properties. This site inspection was carried out on Friday 2 December 2022.

[1] https://www.planningportal.nsw.gov.au/major-projects/projects/glanmire-solar-farm

7. I have also reviewed the following documents in providing this opinion:

   a. Tremain Ivey Advisory Agricultural Consultants, preliminary EIS review letter dated 12 December 2022,

   b. DR Agriculture Pty Ltd, EIS review, dated 9 December 2022,

   c. Integrated Consulting Pty Ltd, Glanmire Solar Farm – Opinion on Bush Fire Impacts, dated 13 December 2022.

8. For ease of reference, the comments in this opinion are provided in relation to the Sections of the EIS submitted with the SSD Application.

SECTION 2 - STRATEGIC CONTEXT

9. This section of the EIS has identified that there is a plethora of strategic documents that identify the need for reducing reliance on fossil fuels and a transition to renewable energy. It has not however been demonstrated, in any meaningful way, that there is strategic justification for the specific project.

10. Strategic planning is undertaken to ensure that future land uses occur in an orderly and proper location. Renewable Energy Zones (REZ) have been established throughout the state to ensure that there is a strategic approach to the provision of renewable energy projects.

11. The large area required to accommodate solar farms sees that the default location is within rural land use zones This results in a competing interest for the rural land.

12. Given that rural land is finite and becoming increasingly marginal or constrained due to climate change, it is critical that the location of non-rural developments is closely scrutinised. Such close consideration is even more important when they are located outside of an area specifically designed/set aside to accommodate such uses (i.e., the REZs).

13. The EIS appears to downgrade the land capability of the solar farm site as evidenced by the reports reviewed under paragraphs 8a and b. Such a downgrading contradicts much of the strategic justification for the site.

14. As outlined by the *Land Use Planning: Planning for Agriculture in Rural Land Use Strategies*[2], agricultural land may not be defined or mapped as State Significant Agricultural Land (SSAL), however, it may still be important from a Local Government Area (LGA) perspective. Therefore, it is considered inappropriate to dismiss the agricultural importance of a site simply because it is not mapped as SSAL or otherwise.

15. NSW Planning & Environment – Resources & Geoscience has developed mapping that shows the renewable energy resources of the state[3]. The solar farm site is located within an area that receives ~17 megajoules per square metre of average daily solar exposure. There are vast areas of the state that receive significantly more solar exposure. No justification has been provided in the EIS as to why this site is more appropriate given that it is in a location that is below the median solar exposure for the state.

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[2] Department of Primary Industries (2022) *Land Use Planning: Planning for Agriculture in Rural Land Use Strategies*, Department of Regional NSW.
[3] NSW Planning & Environment – Resources & Geoscience
https://oeh.maps.arcgis.com/apps/MapSeries/index.html?appid=3b2391c554dd4478a31b88a32cec066a

SECTION 4 – STATUTORY CONTEXT

16. The solar farm site is located within the RU1 Primary Production Zone under the *Bathurst Regional Local Environmental Plan 2014* (LEP), the objectives of which are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To maintain the rural and scenic character of the land.*
- *To provide for a range of compatible land uses that are in keeping with the rural character of the locality, do not unnecessarily convert rural land resources to non-agricultural land uses, minimise impacts on the environmental qualities of the land and avoid land use conflicts.*

17. The proposed development is defined as a 'electricity generating works'.

18. The land use table for the RU1 zone in the LEP is an "open" zoning table which means that all land uses are either permitted with or without consent, with the exception of a number of expressly prohibited land uses. The proposed development is not expressly permitted as a listed land use. Instead, it is permitted with consent as "Any other development not specified in item 2 or 4".

19. This "open" approach to the land use table provides greater flexibility in considering developments, however, it places greater importance on the consideration of the consistency with the overarching objectives of the zone. Clause 2.3 of requires that a consent authority must have regard to the zone objectives when determining a development application.

20. It is considered that the EIS has not demonstrated sufficiently that the development is not antipathetic to the zone objectives. In particular:

a. As outlined further below (in paragraph 27), land use conflict has not been appropriately minimised,

b. In order to maintain the rural character of the land, the development relies upon extensive vegetative screening which introduces new and different bushfire risks which have not been appropriately considered nor mitigated against (refer to document referred to in paragraph 8(c)).

c. The compatibility of the land use has not been demonstrated in terms of:

(i) The necessity to convert the rural land resource to a non-agricultural use, and

(ii) Avoidance of land use conflicts (refer paragraph 27).

21. Section 2.42 of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) requires that the consent authority cannot grant consent to a development for *inter alia* a state significant solar electricity generating works located in a regional city unless it is satisfied that the development:

(a) is located to avoid significant conflict with existing or approved residential or commercial uses of land surrounding the development, and
(b) is unlikely to have a significant adverse impact on the regional city's—

(i) capacity for growth, or
(ii) scenic quality and landscape character.

22. As outlined in paragraph 27, the EIS has not adequately considered the extent of land use conflict, nor has it demonstrated that it has been located to avoid significant conflict with the existing commercial (agricultural) uses of the surrounding land.

23. Furthermore, many of the measures proposed to mitigate other impacts (i.e. visual landscape screening) will exacerbate other impacts on and of the development (i.e. bushfire) and result in greater land use conflict (as outlined in paragraph 27).

SECTION 6 – ASSESSMENT OF KEY IMPACTS

24. In order to make the visual impacts of the development acceptable, the development relies upon the planting and on-going management/retention of significant vegetative screening along the property boundaries. As outlined in the document referred to in paragraph 8(c), the revegetation of the site will introduce a very different bushfire risk into the site and surrounds (in addition to the introduction of the solar farm itself). The bushfire mitigation measures proposed as part of the development do not provide for adequate protection commensurate with the risk.

25. The consideration of land compatibility has been largely limited to land capability and otherwise provides little real consideration of land use conflicts.

26. The reports referred to in paragraphs 8(a) and (b) indicate that land capability provided in the EIS has been downgraded. An erroneous consideration of land capability will have the effect of insinuating that the site is more suitable for a primary production replacement, such as a solar farm.

27. The Land Use Conflict Risk Assessment has not adequately considered:

    a. The introduction of additional and different bushfire risks in the locality.

    b. The practicality, feasibility, appropriateness, and effectiveness of the proposed bushfire mitigation measures in managing bushfire risk in the locality, particularly given the introduction of new hazards and risks into the locality.

    c. The loss of the adjacent property owners' ability to manage their risk (through insurance protection) by virtue of a new land use being introduced that will substantially increase the consequence[4]. This has the potential flow on effect of sterilising land around solar farms from being used for primary production which consequentially results in greater loss of primary production land beyond just the solar farm site.

28. The EIS has not adequately considered bushfire risk. It has not contemplated the additional and different risk the development is introducing through the proposed visual vegetative screening. The development has not been provided with appropriate measures in order to mitigate the resultant bushfire behaviour and impacts as outlined in the document referred to in paragraph 8(c).

SECTION 7 – ASSESSMENT OF ADDITIONAL IMPACTS

29. The absence of sufficient consideration of the matters as outlined in this submission mean that the cumulative impacts of the development have not been adequately contemplated as part of the EIS.

30. The EIS has not reasonably considered the suitability of the site for the development in terms of section 4.15(1)(c) of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

SECTION 8 – PROJECT JUSTIFICATION

31. A large part of the justification for the project is based on the premise that the land is not of high agricultural value, which has been reported as incorrect (refer to 8(a) and (b)).

32. The justification is based on an inadequate consideration of impacts which, in particular, understates impacts of the development and land use conflict.

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[4] I have been advised by the client that advice has been received from insurance experts to the effect that adjoining primary production properties would not be able to obtain insurance coverage if a solar farm was approved on the adjacent site as the cost of damage on a solar farm would be too great to insure against should it be proven that a bushfire originated on the adjacent primary production land and caused impact on the solar farm.

Integrated Consulting
Planning | Bushfire | Surveying

If you have any questions regarding this opinion, please contact the undersigned on 0400 940 482.

Yours sincerely

[redacted]

Erika Dawson
Director | BPAD Level 3 Accredited Practitioner (NSW & WA) | Registered Planner PIA

Integrated Consulting
Planning | Bushfire | Surveying

Our Ref.: 22101-L03_A

Glanmire Action Group
C/- Mr Jonty Boshier
Hennessy Dowd Lawyers
PO Box 697
Bathurst NSW 2795

7 December 2023

Dear Mr Boshier

GLANMIRE SOLAR FARM – OPINION ON BUSH FIRE & TOWN PLANNING IMPACTS IN RELATION TO RESPONSE TO SUBMISSIONS REPORT

1. This opinion has been provided in response to a letter request from Hennessy Dowd Lawyers in relation to the Response to Submissions (RTS) Report associated with the proposed Glanmire Solar Farm State Significant Development Application (SSD-21208499) that was publicly exhibited from 18 November 2022 to 15 December 2022.
2. Specifically, the opinion relates to the following sections of the RTS Report:
    a. 4.3.5 – Fire risk and other hazards,
    b. 4.4 – Planning Instruments,
    c. 5.1.4 – NSW Fire and Rescue Submission,
    d. 5.1.6 – Transport for NSW,
    e. 5.1.11 – Rural Fire Service, and
    f. 5.1.13 – Bathurst Regional Council.
3. I have the following academic qualifications:
    a. Graduate Diploma in Bushfire Protection with Distinction (University of Western Sydney)
    b. Graduate Certificate in Development Planning (Curtin University of Technology)
    c. Graduate Diploma in Natural Resources (University of New England)
    d. Bachelor of Urban and Regional Planning with Honours (University of New England)
4. I am accredited:
    a. by the Fire Protection Association Australia (FPAA) under the Bushfire Planning and Design (BPAD) Scheme (BPAD36371) as a Level 3 Accredited Practitioner in New South Wales and Western Australia. The NSW Rural Fire Service (RFS) recognise this accreditation as "as a person who is qualified consultant in bush fire risk assessment" for the purposes of environmental planning legislation.
    b. By the Planning Institute of Australia (PIA) as a Registered Planner (NSW).
5. I have 23 years' experience working in the planning industry, with the most recent eleven years also incorporating bushfire planning. My experience has been both working in the private sector for various consultancies as well as for local government and consulting for both local and state government.

6. I have previously reviewed the Environmental Impact Statement (EIS) prepared by NGH as publicly exhibited on the Major Projects Website[1]. It is understood the application seeks approval for construction, operation and decommissioning of a 60MW solar farm on Lot 141 DP 1144786 (the solar farm site).

7. I have viewed the solar farm site from surrounding public roads and adjoining private properties. This site inspection was carried out on Friday 2 December 2022.

8. I have previously provided two opinions[2][3] on the original SSD Application. They are appended to this opinion for ease of reference.

9. I have reviewed the following documents in providing this opinion:

   a. NGH Pty Ltd, 2023. Submissions Report: Glanmire Solar Farm, Final V3.0, NGH

   b. Fire and Rescue NSW Letter to NSW Department of Planning and Environment, dated 23 November 2022, titled "Re: Advice on Environmental Impact Statement (EIS) – Glanmire Solar Farm – Lot 141 DP1144786, Glanmire, NSW (SSD-21208499)".

   c. NSW Rural Fire Service Letter to NSW Department of Planning and Environment, dated 16 January 2023, titled "Development Application State Significant – EIS & DA Exhibition – Electricity Generating Works Glanmire Solar Farm, 141//DP1144786".

   d. Bathurst Regional Council Letter to NSW Department of Planning and Environment, dated 14 December 2022, titled "State Significant Development – Glanmire Solar Farm (SSD-2128499)".

   e. Transport for NSW Letter to NSW Department of Planning and Environment, dated 22 January 2023, titled "SSD-21208499: Lot: 141 DP1144786; Glanmire, NSW- Glanmire Solar Farm- Response to EIS".

   f. NGH Pty Ltd, 2023. Amendment Report: Glanmire Solar Farm, Final V3.0, NGH.

   g. Bathurst Regional Council letter to NSW Department of Planning and Environment, dated 4 October 2023, titled "Community Benefit Sharing proposal, Elgin Energy for Glanmire Solar Farm".

   h. Soil Management Designs letter to NSW Department of Planning and Environment, dated 26 September 2023, titled "RE: Soil Assessment at the Glanmire Solar Farm".

10. For ease of reference, the comments in this opinion are provided in relation to the Sections of the RTS Report submitted with the SSD Application.

SECTION 4.3.5 – FIRE RISKS & OTHER HAZARDS

Issue - Concern that RFS already stretched and this Project will put additional pressure on the system; limited resources to fight fires including insufficient water supply to extinguish a fire.

11. The Fire & Rescue NSW (FRNSW) submission states that a condition should be applied requiring a comprehensive Fire Safety Study (FSS) be developed for the project, which *inter alia*, requires consideration of the operational capability of local fire agencies.

12. The FRNSW submission requires that a comprehensive Emergency Response Plan (ERP) be prepared for the development, informed by the FSS.

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[1] https://www.planningportal.nsw.gov.au/major-projects/projects/glanmire-solar-farm
[2] Integrated Consulting, 2022. *Glanmire Solar Farm – Opinion On Bush Fire Impacts.*
[3] Integrated Consulting, 2022. Glanmire Solar Farm – Town Planning Opinion.

13. The FSS and ERP are the standard mechanisms for addressing hazardous developments.

14. If it is demonstrated that the development will require additional resources to ensure appropriate response, the developer should be responsible for funding these resources. This could be addressed by way of a Voluntary Planning Agreement (VPA) for initial and ongoing resourcing.

15. The NSW Rural Fire Service (RFS) submission states that the development must comply with clause 8.3.5 of *Planning for Bush Fire Protection 2019* (PBP). Clause 8.3.5 of PBP requires developments are "provided with adequate clearances to combustible vegetation as well as firefighting access and water[4]." No quantification of water supply is provided in the RFS advice or within PBP.

16. The application proposes provision of a maximum 20,000L of water supply for fire fighting purposes. This provision has not been demonstrated to be based on what would be "adequate" for the development as required by clause 8.3.5 of PBP.

17. Additional information is required in order to determine the required resources, including water supply, to adequately manage and respond to both hazard and bushfire risks associated with the development.

Issue - Concern about the solar farm and proposed BESS exacerbating fire risk; are asset protection zone setbacks sufficient.

18. The FRNSW required FSS and ERP will address the fire risk associated with the BESS.

19. The RFS has not provided any consent conditions in its submission dated 16 January 2023. The submission simply states that:

    ... any development (as proposed) must comply with clause 8.3.5 (Wind and Solar Farms) of Planning for Bush Fire Protection 2019[5].

20. PBP states in clause 8.3.5:

    Wind and solar farms require special consideration and should be provided with adequate clearances to combustible vegetation as well as firefighting access and water. The following should be provided for wind and solar farms:

    - *a minimum 10m APZ for the structures and associated buildings/infrastructure; and*
    - *the APZ must be maintained to the standard of an IPA for the life of the development.*

    Infrastructure for the purposes of requiring APZ excludes:

    - *road access to the site; and*
    - *power or other services to the site and associated fencing.*

    Essential equipment should be designed and housed in such a way as to minimise the impact of bush fires on the capabilities of the infrastructure during bush fire emergencies. It should also be designed and maintained so that it will not serve as a bush fire risk to surrounding bush. A Bush Fire Emergency Management and Operations Plan should identify all relevant risks and mitigation measures associated with the construction and operation of the wind or solar farm. This should include:

    - *detailed measures to prevent or mitigate fires igniting;*
    - *work that should not be carried out during total fire bans;*
    - *availability of fire-suppression equipment, access and water;*
    - *storage and maintenance of fuels and other flammable materials;*

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[4] NSW Rural Fire Service. 2019, Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers, NSW Rural Fire Service, Granville, p. 77.
[5] NSW Rural Fire Service. 2023, *Letter to the NSW Department of Planning and Environment in relation to Glanmire Solar Farm*, dated Monday 16 January 2023, p. 1.

- *notification of the local NSW RFS Fire Control Centre for any works that have the potential to ignite surrounding vegetation, proposed to be carried out during a bush-fire fire danger period to ensure weather conditions are appropriate; and*
- *appropriate bush fire emergency management planning.*

It is important to be aware of operations that may be carried out on days of Total Fire Ban and any prohibited activities or exemptions that are notified by the Commissioner of the NSW RFS under the RF Act s.99.

21. The RTS document states:

The RFS have provided relatively consistent advice in relation to solar farm development. Set backs of 10m, allowing a defensible space between solar assets and grassland vegetation, are required (an Asset Protection Zone). The infrastructure layout includes an access track network which will assist movements around the site in the event of a fire. Detailed fire management plans will be prepared in consultation with the RFS prior to works commencing, to ensure access, firefighting resources and response times are understood[6].

22. The RTS has not addressed the requirements of clause 8.3.5 of PBP. It has simply applied the minimum 10m APZ and has not demonstrated that this provides "adequate clearances to combustible vegetation"[7].

23. The RTS states:

A 10m wide asset protection zone will provide a defensible space between assets onsite and the site boundary. This is standard requirement for solar development[8].

24. A 10m APZ cannot categorically be considered "standard". PBP states that this is the minimum requirement. The prerequisite for an APZ is that "adequate clearances should be provided to combustible vegetation"[9]. This has not been addressed or demonstrated.

25. Furthermore, PBP states "It is important to ensure that a defendable space is provided for the size and scale of the development"[10]. This has not been addressed or demonstrated.

26. It has not been demonstrated that the minimum 10m APZ will be sufficient to ensure the development is "... designed and maintained so that it will not serve as a bush fire risk to surrounding bush"[11].

27. No consideration has been given to the revegetation of the site, including the visual screening and riparian corridors, and its impact on bushfire risk and the adequacy/functionality of the of the APZs proposed.

Issue - Concern that neighbouring activities may impact solar assets, specifically fire risk.

28. The RTS states:

The most probable risk to solar farm assets is that a grass fire may spread from adjoining land and impact on the solar farm's assets. While the site is not bushfire prone land, agricultural activities such as slashing,

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[6] NGH Pty Ltd, 2023. *Submissions Report: Glanmire Solar Farm*, Final V3.0, NGH, p.87.
[7] NSW Rural Fire Service. 2019, Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers, NSW Rural Fire Service, Granville, p. 77.
[8] NGH Pty Ltd, 2023. *Submissions Report: Glanmire Solar Farm*, Final V3.0, NGH, p.87.
[9] NSW Rural Fire Service. 2019, Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers, NSW Rural Fire Service, Granville, p. 77
[10] NSW Rural Fire Service. 2019, Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers, NSW Rural Fire Service, Granville, p. 74.
[11] NSW Rural Fire Service. 2019, Planning for Bush Fire Protection: A guide for councils, planners, fire authorities and developers, NSW Rural Fire Service, Granville, p. 77

harvesting, use and repair of machinery, all have potential to ignite a grass fire which could spread rapidly in this location[12].

29. The site (and surrounds) is not mapped on Bathurst Regional Council's (Council) Bush Fire Prone Land (BFPL) Map. This is because Council has not updated its BFPL Map to include grasslands as required by Section 10.3 of the *Environmental Planning & Assessment Act 1979* and the associated RFS *Guide for Bush Fire Prone Land Mapping*[13].

30. The absence of being mapped as BFPL does not mean the land is not bush fire prone. Site inspections have identified that the land can support a bush fire or is likely to be subject to bush fire attack, and in my opinion should be mapped as being bushfire prone consistent with the RFS *Guide for Bush Fire Prone Land Mapping*.

31. The RTS further states:

No impact on the ability to neighbours to undertake existing agricultural activities as anticipated from the Project. This is set out further in Section 4.3.1 (sub-section F) which found that:

- *Risks have been identified that are considered highly manageable.*
- *These include construction phase and operational phase fire risks on the Project site, requiring careful management in the design as well as through the life of the Project.*
- *There is no reason to think that the adjacent agricultural enterprises will be adversely affected.*

A related issue is the potential effect of fire risk on insurance premiums for neighbours, discussed further in Section 4.3.3.

32. Sub section F of Section 4.3.1 of the RTS states:

Implementation of a solar farm BMP (Biodiversity Management Plan) would reduce the probability of solar farm operation starting a fire or a bush fire damaging the solar farm infrastructure.

With the improvements to site access (site entrance and internal perimeter track), APZ (Asset Protection Zone) setbacks to allow defensible space and emergency protocols, this risk is considered to be sufficiently reduced.

33. I question whether this reference should be Bushfire Management Plan and not Biodiversity Management Plan.

34. As outlined above, the APZs proposed to be provided are the minimum required by PBP and have not been demonstrated to be sufficient for the proposed development in the context of the existing and known future bush fire prone vegetation on and adjacent to the site. The development has not adequately demonstrated compliance with clauses 8.1 and 8.3.5 of PBP.

35. Section 4.3.3 of the RTS states:

Elgin Energy have formed the view that the construction and operation of a solar farm should not significantly impact the cost of a public liability policy of a neighbouring farming property. From the consultation with these insurance providers, there is no evidence of increased insurance premiums being associated with farms which neighbour solar farm projects. On this basis, further set backs and compensations on this account are not considered to be warranted[14].

The Project's assessment team has also investigated this issue further, with reference to the newly released NSW Agricultural Commissioner's report, in November 2022, recommending improvements to the policy framework to manage issues arising alongside the growth in the renewable energy and agriculture sectors (NSW Agriculture Commissioner, 2022). The DPE is understood to be considering the

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[12] NGH Pty Ltd, 2023. *Submissions Report: Glanmire Solar Farm*, Final V3.0, NGH, p.88.
[13] NSW Rural Fire Service, 2015. *Guide for Bush Fire Prone Land Mapping*. NSW Rural Fire Service, Granville.
[14] NGH Pty Ltd, 2023. *Submissions Report: Glanmire Solar Farm*, Final V3.0, NGH, p.75.

recommendations in detail at this time and have not yet provided a formal response. However, the Agricultural Commissioner's report currently recommends:

> *Recommendation 22: Project applicants in the renewable energy sector should cover any additional public liability insurance costs incurred by neighbouring landholders as a result of proximity and risk to new energy facilities. In cases where suitable insurance cannot be obtained, the applicant should indemnify the neighbour for reasonable risk in relation to typical public liability cover.*

The report stated that the principle for this recommendation is that adjacent landholders should bear no additional costs due to the installation of these new facilities.

The NSW DPE has so far taken no action to endorse this recommendation, stating it:

> *... recognises the concerns raised by landholders in relation to fire and insurance risks as a result of neighbouring renewable developments and considers further information and analysis is required to understand the extent of the problem and to respond appropriately. The NSW Government is undertaking this analysis to determine appropriate action on the issue, including further consultation with the Australian Energy Infrastructure Commissioner and the Clean Energy Council.*

As part of the EIS and the development of the Project's mitigation strategies, NGH have investigated fire risk and land use compatibility in particular, in relation to Glanmire solar farm and its effects on neighbouring activities. NGH have also consulted with the RFS and included their recommended procedures and guidelines as part of the Project. Key outcomes from the assessment team are that onsite risks can be managed in accordance with best practice agency advice regarding:

a) Detailed design of higher risk infrastructure (battery energy storage system).

b) Ground cover management plan to monitor and manage the retention of ground cover beneath the panels including fuel management.

c) Biosecurity management strategy, regarding weeds / pests that may impact neighbouring farms.

d) Bushfire management plan, regarding water supply and access to the site in an emergency.

e) Fire safety study and emergency response protocols, as above.

f) Rehabilitation commitments to ensure the decommissioned project retains or improves the land soil capability classes present onsite.

In combination, with the improved site access and onsite network of access tracks that accompany the Project, these mitigation commitments a) to f) will ensure the site is well managed and monitored and neighbours will benefit from this management regime (being more highly managed and subject to reporting and compliance than existing onsite operations).

36. The consideration of bushfire within the application documents have not provided a site-specific assessment to demonstrate that the development will provide for adequate clearances to combustible vegetation as well as fire fighting access and water as required by clause 8.3.5 of PBP. Therefore, it cannot be reasonably concluded that the development complies with Sections 8.1 and 8.3.5 of PBP and thus cannot be concluded to be best practice in relation to bushfire.

37. The RTS has not addressed the inadequacies raised in relation to bushfire risk from our previous opinion[15].

[15] Integrated Consulting, 2022. *Glanmire Solar Farm – Opinion On Bush Fire Impacts.*

SECTION 4.4 – PLANNING INSTRUMENTS

Issue - State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP TI) – being close to a regional city and Raglan

38. The RTS Report refers to a Land Use Risk Conflict Assessment (LUCRA) which was provided in the EIS (Section 6.4.3). No additional information was provided to address this matter.

39. The RTS has not addressed previously raised issues, being:

    a. As outlined in [the former submission] paragraph 27[16], the EIS has not adequately considered the extent of land use conflict, nor has it demonstrated that it has been located to avoid significant conflict with the existing commercial (agricultural) uses of the surrounding land.

    b. many of the measures proposed to mitigate other impacts (i.e. visual landscape screening) will exacerbate other impacts on and of the development (i.e. bushfire) and result in greater land use conflict (as outlined in [the former submission] paragraph 27[17]).

    c. The former submission paragraph 27[18] states:

        27. *The Land Use Conflict Risk Assessment has not adequately considered:*

            a. The introduction of additional and different bushfire risks in the locality.

            b. The practicality, feasibility, appropriateness, and effectiveness of the proposed bushfire mitigation measures in managing bushfire risk in the locality, particularly given the introduction of new hazards and risks into the locality.

            c. The loss of the adjacent property owners' ability to manage their risk (through insurance protection) by virtue of a new land use being introduced that will substantially increase the consequence. This has the potential flow on effect of sterilising land around solar farms from being used for primary production which consequentially results in greater loss of primary production land beyond just the solar farm site.

Issue - Section 4.15(b) and (c) of the Environmental Planning and Assessment Act 1979 (Act) – with reference to impacts on the natural environment in the locality.

40. The RTS does not provide any meaningful additional information in relation to Section 4.15(1)(b) of the *Environmental Planning and Assessment Act 1979* (EP&A Act). It simply refers to where information is provided within the EIS for a very narrow range of impacts to satisfy the requirements of the Secretary's Environmental Assessment Requirements (SEARs).

41. In relation to the suitability of the site (i.e. Section 4.15(1)(c) of the EP&A Act), the RTS references DPE Guidelines (2018) and draft 2021 guidelines, neither of which are listed in the reference list. Therefore, it is not clear what guidelines are being referenced.

42. Furthermore, no additional information has been provided in relation to consideration of site suitability.

43. The RTS has not addressed the issues previously raised, being:

    a. In order to make the visual impacts of the development acceptable, the development relies upon the planting and on-going management/retention of significant vegetative screening along the property boundaries. As outlined in the document referred to in paragraph 8(c) [of

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[16] Integrated Consulting, 2022. *Glanmire Solar Farm – Town Planning Opinion.*
[17] Ibid.
[18] Ibid.

the former submission[19]], the revegetation of the site will introduce a very different bushfire risk into the site and surrounds (in addition to the introduction of the solar farm itself). The bushfire mitigation measures proposed as part of the development do not provide for adequate protection commensurate with the risk.

b. The LUCRA has not been amended to address the matters raised in paragraph 36 above.

44. In the absence of the above information, full proper consideration cannot be given the suitability of the site for the development as required under section 4.15(1)(c) of the EP&A Act.

Issue - Local Environmental Plan, regarding rural use limitations and potential limitations on the future growth of the Regional City of Bathurst.

45. The comments at paragraph 20 of our previous advice[20] remain relevant in response to this matter.

Issue - Bathurst Regional Development Control Plan location – requiring a 50 metre setback.

46. The submission does not provide any additional information in relation to this matter.

47. Development Control Plans (DCP) do not apply to SSD Applications, pursuant to section 2.10 of *State Environmental Planning Policy (Planning Systems) 2021*.

SECTION 5.1.4 – NSW FIRE & RESCUE SUBMISSION

48. The FRNSW submission in relation to this application states:

FRNSW acknowledge correspondence dated 18 June 2022 received from NGH Consulting requesting engagement with FRNSW to ensure relevant matters were addressed in the EIS for this project. FRNSW provided an email response on 23 June 2022 with links to information regarding Emergency Response Planning, Emergency Access, and Fire Safety Studies though these are not referenced in the EIS or PHA.

It has been the experience of FRNSW that renewables facilities with large scale Battery Energy Storage Systems (BESS) pose special problems of firefighting and special hazards exist that may require additional fire safety and management measures. Due to these unique challenges FRNSW make the following recommendations:

1. *That a comprehensive Fire Safety Study (FSS) is developed. The FSS is to be developed in accordance with the requirements of Hazardous Industry Planning Advisory Paper (HIPAP) No.21 and is to meet the operational requirements of FRNSW.*
2. *That the development of the FSS consider the operational capability of local fire agencies and the need for the facility to achieve an adequate level of on-site fire and life safety independence. The FSS should consider worst-case fire scenarios including a full BESS unit fire and demonstrate no fire propagation within the facility.*
3. *That the FSS be submitted, reviewed, and meet the operational requirements of FRNSW prior to any further submission being made to FRNSW; this includes: an Initial Fire Safety Report (IFSR) and / or Performance-Based Design Brief / Fire Engineering Brief Questionnaire (FEBQ).*
4. *That the development of a FSS be a condition of consent.*
5. *That a comprehensive Emergency Response Plan (ERP) is developed for the site in accordance with HIPAP No.12. The findings of the FSS should inform the development and content of the ERP.*

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[19] Integrated Consulting, 2022. *Glanmire Solar Farm – Town Planning Opinion*.
[20] Ibid.

6. *That an Emergency Services Information Package (ESIP) be prepared in accordance with FRNSW fire safety guideline – Emergency services information package and tactical fire plans3.*

7. *That an Emergency Responders Induction Package is developed for the site in consultation with, and to the satisfaction of FRNSW prior to commissioning of the site. The package should inform first responders of site-specific features and safety measures to ensure they are able to undertake their duties effectively in accordance with agency specific Standard Operational Guidelines. The format of the Induction Package should be such that it can be readily shared across all Agencies.*

49. It is imperative that the FRNSW hazard requirements be considered in conjunction with the bushfire requirements as they are likely to integrate both in relation to risk and response requirements.

50. Before the application is determined, it is essential that the fundamentals of development siting, separation distances, access, and water supply relating to both hazards and bushfire are determined and integrated into the proposed development. It is not appropriate to delay determination/consideration of these matters to after the application is determined as they are likely to impact on the layout of the development and impact on other mitigation measures being relied upon such as boundary screening.

SECTION 5.1.6 – TRANSPORT FOR NSW

51. In reviewing the submissions, it appears that TfNSW has agreed to draft consent conditions to satisfy their requirements. These draft conditions are not available on the Major Projects website.

52. I have no comments in relation to this matter.

SECTION 5.1.11 – RURAL FIRE SERVICE

53. The RFS submission in relation to this application states:

The proposal appears to be generally consistent with the aims and objectives of Planning for Bush Fire Protection 2019, however any development (as proposed) must comply with clause 8.3.5 (Wind and Solar Farms) of Planning for Bush Fire Protection 2019[21].

54. The RFS submission does not state that the application complies with the requirements of PBP. Nor does it provide any recommended conditions of consent.

55. The RTS Report reiterates the words contained within clause 8.3.5 of PBP, however, it also assigns numbering to the wording which, in my opinion, implies a checklist of provisions, which is not the case. Clause 8.3.5 is provided verbatim in paragraph 20 of this letter.

56. It is important in applying PBP to understand the entire context of the document, which in this instance also requires clause 8.1 to be addressed.

57. Clause 8.1 of PBP states:

There are other developments where bush fire provisions or requirements need to be applied, that align with the unique features of the development type.

In order to comply with PBP the following conditions must be met:

- *satisfy the aim and objectives of PBP outlined in Chapter 1;*
- *consider any issues listed for the specific purpose for the development set out in this chapter; and*
- *propose an appropriate combination of BPMs.*

It is important to ensure that a defendable space is provided for the size and scale of the development.

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[21] NSW Rural Fire Service. 2023, Letter to the NSW Department of Planning and Environment in relation to Glanmire Solar Farm, dated Monday 16 January 2023, p. 1.

Proposed measures must operate in combination to minimise the impact of bush fire and ensure that access and services are adequate.

58. As outlined in our previous opinion[22]:

    a. The development has not been provided with appropriate APZs cognisant of the existing and proposed level of bushfire risk, and the risk of the different components of the development. Furthermore, no consideration has been given in determining appropriate APZ size to ensure the development does not serve as a risk to land surrounding the site. These considerations as all requirements of clauses 8.1 and 8.3.5 of PBP. The minimum APZ outlined in clause 8.3.5 has been applied without any consideration of risk, or the size and scale of the development.

    b. a nominal 20,000L provision of fire fighting water supply is proposed to be provided with no consideration of actual risk and appropriateness for the use and local conditions.

    c. The proposed access has not been demonstrated that it is suitable for fire suppression, include to and from the site and within the site.

59. Fires within solar farms are difficult to control due to the infrastructure impeding operations[23].

60. It is therefore imperative that in terms of the APZ for the development:

    a. that it is designed to fulfill the required functions (as outlined in section 3.2 of PBP) to provide:

        i. appropriate separation to all the assets on site from the bushfire threat (on and off the site). This is to be based on a site-specific bushfire site assessment. Noting this may be differently sized for the different assets on site based on their risk and need for protection. The size of the APZ should also be designed to provide for adequate separation to ensure the development does not serve as a bush fire risk to surrounding land.

        ii. to provide an area of defendable space between the assets and the areas constituting a bushfire threat (i.e. off site vegetation and on-site retained vegetation). This APZ should not be encumbered by vegetative screening around the property boundary as this will negate the function of the APZ.

        iii. the entire area of the development site containing the assets should form part of the APZ to ensure it is managed in a low fuel state at all times so as to not constitute a bushfire threat.

61. The fire fighting water supply quantity, location and access should be determined in consultation with the response agencies to ensure it is appropriate to the use, development components and their risks, and local context.

62. The access for fire fighting operations, both to and within the site, should be determined in consultation the response agencies to ensure it is appropriate for response to fires approaching the site, manage fires within the site, and to restrict the spread of fires from the site.

63. These Bush Fire Protection Measures (BFPM) need to be quantified prior to the application being determined to ensure the development can be appropriately designed to accommodate these requirements.

64. In the absence of the quantification of the above, the consent authority cannot reasonably determine the likely impacts of the development or that the site is suitable for the development. Consequentially it cannot give full and proper consideration of its statutory obligations pursuant to sections 4.15(1)(b) and (c) of the EP&A Act.

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[22] Integrated Consulting, 2022. *Glanmire Solar Farm – Opinion On Bush Fire Impacts.*
[23] https://reneweconomy.com.au/australian-solar-farm-hit-by-grass-fire-burning-under-modules/

SECTION 5.1.13 – BATHURST REGIONAL COUNCIL

Issue – Alignment with regional and local land use plans

65. I have no additional comments in relation to this matter beyond paragraphs 9 to 15 (inclusive) of our previous advice[24].

Issue – Airport protection area

66. I have no comment on this matter.

Issue – Gateway to the city

67. Council raised the following issue:

Photomontages of the site suggest that the solar farm could be a prominent feature within the landscape and the gateway to the city during the short to medium term, as the vegetation is established and matures onsite.

68. The applicant has responded:

The visual impact assessment has confirmed that the Project would not be a prominent feature within the landscape and that there would not be a significant visual impact on views east or westbound from the Great Western Highway.

...

Assuming favourable conditions, the screening vegetation provided along the north and western boundaries of the Project area are expected to achieve several metres of growth within the first 2-3 years. So that, the Project would be well absorbed, and even less prominent in the view within a short period of time[25].

69. The development relies upon the use of screening vegetation along the boundaries of the solar farm site in order to make the visual impacts of the solar farm acceptable.

70. The development has not adequately considered the bushfire risk of the retention of existing vegetation and introduction of new vegetation to provide these screening functions.

71. The placement of screening vegetation on the outer side of the APZ will make the function of the APZ ineffective as fires approaching the site will not be able to be accessed due to the screening vegetation and thus will not provide a defendable space.

72. The screening vegetation will add a new bushfire threat closer to the development and surrounding properties and the APZ has not been amended in size to respond to this change.

Issue – Energy transition context

73. I have no comment on this matter.

Issue – On site buildings

74. I have no comment on this matter.

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[24] Integrated Consulting, 2022. Glanmire Solar Farm – Town Planning Opinion.
[25] NGH Pty Ltd, 2023. Submissions Report: Glanmire Solar Farm, Final V3.0, NGH, p.139.

Issue – Fencing

75. Council raised the following issue:

The potential impacts of a 2m high security fence on the perimeter needs consideration as it has the potential to impact upon views to and from the site. Final designs, colours and materials are to be considered. Visual impact from 2m high fence around the site perimeter has not been discussed, noting fencing is to be installed behind landscaping which may soften visual impact although delays in establishment of vegetation will lead to short to medium term impacts[26].

76. The applicant has responded:

As noted by Council, the site boundary fencing would be located behind landscaping that would screen the fencing over time. Assuming favourable conditions, the establishment of the vegetation would occur in the short term and is expected to provide several metres of growth within the first 2–3 years.

...

It is not recommended that the site perimeter fencing be treated with a particular colour, such as powder coated posts and coated wire in black or the like. Such finishes have a more urban character and may increase the visual impact depending upon the season and within what context the fence is viewed. The prevailing character of fencing in the locality is timber and galvanised steel with post and wire and other galvanised wire fencing seen across the surrounding rural areas (refer to photographs provided in below). A galvanised finish will develop a patina over time and be less visible as the finish gradually dulls and the colour darkens slightly.

A treatment such as the use of grey or green shade cloth attached to the fencing could be considered as a short-term mitigation measure for the views along Brewongle Lane where the fencing would be in closer proximity. This would obstruct the view to solar infrastructure, however, may have a visual effect in itself, not being something typically seen within the rural landscape.

77. From a bushfire perspective, fencing should be made of non-combustible material, such as metal.

78. From a visual impact perspective, dark colours allow you to "see through them" as opposed to light colours, which tend to provide more of a visual barrier.

Issue – Community benefit scheme

79. The EIS states that:

There are no VPA in place for the Project at this stage however one will be developed in relation to the Community Benefit Sharing Scheme with Bathurst Regional Council[27].

...

Elgin Energy recognises the need to identify benefit sharing opportunities in collaboration with local stakeholders. Elgin Energy values the opportunity to engage around benefit sharing opportunities that provide real and ongoing value to the Bathurst community. The intention is to create a fund that can support very localised and meaningful community development or other neighbourhood-level initiatives that have strong resident support, throughout the life of the Project.

The Community Benefit Sharing arrangement will include a VPA administered by BRC and it is proposed to make contributions towards local initiatives based on the following selection criteria:

- *Contributes to increased resilience for the Glanmire and Bathurst communities*

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[26] Bathurst Regional Council letter to Department of Planning and Environment, titled 'State Significant Development – Glanmire Solar Farm (SSD-2128499)' dated 14 December 2022, p. 6.
[27] NGH Pty Ltd, 2022. Glanmire Solar Farm Environmental Impact Statement, Final 2, NGH, p. 55.

- *Demonstrates strategic alignment with the Council Plans and Strategies for the area (CSP, LSPS, LEP)*
- *Supports development of local skills and capabilities*
- *Supports the conservation of the local environment (flora and fauna)*
- *Supports a transition to a more sustainable Australia.*

Based on community feedback to date, the following opportunities have been identified for further exploration and clarification should the Project be approved.

The annual contribution proposed is $18,000.00 for the life of the project.

It is expected that the benefit sharing arrangements will be refined as the Project progresses, but at this stage, the benefit sharing opportunities for exploration listed below have been identified for further exploration and investigation, while noting that BRC may explore other opportunities.

Table 3-5 Proposed benefit sharing activities

Investment type	Delivered by
Contribution to roadside weed spraying in the Glanmire/Bathurst area	Landcare/Council
Contribution to the Glanmire RFS	RFS
Contribution to the Rotary Youth Driver Awareness (RYDA) program	Rotary
Contribution to the Innovation Hub via CSU	CSU
Contribution to the local WIRES organisation	WIRES
Contribution to the Upstairs Start-up Hub	The Hub
Contribution to the CSU Renewable Energy Centre of Excellence (focused on local initiatives)	CSU
Funding of a scholarship for a local resident to study a relevant degree at CSU – such as electrical engineering, sustainability, environmental management. Focus on students that may be disadvantaged	CSU
Funding for an "Eco Hub" for various environmental organisations and advocacy groups to share within the Bathurst region.	Eco Hub

Figure 1: Table 3-5 from the EIS

80. Council advised in its submission:

The EIS nominates "eight local initiatives" for "exploration and clarification should the project be approved".

Whilst Council supports the concept of the Community Benefit Scheme it has not adopted these "local initiatives" for funding under any Scheme. Council notes that the initiatives involve 3rd parties. Further discussion will be required with the proponent as to Council's priorities[28].

81. The RTS provided by the applicant advised:

The eight initiatives identified in the EIS were a result of extensive community consultation and community feedback during the EIS engagement period.

We acknowledge that Council will have further discussion for Community Benefit Sharing initiatives and the Applicant will work with Council to establish a VPA with initiatives that will be in the best interest of the Bathurst community[29].

82. Council subsequently advised DPE in relation to the community benefit scheme:

I refer to previous correspondence from Bathurst Regional Council and Elgin Energy regarding governance arrangements of a Community Benefit Sharing proposal for the proposed Glanmire Solar Farm, pending project approval.

This letter reconfirms Council's agreement to manage the decision making in regard to the allocation of funds, should the project be approved, and will accept the amount of the monetary contribution offered by Elgin. Despite Council believing the amount is somewhat modest, it is acknowledged that it is consistent with the Department's current guidelines for such projects. It is recommended the Department increase the monetary amount in future revisions of the Guidelines, given the cumulative impact such projects have on local communities.

This agreement does not provide Council's concurrence to project approval. Further, it is Council's expectation that the existing governance arrangements at Council for similar Community Benefit Sharing schemes be continued and expanded to include this and other contributions[30].

83. The local community should not be burdened by any ongoing costs related to the development, including (but not limited to) increased fire risk and response obligations, and road maintenance. The burden should remain with the developer and be adequately compensated for in contributions as part of any VPA.

84. The annual contribution of $18,000 would seem quite low when distributed over eight items, resulting in $2,250 on average per item. It would certainly would not provide any meaningful annual contribution to any of the listed items, considering the annual bachelor's degree costs upwards from $15,000 per year[31].

Issue – Visual impact from the Great Western Highway

85. I have no comment on this matter.

Issue – Vegetation screening

86. No additional comments are made in relation to this matter apart the absence of consideration of impact on the screening vegetation on bushfire impact as raised above.

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[28] Bathurst Regional Council letter to Department of Planning and Environment, titled 'State Significant Development – Glanmire Solar Farm (SSD-2128499)' dated 14 December 2022, p. 7.
[29] NGH Pty Ltd, 2023. Submissions Report: Glanmire Solar Farm, Final V3.0, NGH, p.141.
[30] Bathurst Regional Council letter to Department of Planning and Environment, titled 'Community Benefit Sharing proposal, Elgin Energy for Glanmire Solar Farm', dated 4 October 2023.
[31] https://www.canstarblue.com.au/universities/cost-to-study-in-australia/

Issue – Cultural heritage

87. I have no comment on this matter.

Issue – Impacts on agriculture

88. I have no comment on this matter.

Issue – Insurance issues

89. I have no comment on this matter.

Issue – Social impacts

90. I have no comment on this matter.

Issue – Traffic

91. I have no comment on this matter.

Issue – Non-Aboriginal heritage (Woodside)

92. I have no comment on this matter.

Issue – Non-Aboriginal heritage (Woodside) acknowledgement

93. I have no comment on this matter.

Issue – Continued opposition

94. I have no comment on this matter.

If you have any questions regarding this opinion, please contact the undersigned on 0400 940 482.

Yours sincerely

[redacted]

Erika Dawson
Director | BPAD Level 3 Accredited Practitioner (NSW & WA) | Registered Planner PIA

Attachments:
1. Integrated Consulting, 2022. Glanmire Solar Farm – Opinion On Bush Fire Impacts.
2. Integrated Consulting, 2022. Glanmire Solar Farm – Town Planning Opinion.

Integrated Consulting
Planning | Bushfire | Surveying

Attachment 1

Glanmire Solar Farm – Opinion On Bush Fire Impacts.

Integrated Consulting
Planning | Bushfire | Surveying

Our Ref.: 22101-L01_C

Glanmire Action Group
C/- Mr Jonty Boshier
Hennessy Dowd Lawyers
PO Box 697
Bathurst NSW 2795

13 December 2022

Dear Mr Boshier

GLANMIRE SOLAR FARM – OPINION ON BUSH FIRE IMPACTS

1. This opinion has been provided in response to an email request from Hennessy Dowd Lawyers in relation to the bushfire impacts on the proposed Glanmire Solar Farm State Significant Development Application (SSD-21208499) that is on public exhibition from 18 November 2022 to 15 December 2022.
2. This opinion is provided in response to the following specific questions:
    a. The prospect of fire commencing on a neighbouring rural property as described, and its potential for causing damage to the solar plant if permission is granted to install it on the rectangular block to which we have referred.
    b. The speed with which a fire travels or is capable of travelling through, for example a crop ready for harvest, and the speed with which the fire front can extend by the time it reaches the boundary of the proposed solar plant.
    c. The "spotting distance" of embers.
    d. The location from where such a fire can reasonably be feasible to control.
3. I have the following academic qualifications:
    a. Graduate Diploma in Bushfire Protection with Distinction (University of Western Sydney)
    b. Graduate Certificate in Development Planning (Curtin University of Technology)
    c. Graduate Diploma in Natural Resources (University of New England)
    d. Bachelor of Urban and Regional Planning with Honours (University of New England)
4. I am accredited:
    a. by the Fire Protection Association Australia (FPAA) under the Bushfire Planning and Design (BPAD) Scheme (BPAD36371) as a Level 3 Accredited Practitioner in New South Wales and Western Australia. The NSW Rural Fire Service (RFS) recognise this accreditation as "as a person who is qualified consultant in bush fire risk assessment" for the purposes of environmental planning legislation.
    b. By the Planning Institute of Australia (PIA) as a Registered Planner (NSW).
5. I have 22 years' experience working in the planning industry, with the most recent ten years also incorporating bushfire planning. My experience has been both working in the private sector for various consultancies as well as for local government and consulting for both local and state government.

6. I am currently a member of the DPE/RFS Working Group for Recommendation 27[1] from the NSW Bushfire Inquiry.

7. I have reviewed the Environmental Impact Statement prepared by NGH as publicly exhibited on the Major Projects Website[2]. It is understood the application seeks approval for construction, operation and decommissioning of a 60MW solar farm on Lot 141 DP 1144786 (the solar farm site).

8. I have viewed the solar farm site from surrounding public roads and adjoining private properties. This site inspection was carried out on Friday 2 December 2022.

9. Each Council, where a Bush Fire Risk Management Plan applies, is required by section 10.3 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), to prepare a map that identifies bush fire prone land. This map is required to be certified by the Commissioner of the NSW Rural Fire Service (RFS) and is thence known as the "Bush Fire Prone Land Map" (BFPL Map) for the Council. Council is required to update the map at least every five (5) years.

10. The RFS has published the *Guide for Bush Fire Prone Land Mapping* [3] to assist Councils in preparing the BFPL Map. This guide was last updated in November 2015 and introduced a new Category 3 Vegetation which encompasses medium risk bush fire vegetation including *inter alia* grassland vegetation. Councils were provided with a three (3) year period (from the November 2015 publication) by the RFS to update their mapping to include the Category 3 Vegetation. Bathurst Regional Council has not amended its BFPL Map to include Category 3 Vegetation.

11. In my opinion the solar farm site and its surrounds should be classified as Category 3 Vegetation as it comprises grassland that is not maintained in a managed state (for the purposes of considering bushfire hazard) and cropping is observed as being intermittently carried out and cannot be reasonably excluded from being bush fire prone land on this basis.

12. The purpose of the BFPL Mapping is to provide a legislative trigger for consideration of bushfire as part of planning and building approval processes. For SSD applications, developments on mapped BFPL would ordinarily be referred to the RFS for input to the Planning Secretary's Environmental Assessment Requirements (SEARs).

13. A review of the SEARs issued for the project does not identify bushfire as a specific matter to be addressed, apart from in general consideration of risks and hazards "an assessment of potential hazards and risks including but not limited to bushfires, spontaneous ignition, electromagnetic fields..."[4]. No indication was given as to whether the RFS was consulted as part of the preparation of the SEARs.

14. A review of SEARs for other projects where the land has been mapped as BFPL have included more detailed consideration of bushfire such as "identify potential hazards and risks associated with bushfires / use of bushfire prone land including the risks that a solar farm would cause bush fire and demonstrate compliance with Planning for Bush Fire Protection 2019".

15. The absence of a site being mapped as bush fire prone on the BFPL Map does not obviate the consent authority from the need to consider bushfire risks and impacts either from or to a development. Section 4.15 of the EP&A Act necessitates the consideration of bushfire in relation to a proposed development where there is considered to be land comprising bushfire hazard.

16. Section 6.10 of the EIS[5] considers hazards and risks, including *inter alia* bush fire. A more detailed consideration of the impact of bushfire on the development has been provided in Section 6.10.4 of the EIS. This consideration was not based on a Bush Fire Assessment Report (BFAR) prepared in

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[1] Recommendation 27 - That Government commit to shifting to a strategic approach to planning for bush fire, and develop a new NSW Bush Fire Policy similar to the NSW Flood Prone Land Policy in order to accommodate changing climate conditions and the increasing likelihood of catastrophic bush fire conditions; to build greater resilience into both existing and future communities; and to decrease costs associated with recovery and rebuilding.

[2] https://www.planningportal.nsw.gov.au/major-projects/projects/glanmire-solar-farm

[3] NSW Rural Fire Service (2015) *Guide for Bush Fire Prone Land Mapping Version 5b*, Granville NSW

[4] Planning Secretary's Environmental Assessment Requirements SSD-21208499, dated 23/9/2021, p. 4.

[5] NGH (2022) *Environmental Impact Statement: Glanmire Solar Farm*, Version 2 Final.

accordance with *Planning for Bush Fire Protection 2019* (PBP)[6] nor did the consideration document a specific site assessment of the bush fire attack level based on the Methodology outlined in Appendix 1 of PBP.

17. The bushfire consideration has not considered agricultural activities on adjacent lands as a potential bushfire hazard impacting the development.

18. The bushfire consideration has applied "blanket" bush fire protection measures (BFPM) to the development in the absence of consideration of a site-specific bush fire attack assessment based on a detailed site assessment. It has also not contemplated changes in impact through revegetation/ vegetative screening measures required to ameliorate other impacts of the development and thus proposed as part of the development.

19. In order for a fire to occur and sustain, it requires the presence of oxygen, heat and fuel. In terms of a bushfire, the behaviour of the bushfire is influenced by topography, fuel and weather. Thus, in order to be able to consider the impacts of a bushfire on a particular development and vice versa, it is imperative to understand the local context influencing the bushfire behaviour. Vegetation is the only component that can be managed in order to influence bushfire behaviour.

20. In terms of topography, a fire travels faster uphill compared to over flat terrain or downhill. This is due to the flames being able to reach the fuel ahead of the fire more easily as well as the radiant heat preheating the fuel in front of the fire. Typically, the rate of spread of the fire will double for every ten degrees increase in slope. Aspect can also influence fire behaviour with northern and western aspects of hills tending to be dryer due to greater solar exposure.

21. The fuel for a bushfire is vegetation. The type of vegetation, how it is arranged, its compactness and volume, and moisture content all affect how a bushfire behaves.

22. Fire weather considerations include precipitation (or absence of), temperature, relative humidity, and wind. Fire Danger Ratings (FDR) provide an indication of the consequences of a fire should one start[7] or how difficult it will be to suppress the fire. These FDRs are shown on roadside signs and updated daily to reflect the forecast rating and range from Moderate to Catastrophic[8].

23. Measures of bushfire behaviour include rate of spread, intensity, flame length, and radiant heat flux.

24. There are a number of different models that are utilised to determine bushfire behaviour. The vegetation type determines which models are used. This is because bushfires behave differently through different vegetation complexes.

25. The solar farm site and its surrounds are observed to predominately comprise grassland or crop vegetation with scattered trees. The characteristic that most influences the spread of fire in this type of vegetation is the continuity of the fuel bed. The vegetation height will have the greatest influence on flame height and fuel load on fire intensity[9].

26. Improved pastures have a higher fuel load than native grasses and consequentially result in a comparatively greater fire intensity[10].

27. The curing state of grass and crops influence the ability of a fire to spread and the fire's rate of spread[11]. Cheney & Sullivan (2008) state:

    "Once the landscape is more than 90% cured there is potential for widespread devastating grassfires. By this point there are few natural barriers, such as green creek lines and gullies to inhibit the spread of fire"[12].

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[6] NSW Rural Fire Service (2019) *Planning for Bush Fire Protection: A guide for councils, planers, fire authorities and developers*, Granville NSW.
[7] NSW Rural Fire Service (nd) *Fire Danger Ratings*, https://www.rfs.nsw.gov.au/plan-and-prepare/fire-danger-ratings
[8] AFAC (nd) *Australian Fire Danger Rating System*, https://www.afac.com.au/initiative/afdrs/afdrs-overview/afdrs-design
[9] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria.
[10] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria.
[11] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[12] ibid, p. 55.

28. Other hazards, such as flooding, have a much more certain likelihood of occurring when the weather produces certain conditions. Bushfire on the other hand is reliant upon an ignition source. Bushfires can also occur when the weather conditions are less extreme providing there is an ignition.

29. As the moisture content of fuels decreases the ability to ignite becomes easier. Grassy fuels are capable of being ignited by very small embers or hot particles when the moisture content is below 6%. In these conditions fires can then be ignited by activities that would otherwise not cause ignition, such as "glowing carbon particles from defective exhausts, hot metal sparks from clashing power line conductors, grinding operations and metal striking rock during the operation of slashers or bulldozers"[13].

30. Similarly, during crop harvesting, it is not uncommon for fires to occur through metal harvester components contacting with rocks or from the build-up of flammable organic dust within the harvesting machinery[14].

31. Spontaneous combustion of stored natural fuels, such as silage pits and wet baled hay, are also recognised as an important catalyst for fires[15].

32. The *Chifley Bush Fire Risk Management Plan 2020* identifies the main sources of bushfire ignition in the area are:

    a. Lightning activity (mainly associated with late spring and early summer);

    b. Illegal / careless burning activities by private land owners/occupiers;

    c. Most commonly in grasslands and forested areas adjacent to villages.

    d. Escaped fires from legal burning activities by private land owners/occupiers;

    e. Campfires;

    f. Farm Machinery[16].

33. The structure and composition of grasses also affects the ability for ignition. Upright grasses that have recently died with little surface material are less able to be ignited. Conversely material that has partially decomposed is more likely to ignite as embers can make good contact with the fuel[17].

34. Wind can both hinder and assist ignition. Items such as metal sparks will be cooled by wind and thus will hinder ignition. Ignition from embers, cigarette butts, and other glowing combustion sources will be aided by wind. Once ignition has occurred, wind increases the combustion rate of a fire and will result in the rapid development of a fire. Under windy conditions even small fires become difficult to extinguish[18].

35. The land immediately surrounding the solar farm site comprises unmanaged grassland, improved pastures and croplands. These vegetation types are a classifiable type of vegetation pursuant to Appendix 1 of PBP and as such are capable of carrying a bushfire.

36. The solar farm site and its surrounds are characterised by undulating terrain with the landscape generally sloping in a south and south westerly direction towards Saltwater Creek. Consequentially the land to the west of the solar farm site is largely downslope of the site. The land to the south of the solar farm site is partially upslope and downslope of the site. The land to the east of the solar farm site is generally upslope of the site.

37. The following table outlines the bushfire behaviour outputs for a grassland fire with differing slopes characteristic of the locality:

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[13] ibid, p. 31.
[14] Miguel G. Cruz, Richard J. Hurley, Rachel Bessell and Andrew L. Sullivan. (2020), *Fire behaviour in wheat crops – effect of fuel structure on rate of fire spread* in 'International Journal of Wildland Fire' 2020, 29, 258–271.
[15] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria.
[16] Chifley Bush Fire Management Committee (2020) Chifley Bush Fire Risk Management Plan, NSW RFS, Bathurst.
[17] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[18] Ibid, p. 32

Table 1: Bushfire Attack Level Assessment Scenarios

Bushfire Behaviour Measure/Input	Scenario 1	Scenario 2	Scenario 3
Effective Slope	Flat	Downslope 3°	Downslope 5°
Site Slope	Flat	Downslope 3°	Downslope 5°
Asset Protection Zone (m)	10	10	10
Flame length (m)	7.94	8.8	9.43
Rate of spread (km/h)	14.3	17.59	20.19
Fire Intensity (kW/m)	44,330	54,525	62,594
Radiant Heat (kW/m²)	26.19	28.5	30.13

Notes:
Calculated utilising AS3959 (2018) Method 2 Detailed Method, using standard AS3959 and PBP inputs.

38. From the point of ignition, a bushfire continues to develop/grow until it reaches its potential rate of spread (i.e. it is fully developed). The bushfire behaviour outputs as outlined above are based on a fully developed fire.

39. The time a bushfire takes to reach full development will depend on weather conditions. Unstable conditions that are often characteristic of summer weather including hot north westerly winds with frequent and substantial changes in direction will increase the bushfire rate of spread quickly and thus will have a short time period to reach potential maximum rate of spread. Conversely stable weather conditions will result in a much longer time to reach potential maximum rate of spread[19].

40. It is a very real prospect that a bushfire could ignite on surrounding land and travel to impact the solar farm site.

41. The *Chifley Bush Fire Risk Management Plan 2020* identifies that the prevailing weather conditions for the bushfire season (November to January) in the Bathurst Regional LGA are westerly wind patterns[20]. Therefore, it is more likely that during the bushfire season a bushfire would be likely to impact the solar farm site from the west.

42. Assuming a grass fire had reached its potential rate of spread, using the outputs in **Table 1,** it would move at a rate of 4 to 5 metres per second or cover a distance of 100m in 17 to 25 seconds.

43. The residence time of grass fires is between 5-15 seconds (depending on fuel load and compaction)[21]. Whilst grass fires burn hot, the short residence time means that the duration of exposure is lower than other forms of vegetation (e.g., forest fires have a residence time of in the vicinity of 120 seconds).

44. Whilst grass fires have a shorter residence time compared to other vegetation forms, direct attack on a grass fire can only be utilised up to a fire intensity of around 10,000kW/m[22]. As seen in **Table 1,** a fully developed grass fire is expected to have an intensity of 44,330kW/m to 62,594kW/m.

[19] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[20] Chifley Bush Fire Management Committee (2020) Chifley Bush Fire Risk Management Plan, NSW RFS, Bathurst.
[21] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria
[22] NSW Rural Fire Service
https://nswrfs.atlassian.net/wiki/spaces/TECHNICAL/pages/44502820/Fire+Danger+Index+FDI+and+Fire+Danger+Ratings+FDR

45. Therefore, in order for direct attack to be successful on a grass fire, it would need to occur shortly after ignition and well before full development. Cheney and Sullivan identify that "it is highly unlikely that the head fire will be stopped by any suppression tactics until it runs into a very substantial barrier"[23].

46. Cheney and Sullivan further identify that in order for the barrier, such as a road or firebreak, to be successful, sufficient resources must be available to control the spot fires beyond the break (i.e. in the solar farm) once the fire reaches the break. The break must also be of sufficient width in order for fire fighters to work safely outside of their vehicles and enable spot fires to be suppressed immediately[24].

47. The effectiveness of a firebreak will be lessened when grasses have large seed heads, such as *Phalaris* spp., which enable spotting ahead of the fire[25]. Whilst grassfires typically result in less spotting than fires in other vegetation formations, the amount and distance of spotting would depend on the types of vegetative material and weather conditions.

48. Cheney and Sullivan further identify that when wind speeds exceed 25km/h firebreaks are likely to be ineffective as the winds will blow burning debris along the ground[26].

49. **Plate 1** shows the probability of a firebreak holding, based on width of the fire break and the intensity of the fire. The left-hand scenario assumes no trees within 20m of the firebreak and the right-hand scenario having trees within 20m of the firebreak.

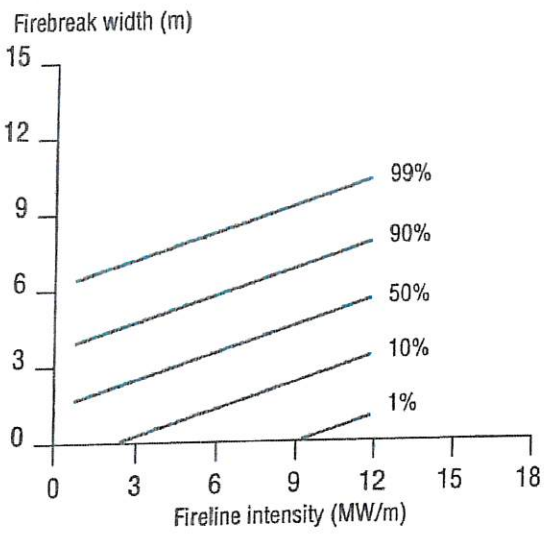

Figure 8.13: Probability of a firebreak holding a head fire in relation to fire intensity and firebreak width, where there are no trees within 20 m of the break. Source: After Wilson (1988).

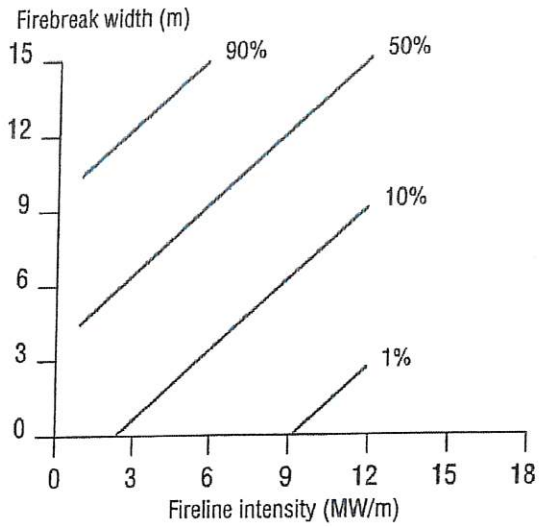

Figure 8.14: Probability of a firebreak holding a head fire in relation to fire intensity and firebreak width, where there are trees within 20 m of the break. Source: After Wilson (1988).

Plate 1: Probability of a firebreak holding under different scenarios[27]

50. The figures shown in **Plate 1** only include scenarios up to 12,000kW/m of intensity, whilst a fully developed fire would be likely to be three (3) to four (4) times that intensity.

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[23] Cheney, P & Sullivan, A. 2008. Grassfires: Fuel, weather and fire behaviour. Second edition, CSIRO publishing, Collingwood Victoria, p. 96.
[24] Ibid p.97.
[25] Ibid.
[26] Ibid.
[27] Ibid p.103

51. **Plate 1** shows that a 10m wide fire break (i.e. the Asset Protection Zone (APZ)) with trees located within 20m of the fire break (i.e. the proposed visual screening) would have 20-30% chance of holding a head fire if the fire intensity was one third the intensity of a fully developed fire.

52. The Indicative Site Layout Plan for the proposed Solar Farm shows:

    a. A 10m wide landscape area will abut the western boundary of the site for more than half the length of the boundary, the southern boundary for approximately two thirds of the length of the boundary, and approximately half the length of the northern boundary of the solar farm site.

    b. A 5m wide landscape area will abut the balance of the western boundary of the site, the eastern boundary of the site and the balance of the northern boundary of the site (plus retention of an existing strip of vegetation).

    c. Two (2) watercourses within the site will be fenced off to provide waterway offset area (approximately 40m wide)

    d. The southern part of the site will be fenced off to retain existing scattered trees.

    e. An exclusion zone is to be provided in the northern part of the site and inside of the boundary screen planting. It is understood that will remain as grassland.

    f. An Asset Protection Zone (APZ) 10m wide is generally to be provided on the inside of the boundary screen planting or between the offset/riparian areas and the solar farm infrastructure. The majority of the APZ includes an access road, however, the central part of the western boundary does not and neither does the central riparian corridor.

53. The Landscape Concept Plan shows that the landscape planting, in the 5 and 10m landscape strips, riparian corridors and exclusion/pasture areas will provide significant revegetation and density of vegetation, in some areas introducing a vegetation likely to be consistent with forest classification.

54. This revegetation will introduce a very different bushfire risk to the site compared to the existing grassland vegetation. For example, whilst the rate of spread of the fire would be slower in a forest type vegetation compared to grassland, it would have significantly greater flame lengths, greater radiant heat, longer residence time, and increased chance of spotting. This different bushfire risk resulting from revegetation has not been considered in the assessment and the mitigation measure have not been provided to reflect the different bushfire behaviour.

55. The location of the APZ on the inside of landscape buffers will do little in the way of providing an effective APZ. The APZs will essentially be a narrow corridor between tall forest like vegetation and the solar panels. It will not provide a safe space for fire fighters to operate and will not provide a functional defendable space due to the narrowness and density of vegetation restricting views toward the approaching fire. Furthermore, many of the areas of the APZ do not have access provided.

56. Considering the scenarios in **Plate 1**, it not expected that the proposed APZ would provide for a suitable fire break in order to halt the spread of fire onto the Solar Farm Site nor to provide a suitable, tenable or safe environment in which to defend the Solar Farm site from, particularly given the length of these narrow APZ area.

57. In terms of access, it has not been demonstrated that the required passing bays (every 200m) and turnarounds can be achieved in order to comply with the PBP requirements.

58. The water supply proposed to be provided for firefighting purposes is the equivalent of that required to protect one (1) dwelling house. The solar farm site has a perimeter distance of over 6km and an area of nearly 200 hectares. The proposed water supply would be vastly insufficient to provide any meaningful protection of the site.

59. In the absence of a specific numerical guideline for water supply volume for solar farms in PBP, the recent Country Fire Service *Design Guidelines and Model Requirements: Renewable Energy Facilities*[28] could be utilised as a best practice guide, which requires:

    a. Generally for the solar farm one (1) x 45,000L static water tank for every 100 hectares of a site, plus,

    b. For the battery energy storage system protection, no less than 288,000L or as per the provisions for Open Yard Protection of AS 2419.1-2005 flowing for a period of no less than four hours at 20L/s, whichever is the greater, plus

    c. For the substation.

If you have any questions regarding this opinion, please contact the undersigned on 0400 940 482.

Yours sincerely

[redacted]

Erika Dawson
Director | BPAD Level 3 Accredited Practitioner (NSW & WA) | Registered Planner PIA

[28] Country Fire Authority (2022). https://www.cfa.vic.gov.au/ArticleDocuments/550/220503_Design_Guidelines_Model_Requirements_Renewable_Energy_Facilities_v1.pdf.aspx

Integrated Consulting
Planning | Bushfire | Surveying

Attachment 2

Glanmire Solar Farm – Town Planning Opinion

Integrated Consulting
Planning | Bushfire | Surveying

Our Ref.: 22101-L02_B

Glanmire Action Group
C/- Mr Jonty Boshier
Hennessy Dowd Lawyers
PO Box 697
Bathurst NSW 2795

13 December 2022

Dear Mr Boshier

GLANMIRE SOLAR FARM – TOWN PLANNING OPINION

1. This opinion has been provided in response to a letter request from Hennessy Dowd Lawyers in relation to the town planning considerations of the proposed Glanmire Solar Farm State Significant Development Application (SSD-21208499) that is on public exhibition from 18 November 2022 to 15 December 2022.

2. I have the following academic qualifications:

   a. Graduate Diploma in Bushfire Protection with Distinction (University of Western Sydney)

   b. Graduate Certificate in Development Planning (Curtin University of Technology)

   c. Graduate Diploma in Natural Resources (University of New England)

   d. Bachelor of Urban and Regional Planning with Honours (University of New England)

3. I am accredited:

   a. by the Fire Protection Association Australia (FPAA) under the Bushfire Planning and Design (BPAD) Scheme (BPAD36371) as a Level 3 Accredited Practitioner in New South Wales and Western Australia. The NSW Rural Fire Service (RFS) recognise this accreditation as "as a person who is qualified consultant in bush fire risk assessment" for the purposes of environmental planning legislation.

   b. By the Planning Institute of Australia (PIA) as a Registered Planner (NSW).

4. I have 22 years' experience working in the planning industry, with the most recent ten years also incorporating bushfire planning. My experience has been both working in the private sector for various consultancies as well as for local government and consulting for both local and state government.

5. I have reviewed the Environmental Impact Statement (EIS) prepared by NGH as publicly exhibited on the Major Projects Website[1]. It is understood the application seeks approval for construction, operation and decommissioning of a 60MW solar farm on Lot 141 DP 1144786 (the solar farm site).

6. I have viewed the solar farm site from surrounding public roads and adjoining private properties. This site inspection was carried out on Friday 2 December 2022.

[1] https://www.planningportal.nsw.gov.au/major-projects/projects/glanmire-solar-farm

7. I have also reviewed the following documents in providing this opinion:

   a. Tremain Ivey Advisory Agricultural Consultants, preliminary EIS review letter dated 12 December 2022,

   b. DR Agriculture Pty Ltd, EIS review, dated 9 December 2022,

   c. Integrated Consulting Pty Ltd, Glanmire Solar Farm – Opinion on Bush Fire Impacts, dated 13 December 2022.

8. For ease of reference, the comments in this opinion are provided in relation to the Sections of the EIS submitted with the SSD Application.

SECTION 2 - STRATEGIC CONTEXT

9. This section of the EIS has identified that there is a plethora of strategic documents that identify the need for reducing reliance on fossil fuels and a transition to renewable energy. It has not however been demonstrated, in any meaningful way, that there is strategic justification for the specific project.

10. Strategic planning is undertaken to ensure that future land uses occur in an orderly and proper location. Renewable Energy Zones (REZ) have been established throughout the state to ensure that there is a strategic approach to the provision of renewable energy projects.

11. The large area required to accommodate solar farms sees that the default location is within rural land use zones This results in a competing interest for the rural land.

12. Given that rural land is finite and becoming increasingly marginal or constrained due to climate change, it is critical that the location of non-rural developments is closely scrutinised. Such close consideration is even more important when they are located outside of an area specifically designed/set aside to accommodate such uses (i.e., the REZs).

13. The EIS appears to downgrade the land capability of the solar farm site as evidenced by the reports reviewed under paragraphs 8a and b. Such a downgrading contradicts much of the strategic justification for the site.

14. As outlined by the *Land Use Planning: Planning for Agriculture in Rural Land Use Strategies*[2], agricultural land may not be defined or mapped as State Significant Agricultural Land (SSAL), however, it may still be important from a Local Government Area (LGA) perspective. Therefore, it is considered inappropriate to dismiss the agricultural importance of a site simply because it is not mapped as SSAL or otherwise.

15. NSW Planning & Environment – Resources & Geoscience has developed mapping that shows the renewable energy resources of the state[3]. The solar farm site is located within an area that receives ~17 megajoules per square metre of average daily solar exposure. There are vast areas of the state that receive significantly more solar exposure. No justification has been provided in the EIS as to why this site is more appropriate given that it is in a location that is below the median solar exposure for the state.

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[2] Department of Primary Industries (2022) *Land Use Planning: Planning for Agriculture in Rural Land Use Strategies*, Department of Regional NSW.
[3] NSW Planning & Environment – Resources & Geoscience
https://oeh.maps.arcgis.com/apps/MapSeries/index.html?appid=3b2391c554dd4478a31b88a32cec066a

SECTION 4 – STATUTORY CONTEXT

16. The solar farm site is located within the RU1 Primary Production Zone under the *Bathurst Regional Local Environmental Plan 2014* (LEP), the objectives of which are:

- *To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.*
- *To encourage diversity in primary industry enterprises and systems appropriate for the area.*
- *To minimise the fragmentation and alienation of resource lands.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To maintain the rural and scenic character of the land.*
- *To provide for a range of compatible land uses that are in keeping with the rural character of the locality, do not unnecessarily convert rural land resources to non-agricultural land uses, minimise impacts on the environmental qualities of the land and avoid land use conflicts.*

17. The proposed development is defined as a 'electricity generating works'.

18. The land use table for the RU1 zone in the LEP is an "open" zoning table which means that all land uses are either permitted with or without consent, with the exception of a number of expressly prohibited land uses. The proposed development is not expressly permitted as a listed land use. Instead, it is permitted with consent as "Any other development not specified in item 2 or 4".

19. This "open" approach to the land use table provides greater flexibility in considering developments, however, it places greater importance on the consideration of the consistency with the overarching objectives of the zone. Clause 2.3 of requires that a consent authority must have regard to the zone objectives when determining a development application.

20. It is considered that the EIS has not demonstrated sufficiently that the development is not antipathetic to the zone objectives. In particular:

a. As outlined further below (in paragraph 27), land use conflict has not been appropriately minimised,

b. In order to maintain the rural character of the land, the development relies upon extensive vegetative screening which introduces new and different bushfire risks which have not been appropriately considered nor mitigated against (refer to document referred to in paragraph 8(c)).

c. The compatibility of the land use has not been demonstrated in terms of:

(i) The necessity to convert the rural land resource to a non-agricultural use, and

(ii) Avoidance of land use conflicts (refer paragraph 27).

21. Section 2.42 of the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (T&I SEPP) requires that the consent authority cannot grant consent to a development for *inter alia* a state significant solar electricity generating works located in a regional city unless it is satisfied that the development:

(a) is located to avoid significant conflict with existing or approved residential or commercial uses of land surrounding the development, and
(b) is unlikely to have a significant adverse impact on the regional city's—

(i) capacity for growth, or
(ii) scenic quality and landscape character.

22. As outlined in paragraph 27, the EIS has not adequately considered the extent of land use conflict, nor has it demonstrated that it has been located to avoid significant conflict with the existing commercial (agricultural) uses of the surrounding land.

23. Furthermore, many of the measures proposed to mitigate other impacts (i.e. visual landscape screening) will exacerbate other impacts on and of the development (i.e. bushfire) and result in greater land use conflict (as outlined in paragraph 27).

SECTION 6 – ASSESSMENT OF KEY IMPACTS

24. In order to make the visual impacts of the development acceptable, the development relies upon the planting and on-going management/retention of significant vegetative screening along the property boundaries. As outlined in the document referred to in paragraph 8(c), the revegetation of the site will introduce a very different bushfire risk into the site and surrounds (in addition to the introduction of the solar farm itself). The bushfire mitigation measures proposed as part of the development do not provide for adequate protection commensurate with the risk.

25. The consideration of land compatibility has been largely limited to land capability and otherwise provides little real consideration of land use conflicts.

26. The reports referred to in paragraphs 8(a) and (b) indicate that land capability provided in the EIS has been downgraded. An erroneous consideration of land capability will have the effect of insinuating that the site is more suitable for a primary production replacement, such as a solar farm.

27. The Land Use Conflict Risk Assessment has not adequately considered:

    a. The introduction of additional and different bushfire risks in the locality.

    b. The practicality, feasibility, appropriateness, and effectiveness of the proposed bushfire mitigation measures in managing bushfire risk in the locality, particularly given the introduction of new hazards and risks into the locality.

    c. The loss of the adjacent property owners' ability to manage their risk (through insurance protection) by virtue of a new land use being introduced that will substantially increase the consequence[4]. This has the potential flow on effect of sterilising land around solar farms from being used for primary production which consequentially results in greater loss of primary production land beyond just the solar farm site.

28. The EIS has not adequately considered bushfire risk. It has not contemplated the additional and different risk the development is introducing through the proposed visual vegetative screening. The development has not been provided with appropriate measures in order to mitigate the resultant bushfire behaviour and impacts as outlined in the document referred to in paragraph 8(c).

SECTION 7 – ASSESSMENT OF ADDITIONAL IMPACTS

29. The absence of sufficient consideration of the matters as outlined in this submission mean that the cumulative impacts of the development have not been adequately contemplated as part of the EIS.

30. The EIS has not reasonably considered the suitability of the site for the development in terms of section 4.15(1)(c) of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

SECTION 8 – PROJECT JUSTIFICATION

31. A large part of the justification for the project is based on the premise that the land is not of high agricultural value, which has been reported as incorrect (refer to 8(a) and (b)).

32. The justification is based on an inadequate consideration of impacts which, in particular, understates impacts of the development and land use conflict.

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[4] I have been advised by the client that advice has been received from insurance experts to the effect that adjoining primary production properties would not be able to obtain insurance coverage if a solar farm was approved on the adjacent site as the cost of damage on a solar farm would be too great to insure against should it be proven that a bushfire originated on the adjacent primary production land and caused impact on the solar farm.

Integrated Consulting
Planning | Bushfire | Surveying

If you have any questions regarding this opinion, please contact the undersigned on 0400 940 482.

Yours sincerely

[redacted]

Erika Dawson
Director | BPAD Level 3 Accredited Practitioner (NSW & WA) | Registered Planner PIA

Glanmire Solar Farm - Public Meeting

Memorandum of Counsel

1. My instructing solicitors, Hennessy Dowd Lawyers, act on behalf of the Glanmire Action Group in respect of a proposed solar farm, associated infrastructure and battery storage in the Glanmire area.

2. I have been instructed by Hennessy Dowd Lawyers to provide my views on the proposal in so far as the solar farm may affect the property rights and liberties of neighbouring land-owners.

3. The common law has long regarded a person's property rights as fundamental.

4. Farmers, especially crop farmers, must have insurance to protect their farms and their crop. Such insurance extends to public liability cover for any damage to adjoining or neighbouring properties.

5. For example, crops in green areas are at risk of catching fire. Prudent farmers insure themselves in the event of any public liability arising from damage caused to their neighbouring lands. They may be liable to adjoining owners if, for example, a fire is started on their land and stretches across adjoining lands.

6. In the present case, a farmer's public liability insurance would be required to cover damage to or destruction of a neighbouring solar farm worth hundreds of millions of dollars.

7. I have read the Insurance Risk Analysis by NLT Insurance Brokers which was submitted to the Commission during the public meeting on 30 November 2023. From a legal perspective, the insurance advice is sound.

8. However, there is an additional legal element to note. An adjoining owner or neighbour of a solar farm would be under a duty of disclosure to inform their insurer about the existence of the neighbouring solar farm. Section 21 of the *Insurance Contracts Act 1984* (Cth) requires disclosure of any matter which may be relevant to an insurer's decision to provide cover and, if so, on what terms.

9. The existence of a $200 million solar farm adjoining an insured's property would require disclosure to an insurer and will most likely result in the insurer increasing its premiums in an exorbitant amount or refusing to provide public liability cover at all.

10. If an adjoining owner is unable to afford or obtain public liability insurance in those circumstances, then the owner will likely be forced to choose from three unjust choices concerning the use of his or her land, namely:

    a. destroy the crop and cease farming on that land to reduce the risk of fire and other activities which could affect or damage the solar farm; or

    b. continue farming operations without insurance and run the risk of catastrophe for that farmer personally (as an uninsured) if he or she becomes liable for any damage caused to the adjoining solar farm; or

    c. pay an exorbitant premium for insurance, which could result in the farm running at a financial loss.

11. If the adjoining land is owned by a trustee, which is not uncommon, the second option (running the risk without insurance) may not be viable at all. This is because trustees have a duty to ensure that the property they hold is adequately protected otherwise the beneficiaries are at risk. Accordingly, a trustee owner would be forced into a far more precarious situation by an adjoining solar farm and would likely be required to seek judicial advice as to whether it is in the beneficiaries' best interests to either (1) insure the land at exorbitant costs (and probably cause a net loss for farming enterprise) or (2) sell the farm (presumably at a fire sale price because there would be few, if any, willing buyers on the market who would buy land which cannot be viably insured).

12. One alternate method which I have been asked to comment upon is whether a form of perpetual indemnity could be imposed on the owner of the solar farm – namely, an indemnity by the owner of the solar farm that it will pay for any loss or damage caused to the solar farm by any adjoining owner. I foresee an issue with that course, namely, there will be successors in title to both the solar farm land and the adjoining land. It is well established under the common law that positive covenants do not run with the land and therefore will not bind successors in title. Accordingly, it is unclear how any perpetual indemnify mechanism would be put in place. I have not been briefed with any proposals in this regard, thus, I am not aware if any potential mechanisms have been proffered.

13. The matters set out in this memorandum are not intended for use as legal advice. Any reader of this memorandum should seek their own independent legal advice based on their own circumstances. The purpose of this memorandum is to provide a high-level commentary on the proposed solar farm and the potential legal issues that should be investigated and addressed in detail by the relevant authorities (to the extent they have not already done so).

Hayden Fielder

Barrister, Eight Selborne Chambers

[redacted]

7 December 2023

Peer Review – Sections of Minesoils (Aug. 2023) and DPE (Nov.2023) Reports – 24th November 2023

Glanmire Action Group

C/- Jonty Boshier
Hennessy Dowd
Russell St
Bathurst, NSW 2795

Private and Confidential

D R Agriculture Pty Limited
As trustee for the D R H Agricultural Trust ABN: 51 068 260 644

2470 Mitchell Highway
Molong NSW 2866
Ph: 0408 820 467 / 02 6366 9118

Jonty Boshier
Hennessy Dowd
191 Russell St
Bathurst, NSW 2795

November 24th, 2023

Peer Review – Glanmire Solar Farm Minesoils' and DPE's 2023 Reports (sections of)

Dear Jonty,

The report attached summarises my review of relevant sections of the above reports as asked.

Should you wish for further clarification of any of the material presented, please do not hesitate to contact me.

Yours sincerely,

David Harbison
Director.

Peer Review – Minesoils Pty Ltd (Aug 2023) and DPE (Nov 2023) Reports (Sections of)

I, David Harbison, of D R Agriculture Pty Ltd, 2470 Mitchell Highway, Molong, being an independent agronomist / agricultural advisor say;

1. My previous views and reports relating to land and soil capability (LSC) class of the proposed site have been, in principle, validated by Minesoils Pty Ltd's (Minesoils) findings (supported by Dr. David McKenzie) of 40.6 ha of Class 3 land. It should also be noted that the past reference to the LSC of the site as Class 2 and Class 3 by the NSW Department of Planning, Industry and Environment's eSpade service, 'Raglan Soil Landscape' (espade.environment.nsw.gov.au) was correct at the time of publication. Since that time, the Office of Environment and Heritage (OEH) reviewed and released the "The land and soil capability assessment scheme" (2012) which built on the earlier version but with more emphasis on a broader range of soil and landscape properties.

2. Whilst the revised scheme has provided slightly different LSC class ratings, provided in Minesoils report as;

    a. 40.6 ha Class 3: high capability land

    b. 132.9 ha Class 4: moderate capability land, and

    c. 12.6 ha Class 5: moderate – low capability land,

    the site's productivity potential is not limited by this classification. 25% of this proposed development footprint is Class 3 land (Dept. of Planning and Environment – Glanmire Solar Farm, Nov. 2023) and according to the Guidelines for Large Scale Solar, should be avoided.

3. 93% of the site is classified as "moderate or high capability land" and from Minesoils report, 179.5 ha (96.5% of the site) is arable - "able to support cultivation to establish fodder crops and pastures and excludes dwelling and surrounds, shedding, waterways and dams".

4. Within the Bathurst LGA, 93% of agricultural land is used for grazing, with a further 6% used for cropping. This site can be used for both. From a production perspective, the district average stocking rate is approximately 8 dse/ha (Behrendt and Eppleston, 2011). This site, with testament to earlier reports was estimated to have a productivity stocking rate of 13 dse/ha (Tremain Ivey Advisory, 2021) and 16 dse/ha (Minesoils, 2023). These figures are 60 - 100% higher than district practice, and reflect just how productive this site is, irrespective of LSC.

5. Understanding the future risk of soil dispersion and soil erosion is critical to such a site. With the known soil sodicity issues at depth from many sources, disturbing that soil layer has significant environmental risk. Dr. David McKenzie in his letter to the Dept. of Planning and Environment agrees on the importance of soil dispersion management at the Glanmire site. There can be no guarantee that when the proposed trenches are to be dug, that mixing of soil layers will not occur.

Opinion

6. As a consequence of point 5 above, it would be assumed that there will be some sodic material placed at a different level in the soil profile to that where it naturally occurs at the moment. Further, water infiltration rates in the trenched areas will be altered. Soil bulk density will be changed. This could lead to faster, or slower, infiltration, with consequences of faster, or slower, water movement. Faster would lead to potential greater dispersion and erosive forces within the soil profile, slower could mean greater overland flow as less infiltrates. Both can have environmental consequences for the immediate site, and potentially 'down stream' where the water flows. Either outcome has consequential erosion issues and will degrade any LSC further, deeming future land use at a lower capability than currently exists.

7. Important Agricultural Land (IAL) is another assessment to be considered in any development on rural land. While LSC is mapped for NSW, maps of IAL have not yet been completed. The NSW Department of Primary Industries (NSW DPI) pilot mapping project undertaken within the Central Tablelands and Hunter regions of NSW aimed to identify and map IAL. The mapping takes into account analysis of current land uses, biophysical, socio-economic and agricultural industry approaches. The guideline explores how mapping methods can be used either individually or in combination to produce a more comprehensive assessment (NSW Department of Primary Industries, 2017). The IAL pilot map for the Central Tablelands of NSW does not cover the proposed site.

8. Only 6% of the land in the Bathurst LGA is suitable for cropping, with the local community knowing that this site has been cropped for much of the last 70 years. Almost 100% of the proposed site would be within that 6% of cropping land. That is how important this piece of land is to the Bathurst LGA and its productivity.

9. It has been noted that should this mixed cropping/grazing land be approved, a potential condition of approval will be to graze under the solar panels. Grazing management is key to maintaining ground cover, preventing bare ground and erosion. Not at any time in my experience can grazing management be conducted on one "paddock" of 159 ha without detrimental effects on some areas. There has been no indication in the proposal that paddock fences of manageable land areas will be reinstated post construction, and the development will see the current water sources (dams) filled in. How will stock be watered, and better, managed from overgrazing/compacting some areas while not grazing others? Two outcomes of such are erosion and increased fire risk/fuel load.

10. With the future food and fibre needs of a growing population in Australia, let alone the world, farmers are constantly being required to produce more agricultural product from the same amount, or less, land. Each loss of agricultural land and farm productivity to developments such as this proposal all contribute to a greater loss of food and fibre. Over the term of the proposal, it will amount to a significant amount of forgone food and fibre, creating greater demand for what food is produced elsewhere. Such demand could be inflationary, and longer term, you may save a little on your power bill, but pay a premium for future food and fibre needs, so another net loss.

References

11. Behrendt K. and Eppleston J. (2011). Proceedings of the 26th Annual Conference of The Grassland Society of NSW Inc.

12. Department of Planning and Environment (2023) (dpie.nsw.gov.au). Glanmire Solar Farm, State Significant Development Assessment Report (SSD 21208499)

13. Minesoils Pty Ltd (2023). Glanmire Solar Farm; Soil, Land and Agricultural Impact Assessment. Report number MS-103.

14. NSW Department of Primary Industries (2017). Agricultural Land Use Planning – A guideline to identifying important agricultural lands in NSW.

15. NSW Office of Environment and Heritage (2012). The Land and Soil Capability Assessment Scheme, Second Approximation. Sydney: NSW Office of Environment and Heritage.

16. State of NSW and Department of Planning, Industry and Environment (2022) ©. Raglan Soil Landscape - from espade.environment.nsw.gov.au

17. Tremain Ivey Advisory (2021). Agricultural Impacts of Proposed Glanmire Solar Farm.

Tremain Ivey Advisory
Agricultural Consultants

Agricultural Impacts of Proposed Glanmire Solar Farm

Draft Agricultural Consulting Report to:

Glanmire Action Group

Prepared for: Jo Petch and Peter Hennessy on behalf of Glanmire Action Group

19 January 2021

Prepared by: **Tremain Ivey Advisory**
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Contents

Schedules & Attachments

1 Executive Summary

1.1 Introduction

This report presents an investigation of the agricultural and economic impacts of the proposed solar farm on land at 4823 Great Western Highway, Glanmire, NSW 2795 ("the Property"). Proponents of the project are Elgin Energy. The report was written under instructions from Jo Petch and Peter Hennessy, acting on behalf of the Glanmire Action Group.

This report details the outputs of an investigation of the agricultural productivity of the proposed site of the solar project.

1.2 Agricultural Capacity of Solar Project area

Elgin Energy (2020) advises that:

- the Property that comprises the Solar Project has a total area of **186 ha**; and
- the development footprint for the Solar Project is **140 ha**.

Further, Elgin Energy (2020) advise that the aim is to return the development footprint area to grazing with sheep once the Solar Project is operational.

TIA analysis using GIS mapping shows:

- The area available for agricultural production on the Property is approximately **185 ha** (the 'Productive Area').
- The arable area is approximately **179.5 ha**. This is the area able to support cultivation to establish crops and pastures.

1.3 Assessed Agricultural Production Potential

TIA agree with the assessment of agricultural potential of the Solar Project area provided in a report prepared by Mr David Harbison and dated 16 November 2020. The Solar Project area is capable of supporting an intensive mixed crop and livestock farming system. Such a farming system is typical of that utilised by farm businesses on the lands of similar agricultural potential surrounding the Solar Project area and generally in the Bathurst region.

1.4 Agricultural Financial Returns

The financial returns from agricultural production on the Solar Project area is based on a mixed crop and livestock farming system and the assessed agricultural potential provided by Mr Harbison. The key assumptions within the analysis are designed to provide financial returns indicative of an average year with respect to climate and market conditions.

An overview of the key results from the budget is shown over.

Overview - Whole Farm Budget - Average Year

Budget Overview	
Income	$228,714
Operating Expenses	126,664
Operating Return	102,050
Non Operating Costs	12,750
Total Cash Outgo	126,664
Net Cash Surplus/Deficit	$102,050

1.5 Alternative Sites

The report presents financial returns from alternative sites, in areas with lower agricultural production potential.

Comparable financial returns have been prepared for the NSW Far West based on the median stocking rate calculated from ABARES (2021) data.

The TIA analysis has included allowance for general expenses that are directly linked to the operation of 186 ha in the Far-West area of NSW.

An overview of the key results from the budget is shown below.

Overview - Whole Farm Budget – NSW Far West

Budget Overview	
Income	$4,512
Operating Expenses	1,868
Operating Return	2,644
Non Operating Costs	250
Total Cash Outgo	1,868
Net Cash Surplus/Deficit	$2,644

1.6 Comparison of Financial Returns

Comparing the results of the analyses, the annual gross income for Solar Project area is $228,714 compared to $4,512 for NSW Far West.

The gross income for 186 ha in NSW Far West is less than 2.0% of the Solar Project area.

2 Introduction

2.1 Background

This report presents an investigation of the agricultural and economic impacts of the proposed solar farm on land at 4823 Great Western Highway, Glanmire, NSW 2795 ("the Solar Project"). Proponents of the project are Elgin Energy. The report was written under instructions from Jo Petch and Peter Hennessy, acting on behalf of the Glanmire Action Group.

The Glanmire Action Group comprises a group of eight landowners of neighbouring properties. The group is not a formal entity (ie. not a registered incorporated association).

This report details the outputs of an investigation of the agricultural productivity of the proposed site of the solar project, 4823 Great Western Highway, GLANMIRE NSW 2795 ("the Property").

This report has been prepared in accordance the Ag Institute Australia code of ethics.

All enquiries which are desirable and appropriate have been made. No relevant matters of significance which the author regards as relevant have, to the knowledge of the author, been withheld.

This report has been prepared by Richard Ivey with the assistance of Tremain Ivey Advisory (TIA) associate Andrew Rice.

2.2 Instructions Accepted

The initial brief for the TIA investigations was detailed in a letter from the Glanmire Action Group (dated 19 November 2020).

The instructions accepted where detailed in a TIA engagement agreement (dated 23 November 2020). The engagement agreement specified the following tasks to be undertaken under the engagement:

1. Obtain and review all relevant background documents including land classification and utilisation options [for the Property].
2. Undertake discussions with the lessee [of the Property].
3. Determine an appropriate average year management program [for the Property].
4. Prepare detailed budgets quantifying gross and net financial returns expected from the average year program.
5. Research relative impact of establishing the Solar project on the Property compared to other sites with lower [agricultural] productivity.
6. Prepare and present draft [written] report detailing the above issues.
7. Receive and review feedback from members of the Glanmire Action Group in relation to the above draft report.
8. Incorporate any further issues as appropriate into a final report.

9. Prepare and present a final report as detailed above.

2.3 Documents Provided

The following documents were provided by Glanmire Action Group for the preparation of this report:

1. Letter to TIA (dated 19 November 2020) detailing initial brief and background information.
2. Document titled 'Synopsis (Full)' (undated); provides background information on the proposed Solar Project, Glanmire Action Group and the proposed Project site.
3. Proposed Solar Farm at Glamire, NSW: FAQ (1 November 2020), Elgin Energy Pty Ltd.
4. Agronomic Inspection Report (dated 16 November 2020), DR Agriculture Pty Ltd (author: Mr David Harbison, Director).

2.4 Goods and Services Tax

It is assumed that operators of the Property have an Australian Business Number (ABN) and are registered for Goods and Services Tax (GST). On this basis operators will receive a tax credit for GST paid on goods and services in operation of the Property.

Therefore, income and expenses presented in this report on a GST exclusive basis, unless otherwise stated.

2.5 Acronyms and Abbreviations

arable area	Area able to support cultivation to establish crops and pastures.
ASC	Australian Soils Classification
Average year	Average year with respect to climate and market conditions.
BOM	Bureau of Meteorology
BSAL	Biophysical Strategic Agricultural Land
DPIE	(NSW) Department of Planning, Industry and Environment
DSE	Dry Sheep Equivalents
GIS	Geographic Information System
ha	Hectare(s)
ISF	Inherent Soil Fertility
LGA	Local Government Area

Mixed farming	Mixed crop and livestock production.
NDVI	Normalised Difference Vegetation Index
(NSW) OEH	former (NSW) Office of Environment & Heritage
Productive Area	Area of the Property that is available for agricultural production.
(the) Property	823 Great Western Highway, GLANMIRE NSW 2795
Km	Kilometre
M	Metre
SL	Soil Landscape
TIA	Tremain Ivey Advisory
(the) Solar Project	Glanmire Solar Farm project

3 Proposed Glanmire Solar Farm Project

3.1 Background

The Solar Project proponent is understood to be Elgin Energy Pty Ltd.

With offices in London (United Kingdom), Dublin (Ireland), Sydney (NSW) and Melbourne (VIC)[1], Elgin Energy was founded in 2009. Reportedly, Elgin Energy has plans for solar farm developments in United Kingdom, Ireland and Australia. While plans are held for solar farm projects in Australia, there are no other current projects known to exist in Australia based on information available on Elgin Energy website.[2]

3.2 Project Site Location

The site of the Glanmire Solar Farm project ("the Solar Project") is 4823 Great Western Highway, GLANMIRE NSW 2795 ("the Property") (Elgin Energy 2020).

The Property is understood to comprise Lot 141 DP1144786 (Bathurst Regional LGA). This is based on site address details and location mapping (Elgin Energy 2020) and use of SIX Maps (NSW Spatial Services 2021a) to obtain full lot details.

The Property is some 11 km east of the major regional centre of Bathurst (NSW).

Project site and location in relation to Bathurst is shown in Figure 1. Figure 1 has been prepared by TIA and shows the following spatial information from NSW Spatial Services (2021b):

- a base map comprising the latest available satellite imagery (15 August 2013; 50 cm resolution); and
- overlays;
    - Lot (boundary and numbers);
    - Project boundary (based on lot boundaries); and
    - 1 m contours.

NSW Spatial Services imagery has been used in Figure 1 as it provides evidence of historical land use for the Property (discussed further Section 3.3).

3.3 Current Site Ownership and Operation

The Property that comprises the proposed Solar Farm site is owned by Mr Michael Danziger. The farm operations on the Property are understood to be conducted under a share farming agreement. The share farmer is Mr Brett Bailey. Mr Bailey leases land in other areas within NSW.

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[1] https://www.elgin-energy.com/contact-us/

[2] https://www.elgin-energy.com/

While the property has supported mixed crop and livestock operations in the past, the Glanmire Action Group advise that it is currently operated as farm business focused on grazing (sheep for meat and wool). Mr Harbison (personal communication 6 January 2021) confirmed that at the time of his inspection (12 November 2020) there was wheat, oats and canola crops growing on the Property.

Figure 1 (base image) shows evidence of past cultivation for crop and pasture. Within the 2013 base image in Figure 1, winter crops can be seen within the 5 paddocks that comprise the Southern portion of the Property.

The residence on the Property is understood to be under a residential rental lease, separate to the share farming agreement.

3.4 Project Site and Development Footprint Areas

Elgin Energy (2020) advise that the Property that forms the Solar Project site is **186 ha**.

As per Section 3.2, the Solar Project Site comprises Lot 141 DP1144786 (Bathurst Regional LGA). Verification by TIA using Geographic Information Systems (GIS) mapping shows that this lot has an area of 185.8 ha. This is consistent with the Site area reported by Elgin Energy (2020). An area of 186 ha will be assumed for the Property in the TIA analysis presented in this report.

The development footprint is understood to be **140 ha** (Elgin Energy 2020). Details of the development footprint location where not available for the preparation of this report.

3.5 Project description

The Solar Project is described by Elgin Energy (2020) as follows:

> *Glanmire Solar Farm is proposed to have a capacity of approximately 60 megawatts (MW)(ac) comprising ground mounted solar photovoltaic (PV) modules (panels) similar to those installed on rooftops around Australia.*
>
> *The project is aiming to continue sheep grazing within the development footprint of the project once operational.*

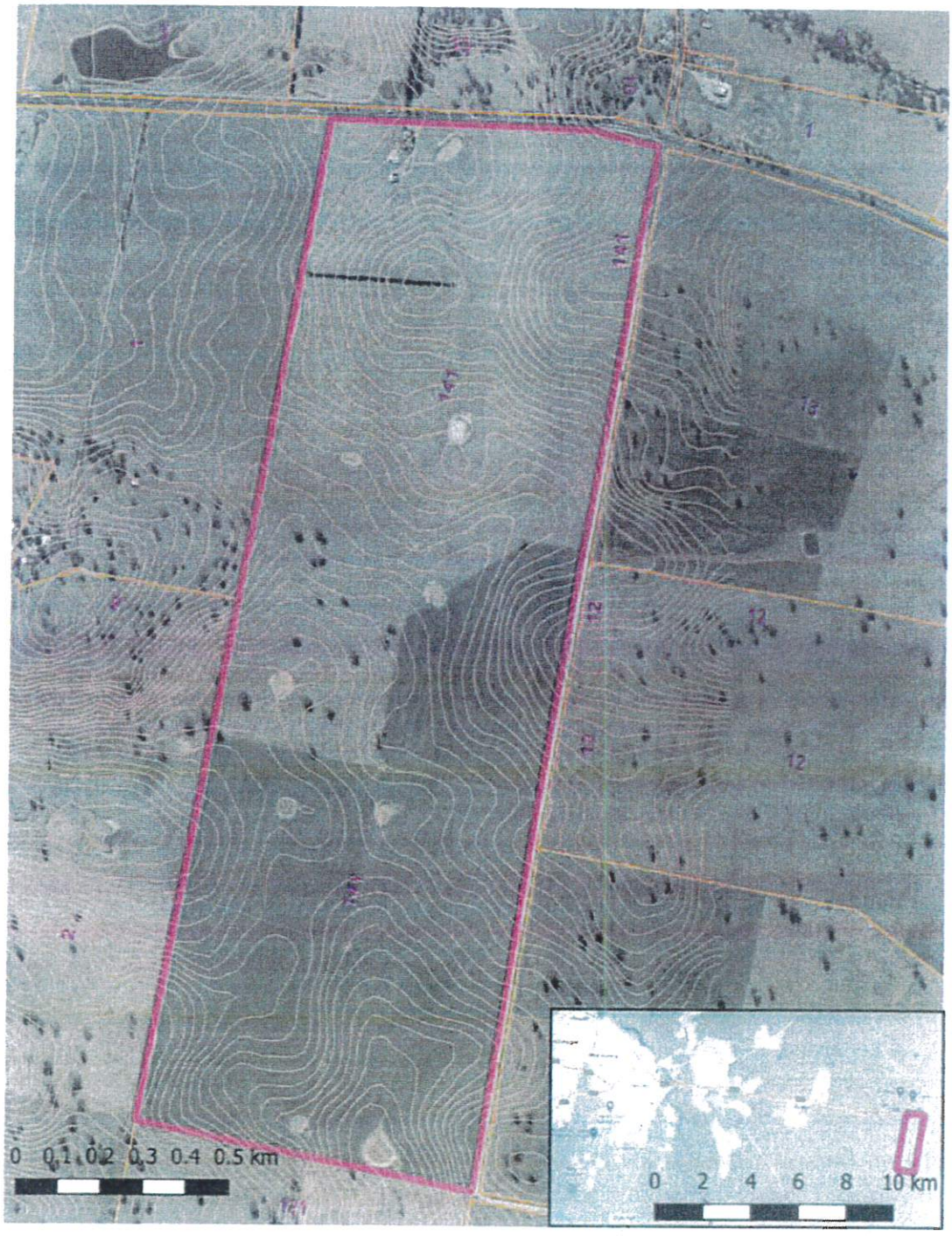
3.6 Reasons for selecting proposed Solar Farm Site

Elgin Energy (2020) advise that the reasons for selecting the proposed Site include:

- *High solar irradiance;*
- *Cost-effective grid connection with capacity;*
- *Relatively flat and clear land with few environmental constraints; and*
- *Not identified as highest quality land or 'Biophysical Strategic Agricultural Land'.*

TIA understand that the reference to Biophysical Strategic Agricultural Land refers to the NSW Department of Planning, Industry and Environment system of classification and mapping of agricultural land (DPIE 2021).

Figure 1: Solar Project site map



4 Agricultural Capacity of Solar Project area

The agricultural capacity of the Solar Project area is defined by the area available for production, property improvements, biophysical resources, climate and the regional infrastructure and support services. These aspects are discussed in the follow in sub-sections.

The assessment of agricultural productive capacity is assessed based on a combination of these resources.

4.1 Areas

As detailed in Section 3.4, Elgin Energy (2020) advises that:

- the Property that comprises the Solar Project has a total area of **186 ha**; and
- the development footprint for the Solar Project is **140 ha**.

Further, Elgin Energy (2020) advise that the aim is to return the development footprint area to grazing with sheep once the Solar Project is operational.

TIA analysis using GIS mapping shows:

- The area available for agricultural production on the Property is approximately **185 ha** (the 'Productive Area'). There is approximately 1.2 ha associated with the area surrounding the dwelling and farm sheds on the property. While the area would be utilised for limited grazing with livestock, it has been deducted from the Productive Area.
- The arable area is approximately **179.5 ha**. This is the area able to support cultivation to establish crops and pastures. Areas on the Property assessed as non-arable includes area surrounding the dwelling and sheds, dams, waterways, watercourses and tree lots. These non-arable areas can be seen in Figure 1.

Mr Harbison (personal communication 6 January 2021) confirmed that at the time of his inspection (12 November 2020) there was wheat, oats and canola crops growing on the Property.

Figure 2 shows Normalised Difference Vegetation Index (NDVI) imagery for the Property captured by satellite on 15 November 2020. NDVI imagery is an indicator of crop and pasture health and growth [1]. Maximum NDVI values are normally around 0.85. The scale at the bottom of Figure 2 shows that the darker blue areas on the Solar Project area are around 0.7. This suggests that these areas were under winter crop at the time of the image. Areas of orange (NDVI 0.17) are likely to be heavily grazed areas or crops that were approaching or at maturity. For example, canola ready for windrowing is generally around 0.40 NDVI.

[1] https://www.decipher.com.au/blog/agriculture/what-is-ndvi-imagery-and-how-can-i-use-it-this-season/

For comparison NDVI imagery from earlier in the year (23 July 2020 is shown). A dark blue area (NDVI 0.84) in the north-western portion of the property is expected to represent a winter crop paddock.

Figure 2: NDVI imagery (10 November 2020) for the Solar Project area

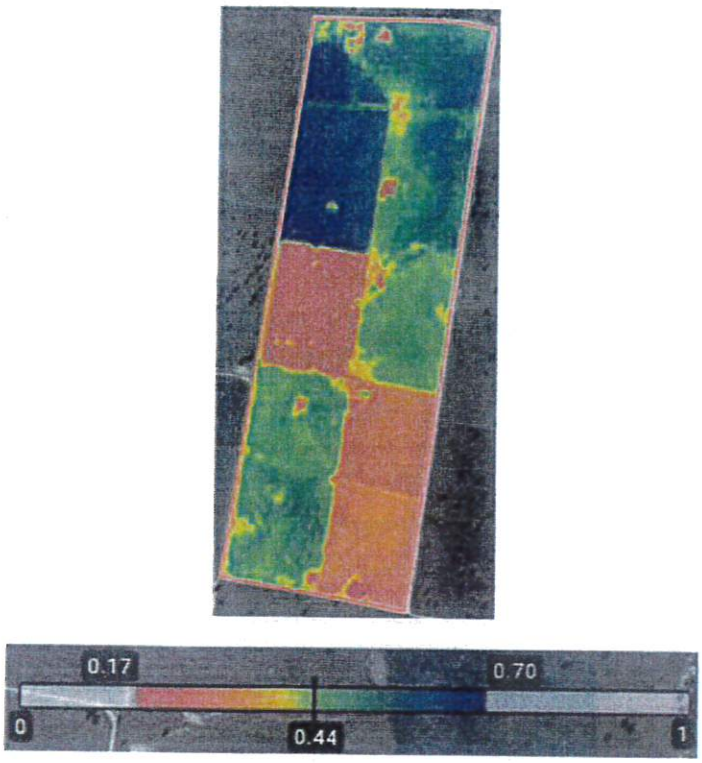
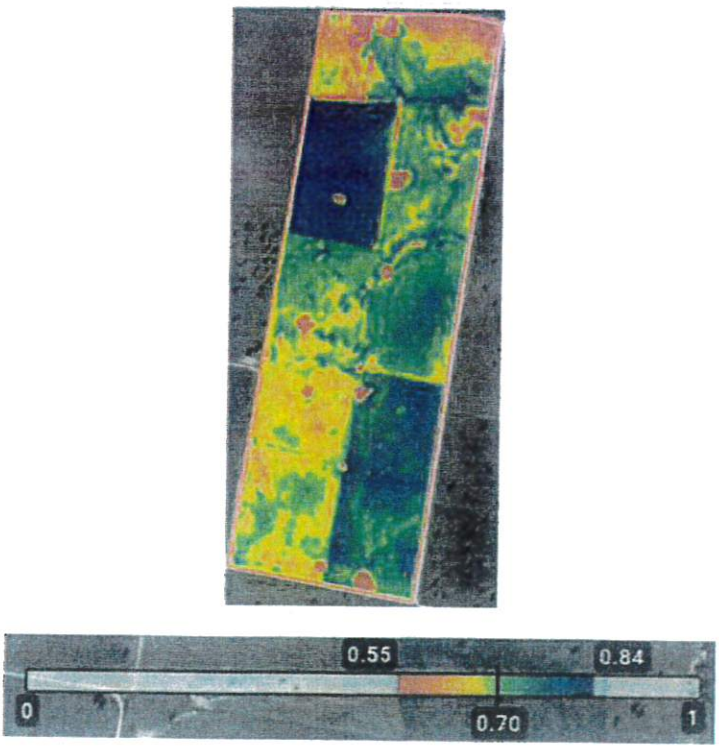


Figure 3: NDVI imagery (23 July 2020) for the Solar Project area



4.2 Property Improvements

Based on his inspection of the property, Mr Harbison describes the structural improvements on the Property in his report (dated 16 November 2020) as:

- Dwelling and associated farm sheds; and
- Livestock fencing.

TIA understands that fencing is suitable for containment of both sheep and cattle. Based on satellite imagery (Figure 1), TIA notes that the property has subdivision fencing to form eleven major paddocks for grazing.

Based on satellite imagery (Figure 1), TIA notes that there are nine earthen dams on the property. These dams capture surface water runoff from the property and water from first and second order streams flowing across the Property.

It is not known if there are any other sources of water for livestock on the Property in addition to the dams. TIA consider that the dams noted in Figure 1 would be sufficient to meet the water requirements for livestock grazing on the property on a year-round basis with surface water runoff in most years.

4.3 Biophysical Resources

Soils are the key property biophysical resource determining the agricultural productivity of the Solar Project area. Mr Harbison provides a detailed account of his assessment of the soils on the Solar Project area and surrounding farms in his report (dated 16 November 2020).

In his report (dated 16 November 2020), Mr Harbison described the soils as follows:

> *The soils in this block may be described as free draining loamy sands/sandy loams in the surface, with a heavier textured loam to sandy clay material deeper in the profile. The "Bathurst Granite" geology of the Bathurst Basin has generally resulted in light textured sandy soils over much of the local district similar to this site.*

Soils mapping covering the site (NSW Spatial Services 2021b and) with TIA analysis using GSI mapping shows the following with respect to soils on the Solar Project area:

- **Australian Soils Classification (ASC):** The majority of the Solar Project area has soils from the ASC group - Sodosols (131.4 ha; 71% of area). The balance of the area has soils from ASC group – Chromosols (54.6 ha; 29% of area).
- **Inherent Soil Fertility (ISF):** The majority of the Solar Project area has soils from the ISF class - moderate (131.4 ha; 71% of area). The balance of the area has soils from ISF class – moderately low (54.6 ha; 29% of area). The ISF classes match the ASC groups mapped on the Solar Project area, whereby Sodosols are mapped as ISF class – moderate and Chromosols are mapped as ISF class – moderately low.
- **Soil Landscape (SL):** Like the ISF, SL mapping matches the ASC mapping. There are two SL present on the Solar Project area. The majority of the Solar

Project area is Bathurst SL (131.4 ha; 71% of area). The balance of the area is Raglan SL (54.6 ha; 29% of area).

The SL mapping provides a useful description of the landscape and soil sequences for the Solar Project site. Descriptions from SL mapping (DPIE 2020a):

Bathurst SL: The Bathurst soil landscape is located on hills around Bathurst and has non-calcic brown soils with yellow solodic soils on the lower slopes and in drainage lines. Sands (Uc1) and mottled yellow solodic soils also occur.

This landscape has undulating to rolling hills, with elevations of 650–850 m and most slopes from 6–10%. Slope lengths vary from 400–800 m, but can range up to 2000 m. Drainage depressions slopes are from 4–7%, but range from 1–9%. Local relief is from 30–70 m. Erosional channels drain north into the major streams. Drainage pattern is convergent, with drainage lines from 500–1000 m apart.

A savannah woodland with a yellow box community is dominant vegetation type.

Raglan SL: This landscape comprises the gently undulating to undulating rises on the Bathurst Plains. Red solodic soils are the dominant soils with yellow solodic soils commonly found on lower slopes and in drainage depressions. Some non-calcic brown soils are associated with Bathurst soil landscape on upper slopes. Red massive earths and yellow earths are also present.

This landscape comprises of gently undulating to undulating rises, 680–780 m above sea level. Average slope angles range from 2–5%, with small pockets between 6–10%. Slope lengths are from 100–300 m, with some up to 2000 m. Drainage depressions have slopes of 1–2%. Local relief is from 20–30 m, with some up to 40 m. Drainage lines are fixed and are widely spaced at 400–500 m apart.

Savannah grassland is the dominant vegetation community, with river she-oaks along main drainage channels.

4.4 Climate

The nearest Bureau of Meteorology (BOM) recording station is Bathurst Airport (Station 063291) some 4.5 kilometres to the north-west of the Solar Project area. However, this station only opened in 1988 and the key data from this station relevant to this report (rainfall and temperature) is only from 1994 onwards. Therefore, Bathurst Agricultural Station (Station 063005), some 11.5 km west of the Solar Project area has been used in this report. The Bathurst Agricultural Station was opened in 1908, with temperature records from 1909 and rainfall from 1908.

TIA considers that the Bathurst Agricultural Station (the 'Bathurst BOM station') will provide an apprpriate indication of the climate for the Solar Project are, suitable for the purposes of this report.

The mean rainfall (**Error! Reference source not found.**) is 635.2 millimetres for Bathurst Agricultural Station (elevation 713 m). As with other parts of Central

Tablelands region, rainfall is strongly influenced by altitude. The Solar Project area has elevation that generally ranges from 720 to 740 m. Therefore, the Bathurst Agricultural Station rainfall is expected to be similar to the Solar Project area.

The rainfall at the Bathurst BOM station is relatively reliable with moderately variability[1] of 64%. Records indicate that one in 10 years records an annual rainfall of less than approximately 69% of the long-term average. One in 10 years also records rainfall of more than 132% of the long-term average. Variability in rainfall is greater in in summer and early autumn (December to March) than at other times of the year.

A summary of temperature records for Bathurst BOM station is set out in **Error! Reference source not found.**. The mean maximum monthly temperature reaches a high of 28.2°C in January and a low of 11.4°C in July.

There has been an average of 5.7 days per annum over 35°C. The mean minimum monthly temperature falls to a low of 0.5°C in July but is around 13.5°C in January and February.

Temperatures in the Solar Project area will largely be similar to the Bathurst BOM station, based on elevation.

There has been an average of 94.4 days per annum with a minimum temperature under 2°C, which is generally regarded as the approximate temperature at which a frost will occur. Nights with a minimum temperature of less than 2°C can be generally expected in between June and August in a typical year.

[1] Defined as the 90th rainfall percentile minus the 10th rainfall percentile divided by the median.

Table 1: Summary of rainfall records – Bathurst Agricultural Station

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Bathurst (Bathurst Agricultural Station)													
Station Number: 063005 · Opened: 1908 · Latitude: 33.43°S · Longitude: 149.56°E · Elevation: 713 m													
Mean	68.3	57.8	52.9	42.0	41.3	44.0	48.1	49.2	47.1	58.8	60.7	65.7	635.2
Median	58.2	47.8	41.7	37.2	33.7	36.8	41.7	44.6	43.6	53.9	55.4	59.0	626.9
10th percentile	13.2	5.6	6.3	6.8	8.4	15.8	14.4	15.4	15.8	17.3	17.7	12.1	436.8
90th percentile	116.4	127.8	120.5	84.3	80.7	89.3	92.1	89.3	80.6	105.4	111.5	135.1	840.4

Table 2: Summary of temperature records – Bathurst Agricultural Station

Statistic Element	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Bathurst (Bathurst Agricultural Station)													
Station Number: 063005 · Opened: 1908 · Latitude: 33.43°S · Longitude: 149.56°E · Elevation: 713 m													
Mean maximum temperature (°C)	**28.2**	**27.3**	**24.6**	**20.2**	**15.7**	**12.3**	**11.4**	**13.0**	**16.5**	**20.1**	**23.5**	**26.5**	**19.9**
Decile 1 maximum temperature (°C)	22.0	22.0	19.7	15.9	11.8	8.7	7.8	9.0	11.2	14.4	17.0	20.6	
Decile 9 maximum temperature (°C)	34.2	33.0	29.5	25.0	20.2	15.8	15.0	17.7	22.0	26.0	30.0	32.4	
Mean number of days >= 35°C	2.8	1.4	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	1.0	5.7
Mean minimum temperature (°C)	**13.5**	**13.4**	**10.8**	**6.7**	**3.3**	**1.6**	**0.5**	**1.2**	**3.4**	**6.2**	**9.0**	**11.7**	**6.8**
Decile 1 minimum temperature (°C)	9.0	9.0	5.6	1.3	-2.0	-3.5	-4.4	-3.2	-1.3	1.0	3.9	6.2	
Decile 9 minimum temperature (°C)	17.5	17.0	15.0	11.8	9.0	6.6	5.0	5.6	8.1	11.0	13.8	15.6	
Mean number of days <= 2°C	0.0	0.0	0.3	4.3	13.6	16.9	20.6	19.1	13.0	5.5	1.0	0.1	94.4

4.5 Land Zoning

The entire Solar Project area are zoned RU1 Primary Production under the Bathurst Regional Local Environmental Plan (LEP) 2014 (Bathurst LEP 2014).

The objects of the RU1 zone within Bathurst LEP are to:

- encourage sustainable primary industry production by maintaining and enhancing the natural resource base;
- encourage diversity in primary industry enterprises and systems appropriate for the area;
- minimise the fragmentation and alienation of resource lands;
- minimise conflict between land uses within this zone and land uses within adjoining zones;
- maintain the rural and scenic character of the land; and
- provide for a range of compatible land uses that are in keeping with the rural character of the locality, do not unnecessarily convert rural land resources to non-agricultural land uses, minimise impacts on the environmental qualities of the land and avoid land use conflicts.

4.6 Land Classification

There are a number of measures of land capability relevant to agriculture. This report concentrates on the land and soil capability assessment scheme (OEH 2012). However, other measures are also examined in the following sections.

4.6.1 Land and Soil Capability

4.6.1.1 Background

The land and soil capability (LSC) assessment scheme was published in 2012 by the former Office of Environment & Heritage (OEH 2012), representing a revision of an earlier scheme that was first published by the former Soil Conservation Service of NSW in 1986 (Emery 1986). The LSC system builds on the earlier scheme, but with more emphasis on a broader range of soil and landscape properties.

LSC is based on an assessment of the biophysical characteristics of the land, the extent to which this will limit a particular type of land use, and the current technology that is available for the management of the land. It indicates the broad agricultural land uses most physically suited to an area. That is, it determines the best match between the physical requirements of the use and the physical qualities of the land, and the potential hazards and limitations associated with specific uses over a site. The LSC system can provide guidance on the inputs and management requirements associated with different intensities of agricultural land use (Woodward 1988).

The LSC assessment is based on the premise that using land beyond its capability may have serious consequences for the land and soil resources of the State as well as broader environmental impacts on water, air and biodiversity (Woodward 1988).

The LSC assessment scheme comprises eight Land Capability Classes (1 to 8) with values representing a decreasing capability of the land to sustain intensive agricultural land use. Class 1 represents land capable of sustaining most intensive land uses including those that are often associated with regular soil cultivation, whereas Class 8 represents land that can only sustain very low intensity land uses.

The current LSC scheme was initially developed for the NSW property vegetation planning program under the former *Native Vegetation Act* 2003 and further upgraded for the NSW Natural Resources Monitoring, Evaluation and Reporting program.

The LSC assessment scheme uses the biophysical features of the land and soil including landform position, slope gradient, drainage, climate, soil type and soil characteristics to derive detailed rating tables for a range of land and soil hazards. These hazards include water erosion, wind erosion, soil structure decline, soil acidification, salinity, waterlogging, shallow soils and mass movement. Each hazard is given a rating between 1 (best, highest capability land) and 8 (worst, lowest capability land). The final LSC class of the land is based on the most limiting hazard.

The LSC class gives an indication of the land management practices that can be applied to a parcel of land without causing degradation to the land and soil at the site and to the off-site environment. As land capability decreases, the management of hazards requires an increase in knowledge, expertise and investment. In lands with lower capability, the hazards cannot be managed effectively for some land uses.

The LSC assessment scheme is most suitable for broad-scale assessment of land capability, particularly for assessment of lower intensity, dryland agricultural land use. It is less applicable for high intensity land use, or for irrigation (Woodward 1988).

4.6.1.2 The Solar Project area

Based on existing state-wide mapping by OEH (2012), The Solar Project area consists of Class 3 and 5 land. There are areas of Class 2 land immediately outside the Project area to the south (Figure 4). The class 3 land occurs in the south-west portion of the Project area.

The LSC mapping matches the soils mapping (ASC, ISF and SL) presented in Section 4.3. The majority of the Solar Project area is Class 3 (131.4 ha; 71% of area). The balance of the area is Class 5 (54.6 ha; 29% of area).

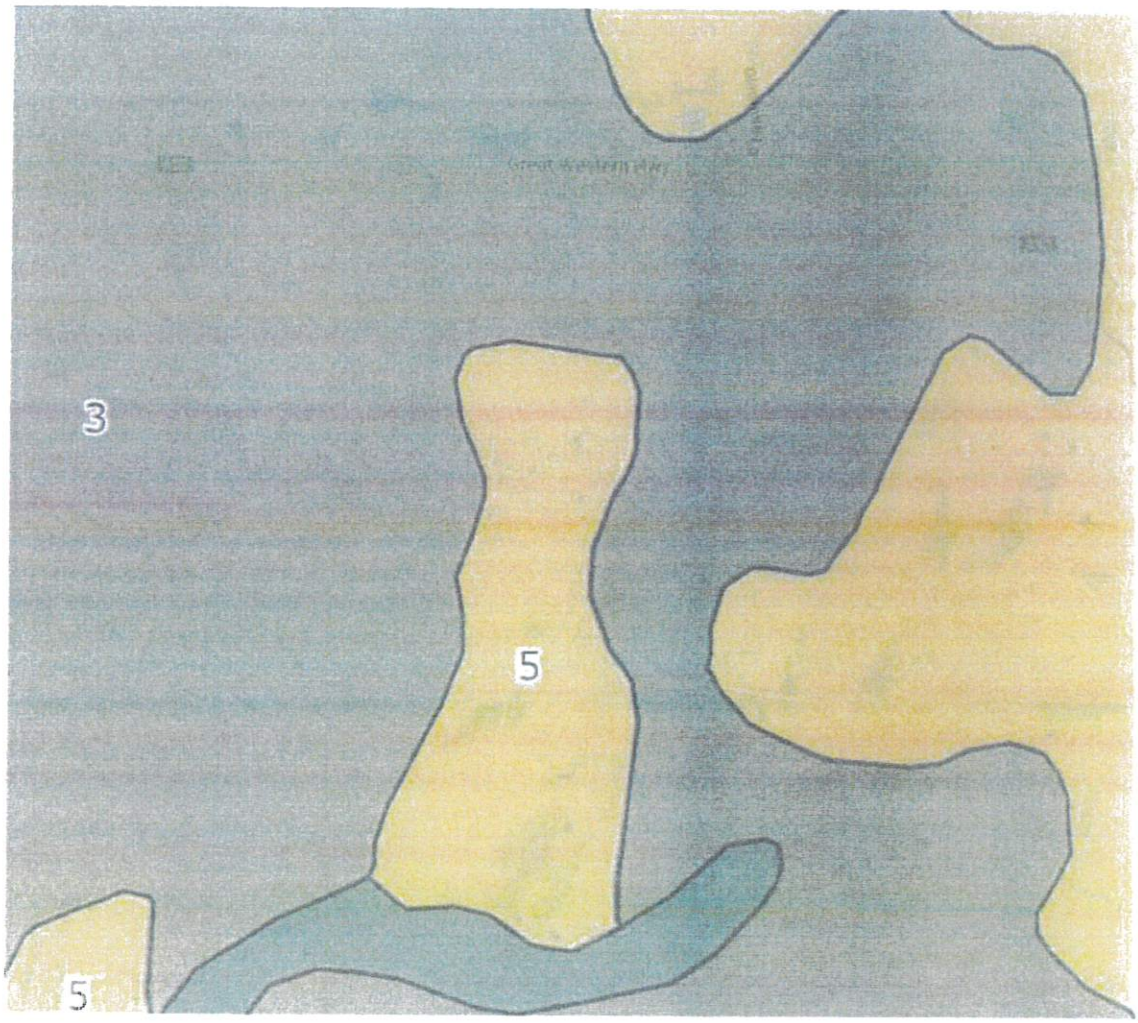
Class 3 land is described as *"high capability land: Land has moderate limitations and is capable of sustaining high-impact land uses, such as cropping with cultivation, using more intensive, readily available and widely accepted management practices. However, careful management of limitations is required for cropping and intensive grazing to avoid land and environmental degradation.*

Class 5 land is described as *"moderate–low capability land: Land has high limitations for high-impact land uses. Will largely restrict land use to grazing, some horticulture (orchards), forestry and nature conservation. The limitations need to be carefully managed to prevent long-term degradation.*

The LSC class for land is based on the most limiting constraint. In the case of the Solar Project area, class 5 land is water erosion (5) and wind erosion (4). This is based on soil type, not landscape factors (eg. slope). Other constraint classes for these areas show only low levels with respect to other soil constraints (structure, acidification, salinity, waterlogging, shallow/rockiness and mass movement). With modern farming practices, the risk of erosion can be managed, and this would enable the class 5 areas on the Solar Project area to be utilised with similar capability to the class 3 areas.

The LSC mapping broadly concurs with observations made by Mr Harbison.

Figure 4: Soil and land capability for the Solar Project site



4.6.2 Other Measures of Land Capability

4.6.2.1 Agricultural Land Classification

The agricultural land classification (ALC) system is similar to the LSC assessment scheme. The current agricultural land classification (ALC) system (Hulme, et al 2002) was developed by the former NSW Agriculture (now DPI).

Under the ALC system land is classified by evaluating biophysical, social and economic factors that may constrain the use of land for agriculture. In general terms, the fewer the constraints on the land, the greater its value for agriculture. Each type of agricultural enterprise has a particular set of constraints affecting production.

The ALC system is not considered in detail in this assessment due to its similarity to the LSC assessment scheme, and its limitations. Squires (2017) states that the ALC system has limitations with *"poor quality control of product, limited availability and suitability for digital conversion (available as paper maps only in some areas), does not identify specific industry needs and excludes non-soil based agricultural needs"*.

There is no known, existing ALC mapping covering the Solar Project site. Unlike the LSC assessments, there is not state-wide mapping coverage. ALC mapping tends to be undertaken by NSW DPI on an as needed basis for assessment of proposed developments in localised areas.

4.6.2.2 Biophysical Strategic Agricultural Land

Biophysical strategic agricultural land (BSAL) is land with high quality soil and water resources capable of sustaining high levels of productivity. The protocol for determining BSAL is set out in OEH (2013). BSAL have the best quality intrinsic landforms, soil and water resources which are naturally capable of sustaining high levels of agricultural production and require minimal management practices to maintain this high quality (DPE 2013).

In October 2013, 1.74 million hectares of BSAL were mapped in Upper Hunter and New England North West regions by the then NSW Department of Planning and Infrastructure (DPIE 2020b). In January 2014, the NSW Government finalised mapping for an additional one million hectares of BSAL across the rest of the State.

Broadly, the criteria for BSAL requires land to be moderate to high inherent fertility (Section 4.3) and LSC class 1 to 3 (Section 4.6).

There is BSAL mapped within the Bathurst Regional LGA. The closest BSAL to the Solar Project site is some 3.6 km to the north-west and only 0.8 km to the south (Figure 5).

DPIE (2020) have not mapped any BSAL in the Solar Project area.

Figure 5: BSAL in close proximity to the Solar Project site

4.6.2.3 Important Agricultural Land

The DPI is undertaking important agricultural land ("IAL") mapping across nine regions in NSW. The IAL mapping program contributes to the DPIE's regional planning actions that identify the need to map important agricultural lands in NSW. Knowing where important agricultural land is situated and understanding its requirements, value and contribution will assist state and local government, organisations and industries with making decisions about current and future agricultural land uses (DPI 2020a).

Important agricultural land ("IAL") is not precisely defined by DPI. The key document on important agricultural land "A guideline to identifying important agricultural lands in

NSW" (DPI 2017) states that IAL is defined as *"existing or future location of local or regionally important agricultural industries or resources as mapped"*.

A pilot project in the Central West and Upper Hunter of NSW defined important agricultural industry land as *"land that is highly suitable for specific agricultural industries in accordance with the typical biophysical, marketing and climatic conditions for the locality or region"*.

DPI (2017) sets out the criteria and thresholds used in the mapping of IAL during a study of the Central West and Orana regions of NSW. However, the criteria and thresholds for agricultural industries in a particular study area may vary considerably from those in a different geographic area, and some criteria may not be directly transferable from one region to another.

DPI advise that the IAL Project has recently been updated in response to feedback. The IAL project remains a key part of the Government's commitment to implementing Right to Farm Policy and is proposed to be completed in 2020. The revised project will ensure a product is developed which is suitable for inclusion in the planning framework.

The intent of the revised IAL Mapping Project is to identify areas in a region which are key contributors to that region's agricultural economy; and have the inherent capability of being productive with minimal inputs. These areas will be identified on a basis that they are suitable for consideration when consent authorities are undertaking strategic and statutory planning (DPI 2020d).

The pilot project in the Central West covered the Orange, Cabonne and Blaney LGAs[5]. Mapping for these LGA show extensive coverage of IAL for grazing and cropping, wool production and horticulture and viticulture. The area of IAL mapped within these LGAs is far greater than BSAL.

It is understood that IAL mapping has not yet been undertaken for the Bathurst Regional LGA.

4.7 Assessed Agricultural Production Potential

In his report (dated 16 November 2020), Mr Harbison stated that the agricultural productivity of land is determined by the combination and interaction of the natural elements including:

a) *The quality and health of the soil;*
b) *The temperate range throughout the various distinct seasons; and*
c) *Rainfall.*

Mr Harbison described the agricultural production potential of the Solar Project area as follows:

[5] https://www.dpi.nsw.gov.au/agriculture/lup/agriculture-industry-mapping/ag-mapping

At this location [the Solar Project area], the natural elements [listed a) to c) above] combine and interact to render this land with good productive potential. It is sought after by farmers/rural producers.

In my opinion, this land can be appropriately used for broadacre dryland cropping, be it oats, canola, wheat, barley etc, as well as for pasture. According to NSW DPI national variety trials (NVT's), wheat yields in the district of up to 5.39 t/ha have been achieved (source NVT Online). Such trial data is not directly available for canola or oats, however it is generally accepted that canola yields about half that of wheat. As such, canola yields of up to 2.7 t/ha may be achieved, with 2.5 t/ha being achieved quite often, while oats is a lighter grain and yields less than wheat, more typically 2.5 – 4 t/ha. In the pasture phase, much of this land has historically grazed 7.5 – 10 dry sheep equivalents (DSE) per ha, with the higher performing farmers reaching annualized stocking rates even higher.

TIA agree with the assessment of agricultural potential of the Solar Project area provided by Mr Harbison. The Solar Project area is capable of supporting an intensive mixed crop and livestock farming system. Such a farming system is typical of that utilised by farm businesses on the lands of similar agricultural potential surrounding the Solar Project area and generally in the Bathurst region.

While OEH (2012) land and soil capability mapping shows variation in capability across the Solar Project area (Section 4.6.1.2), TIA consider that with the application of best management practices, the effective agricultural capacity of the land is relatively uniform. The reasoning for this assessment is detailed in Section 4.6.1.2.

5 Agricultural Management Program

5.1 Background

A detailed assessment of the agricultural production potential of the Solar Project area was presented in Section 4 (see summary in Section 4.7). The TIA assessment of agricultural production potential agrees with that of Mr Harbison (his report dated 16 November 2020).

The following sub sections detail an agricultural management program based on the above assessments. The management program is indicative of an average year with respect to climate and market conditions.

5.2 Productive Area

Full details of the different areas that comprise the Solar Project area were provided in Section 4.1.

While the total area of the Solar Project area is understood to be 186 ha, the area available for agricultural production is only approximately **185 ha**. Within this area, the arable area is approximately 179.5 ha.

5.3 Farming System

Mixed crop and livestock production ('mixed farming') is a common farming system in the area surrounding the Solar Project area and the broader Bathurst Region. The historical and current land use on the Solar Project area has been mixed farming.

While mixed farming is the common agricultural land use, there is the potential for other farming systems on the Solar Project area. The most common alternative in the local area is specialist grazing with sheep only, cattle only or both sheep and cattle.

The Solar Project area has potential to support more intensive agricultural land use, such as dryland horticulture. This would require significant capital investment to establish.

TIA consider that in assessing the impacts on agricultural productivity of the proposed site of the Solar Farm project, that an assessment based on mixed farming system is most appropriate. This is consistent with both the historical and current land use on the Solar Project area.

5.4 Crop Production

While summer crop production is possible in the Bathurst area, winter crop production is the most commonly practiced. Summer crop production is generally practiced where there is a capacity to irrigate the land.

The TIA assessment of is based on winter crop production as part of a mixed farming system. Within a mixed farming system crops are grown in rotation with pasture, with crop and pasture phases of varying lengths. There is a wide variation in the length of phases in the Bathurst area. Commonly pasture phases vary between 5 to 15 years and crop phases between 3 to 5 years. The crop phase commonly consists of different winter crops grown in sequences to maximise crop rotation benefits. While not an exhaustive list, crop rotation benefits include pests, weeds, disease management and crop residue management and increased nutrient availability.

For the purpose of the TIA analysis the following is the assumed crop production system:

- Crop phase:
  - Phase Length: 3 years.
  - Crop Sequence: canola (winter type – grazing and grain), wheat (winter type – grazing and grain) and wheat or barley (spring type).
  - Crop Area (annual): 59.8 ha (33% of arable area, based on crop phase 3 years and pasture phase 6 years)
- Pasture phase:
  - Phase Length: 6 years (pasture established in year 1).
  - Pasture Types: Mixed pasture with combination of perennial grasses, lucerne and annual legumes.

The above crop production system is consistent with the assessment of agricultural production potential by Mr Harbison (Section 4.7).

5.5 Livestock Production

Glanmire Action Group advise that the Solar Project area it is currently operated as farm business focused on grazing (sheep for meat and wool).

The current returns for breeding enterprises, dual purpose Merino sheep (meat and wool) and beef cattle, are very similar, with both around $54 per DSE.

Based on the current operation of the Solar Farm area, farm infrastructure is assumed to best suit sheep. For the purpose of the TIA analysis, it assumed that sheep are the sole livestock enterprise operated on the Solar Farm area.

Consistent with the assessment of agricultural production potential by Mr Harbison, the TIA analysis is based on an annual stocking rate of 10.0 DSE per hectare plus an additional 3.0 DSE per hectare allowance for the use of grazing crops. Therefore, the total annual stocking rate used in the analysis is 13 DSE per hectare.

6 Agricultural Financial Returns

6.1 Background

The financial returns from agricultural production on the Solar Project area is based on the management program detailed in Section 5. The key assumptions within the analysis are designed to provide financial returns indicative of an average year with respect to climate and market conditions.

6.2 Key Assumptions

Following are details of key assumptions for the analysis of financial returns:

- All income and expenses are presented on a GST exclusive basis.
- The analysis is based on enterprise gross margin budgets that include allowance for contracting for key enterprise operations; crop (machinery operations – spraying, sowing and harvest) and livestock (lamb marking and shearing).
- A general allowance is included for casual labour to cover labour not associated with key enterprise operations above.
- Agricultural output prices within the analysis reflect current market values (January 2021). These are considered representative of expected on-going values.
- Input prices reflect expected values for 2021 production. These are considered representative of expected on-going values.
- Livestock enterprise gross margins are based on the latest NSW DPI gross margins (NSW DPI 2021). NSW DPI sheep budgets where last updated September 2019, hence TIA have constructed own budgets to reflect current market conditions for input and output pricing. TIA budgets utilise the physical production parameters from the NSW DPI budgets.
- Crop enterprise gross margins are based on the past NSW DPI gross margins (NSW DPI 2021). NSW DPI no longer publish winter crop budgets (last updated 2012), hence TIA have constructed own budgets to reflect current production parameters and market conditions.
- Financial returns are shown before an allowance for the value of owner-operators management and labour.
- Financial returns are shown before finance costs.

6.3 Results of Analysis

Table 3 shows the annual - whole farm budget.

Table 3: Whole Farm Budget – Average Year

						Annual TOTAL
INCOME						
Livestock Gross Income	**Units (head)**		**Income ($/hd)**		**Sub Total ($)**	
Merino Breeding ewes (self replacing) - dual purpose (wool & meat)	700 ewes	@	$176 /ewe		$123,527	
Other					0	$123,527
Crop & Pasture Gross Income	**Area (hectares)**		**Income ($/ha)**	**% Production Retained**	**Sub Total ($)**	
Wheat (grazing & grain)	19.93 ha	@	$1,544 /ha	0%	$30,767	
Wheat (after cereal)	19.93 ha	@	$1,788 /ha	20%	28,505	
Canola (Clearfield)	19.93 ha	@	$2,253 /ha	0%	44,912	
Pasture - perennial (establishment)	19.93 ha	@	-		0	$104,184
Other Farm Income						
Fuel Rebate - general fuel usage*	2,500 L	@	$0.42 /L			1,003
Interest received						0
TOTAL INCOME						**$228,714**
EXPENSES						
Livestock Enterprise Expenses (inc. contract services & shearing)	**Units (hd)**		**Costs ($/hd)**		**Sub Total ($)**	
Merino Breeding ewes (self replacing) - dual purpose (wool & meat)	700 ewes	@	$52 /ewe		$36,467	
Purchase fodder & supplements					0	$36,467
Crop & Pasture Enterprise Expenses (inc. P&E variable costs)	**Area (ha)**		**Cost ($/ha)**		**Sub Total ($)**	
Wheat (grazing & grain)	19.93 ha	@	$563 /ha		$11,215	
Wheat (after cereal)	19.93 ha	@	$572 /ha		11,409	
Canola (Clearfield)	19.93 ha	@	$939 /ha		18,714	
Pasture - perennial (establishment)	19.93 ha	@	$355 /ha		7,076	$48,414
Pasture Variable Expenses (established pasture areas)						
Contact forage conservation (hay/silage)	20 ha	@	$152 /ha[^]		$3,022	
Fertiliser (allowance for maintenance P applications)	1,624 DSE	@	0.8 kg P/DSE[^] x $2.98 /kg P[^]		3,874	
Pest & Weed Control - established pastures	125 ha	@	$50 /ha x 25% area		1,565	$8,460
General & Overhead Expenses						
Pest & weed - general*					$500	
Freight & Cartage - general*					500	
Labour - casual (includes super 9.5% & workers comp. 10.0%)	0.02 FTE	@	$106,080/FTE		2,367	
Labour - permanent (includes super 9.5% & workers comp. 10.0%)	0.00 FTE	@	$90,000/FTE		0	
Contracting - general*					250	
Fuel & Lubricants - general fuel use*	2,500 L	@	$1.25 /L		3,125	
Electricity & Gas					3,000	
R&M - Plant & Machinery					6,375	
R&M - Land & Improvements					7,500	
Licences, Permits & Regos					750	
Rates - Shire & LLS					1,570	
Insurance					1,275	
Bank Fees & Gov't Charges					1,200	
Professional Fees - accounting, legal & other specialist services					2,500	
Telephone, Internet & Postage					660	
Subscriptions, Publications & Advertising					250	
Office & Computer Supplies					250	
Sundry					250	$33,322
TOTAL OPERATING EXPENSES						**$126,664**
OPERATING RETURN						**$102,050**
Land Lease & Rent						$0
Plant & Equipment Finance						0
EBITDA						**$102,050**
Depreciation - P&E	$255,000	@	5.0%			$12,750
OPERATING PROFIT (EBIT)						**$89,300**
Finance Expenses						
Interest - overdraft (allowance)	$0	@	5.5%			$0
Interest - loan(s)	$0	@	3.0%			0
NET PROFIT before tax						**$102,050**
Non Operating Expenses						
Capital Movements						$0
Loan Movements						0
Drawings/Owner Operator Renumeration						0
TOTAL CASH OUTGO						**$126,664**
Net Cashflow						**$102,050**

* *General allowance only; direct enterprise cost for these items included in GM budgets.*

An overview of the key results from the budget is shown in Table 4.

Table 4: Overview - Whole Farm Budget - Average Year

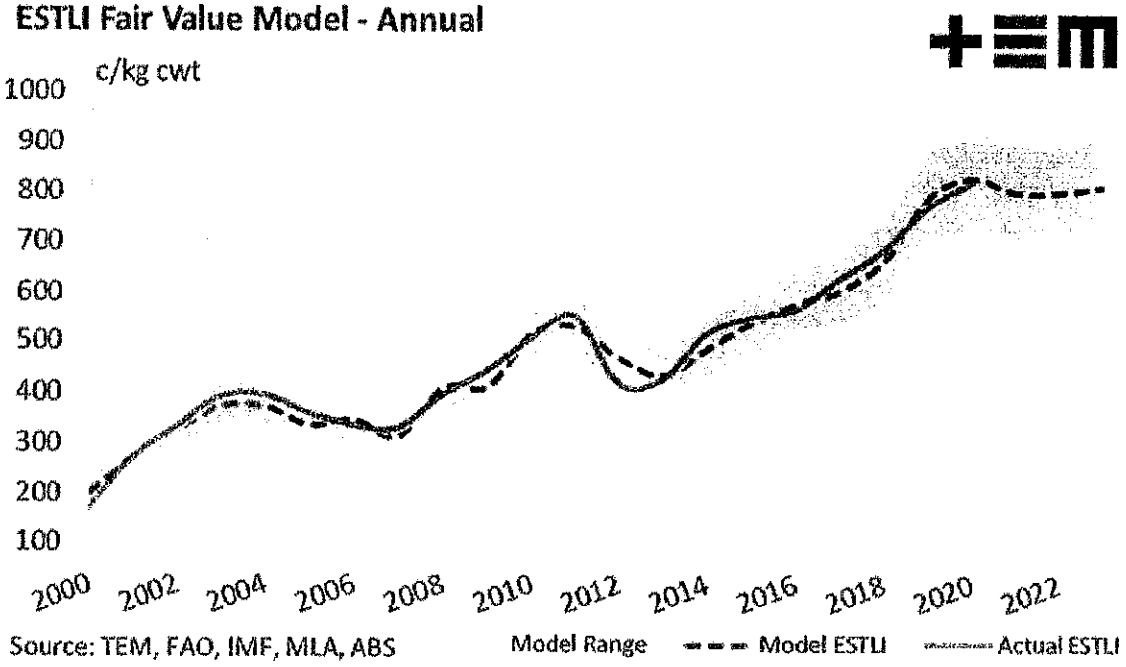
Budget Overview	
Income	$228,714
Operating Expenses	126,664
Operating Return	102,050
Non Operating Costs	12,750
Total Cash Outgo	126,664
Net Cash Surplus/Deficit	$102,050

6.4 Projected Trading

The major factors affecting financial returns from trading are climate and markets for farm input and outputs. The interaction of climate and markets can have both positive and negative impacts on financial returns.

Given the livestock management program is based on dual purpose sheep, sheep prices have a significant impact on the financial returns. Current sheep prices are at historical highs at present but are predicted to be maintained for the foreseeable future. Figure 6 shows the Eastern States Trade Lamb Indicator (ESTLI) actual (2000 – 2020) and modelled (2000 -2023), based on an analysis prepared by TEM (2021).

Figure 6: ESTLI - actual (2000 – 2020) and modelled (2000 -2023)



7 Alternative Sites

7.1 Background

Section 6 presents the financial returns from agricultural production on the proposed Solar Project area.

The following sections present information on the financial returns from alternative sites, in areas with lower agricultural production potential.

7.2 Far West NSW

Due to the combination of climate and soils, NSW Far West generally has a significantly lower agricultural production potential to that of the Solar Project area.

ABARES (2021) Farm Surveys Data for NSW Far West for the period 1990 to 2019 has been used to estimate the actual stocking rates. TIA analysis shows that over the period 1990 to 2019, the median stocking rate was 0.32 DSE per hectare (maximum 0.46 and minimum 0.08). By comparison the assessed carrying capacity for the Solar Project area is 13 DSE/ha.

In Far West NSW there is only limited areas of crop sown. ABARES (2021) data for the period 1990 to 2019 shows that the median proportion of the property sown to crop was only 1.01% (maximum 2.08% and minimum 0.33%).

7.3 Financial Returns

Comparable financial returns can be prepared for the NSW Far West based on the median stocking rate calculated from the ABARES (2021) data.

In the TIA analysis for the NSW Far West operation it is assumed that sheep are the sole enterprise on 186 ha. For simplicity the same sheep gross margin ($/DSE) is applied to the modelled operation in the NSW Far West as that used for the Solar Project area. In reality, the gross margin per DSE may be lower for NSW Far West compared to the Solar Project area.

Farm businesses in the NSW FAR West are much larger than the 186 ha that comprises the Solar Project area. ABARES (2021) data for the period 1990 to 2019 shows that the median property area operated was 31,379 ha. As such, there is some complexity in representing the share of general and overhead expenses associated with 186 ha as part of a much larger operation. For ease of interpretation the TIA analysis has included only allowance for general expenses that are directly linked to the operation of 186 ha.

An overview of the key results from the budget is shown in Table 4.

Table 5: Overview - Whole Farm Budget – NSW Far West

Budget Overview	
Income	$4,512
Operating Expenses	1,868
Operating Return	2,644
Non Operating Costs	250
Total Cash Outgo	1,868
Net Cash Surplus/Deficit	$2,644

Comparing the results of the analysis in Section 6, the annual gross income for Solar Project area is $228,714 compared to $4,512 for NSW Far West. The gross income for 186 ha in NSW Far West is less than 2.0% of the Solar Project area.

8 References

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9 Curriculum Vitae – Richard Ivey

NAME:	Richard Victor IVEY 13 Gipps Street, Wellington, NSW
POSITION:	Agricultural Consultant & Forensic Accountant Tremain Ivey Advisory (formerly with Crowe Horwath)
PROFESSIONAL AFFILIATIONS:	Chartered Accountant (CA) Registered Tax Agent Justice of the Peace
TERTIARY QUALIFICATIONS:	Accounting Conversion (Bachelor of Commerce) University of Tasmania (1980-81) Post-Graduate Diploma of Agricultural Economics, University of New England (1973) Bachelor of Agricultural Science, University of Tasmania (1972)
PROFESSIONAL EXPERIENCE:	Chartered Accountant, Agricultural Advisor & Management Consultant Sydney and Regional NSW Finance Officer, Tasmanian Development Authority Owner and operator of a beef cattle enterprise, Wellington NSW
SPECIAL EXPERTISE:	• Business Assessment, Analysis & Valuation • Appraisal of Investment Proposals • Special Projects and Surveys • Management, Financial and Investigative Accountancy • Assessment of Primary Production Systems

TA

MAJOR PROJECTS:

Farm and Agribusiness Management

- Pre purchase appraisal of agricultural investment proposals. Tasks include: assessment of all resources required for the proposal; quantifying input requirements (including start up and working capital, technical, financial & marketing expertise); development of discounted cashflow budgets and risk analyses.

- Providing ongoing financial and technical expertise to primary producer clients in south eastern Australia. Advice is provided on many aspects of crop, stock and pasture husbandry. Also on enterprise mix, feed utilisation, enterprise analysis and whole farm management including cash flow budgeting and management (ongoing).

- Providing farm management inputs for the management and operation of various properties on behalf of absentee landowners (ongoing).

- Present Value Calculations for future expenses and income. These calculations include all relevant operating and capital income and outgo associated with a broad range of agricultural industries and enterprises. Also the establishment of appropriate discount factors to account for production, market and climatic risk.

- Acted as mediator in disputes between primary producers and trading banks. This was performed under the terms of the NFF/ABA Farm Assessment Scheme.

- Team Leader for a project involving the design and installation of a computerised asset register for a major Australian agricultural company involved in the cotton, beef, sheep and grain industries.

- Negotiated the terms and conditions associated with the leasing of agricultural holdings. Monitored lease progress on behalf of both lessees and lessors. Nominated as arbitrator in respect of past and existing lease agreements.

- Advised on the establishment and operation of a commercial cross-breeding enterprise involving some 2,000 breeding cows.

- Consultant to private consortium looking to market wool to China through direct sale and joint venture arrangements with Chinese processors (ongoing).

- Team leader responsible for the investigation and evaluation of the profit potential of a major Northern Territory abattoir. Work involved documenting and analysing source, type and cost of slaughter cattle over a five year time frame, costs of processing, type and market price of outputs.

Accounting

- Provision of financial and accounting advice to individuals and companies looking to establish, operate and expand small business activities. These businesses are representative of a broad spectrum of agricultural and other industry sectors.

- Preparation of financial statements on behalf of small business clients. These statements are required for management, taxation and compliance purposes.

- Completed business valuations in many industry sectors including retail, professional services, agribusiness, finance, accommodation, construction, and personal services.

- Developed a benchmarking and comparative analysis service for clients aimed at improving their business performance.

- Developed a specialised management accounting service for primary producers. The system involves monthly reporting based on budgeted and actual financial information relating to primary producer clients' farming operations (ongoing).

Land Management, Suitability and Classification

- Assess potential use of multi million dollar South Coast NSW land holding as agricultural land to determine eligibility for exemption from land tax. (Administrative Decisions Tribunal matter).
- Assessments of economic costs associated with granting of Exploration and Mining Leases on agricultural land in the Braidwood, Broken Hill and Northern Tableland districts. (Mining Warden's Court matters).
- Comprehensive assessment of the agricultural value, suitability and classification of land proposed for use as refuse disposal area by Cabonne and Orange City Councils (Land and Environment Court matter).
- Assessment of the effect of large scale Mining development on major grape producer in the Hunter Valley. (Land and Environment Court matter).
- Appraisal and assessment of significant agricultural land holding within Singleton Council boundaries being considered for rezoning purposes.
- S515 of the Local Government Act. (Baulkham Hills Shire Council).

Forensic Accounting

- Examples of large investigative accountancy projects undertaken include:
  - Breach of contract claim involving rural property developer and large investment bank.
  - Class action by over 400 cattle producers.
  - Damage claims arising from various fires involving approximately 200 rural properties.
  - Breach of contract claim involving large contracting firm.
  - Product liability action involving a major grain supplier and a malt manufacturing and export company.
  - Damage claims by Victorian and South Australian potato growers arising from supply of contaminated mother seed.
  - Professional negligence action brought by a prominent venture capital business.
- Acting as an expert witness for litigation matters arising from various causes including negligence, breach of contract, trade practice disputes, personal injury and workers compensation claims. Services provided include investigations, report preparation and presentation of evidence before the Courts.
- Acting as Court appointed expert to assess economic losses of litigants.
- Services provided included complete analysis of financial statements and supporting documents, application of industry statistics, and benchmarks together with analysis of markets, quantification of trends and identification and appraisal of causal factors associated with variation in financial performance.

10 Curriculum Vitae – Andrew Rice

NAME:	Andrew John Rice "Kimbar Park", 252 Mugincoble Lane, PARKES NSW 2870
POSITION:	Agribusiness Consultant, ASPIRE agri
PROFESSIONAL AFFILIATIONS:	Australian Institute of Company Directors – member (2016 to present) and graduate (MAICD, June 2017).
TERTIARY QUALIFICATIONS:	Bachelor of Rural Science (1st Class Hons) 1992 University of New England
PROFESSIONAL EXPERIENCE:	2017 - present: Agribusiness Consultant (ASPIRE agri, Parkes NSW) 2015 - present: Non-Executive Director, Chair since November 2018 (Foundation of Arable Research Australia, ACN 159 209 480) 2015 - 2017: Agribusiness Consultant (ORM, Parkes NSW; ACN 618 781 927) 2012 - 2015: Manager – Regional Grower Services, South (Grains Research & Development Corporation, Parkes NSW) 1999 - 2012: Agribusiness Consultant (WHK Parkes NSW) 1997 - 1999: Agricultural Resource Management Officer (NSW Agriculture, Forbes NSW) 1996 - 1997: Field Agronomist (CRT, Parkes) 1992 -1996: Agronomist & Farm Management Consultant (Ivey ATP, Wellington NSW)
SPECIAL EXPERTISE:	• Applied farm business management; • Farm budgeting, business modelling and performance analysis; • Crop and pasture agronomy; • Livestock and grazing management; • Grain marketing; and • Management of agricultural research, development & extension (RD&E).

Schedule 1

Sheep Enterprise Gross Margin

Merino Breeding ewes (self replacing) - dual purpose (wool & meat)
Merino Ewes (59 kg LWT - 20 micron fleece) joined to Merino Rams

	Enterprise Units:	700 ewes	59 kg LWT	
	DSE Rating:	2.32 dse/ewe		
			Av. Growth Rates	Av. Sale Weight (LWT)
Wethers Sold @:	4.0 months of age	weaners	0.145 kg/day wethers	23 kg
	18.0 months of age	hoggets	0.080 kg/day wethers	48 kg
Ewes Sold @:	4.0 months of age	weaners	0.145 kg/day ewes	23 kg
	18.0 months of age	hoggets	0.080 kg/day ewes	48 kg

INCOME:

Livestock	Livestock Class	Number (head)	Average Carcase (CWT kg/head)	Price (c/kg CWT)	Average Value ($/head)	TOTAL
SALES	Weaner Wethers	301	10 kg	983	$102	$30,928
	Weaner Ewes	-	10 kg	983	$102	0
	Hogget Wethers	-	21 kg	727		0
	Hogget Ewes	90	20 kg		$261	23,490
	Cull Hogget Ewes	14	20 kg		$261	3,654
	CFA/cull Ewes	172	25 kg	833	$157	26,979
	CFA Rams	3	30 kg	448	$134	403
	Total Sales	*580 head*			Sub Total - Livestock	$85,955

Wool	Livestock Class	Number (head)	Average Greasy Wool Production (kg/head)	Greasy Price (c/kg)	Average Value ($/head)	TOTAL
SHEARING	Adults - ewes	672	5.64 kg	758	$42.76	$28,733
	Hoggets - ewes	211	3.70 kg	777	$28.75	6,066
	Rams	14	7.50 kg	758	$56.86	796
	Weaners - ewes	289	1.18 kg	341	$4.06	1,173
CRUTCHING	Adults	714	0.40 kg	390	$1.56	1,114
	Lambs	301	0.30 kg	390	$1.17	352
	Total Wool Production	*30 bales*			Sub Total - Wool	$38,234
					A. TOTAL INCOME	**$123,589**

VARIABLE COSTS:

	Livestock Class	Number (head)	Average Liveweight - LWT (kg/head)	Price (c/kg LWT)	Average Cost ($/head)	TOTAL
PURCHASES	Ewes/Ewe Hoggets	0				
	Rams	4			$2,500	$10,000
	Total Purchases:	*4 head*			Sub Total - Purchases	$10,000

	Livestock Class	Number (head)	Applications	Cost per Application ($/head)		TOTAL
SHEARING & CRUTCHING						
Shearing	Ewes, Hoggets & Lambs	1,172	1	$7.15		$8,380
	Rams	14	1	$10.09		141
Crutching	Ewes, Hoggets & Lambs	1,001	1	$1.41		1,411
	Rams	14	1	$2.33		33
ANIMAL HEALTH						
6-in-1 Vaccine	Ewes/Ewe Hgts/Rams	917	1	$0.24		$220
Internal Parasites	Ewes/Ewe Hgts/Rams	917	2	$0.93		1,706
Jetting (fly control)	Ewes/Ewe Hgts/Rams	917	1	$1.76		1,614
Preg Scanning	Ewes/Ewe Hgts	700	1	$0.80		560
6-in-1 Vaccine	Weaners	623	1	$0.24		$150
Internal Parasites	Weaners - ewes	312	3	$0.44		411
Internal Parasites	Weaners - wethers	312	1	$0.44		137
Jetting (fly control)	Weaners - ewes	211	1	$0.46		97
CONTRACTING						
Lice Control (dipping t	Ewes/Ewe Hgts/Rams	917	1	$1.12		1,027
Mark & Mules	Weaners - ewes	301	1	$4.18		1,258
Mark (only)	Weaners - wethers	301	1	$1.50		452
EAR TAGS	NLIS	623	1	$0.26		162
	Replacement Ewe Hgts	189	1	$1.25		236
LIVESTOCK SELLING COSTS						
Commission, Yard Dues & Transit Insurance				6.0%		5,121
MLA Levies						765
Freight		580		$1.60		928
WOOL SELLING COSTS						
Commission, Warehousing & Testing				$43.00	bale	1,290
Freight		30	bales	$10.00	bale	300
Wool Packs		30	bales	$11.29	pack	339
Wool Tax				1.5%		574
SUPPLEMENTARY FEEDING						0
PASTURE	125 ha	@	$59.00 /ha	maintenance costs		6,996
					B. TOTAL VARIABLE COSTS	**$44,306**

GROSS MARGIN:	Pasture Costs *Excluded*	*Included*
Total (A-B)	$86,278	$79,283
per ewe	$123.25	$113.26
per DSE	$53.13	$48.82
per hectare	$690.65	$634.65

WOOL PRICES as at 16/01/2021 WoolCheque

	Specifications	Micron	AWEX Type	Specifications (all 35n/ktex)	Clean Price (c/kg)	Yield	Greasy Price	% Clip
Adults (ewes & rams)								
Fleece	1% VM, 90 mm, 35 n/kte	20	MF5	1% VMB, 90mm	1,230	65%	800	75%
Skirtings / Belli	4.8% VM, 80 mm, 35 n/k	19	MP5	4.8% VMB, 80mm	1,241	56%	695	20%
Cardings	2.9% VM, 90 mm, 35 n/k	20	MZ2	2.9% VMB, 80mm	750	52%	390	5%
						Average	758	
Hoggets								
Fleece						65%	-	75%
Skirtings / Bellies						56%	-	20%
Cardings						52%	-	5%
						Average	-	

DETAILED FLOCK PARAMETERS

General

Enterprise Units:	700 ewes	Birth Weight (kg/hd):	5.25	
Base DSE rating:	2.32 /ewe			
Flock mortality:	4%	Marking %	89%	
		Weaning %	86%	3 months of age
Ewes culled as dry after scanning:	11%			
Ewes culled for other reasons	0%	ie. total ewes culled	11%	
		or	77 ewes	
Rams CFA @:	4 years old			

Mating Management

Joining %:	2.00%	Total Number of Rams:	14 hd
Ewe hoggets culled/not joined:	30.0%		

Marketing Program

Wethers sold as hoggets:	0%
Ewes sold as hoggets:	100%

Grazing Management

Stocking rate/ha:	13.00 DSE

Schedule 2

Wheat (grazing & grain) - GROSS MARGIN

Indicative Program
CW - East

TOTAL AREA:	20 ha	YIELD:	4.90 t/ha		
GRADE:	4 APW1	BASE:	11.0%	Protein	
SILO PRICE:	$315.00 /t	PROTEIN:	11.0%		

						$ / Hectare	TOTAL
INCOME:							
GRAIN PAYMENTS			$315 /t	@	4.90 t/ha	$1,543.50	$30,767
LIVESTOCK GRAZING:							
Steers	2.5 hd/ha	@	0.8 kg/day	x 60 days x	$3.38 /kg	$405.60	$8,085
				A. TOTAL INCOME		**$1,949.10**	**$38,852**
			Average Grain Price	$398 /t			
VARIABLE COSTS:							
MACHINERY OPERATIONS							
(contract)	*Sowing - direct drill*		$57.00 /ha	@	100% of area	$57.00	$1,136
(contract)	*Spraying*		$10.00 /ha	@	400% of area	$40.00	$797
SPREADING	*Ground Spreading - fertiliser <200 kg/ha*		$105.00 /t	@	0.150 t/ha		
(contract)					100% of area	$15.75	$314
SEED	(retained)		60 kg/ha	@	$0.71 /kg	$42.48	$847
FERTILISER	*MAP*		225 kg/ha	@	$650 /t	$146.25	$2,915
	Urea - granulated		0% of area	(predrilled - prior to sowing)			
			0 kg/ha	@	$560 /t	$0.00	$0
	Urea - granulated		100% of area	(topdress)			
			150 kg/ha	@	$560 /t	$84.00	$1,674
HERBICIDES	*Glyphosate 450 - (*		200% of area	Fallow			
			1.25 L/ha	@	$4.15 /L	$10.38	$207
plus -	*Kombo 950*		0.250 kg/ha	@	$5.00 /kg	$2.50	$50
	Amicide Advanced		100% of area	Fallow	(applied as a mix)		
			0.50 L/ha	@	$7.10 /L	$3.55	$71
	Logran 750 WG		0% of area	Pre-emergent			
			0.035 kg/ha	@	$135.00 /kg	$0.00	$0
	Trifluralin 480/Tret		100% of area	Pre-emergent	(applied as a mix)		
			1.50 L/ha	@	$9.00 /L	$13.50	$269
	Tristar Advance		0% of area	Post - Emergent			
			1.50 L/ha	@	$22.00 /L	$0.00	$0
	Tigrex		100% of area	Post - Emergent			
			0.75 L/ha	@	$12.50 /L	$9.38	$187
	MCPA LVE		100% of area	Post - Emergent	(applied as a mix)		
			0.30 L/ha	@	$11.50 /L	$3.45	$69
FUNGICIDES	*Bayleton/Triad*		100% of area	Post - Emergent			
			0.50 L/ha	@	$5.13 /L	$2.57	$51
	Opus 125		0% of area	Post - Emergent			
			0.25 L/ha	@	$24.00 /L	$0.00	$0
HARVEST	(contract)		4.90 t/ha	@	$15.90 /t	$77.91	$1,553
CARTAGE	(contract)		4.90 t/ha	@	$11.00 /t	$53.90	$1,074
AERIAL SPRA'	(contract)		$120.80 /ha	@	0% of area	$0.00	$0
				B. TOTAL VARIABLE COSTS		**$562.61**	**$11,215**
				TOTAL GROSS MARGIN (A-B)		**$1,386.50**	**$27,637**

PARAMETRIC BUDGET ($ per Hectare)

		GRAIN PRICE ($/t)				
		284	299	315	331	364
GRAIN YIELD (t/ha)	3.92	$575.08	$636.82	$698.56	$760.30	$889.95
	4.41	**$700.81**	**$770.27**	**$839.73**	**$909.18**	**$1,055.04**
	4.90	$826.55	$903.72	$980.90	$1,058.07	$1,220.14
	5.39	**$952.28**	**$1,037.17**	**$1,122.06**	**$1,206.96**	**$1,385.23**
	5.88	$1,078.01	$1,170.62	$1,263.23	$1,355.84	$1,550.32

Schedule 3

Wheat (after cereal) - GROSS MARGIN

Indicative Program
CW - East

TOTAL AREA:	20 ha	YIELD:	5.50 t/ha	
GRADE:	H2	BASE:	11.0%	Protein
SILO PRICE:	$325.00 /t	PROTEIN:	11.0%	

						$ / Hectare	TOTAL
INCOME:							
GRAIN PAYMENTS		$325 /t	@	5.50 t/ha		$1,787.50	$35,631
				A. TOTAL INCOME		$1,787.50	$35,631
		Average Grain Price $325 /t					
VARIABLE COSTS:							
MACHINERY OPERATIONS							
(contract)	*Sowing - direct drill*	$57.00 /ha	@	100% of area		$57.00	$1,136
(contract)	*Spraying*	$10.00 /ha	@	575% of area		$57.50	$1,146
SPREADING	*Ground Spreading - fertiliser <200 kg/ha*	$105.00 /t	@	0.150 t/ha			
(contract)				100% of area		$15.75	$314
SEED	(retained)	50 kg/ha	@	$0.71 /kg		$35.40	$706
FERTILISER	*MAP*	180 kg/ha	@	$650 /t		$117.00	$2,332
	Urea - granulated	0% of area	(predrilled - prior to sowing)				
		50 kg/ha	@	$560 /t		$0.00	$0
	Urea - granulated	100% of area	(topdress)				
		150 kg/ha	@	$560 /t		$84.00	$1,674
HERBICIDES	*Glyphosate 450 - (*	250% of area	Fallow				
		1.25 L/ha	@	$4.15 /L		$12.97	$259
plus -	*Kombo 950*	0.250 kg/ha	@	$5.00 /kg		$3.13	$62
	Amicide Advanced	100% of area	Fallow	(applied as a mix)			
		0.50 L/ha	@	$7.10 /L		$3.55	$71
	Logran 750 WG	0% of area	Pre-emergent				
		0.035 kg/ha	@	$135.00 /kg		$0.00	$0
	Trifluralin 480/Tref	100% of area	Pre-emergent				
		1.00 L/ha	@	$9.00 /L		$9.00	$179
	Tristar Advance	75% of area	Post - Emergent				
		1.50 L/ha	@	$22.00 /L		$24.75	$493
	Tigrex	100% of area	Post - Emergent				
		0.75 L/ha	@	$12.50 /L		$9.38	$187
	MCPA LVE	100% of area	Post - Emergent	(applied as a mix)			
		0.30 L/ha	@	$11.50 /L		$3.45	$69
FUNGICIDES	*Bumper/Aurora/Til*	50% of area	Post - Emergent				
		0.25 L/ha	@	$11.39 /L		$1.42	$28
	Opus 125	0% of area	Post - Emergent				
		0.25 L/ha	@	$24.00 /L		$0.00	$0
HARVEST	(contract)	5.50 t/ha	@	$14.10 /t		$77.55	$1,546
CARTAGE	(contract)	5.50 t/ha	@	$11.00 /t		$60.50	$1,206
AERIAL SPRAY	(contract)	$82.00 /ha	@	0% of area		$0.00	$0
				B. TOTAL VARIABLE COSTS		$572.34	$11,409
				TOTAL GROSS MARGIN (A-B)		**$1,215.16**	**$24,222**

PARAMETRIC BUDGET ($ per Hectare)

GRAIN YIELD (t/ha)	GRAIN PRICE ($/t) 293	309	325	341	375
4.40	$742.27	$813.77	$885.27	$956.77	$1,106.92
4.95	**$889.34**	**$969.78**	**$1,050.21**	**$1,130.65**	**$1,299.57**
5.50	$1,036.41	$1,125.78	$1,215.16	$1,304.53	$1,492.22
6.05	**$1,183.48**	**$1,281.79**	**$1,380.10**	**$1,478.42**	**$1,684.87**
6.60	$1,330.55	$1,437.80	$1,545.05	$1,652.30	$1,877.52

Schedule 4

Canola (Clearfield) - GROSS MARGIN

Indicative Program

CW - East

TOTAL AREA:	20 ha		YIELD:	3.50 t/ha			
SILO PRICE:	$625.00 /t		OIL:	44.0%			
INCOME:						**$ / Hectare**	**TOTAL**
GRAIN PAYMENTS		$625 /t	@	3.50 t/ha		$2,187.50	$43,604
	Oil Bonus	$9.38 /t	premium @	2.00%		$65.63	$1,308
				A. TOTAL INCOME		**$2,253.13**	**$44,912**
		Average Grain Price $643.75 /t					
VARIABLE COSTS:							
MACHINERY OPERATIONS							
(contract)	*Sowing - direct drill*	$57.00 /ha	@	100% of area		$57.00	$1,136
(contract)	*Spraying*	$10.00 /ha	@	600% of area		$60.00	$1,196
SPREADING	*Ground Spreading - lime 2.5 t/ha*	$15.50 /t	@	2.50 t/ha			
(contract)				100% of area		$38.75	$772
	Ground Spreading - fertiliser <200 kg/ha	$105.00 /t	@	0.150 t/ha			
				100% of area		$15.75	$314
SEED (purchased)	*IT - Hybrid*	3.00 kg/ha	@	$34.00 /kg		$102.00	$2,033
FERTILISER	*Lime (Westlime)*	100% of area	(topdress)				
		2.500 kg/ha	@	$55 /t		$137.50	$2,741
	MAP	150 kg/ha	@	$650 /t		$97.50	$1,944
	SOA - Granular	0% of area	(predrilled - prior to/at sowing)				
		75 kg/ha	@	$445 /t		$0.00	$0
	Urea - granulated	100% of area	(topdress)				
		150 kg/ha	@	$560 /t		$84.00	$1,674
HERBICIDES	*Glyphosate 450 - G*	200% of area	Fallow				
		1.25 L/ha	@	$4.15 /L		$10.38	$207
plus -	*Kombo 950*	0.250 kg/ha	@	$5.00 /kg		$2.50	$50
	Amicide Advanced	100% of area	Fallow	(applied as a mix)			
		0.50 L/ha	@	$7.10 /L		$3.55	$71
	Propyzamide 500	100% of area	Pre-Emergent				
		1.00 L/ha	@	$26.45 /L		$26.45	$527
	Intervix / Intercept	100% of area	Post-Emergent				
		0.60 L/ha	@	$31.00 /L		$18.60	$371
	Select Xtra/Clethod	100% of area	Post - Emergent				
		0.33 L/ha	@	$19.00 /L		$6.27	$125
plus -	*Hasten*	1.00 L/ha	@	$4.70 /L		$4.70	$94
	Lontrel Advanced/C	25% of area	Post - Emergent	(applied as a mix)			
		0.15 L/ha	@	$42.05 /L		$1.58	$31
FUNGICIDES	*Prosaro 420 SC*	100% of area	Post - Emergent				
		0.375 L/ha	@	$74.50 /L		$27.94	$557
INSECTICIDES	*Talstar 250EC*	0% of area	Pre-emergent (bare earth)				
		0.04 L/ha	@	$136.00 /L		$0.00	$0
	Karate Zeon (aerial application)	100% of area	Post - Emergent				
		0.036 L/ha	@	$108.00 /L		$3.89	$78
WINDROW	(contract)			$37.05 /ha		$37.05	$739
HARVEST	(contract)	3.50 t/ha	@	$42.50 /t		$148.75	$2,965
CARTAGE	(contract)	3.50 t/ha	@	$11.00 /t		$38.50	$767
AERIAL SPRAY	(contract)	$16.20 /ha	@	100% of area		$16.20	$323
				B. TOTAL VARIABLE COSTS		**$938.85**	**$18,714**
				TOTAL GROSS MARGIN (A-B)		**$1,314.28**	**$26,198**

PARAMETRIC BUDGET ($ per Hectare)

GRAIN YIELD (t/ha)	GRAIN PRICE ($/t) 375	500	625	656	722
2.85	$197.00	$564.03	$931.07	$1,022.83	$1,215.52
3.00	$246.92	$633.28	$1,019.63	$1,116.22	$1,319.06
3.16	$299.48	$706.17	$1,112.85	$1,214.53	$1,428.04
3.33	$354.80	$782.89	$1,210.98	$1,318.01	$1,542.76
3.50	$413.03	$863.65	$1,314.28	$1,426.93	$1,663.51
3.85	$529.49	$1,025.18	$1,520.87	$1,644.79	$1,905.02
4.20	$645.95	$1,186.70	$1,727.45	$1,862.64	$2,146.53

Attachment 1

ABARES Farm Survey Data – NSW Far West

Year	ABARES Data						TIA Analysis - based on ABARES data				
	Beef Cattle - numbers as at 30 June		Sheep - numbers as at 30 June		Area Operated - as at 30 June	Crop Area	Total DSE			Stocking Rate	Crop Area
	Cows	Herd (Total)	Ewes	Flock (Total)	(ha)	(ha)	Cattle	Sheep	TOTAL	(DSE/ha)	(% total property
1990	84	170	4,330	8,333	24,478	93	1,281	10,046	11,327	0.46	0.38%
1991	93	190	3,673	6,720	24,888	121	1,418	8,521	9,940	0.40	0.49%
1992	78	146	3,407	5,691	23,842	78	1,190	7,904	9,094	0.38	0.33%
1993	80	174	3,136	5,265	26,697	128	1,220	7,276	8,496	0.32	0.48%
1994	112	227	3,049	5,483	30,327	121	1,708	7,074	8,782	0.29	0.40%
1995	107	227	3,225	5,381	26,207	140	1,632	7,482	9,114	0.35	0.53%
1996	112	217	3,100	5,518	26,328	175	1,708	7,192	8,900	0.34	0.66%
1997	112	219	2,601	4,615	24,072	172	1,708	6,034	7,742	0.32	0.71%
1998	82	182	2,213	3,752	20,154	420	1,251	5,134	6,385	0.32	2.08%
1999	134	260	2,826	4,780	24,368	217	2,044	6,556	8,600	0.35	0.89%
2000	118	238	3,357	5,649	28,051	244	1,800	7,788	9,588	0.34	0.87%
2001	121	256	3,393	5,228	28,523	207	1,845	7,872	9,717	0.34	0.73%
2002	79	153	2,597	3,910	24,677	245	1,205	6,025	7,230	0.29	0.99%
2003	-	148	-	3,221	30,077	249	*2,257*	*343*	*2,600*	0.09	0.83%
2004	-	136	-	3,855	29,788	305	*2,074*	*316*	*2,390*	0.08	1.02%
2005	63	125	2,945	4,306	31,379	418	961	6,832	7,793	0.25	1.33%
2006	96	173	2,417	3,574	27,214	282	1,464	5,607	7,071	0.26	1.04%
2007	73	154	2,456	4,048	30,649	223	1,113	5,698	6,811	0.22	0.73%
2008	100	193	2,424	3,863	23,950	337	1,525	5,624	7,149	0.30	1.41%
2009	94	171	2,008	3,110	22,199	352	1,434	4,659	6,092	0.27	1.59%
2010	117	239	2,188	3,326	25,629	309	1,784	5,076	6,860	0.27	1.21%
2011	136	278	2,579	4,185	26,019	321	2,074	5,983	8,057	0.31	1.23%
2012	134	314	2,739	4,565	24,861	290	2,044	6,354	8,398	0.34	1.17%
2013	176	353	2,448	4,152	23,455	282	2,684	5,679	8,363	0.36	1.20%
2014	125	235	2,969	4,196	25,017	300	1,906	6,888	8,794	0.35	1.20%
2015	144	254	3,216	4,996	27,952	326	2,196	7,461	9,657	0.35	1.17%
2016	148	281	3,488	4,954	29,247	323	2,257	8,092	10,349	0.35	1.10%
2017	135	260	3,265	4,924	27,155	481	2,059	7,575	9,634	0.35	1.77%
2018	100	197	2,422	3,447	26,893	430	1,525	5,619	7,144	0.27	1.60%
2019	75	161	1,796	2,247	29,115	262	1,144	4,167	5,310	0.18	0.90%
High					31,379					0.46	2.08%
Low					20,154					0.08	0.33%
Median					26,268					0.32	1.01%

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To whom it may concern – RE: Solar Proposal at 4823 Great Western Highway, Glanmire

I, Michael Lund of PR Master Stephens & Co, Licensed Real Estate Agent/ Manager have been asked to share my further views on the Solar Proposal at 4823 Great Western Highway, Glanmire.

By way of background, I have been a real estate investor for 20 years, and an agent for Master Stephens for approximately 13 years.

Master Stephens & Co is the oldest independent Stock and station agents in the area servicing all of NSW. We are considered experts in the trade of goods, stock and property. I am a Licensed real-estate agent (Australian College of Professionals), and an Auctioneer Stock and Station Agent.

My entire career has been based out of Bathurst.

I was asked to prepare a report in relation to this land in 2021. I prepared the report which is now attach to this report. I adhere to the contents of that report.

Time has gone by of course, between July 2021 and now, and in my experience, rural properties, particularly smaller rural properties, have escalated significantly in value, and in a setting where the broader community of real-estate agents are indicating a 'dip' in real estate. That has not been, and is not my experience, in the Bathurst area.

I have been referred to certain portions of the Environmental Impact Statement (EIS) dated November 2022, and I now refer to pages 188 – 189, and 233.

1. Elgin Energy suggests that there is no evidence that a solar project (such as the one proposed here), has an impact on the value of adjoining nearby rural properties. There is in my view, no point in debating that broad statement because I am confident it simply has no relevance to the proposal located at the proposed site.

2. Before 2014, there were several blocks created in this general area of size less than 100 hectares. As I understand, the Bathurst Regional Council set about endeavouring to strike a happy medium between the demand for smaller blocks and the need to preserve a green belt around Bathurst, and to preserve good productive land.

The end result was the Bathurst Regional Local Environment Plan 2014, and since that time, rural properties in the subject area are required to be 100 hectares or more. The fact is, that most rural landowners surrounding this block have in fact subdivided their blocks into 100 hectares, or thereabouts, and have either sold them off or are holding on to them. Each block of course, has a building entitlement.
Since 2014 I have seen several houses erected in the close vicinity of this block, all of high value, consistent with the high value of the rural property/ real estate that surrounds this block.

3. It is in my view, particularly having regard to the 100-hectare size, the location of the land, the fact it is on the perimeter of a growth city and the fact the land enjoys all of the qualities described in my earlier report, it is inappropriate to lump this in with broad acres.

4. In my view, a development such as that proposed will not only occupy two building blocks for the next 40 years, but will take out of production, land that enjoys all of the qualities that I refer to in my prior report, that is to say, high quality land.

5. I have viewed several photographs in the EIS including those on pages, 104, 115 - 116, 118 and 121, and my unhesitating opinion is that this proposal will have a serious detrimental impact upon the surrounding properties both in terms of value and in terms of production.

6. I am aware of the serious insurance issues imposed upon neighbours as a result of this proposal.

I refer to pages 162 to 164 of the EIS and I say the following: -

1. The description of this land as 4 and 5 is totally foreign to my impression of the land.

2. My knowledge of the productivity of this land, and of course the value of the land is as assessed by me and so many other agents and so many other purchasers over many years.

3. I adhere to the view that it is productive cultivation land.

Kind regards,

[redacted]

Michael Lund
Sales Manager

8 December 2022

HENNESSY DOWD
Lawyers

Our Ref: JRB:LMH:221755
Your Ref:

9 November 2023

National Insurance Brokers
Association
Suite 4.01B, Level 4,
31 Market Street, Sydney
NSW 2000

[redacted]

Dear Sir/Madam,

RE: Glanmire Action Group

We act for certain members of the Glanmire Action Group. The Group was formed a few years ago now to investigate the merits or otherwise of allowing the installation of a solar plant and associated equipment on 200 hectares of cultivation land at 4823 Great Western Highway, Glanmire. The proponent is Elgin Energy.

To assist in familiarising you with the proposed Glanmire Solar Plant and the Glanmire Action Groups/ community opposition, we **attach** the following documents:

(a) A copy of Elgin Energy Pty Limited's brochure;

(b) A copy of Glanmire Action Group's brochure.

The Glanmire Action Group brochure depicts at least part of the proposed solar block and the photo was taken in spring 2022. The crop is canola.

We also **attach** an aerial photo depicting the block proposed for solar. You will note the block is rectangular with north/south length by about 2,300 metres and east/west being about 800 metres.

Elgin's brochure outlines panels to cover about 158.6 hectares. Please assume the proposal includes:

- About 120,000 solar modules;
- A 60MW Battery Energy Storage System

Principal Legal Practitioner
Evan M Dowd
Dip. Law (LPAB) Sydney
Acc. Spec LSNSW (Criminal)

Legal Practitioner
Louisa M Hennessy
Dip. Law (LPAB) Sydney

Legal Practitioner
Jonty R D Boshier
B.A., LL.B (Hons)

Shannon Stiff
Paralegal

Andrew D Hutchison
Legal Assistant

191 Russell Street
PO Box 697
Bathurst NSW 2795
Phone 02 6324 5441
evan@hennessydowdlawyers.com

- Approximately 18 Inverters;
- One Maintenance Building;
- Two large transformers; and
- 2m high fencing with barbed wire.

Until now neighbours immediately to the west have for many years grown and harvested grain crops off this cultivation land. Those crops have of course been planted to near the north/south boundary of 4823 Great Western Highway. At 4823 similar activities have been performed.

Typically, of course grain is harvested at the height of summer at Christmas/New Year period. It is done when the grain is ripe, and the grass is high and very dry. This is of course a time of high fire danger.

Typically, a contract harvester supplies and operates the harvester and grain trucks etc. may be supplied and operated by contractors and/or the landowner/occupier. All involved are generally aware of the heightened fire risk of this activity.

The prevailing wind in summer is the hot dry westerly wind. Typically, an owner/occupier has a "rural policy" and public liability cover in the event for example for fire starting and extending the neighbouring properties/buildings. This cover is typically $20,000,000 to $30,000,000. This is deemed quite adequate to cover the risk in a rural setting as indeed the subject area has been until now.

The issue here is rather unusual probably because planning authority policy discourages a solar proposal on cultivated land, that is to say grain producing land and so the elevated risk of fire due to the harvest activities as described coupled with an adjoining solar plant said to be worth $250,000,000 or more may not have arisen, however in this instance the proponent is persisting and so the issue is real indeed.

The proponent estimates that the solar capital to be introduced into 4823 Great Western Highway will total $250 million and it will generate power for 28,000 homes. This would be likely to produce a profit to the proponent which may be destined for overseas. We ask you to assume the adjoining owners/occupiers reasonably require $300 million public liability cover.

You will see therefore that the introduction of the solar plant onto rural cultivation land introduces a whole new risk (in terms of capital worth and potential loss of profits) to the neighbouring farmer engaged in typical rural activities for this land including retaining subcontractors who may not themselves be insured.

Of course, some farmers carry on rural activities as trustees and we expect it would be illegal for a farmer to put trust assets/property at risk by not having sufficient insurance even if a farmer himself was otherwise minded to take the risk of not insuring or under-insuring.

In February 2021 when basic facts were known a member of our Group, Mr P R Hennessy SC forwarded a letter of instruction to Craig Mizon, insurance broker and Mr Mizon thereafter provided to the Group his report. His report addressed the writer's questions asked.

In summary you will see:

1. There is need to disclose to a prospective insurer the existence of such an asset adjoining.

2. Essentially if one could find an insurer the premium would be prohibitively high.

3. Until now the proponent has not relevantly addressed Mr Mizon's report.

4. There will be, of course a need to increase insurance cover from $30 million to $300 million.

The proponent, while not providing us with a report from you or indeed anyone else, purports to deal with the issues accurately and clearly raised by us by stating:

- "*The Australian Insurance Council was consulted prior to EIS exhibition and again after, on this issue. They have confirmed there is no further change to their initial statement, which was, they are not aware of any position of escalated risk focus being placed on neighbouring properties solely as a result of solar facilities being established*".

- *"Communication with the National Insurance Brokers Association (NIBA) resulted in a similar comment. They advised there is no evidence of increasing insurance premiums on sites adjacent to solar farms*".

For the purpose of answering the questions below please assume the accuracy of the facts outlined above. We ask:

1. Did you or someone on your behalf make the statement attributed to you?

2. Were the facts outlined above and/or contained in Mr Hennessy SC's letter of instruction to Mr Mizon adequately outlined to you before you stated as above?

    i. If the answer to 1 is yes do we correctly interpret your view is:

        a. No impact upon duty to disclose – no need to disclose?;

        b. No impact upon risk?;

c. No impact upon premium in insuring for $300,000,000 instead of $30,000,000?

Please assist by obtaining an insurance quote.

ii. If the answer to 1 is no:

a. In what report were the facts outlined to you not adequate?

b. Were you misled by Elgin Energy Pty Ltd, NGH Pty Ltd, or any of their representatives?

We are keen to ascertain if there is an issue.

It seems to the writer the issue is rather clear, and the matter was largely addressed by Mr Mizon and perhaps if the issue is made clear to you as we hope we have done, the insurance experts may in fact be in agreeance.

Yours faithfully
HENNESSY DOWD LAWYERS

[redacted]

Jonty Bosher
Legal Practitioner

[redacted]

Encl.

Statement of Mark Ryan

I, Mark Ryan, of 5018 Great Western Highway, Glanmire, Farmer, make the following statement:-

1. I provided an earlier statement dated 6 December 2023 which is attached to this statement.

2. I reaffirm this statement.

3. I currently own rural/ cropping land located between the township of Raglan and the proposed Glanmire Solar Plant.

4. In recent years I have attempted to subdivide my rural property. However, I am unable to subdivide this land as Bathurst City Council considers such action adversely effect the "scenic character of the land".

5. I suggest the imposition of a solar plant in the same region will affect the scenic character of the land to a higher degree, such that its installation is entirely inappropriate for the area.

6. I have read the Department of Planning's State Significant Development Assessment Report (SSD 21208499).

7. I note that in that report, the subject land is described as "occasional cropping land". I disagree with this statement entirely.

8. I used the property for the purpose of grain production over the years that I leased it between the late 1980's and early 2000's, and for the most part, it has been used for cropping ever since. The description as "occasional cropping land" is directly contradictory to my experience while I occupied the land. It is also directly contrary to my observations over the years between then and now.

9. If you look at the property as at the date of this statement there appears to be the remains of a crop. And in so far there is grazing going on, there appears to be grazing on stubble and the leftovers of crop.

10. This is the extent to which so called grazing occurs. For true grazing to occur one normally plants a pasture upon which stock grazes. That is not the case on this property.

11. Grazing has been used as a method of clearing the property in preparation for the next cropping season.

12. I confirm what I said in my earlier statement that this land is equal to any land I have farmed in the greater tableland's region.

13. The land in this district is regarded as the most productive in the region.

[redacted]

Signed: [redacted]

Mark Ryan

Date: 29/11/23

Chevaudre Solar Plant EIS Clarification
Banbury Show April 2022

I [illegible] of [illegible] say

1. I attended the Banbury Show on 29/30 April 2022.
2. I with [illegible] attended Elgin's Stall.
3. I objected/ gave comments in the subject proposal and did not receive information at the close of play.
4. I wish to make the following additional comments:

[illegible]

Signed: [illegible]

Dated: 6/11/2022

[illegible]

[redacted]

Jonty Boshier

From: Heidi Schmit [redacted]
Sent: Thursday, 16 November 2023 2:42 PM
To: Jonty Boshier; Evan Dowd; Andrew Hutchison; 'Peter Hennessy'
Cc: NIBA Info; Philip Kewin
Subject: RE: Proposed Glanmire Solar Plant

Categories: LEAP

Good afternoon,

Thank you for your email. I apologise for the delay in having it addressed by the appropriate person at NIBA.

Our CEO, Phil Kewin, is now aware of your letter and will be in touch with you as soon as possible.

Kind regards,

Heidi Schmit
Executive Assistant to CEO,
Philip Kewin

[redacted]

National Insurance Brokers Association
Suite 4.01B, Level 4, 31 Market Street
Sydney, NSW, 2000

www.niba.com.au

From: Jonty Boshier [redacted]
Sent: Thursday, November 9, 2023 4:17 PM
To: NIBA Info <Info@niba.com.au>
Cc: Evan Dowd [redacted]; Andrew Hutchison [redacted]
'Peter Hennessy' [redacted]
Subject: Proposed Glanmire Solar Plant

Dear Sir/ Madam,

Please find **attached** correspondence for your attention.

Kind regards,

Jonty Boshier
Solicitor

Hennessy Dowd Lawyers
[redacted]
Bathurst,
NSW 2795

Attention: Jonty Boshier

Re:
Elgin Energy Pty Limited – Solar Proposal,
[redacted]

Australian Bushfire
Protection Planners Pty Ltd
ACN 083085474
Bushfire Mitigation Consultants

Dear Jonty,
Thank you for the correspondence dated 29th November in which you seek a response to the following questions:

1. The prospect of fire commencing on a neighbouring rural property as described, and its potential for causing damage to the property upon which, if permission is granted, the solar plant will be installed.

2. The speed with which a fire travels or is capable of travelling through, for example a crop ready for harvest, and the speed with which the fire front can extend by the time it reaches the boundary of the proposed solar plant.

3. The "spotting distance" of embers.

4. The location from where such a fire can reasonably feasibly be contained.

5. Any other matter you consider as relevant as to risk.

Response to Question 1:

Fire has the potential to commence on the land surrounding the site on which approval is being sought to construct the Glanmire Solar Farm. Ignition sources include farm machinery, welding, cutting, grinding, vehicles, cigarettes and lightning.

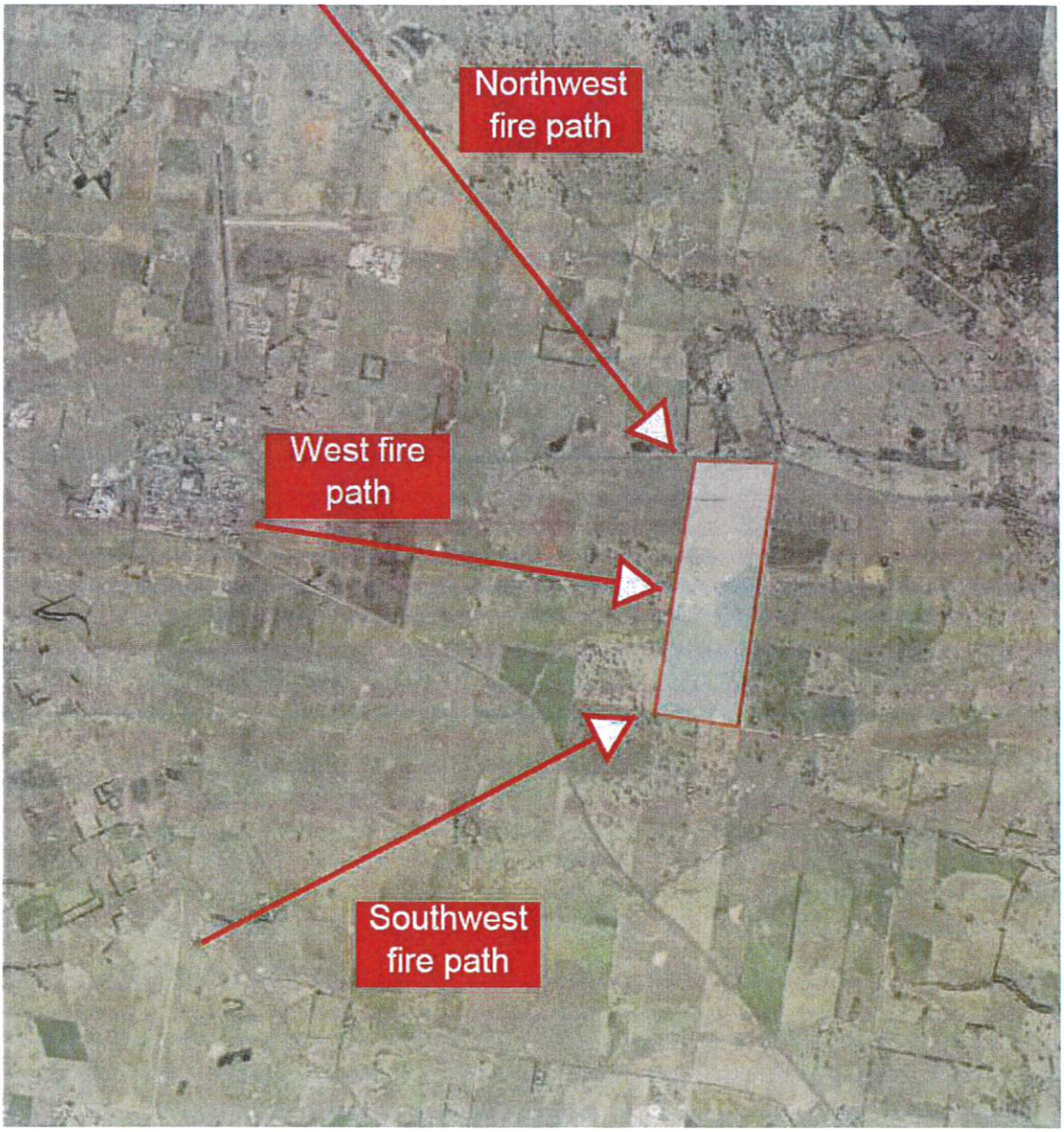
Catastrophic fire events can result in large scale bush/grassland fires (including standing crops) spreading across the landscape for many kilometres.

An example is the fire that started on a property on Sir Ivan Doherty Drive, Leadville, to the east of Dunedoo. This fire spread more than 50 kilometres under north-westerly and westerly towards Merriwa and Gulgong, causing significant property damage.

There is no reason that a similar fire event will not occur in the landscape surrounding the solar farm and cause damage to the solar arrays and associated equipment.

The predominant fire paths likely to impact the solar farm site is from the northwest, west and southwest – refer to Figure 1.

Figure 1 – Plan of potential fire paths likely to impact the Solar Farm site.



Response to Question 2:

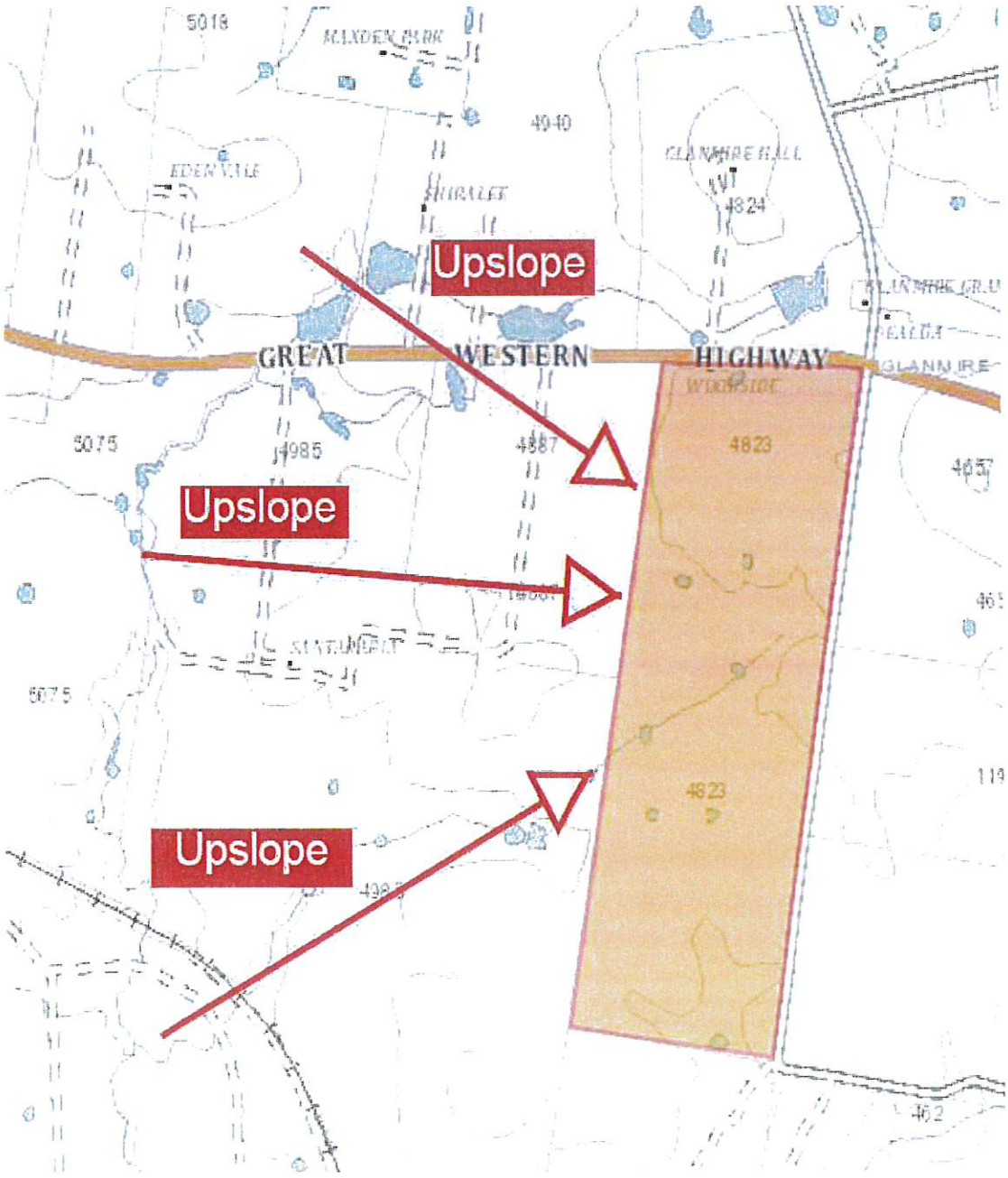
The speed at which fires spread is determined by the type of the structure of the fuels, topography of the land and the speed of the wind.

Fires that spread across open grass/crop land travel at a faster rate than fire that spread through forest vegetation.
This is because grassland/crops are open to the effects of wind whilst the forest structure is dense, reducing the speed of the wind through the denser vegetation.

The topography of the land also has an impact on the spread of fire. Over short distance the effect of slope is very pronounced.

The rate of forward spread will double up a 10 degrees slope.

Figure 2 – Plan of fire path gradients.



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The predominant vegetation on the land to the northwest, west and southwest of the site is grassland/crops. The intensity of a fire and its difficulty of control is affected by the quantity of grass and the pasture. Heavy pastures burn faster and with a greater intensity than lighter pastures.

For grassland/crops at 70% cured and a temperature of 40 degrees Celsius with 10% humidity and a Fire Danger Index of 80 the rate of spread is calculated as 10.5 km/h.

The fire spread will be 170 hectares in 30 minutes, increasing to 1000 hectares in one hour, 4000 hectares in two hours. Flame height in average pasture vegetation is 6.0 metres and 11.0 metres for heavy pasture.

The perimeter of a grassfire increases by 2.5 times the forward spread of the fire i.e. if the forward spread is 10 km/h, the perimeter spread will be 25 km/h.

Response to Question 3:

The spotting distance ahead of a fire front depends on the structure of the vegetation (grassland/crops or forest), dryness off the vegetation, wind speed and flame height.

Grassland/crop fire produce fast moving, hot fires that give off burning embers that can travel kilometres ahead of the fire front. The spotting distance depends on wind speed.

Spot fires will penetrate the solar farm, igniting the grassland vegetation and equipment.

Response to Question 4:

A catastrophic fire event has the potential to 'out-run' fire-fighting efforts with reliance mainly being on aerial water bombing being the safest method of control.

The Sir Ivan's fire spread with the changing wind direction and burnt for many days, out-running fire crews.

A similar potential exists in the landscape surrounding the proposed solar farm with no defined point at which the fire can be controlled.

Response to Question 5:

The addition of the proposed planting along the boundary of the solar farm site, combined with the proposed screen planting on the solar farm site, will increase

level of radiant heat on the arrays and increase the risk of ember attack from burning bark and leaves.

Graham Swain
Managing Director,
Australian Bushfire Protection Planners Pty Limited.
05.12.2022

Graham Swain

Bushfire Planning & Protection Consultant 2020

Fire Control Officer, Wyong Shire NSW 1994

''Graham's assessments and mitigation measures put forward to protect against the impacts of bushfire have been undertaken, over 17 years with me, in a professional manner and with the full cooperation and support of the ACT Emergency Services Agency, the Fire Management Unit of EPSDD, the Suburban Land Management Agency. He is dedicated to understanding fire behaviour & applying lessons learnt & new research to the protection of life and property." ***Dave Richardson, Snr Development Director, Dept. of Planning, ACT Government.***

"I have worked extensively with Graham Swain on a wide variety of projects for over 20 years and emphatically recommend him as a leading bushfire expert in eastern Australia.
He is a very effective communicator and, when

Graham Swain is a deeply experienced, respected and skilled Australian bushfire planning professional collaborating with Australia's environmental leaders and planners to achieve the best people protection against fires in Australian building developments.

His career progression began with 20 years as an architect and commercial-residential builder being introduced to the bushfire sector by joining his local volunteer brigade on NSW Central Coast in 1975. His first professional bushfire role commenced in 1985 as Fire Control Officer for Wyong Shire and then briefly reporting to the NSW Commissioner in 1994-96 before transitioning intc Bushfire Consulting employment and finally establishing his own company - Australian Bushfire Protection Planners Pty. Ltd. in 2004.

Graham has been responsible for managing over 10,000 incidents, 20 major bushfires and three emergency bushfires when he was Fire Control Officer, protecting 120,000 people on the NSW Central Coast.

He has experienced first-hand the responsibility of leading 14 brigades, 900 volunteers, equipment and supervising police, army and other support agencies during the 1994 emergency bushfires.

"Ahead *of his time"* reported by retired Commissioner Phil Koperberg, Graham developed an unprecedented volunteer Executive Brigade Management System that included a Senior Executive Group with ancillary groups covering Communications, Canteen, Welfare and Public Relations, Training.

He introduced an overlay paging system resulting in 24 hour 4 min brigade turnout time. He developed the current NSW RFS Label dress badge and the new name of 'Wyong Rural Fire Service (RFS)'. He also introduced the 2 piece bushfire fighting PPE, structural firefighting PPE for Wyong Rural Fire Service, unprecedented (within the RFS) full breathing apparatus capability for all Wyong brigades plus a GPS tracking of fire appliances in 1994 when the RFS has only just began roll-out of the same system 25 years later in 2019!

Graham was appointed by Commissioner Koperberg the Incident Controller for 3 bushfire emergencies in 1991-94 covering 800,000 hectares on the central coast and hinterland, including the Gunderman, Mogo Creek, Denman and Rylstone bushfires. He supervised the emergency management team including visiting CFA brigades, police, ambulance, NSW Fire Brigade, National Parks & Wildlife Service & Forestry, Central Coast Volunteer Rescue Squad and support agencies. He participated in aerial reconnaissance twice daily, on call 16 hrs /day for 15 days.

This resulted in preventing catastrophic fire impingement into the central coast

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working on a team with him, I am always impressed by his depth of experience, general knowledge and his steadfast drive to provide the best possible consultancy advice for bushfire mitigation." ***Dr. David Robertson, Managing Director, Cumberland Ecology.***

"Graham is professional, knowledgeable, diligent and uncompromising on matters of bushfire safety and protection – he is recognised as a leader in the field." **Michael Staunton, Barrister, Martin Place Chambers**

"Graham's style is direct, practical and knowledgeable, and in my years with dealing with him, without peer." **Stephen Conroy, Surveyor, Springwood.**

A very dedicated professional who is steeped in his knowledge of planning for bushfire protection. **Stephanie Vatala, Lawyer**

"His huge experience in the field is unrivalled." **Azar Kassis, Builder Developer.**

with **nil injuries, deaths or loss of properties.**

Over the last 20 years Graham has been providing high-level advisory, reporting and attending Land & Environment Court as an expert witness for developments including schools, nursing homes, new residential suburbs and commercial areas, Solar and Wind Farms with projects covering NSW, ACT, Victoria, Western Australia and Queensland.

He liaises with government planners, ecologists, developers, architects, builders and lawyers. Graham has high-level expertise in delivering premium results to protect the lives of people from bushfires. He has developed an extensive level of cooperation with many professional consultants in the planning sector.

Graham is passionately motivated to make a difference in the protection of the Australian community from the impact of bushfires in the urban environment which is now being aggravated by changes in fire behaviour linked to climate change.

CURRICULUM VITAE

GRAHAM SWAIN

PRESENT POSITION

Managing Director, Australian Bushfire Protection Planners Pty. Limited.

QUALIFICATIONS

- Architectural Drafting Certificate - *Sydney Technical College*
- Licensed Builder/ Project Manager.
- Hazardous Materials Incidence Management - *Country Fire Authority, Victoria*
- Basic Rural Fire-fighter Course - *NSW Rural Fire Service*
- Crew Leader Course - *NSW Rural Fire Service*
- Regional Bushfire School - *NSW Rural Fire Service*
- Instructional Techniques Course - *NSW Rural Fire Service*
- 41A (Bushfire Emergency) Planning Course - *NSW Rural Fire Service*
- Hazard Analysis - *NSW Rural Fire Service*
- Crew Leader Course - *Australian Fire Protection Association*
- Instructional in Fire Protection for Fire Control Officers - *Australian Fire Protection Association*
- Disaster Management - *State Emergency Management*
- Local Emergency Management - *Australian Counter Disaster College*
- AIIMS Incident Management Course - *Australian Fire Authorities Council*
- Introduction to Critical Incident Debriefing - *Department of Community Services*
- O.H & S - *Workcover Authority of NSW*
- Accounts Management - *Housing Industry Association*
- Staff Management - *Housing Industry Association*

FIELDS OF BUSHFIRE EXPERTISE

- Bushfire Management and Suppression
- Bushfire Planning and Mitigation
- Bushfire Risk Assessment & Risk Management
- Bushfire Behaviour
- Fire control and Operational Management
- Evacuation Planning, Management &Training
- Assessment of risk to Life & Property from potential bushfire threat
- Assessment of design & construction of buildings
- Disaster Management
- Incident Control
- Hazardous Materials Management
- Occupational Health & Safety for Bushfire Fighters

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Email. abpp@bigpond.net.au

FIRE FIGHTING/EMERGENCY MANAGEMENT POSITIONS HELD

• Deputy Regional Co-ordinator	- Department Bushfire Services
• Fire Control Officer	- Wyong Shire
• Primary Nominee	- Wyong Shire
• Executive Officer	- Wyong District Fire Committee
• Executive Officer	- Wyong Industrial Emergency Action Committee
• Training Officer	- Central Coast Petroleum Industry Response Group
• Member	- Wyong Local Emergency Management Committee
• Member	- Wyong Local Emergency Management Committee Rescue Sub-Committee
• Member	- Central Coast Disaster Recovery Committee
• Member	- Hunter Region Fire Committee
• Executive Officer	- Hunter Region Rural Fire Service Training Committee

- Department of Bushfire Services representative on the following Bushfire Committees: Lake Macquarie, Maitland, Port Stephens, Cessnock, Singleton, Muswellbrook, Scone, Rylstone, Great Lakes, Dungog, Gloucester, Taree & Hastings.

FIRE FIGHTING EXPERIENCE

Graham joined the Bays Bushfire Brigade, Gosford City, in 1974 and under-took training to become an active volunteer member and attended bushfire and other emergencies in the Gosford area. Appointed to the position of Captain of the brigade in 1977 and retained that position until 1985 when he was appointed to the full-time position of Fire Control Officer for the Wyong Shire until September 1994.

As Fire Control Officer, Graham managed fourteen brigades with approximately 1100 volunteer service members dealing with emergencies ranging from local bushfires, structure fires and road accidents, chemical spills to bushfire emergencies on the Central Coast and Hornsby.

Graham's involvement with the Bays Bush Fire Brigade provided operational management experience of fires in the local Bays area and other areas within Gosford City. His appointment as Fire Control Officer, Wyong Shire, in 1985 provided further experience in identifying bushfire hazards and risks, mitigation measures and fire management at a professional level.

In this role he provided Wyong Council with bush fire planning advice in the preparation of Local Environmental Plan & Development Control Plan documentation and individual development / building applications. Graham also represented Council on bushfire matters in the Land and Environment Court, with the first matter being heard in 1985.

Operationally, his term as Fire Control Officer allowed him to hone his fire fighting management skills dealing with bushfires in such diverse vegetation types as Hawkesbury Sandstone Dry Sclerophyll Forest to Coastal Heath, whilst becoming involved in emergency management at a broader scale. In December 1990 and October 1991 Wyong experienced major bush fires which resulted in the declaration of 41F Emergencies under the Bush Fires Act 1949 and Graham was appointed to the position of Emergency Controller during both emergencies.

During the January 1994 bushfire he was appointed Emergency Appointee (Incident Controller) for the fires in Wyong and the Deputy Appointee for the fires in Gosford City, in charge of local and interstate fire fighting resources combating fires on the Central Coast and within Cessnock Shire.

As Executive Officer of the Wyong District Bush Fire Management Committee he gained experience in the preparation of Local Emergency & Bushfire Management Plans.

Graham was a member of the Wyong Local Emergency Management Committee; member of the Wyong Local Emergency Management Committee Rescue Sub-Committee the Executive Officer of the Wyong Bushfire Management Committee; Executive Officer of the Wyong Industrial Emergency Action Committee; Training Officer – Central Coast Petroleum Industry Response Group; Member of the Central Coast Disaster Recovery Committee; Member of the Hunter Region Fire Committee and Executive Officer of the Hunter Regional Rural Fire Service Training Committee.

In September 1994 he commenced duties with the Department of Bushfire Services (Rural Fire Service) as Deputy Regional Co-ordinator, Hunter Region, responsible for the management of operations, emergency planning and training in the Hunter Region.

As Deputy Regional Co-ordinator with the Department of Bush Fire Services, Graham provided assistance to Local Governments in the preparation of 41A Emergency and Fuel Management Plans and Standards of Fire Cover.

FIRE PLANNING EXPERIENCE

Graham commenced providing bushfire protection advice on development proposals in 1985 in his position as Fire Control Officer, Wyong Shire and pioneered the introduction of the many construction standards that are relevant to present building construction.

He commenced private consulting in bushfire planning in April 2000 and has prepared bushfire protection assessments for subdivisions, special protection developments, and master plans, residential, industrial and commercial developments including the preparation of numerous bushfire evacuation plans.

Graham has prepared bushfire risk assessment reports for the Australian Capital Territory Government on the reconstruction of the rural villages of Stromlo, Pierces Creek and Uriarra, following their destruction during the January 2003 bushfires.

He has advised the ACT Government on the bushfire protection planning requirements for the ACT Emergency Services Headquarters and undertaken bushfire risk assessments for more than 42 new urban release areas in the Australian Capital Territory and was instrumental in the introduction of urban edge treatments for all new development in the territory.

Graham advised the Department of Defence in the preparation of the Fire Management Plan for Majura Field Firing Range (ACT) and works within Campbell Barracks, Perth (Western Australia).

Graham has extensive experience in the provision of advice on bushfire hazard and risk, fire behaviour, preparation of bushfire risk and Bushfire Attack Level (BAL) assessments, fuel management plans, fire management plans, evacuation plans local environment plans and development control plans.

EXPERT WITNESS EXPERIENCE

Graham's first involvement in providing assistance to the Court was in August 1985 when he was employed by Wyong Shire Council as Fire Control Officer for the Wyong Shire. Continuing involvement in the provision of expert advice occurred during the ten year period following the initial hearing in 1985 with more frequent appearances before the Court occurring since he commenced private consulting in 2000.

In the past eighteen years Graham has provided expert advice to the Court on more than fifty (50) occasions.

The following are some of those cases:

- Land & Environment Court Proceedings No 10416 of 2000, Landcom ats Sutherland Shire Council;
- Land & Environment Court Proceedings No 10269 of 2001, John Bourke ats Great Lakes Council;
- Land & Environment Court Proceedings No 40018 of 2001, Mrs. Susan Maul ats Liporoni and Anor;
- Land & Environment Court Proceedings No 10210 of 2002, Wyong Shire Council ats Filmtide Pty Limited;
- Land & Environment Court Proceedings No 10262 of 2002;
- Ku-ring-gai Council ats Masterbuilt Pty Ltd;
- Land & Environment Court Proceedings No 10634 of 2002, Ku-ring-gai Council ats M & R Civil;
- Land & Environment Court Proceedings No 10635 of 2002, Ku-ring-gai Council ats M & R Civil;
- Land & Environment Court Proceedings No 10636 of 2002, Ku-ring-gai Council ats M & R Civil;
- Land & Environment Court Proceedings No 10973 of 2002, Rosecorp Pty Ltd ats Ku-ring-gai Council;
- Land & Environment Court Proceedings No 10722 of 2002, Ku-ring-gai Council ats Flower & Samios;
- Land & Environment Court Proceedings No 10263 of 2003, Great Lakes Council ats DCR Property Consultants;
- Land & Environment Court Proceedings No 11353 of 2003, Cessnock Council ats Synergy Environmental Planning;
- Land & Environment Court Proceedings No 11260 of 2004, Ku-ring-gai Council ats Chella Holdings Pty Ltd;
- Land & Environment Court Proceedings No 11544-11548 of 2004, Avondale Properties Ltd ats Ku-ring-gai Council;
- Land & Environment Court Proceedings No. 11366 0f 2004, Kur-ring-gai Council ats Mark Shaynd;
- Land & Environment Court Proceedings No. 11626 of 2004 Providence Projects Pty Limited ats Gosford Council;
- Land & Environment Court Proceedings No. 10470 of 2005, Pepperwood Ridge Pty Ltd ats Newcastle City Council;
- Land & Environment Court Proceedings No. 11029 & 11030 of 2005, Ku-ring-gai Council ats Ray Fitzgibbon Architects Pty Ltd – Court Appointed Expert;
- Land & Environment Court Proceedings No. 10055 of 2005, CBD Prestige Property Holdings Pty Ltd ats Hornsby Shire Council;
- Land & Environment Court Proceedings No. 10059 of 2006, Pittwater Council ats Jenkins;

- Land & Environment Court Proceedings No. 10292 of 2006, Pittwater Council ats Ute Rossi;
- Land & Environment Court Proceedings No. 10222 of 2006, Waterview St Properties ats Gosford City Council – Court Appointed Expert;
- Land & Environment Court Proceedings No. 30826 of 2006, Langford & Jordon ats The Minister for Planning;
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- Land & Environment Court Proceedings No. 00151186 of 2016, Statewide Planning Pty Ltd ats Northern Beaches Council;
- Land & Environment Court Proceedings No. 310397 of 2016, Connie Saffioti ats Kiama Municipal Council;
- Land & Environment Court Proceedings No. 2017/00236706 of 2017, Dukor 24 Pty Ltd ats Northern Beaches Council;
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- Land & Environment Court Proceedings No. 2019/00023960 Giuseppe Calarco Antonetta Calarco ats Liverpool City Council;

MEMBERSHIPS

Fire Protection Association Australia Member No: 48781

Jonty Boshier

From: Thomas, Nick [redacted]
Sent: Monday, 20 November 2023 3:24 PM
To: Jonty Boshier
Cc: Doueihi, Wagih
Subject: Glanmire Action Group

Categories: LEAP

Good afternoon Jonty

We have been instructed to advise the National Insurance Brokers Association in relation to your letter to the Association dated 9 November 2023.

Would you please direct any further communications in relation to the matters raised in your letter to us.

Kind regards

Nick Thomas, Partner
Clayton Utz
[redacted]

Wagih Doueihi, Special Counsel
Clayton Utz
[redacted]

Letter of Insurance Risk Analysis Glanmire Solar Farm

Prepared by: NLT Insurance Brokers Pty Ltd

Prepared by: Nichole Frame
Reviewed by: Levi Thurston

Table of contents

General Disclosure

The information contained in this letter is general in nature and may not be appropriate for your own objectives, financial situation and needs in making recommendations.

You will need to consider the appropriateness of any information or general advice we give you, having regards to your situation, before acting on our advice or buying any product.

The current insurance market

Australia is currently in a hard market, which is an upward swing in the insurance cycle. Currently there is no sign that this market will soften over the next 12 months.

The current hard market has been caused by the increased severity of natural perils & hazards, which has resulted in large loss rations and investment losses across the insurance industry.

In Australia the 2022 natural perils & hazards are the costliest catastrophe on record based on insured losses.

Australia is currently facing high inflation which is putting stress on householders and employers because of labour shortages and rising reinsurance cost, which is being passed onto the consumer.

In Australia many insurers are finding it difficult to source reinsurance across many markets, which is causing supply chain issues. Reinsurers are raising their fees to mitigate any losses due to increased claims and the increased likelihood of natural hazards, which are also being passed onto the consumer.

The result is that premiums in Australia have increased, insurance coverage is constrained, and the capacity for insurance products has reduced in the market.

It is anticipated that across the Australian insurance market premiums will rise by at least 10% across 2023.

The Australian Crop Market

The economic value of agriculture within Australia is estimated at $93 billion. In 2022/2023 the economic value of agriculture to the Bathurst region was $72 million.

The average cropping farmer in Australia between 2021-2022 had a cash income of $380,400. However, some cropping farms earnt as low as $57,000. Therefore, there is high motivation for risk mitigation through farm insurance policies.

The current peril crop insurance market provides insurance coverage against natural perils that affect crop production and yield. Many farmers also mitigate risk using farm broadform liability. Farm broadform liability can be extended to include coverage for any incident that affects an adjoining property in the form of excess layers. Extensions and excess layers on insurance policies incur increased premiums.

There are only a couple of insurers who offer peril crop insurance. When insurance coverage is offered it comes with substantial exclusions and limitations such as being limited to winter

crops such as wheat, barley, oats, triticale, lupin and canola. This does not take into account any additional broadform extensions or excess layers required to protect any adjoining property from an incident that start elsewhere.

Current insurers in the market who may consider insuring crop liability insurances with additional extensions are:

- Allianz
- QBE
- Certain underwriters of Lloyds
- IAG

Of these insurers, it is highly unlikely that they would provide insurance terms to insurer against the increased liability posed by an adjoining solar farm because of the hard market. If terms were provided they would be very expensive and cost prohibitive to the running of any adjoining cropping farms.

Unauthorised foreign insurers

In this instance the likely hood of needing to go to an unauthorised foreign insurer is high, due to the current hard market, to secure the additional farm broadform liability.

The process of getting approval by ASIC, APRA and NIBA to use a foreign insurer is a long, time-consuming and expensive process.

The below is a list of Direct Offshore Foreign Insurers (DOFI) who were approved before *"1 July 2008, applied to APRA for authorisation under subsection 12(1) of the Insurance Act 1973 and paid the relevant application fee"*

As of 2009 the DOFI were:

- Sovereign Insurance Pty Ltd
- Contractors Bonding Limited (has since ceased trading)

It should be noted that, policies bound with an unauthorised foreign insurer does not have the protections of the Insurance Act 1973. Also, APRA cannot guarantee the quality of the insurance services provided by these companies.

In conclusion, this is not a market that should be entered into lightly, due to the lack of oversight, protection, and insight by APRA. This market should not be used as the only risk mitigation tool for adjoining cropping farms that may impact the daily operations of the proposed solar farm in the event a cropping farm had an incident that disrupted the running of the solar farm.

Location of the Risk

Glanmire NSW is located 13.4km from Bathurst. Glanmire comprises of primary production land used for various agricultural enterprises such as cropping, grain, cattle, sheep, the Glanmire Boarding Kennels, Air BnB's and Wedding Venues.

The proposed future solar farm is located at the Corner of the Great Western Highway and Brewongle Lane. Access for the solar farm will be off Brewongle Lane.

The adjoining neighbours are identified as primary producer land with many of the farming activities comprising of cropping activities.

Risk Assessment

Underwriters and reinsurers use risk frameworks and catastrophe profiles in accordance with ISO 31000 standard.

When we look at the risk frameworks for the cropping farm and the impact it may pose to the proposed solar farm at Glanmire the main risks are:

- Climate change
- Fire
- Spray drift
- Environmental contamination

Aside from the high risk that climate change has on cropping farms, due to the increased risk of drought and loss of productivity.

Fire from crop harvesting or climate change is also a high risk that is associated with cropping farms and a risk that is likely to cause a substantial risk to the proposed solar farm. Fire can also start on a cropping farm due to lightning storms, which can set the crops on fire. Natural perils such as storms are on the rise in Australia. Therefore, there is the potential for this risk to increase.

When we look at fire incidents, we need to consider the damage the farm poses to the adjoining solar farm and the long-term contamination this can cause. If the soil and water table becomes contaminated, then the long term effect on the adjoining crop productivity may decline or the farming enterprise may have to cease trading.

Spray drift may interfere with productivity of the solar panels, by reducing how much energy the panels can produce.

Enclosed are Risk Reports for Farming Cash Grains and Renewable Energy Farm, which contain additional risk and catastrophe details.

Risk Mitigation

A solar farm may impact the productivity of any neighbouring cropping farms and vice a versa if alternate risk mitigations other then insurance are not implemented. These risk mitigation measures may be and are not limited to:

- Fire exclusions areas within the solar farm. Eg 30 metre minimum exclusion next to adjoining farmland from the fenceline.

- The Crop Farm also needs an exclusion area as well to the adjoining Solar Farm. This will need to be a minimum of 30 Metres from the fence line.
- Dedicated water tanks with high pressure fire hose attachments and pumps to put out fires
- Additional cleaning and maintenance programs to ensure that spray drift from adjoining copping farms does not cause long term damage to the solar panels
- A clear daily program of maintenance for any Harvesters and other cropping equipment that must include pre and post harvest checks.
    - This will need to be date, time and signed for each check
    - Blowing down of each machine confirming it is clear of all debris and crop dust
    - All fluid levels are checked in all machines and topped up
    - All filters checked and changed if required.
    - That all fire extinguishers are in place on the machines and ready for use.
    - Water Tankers are full and pumps function ready for use.
    - Crop is free from Rocks and debris that could be struck causing fire
    - Harvesting is not done on total fire ban days.
- The use of any contracted or sub-contracted Harvest operators.
- Both the Farm and Solar farm should be engaging a work health and safety consultant to develop comprehensive risk management and mitigation plans.
- Both the Farm and Solar farm should be engaging in maintenance specialists to manage onsite equipment and operational maintenance.

To accurately consider insuring the risk that the cropping farm proposes to the solar farm the following claims have been identified:

- Supply chain interruptions to the electricity supply
- Business interruptions and claims for loss of income
- Loss of assets on the solar farm
- Connection and reestablishment fees
- Environmental and contamination fines

Insurance required

For the properties that neighbour the potential solar farm it would be fair and reasonable for Broadform liability with excess layers to be taken out considering the contingent liability exposure. When the above losses are considered, the neighbouring crop farms would need to insurer against a potential liability of $200 Million, to mitigate risk and future claims.

Indicative premiums

If the neighbouring crop farms were to seek quotes for this insurance the indicative premiums may commence or be in excess of $200,000 plus government charges, underwriting fees and brokers fees. This is dependent on being able to secure formal quotes, which is significantly reduced due to the hard market.

If a formal quote and terms were to be obtained, this insurance would be cost prohibitive to the continued running of any adjoining cropping farm, without considering or taking into account their current outgoings and expenditures.

Conclusions

We would like to draw attention to page 75 of the NGH submission report where the DPE Agricultural commissioners informal response states the following:

"Recommendation 22: Project applicants in the renewal energy sector should cover any additional Public Liability insurance costs incurred by neighbouring landholders as a result of proximity and risk to new energy facilities. In cases where suitable insurance cannot be obtained the applicant should indemnify the neighbour for reasonable risk in relation to typical public liability cover."

With all of the above taken into account, it is our professional opinion that no neighbouring crop farm could easily secure the broadform liability and its excess layers required to protect them from a claim occurring due to a loss sustained on the solar farm due to their farming activities. Additionally, if terms were to be obtained then the premium payable would be unsustainable for the crop farm to pay.

In conclusion we would recommend following the informal remarks stated by the agricultural commissioner that the renewable energy sector should cover these costs or indemnity the neighbouring properties against the reasonable risks of their farming activities relating to Public Liability. We would recommend extending this statement to be broadform liability rather than limited to Public Liability only.

Resources

Enclosed

PDF Risk Report Farming Cash Grains

PDF Risk Report Renewable Energy Farms

FSG - https://www.nltinsurance.com.au/wp-content/uploads/2022/11/FSG-NLT-Insurance-Brokers-Pty-Ltd-V009-8-November-2022.pdf

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https://www.agriculture.gov.au/abares/research-topics/surveys/cropping

Our Team and Support

At NLT Insurance Brokers Pty Ltd we have a team of qualified professional brokers who are dedicated to providing you with a great client experience.
You can contact us via the following and we will endeavour to respond to your within 24 hours.

Main Contact	Levi Thurston Director NLT Insurance Brokers
Phone	02 6331 0227
Email	"levi.thurston@nltinsurance.com.au"
In Person	PO Box 1573 Bathurst NSW 2795

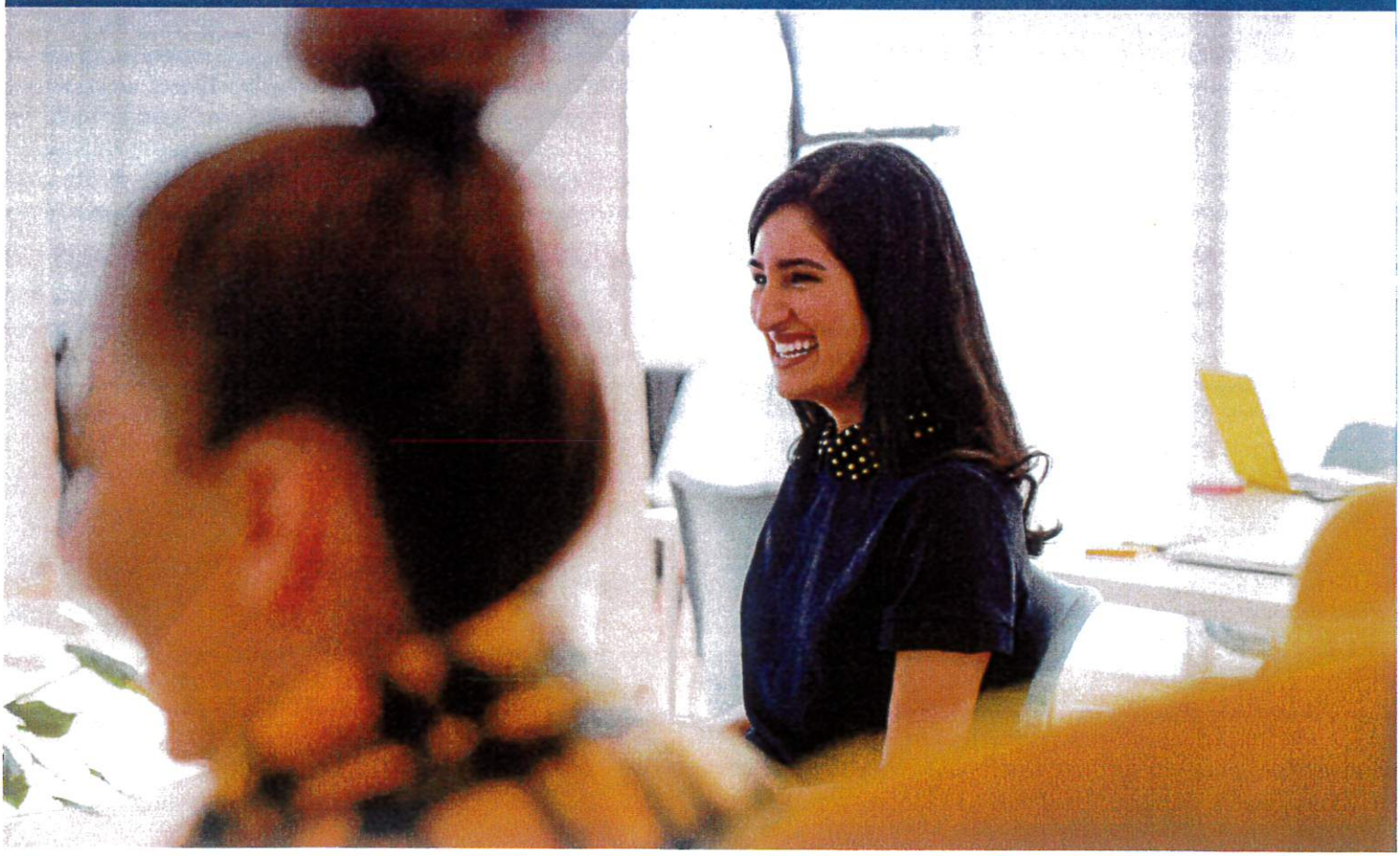
If you need special assistance

We are committed to supporting people with diverse needs and take into account their specific circumstances. This includes people currently experiencing any vulnerability, for example relating to age, disability or mental or physical health conditions. Please advise us if there is anything we can do to provide you the required level of support. For further information, please refer to our Vulnerable Clients Policy.

iProfileRisk

Risk Hazard and Natural Catastrophe Report

Farming - Cash Grains
Glanmire NSW 2795, Australia



25 November 2023

Section 1.0

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Natural Catastrophe Detailed Descriptions

Important Notice

iProfileRisk is provided by Steadfast Risk Group Pty Ltd ABN 24 104 693 183.

This report includes information from you and other sources we believe to be correct. The advice in our report relies on this information.

If any of the information is wrong or incomplete, this may affect our advice. Please tell us immediately of any errors or omissions in this information either from you or to your knowledge from other sources.

iProfileRisk hazard ratings are linked to specific industries. These ratings are our opinion after collaboration with recognised data organisations in the insurance industry.

This report is for you only. We do not accept any duty of care to an insurer or other third party for this report.

Our maximum liability for any errors or omissions in our report is $1 million AUD.

NLT Insurance Brokers Pty Ltd is an Authorised Representative of Community Broker Network Pty Ltd ABN 60 096 916 184 AFSL 233750

Introduction to Steadfast iProfileRisk

Steadfast Risk Group's Framework

Steadfast offers an end-to-end risk framework for brokers and their clients based on the internationally recognised ISO 31000 standard.

Steadfast Risk Group provides a spectrum of in-house services and solutions ranging from enterprise risk management, risk and natural catastrophe hazard identification, property engineering consultation/services and alternative risk transfer.

Framework diagram

What is iProfileRisk?

iProfileRisk is a data driven and online accessible platform aimed at simplifying risk hazard identification and providing natural catastrophe high level summaries for brokers and their clients.

It empowers proactive risk identification and risk centred conversations between brokers and their clients, through enabling data driven risk decisions and mature financial acumen for insurance risk considerations.

Objective of this report

Utilising iProfileRisk in conjunction with other Steadfast Risk Group offerings enables easy identification of the most prominent risks impacting an industry and SwissRe's natural catastrophe summary for a specific location.

Risk Hazard and Natural Catastrophe Summary

Identifying hazards in the workplace involves finding things and situations that could potentially cause harm to the organization. The following chart is a graphical representation or the likelihood and severity of a loss occurring within any of the classes of insurance listed in the chart.

YOUR SEARCH RESULTS

Risk Hazard rating

Natural Catastrophe

- Hailstorms — High (0.6 - 0.8)
- Bushfire/Wildfire — Significant
- Lightning — Significant (7-10)
- Earthquake — Very Low (0.014 - 0.045)
- Landslide — Very Low
- Tornado — Very Low (< 0.1)
- Wind Speed/Cyclone — Low (25-30 m/s)

RISK HAZARD DETAILED DESCRIPTIONS

Workers' Compensation/ Employers' Liability

High risk: 8/10

Risk exposure is typically high due to the nature of raising crops, orchards, farming and handling livestock.

Risk exposure is typically high due to the nature of raising crops, orchards, farming and handling livestock. Farming industries may expose employees to office, technology, and labour-intensive hazards. Potential hazards can include cuts or burns, slipping or tripping over furniture, wet surfaces or equipment, falling over or falling from heights, electrocution, injuries from repetitive movements, back and neck strain, injuries from falling items, or mobile equipment. Employees may face injuries while handling livestock, including trampling, crushing or goring. Employees may become entangled or entrapped. Farmers are at higher risk of respiratory infections and diseases, including chronic lung infections, bronchitis, asthma, and cancers from inhalation and exposure to methane and high volumes of dust particles in grain silos and exposure to pesticides and fungicides. Biohazards may include exposure to pathogens and infectious diseases or reactions to cleaning products. Mental health exposures may include burnout, high stress from job activities, and increased fatigue, particularly during droughts. Employers should make OH&S policies a priority and enforceable, always placing the safety of employees central to business operations. Larger operations may employ young or migrant workers, where their primary language is non-native.

Workers may need to drive company-owned vehicles, carrying exposure in the case of a road accident. These hazards are best managed by appropriate employee training to avoid injuries, guidance in client management when on-premises, and good hygiene and distribution of protective equipment practices. Technology and machines associated with the business must be appropriately set up to avoid further exposures. For industries requiring manual labour, muscular or skeletal issues from excessive strain may arise, incurring rehabilitation costs, particularly if the employee can no longer work due to their injuries. Machinery and equipment may be very hazardous to operate, so clear instructions should be given and strong preventative measures employed to avoid serious injury. Prolonged used of machinery may cause Raynaud's disease or other chronic vibration conditions. Occupational health and safety regulations should be strictly followed at all times to prevent exposures. Hearing protection devices should be distributed when there is a risk of hearing damage or loss due to high noise hazards associated with farming processes. Additionally, correct and regulation approved personal protective equipment is often required in these industries.

Crop Insurance

Medium risk: 6/10

Main exposures for these farms include severe weather, including excessive rain, hail, wind, drought, flooding, or fire.

Main exposures for these farms include severe weather, including excessive rain, hail, wind, drought, flooding, or fire. Natural causes may consist of crop failure due to pests, insects, animals, weeds and other plant infections. Large-scale losses may occur. Due to the size of the operation, crop exposure is assessed as moderate. Employee fidelity could be an exposure managed through careful staff selection procedures. Whilst it would be difficult for theft to occur from employees, inadequate care or destruction of the trees could be an exposure. Preventative measures should be in place to avoid crop losses during the season, such as using pesticides to ensure the quality of tree growth. Keeping water tanks on the property may be beneficial, assisting in cases of fire or drought. Lower crop yield in the season or crop losses could affect the insureds expected sales and reputation. These losses could also see potential clients opting for competitors in the future. As farms tend to have a predominantly seasonal business, losses are only likely to affect one season, reducing the severity of exposures and allowing time for recovery. Crop insurance typically does not cover crops after harvesting but rather when plants are grown or standing in fields.

Inland Marine

Medium risk: 6/10

Inland marine exposure is moderate due to stock, produce and equipment transit shipment risks which may be required for the insured.

Inland marine exposure is moderate due to stock, produce and equipment transit shipment risks which may be required for the insured. Replacement of crops may be covered here. Main exposures include:

- Theft;
- Damage to crops, stock, machinery, or client records;
- Crushing damage and insufficient packaging of supplies;
- Vehicle collisions
- Bailee exposure for crops owned by third parties but raised by the insured

Contaminated crops may cause legal and reputational liabilities, or third party damage may arise due to high impact collisions on busy major roads during transit. Goods may be expensive in time and financial cost to replace. Exposures will be lower for companies that engage in subcontracted delivery practices of crops to market, categorised under contract where the carrier is liable for loading, unloading, imports and exports. In that case, carriers may be responsible for loss or damage to materials, equipment and deliveries. These practices also apply to the transit of other raw materials. Cover may need to include stock transfer between insured premises. Theft of machinery, produce, or stock during transit and non-delivery of high value shipments are of significant risk exposure. Additional exposures include loss of mobile equipment, records and papers that may be of high value. This is particularly critical if confidential and sensitive client information is lost, damaged or stolen during transit. Strong security measures should be installed to deter potential criminals from premises where shipments are handled, including video surveillance and well-trained security. Alarm systems should be considered. The insured should train employees in appropriate handling processes to prevent damage to goods. Vehicles should be stored in secure facilities.

Property

Medium risk: 6/10

Depending on the type of facilities owned and operated by the insured, premises vary in replaceability subject to availability of alternative spaces to conduct business operations.

Depending on the type of facilities owned and operated by the insured, premises vary in replaceability subject to availability of alternative spaces to conduct business operations. For farming industries, alternative premises are easier to locate particularly in rural areas. Additionally, spaces may be large enough that the business can safely conduct operations in a different portion of the property. Farming operations may be affected for one season of business, or interruptions may be prolonged where it is difficult to obtain necessary machinery. Furthermore, loss of reputation may occur during the relocation and setup process. Exposures that lead to property damage include malfunctioning equipment, space heaters, faulty electrical wires, lightning strikes, and smoking hazards. Large volumes of grain may cause debris and dust particle explosions. Fire load includes livestock feed, hay, fences, fuels and chemicals, loss of livestock, crop losses, floor coverings and bedding, equipment, and wooden structures. Damage may incur to displays, furniture, office furnishings, office technological equipment, debris, waste, automated equipment, stock, livestock, crops, and important documents. Premises with kitchen equipment carry further ignition sources, including stoves, microwaves, ovens, grills, etc. Natural weather disasters, particularly bushfires, storms, strong winds and floods may also cause significant property damage.

Automobile Liability

Medium risk: 5/10

The agricultural industry is heavily reliant on vehicles as part of their operations, leading to business interruptions in the case of exposure.

The agricultural industry is heavily reliant on vehicles as part of their operations, leading to business interruptions in the case of exposure. Larger operations that own vehicles for pick-ups and transport of livestock and supplies have increased exposure. Many larger operations in this category may own a van or fleet of vehicles and trucks, carrying significant exposure. Businesses that contract produce carriers or do not haul produce or livestock will have reduced exposure. Vehicles primarily carry heavy farm machinery, supplies, produce, logged wood, poultry, or livestock. Vehicles should be properly assessed to be safe to carry heavy items. Other vehicles may carry precious goods, such as client documents, equipment for operations and stock, which may burden significant losses if not transported appropriately. Vehicles used for transportation of livestock should consider ethics standards.
Vehicles generally used for short-distance transport carry lower risks than those used for long-distance transport of passengers, livestock, produce, services in case of emergency, or equipment. Ongoing and high standard of fleet management and OH&S policies is essential. Long haul vehicles are prone to high accident rates, in addition to the extensive amount of time on the road, the size and radius of operations, driver fatigue and vandalism at the depot. Traffic congestion may reduce service efficiency and increase the risk of crashes and exposure to other hazards. Driving at night increases risk as roads may not be well lit and visibility reduced, hazards may be less visible, and headlights from nearby vehicles may affect driving. Weather conditions such as rain, fog or snow may increase driving difficulty. Drivers should be experienced and qualified, with young drivers avoided. The nature of goods and safe storage and handling of the same are also important considerations. The use of employee vehicles could create indirect liability exposure.

Directors' and Officers' Liability/Management Liability

Medium risk: 5/10

Medium liability.

Medium liability.The insured may have administrators who have a direct influence over the business operations. There is also considerable risk to employee and third party damage or injury, especially in labour intensive or manufacturing related business operations. There may be increase exposure to unforeseen actions or wrongful acts during business operations, especially where there is a lack of clear and well maintained documentation or on-going employee and business management training. Size and scale of business operations, may impact risk exposure and liability. Management should ensure that business operations, practices and culture remain compliant to industry and government regulations.

Environmental Impairment Liability

Medium risk: 5/10

Environmental impairment is a moderate risk for this industry.

Environmental impairment is a moderate risk for this industry. Risk exposures from larger-scale operations could include the excretion of pollutants from livestock, produce, and farm facilities, mismanagement of general waste and associated liabilities. Strong waste and pollutant management processes should be considered to reduce risk potential. Biohazards may also be applicable and must be disposed of appropriately to avoid further liability. Due to runoff, soil may be contaminated on adjacent properties, though this is less likely to occur in larger paddocks, or businesses with larger distances from other owned properties. Nearby water sources may become polluted from operations. Contaminated wastewater and/or polluted water is a significant environmental threat and should be managed accordingly. Surety bonds may be required. Pesticides, fungicides, medicines, and other chemicals may cause environmental liabilities from improper application, storage and handling. Extra care must be taken when cultivating controlled crops. Emissions from vehicles owned by the company should be considered. Environmental laws and guidelines should be followed accordingly to avoid exposure, particularly for industries that often produce large quantities of carbon emissions.

Cyber Insurance

Medium risk: 4/10

Cyber hacks could result in security and privacy breaches.

Cyber hacks could result in security and privacy breaches. There is potential for large volumes of sensitive personal or corporate data to be leaked. This can be prevented by substantial training and compliance protocols for employees, background checks, and strong cyber protection policies and infrastructure. Business interruptions may be significantly increased as a result of cyber attacks, potentially damaging to the insured's reputation.

The risk of cyber threats, hacks and compromise of IT-related breaches are considerable. The nature of work and business operations can be dependent on IT and/or cloud platforms and systems with copious amounts of insured and client-sensitive data.

- Data breach: through electronic devices connected to insured networks. Access to confidential information through human error, lost devices etc.
- External cyber attacks through internal system vulnerabilities/negligence or deliberate acts or external attacks
- Electronic data/software loss/ replacement cost following a cyber attack
- Business interruption/increased in cost of working following a cyber-attack
- Businesses held to ransom before systems are released;
- Cyber-threat from interconnected supply chain business partners/outsourced services providers
- Internal control and other issues – e.g. non-segregation of sensitive data, inadequate user access control/password protection, outdated POS software applications, absence of up to date antivirus software/firewalls, unencrypted data/information/lack of end-to-end encryption
- Possible presence of older devices/computer systems with outdated operating systems and unsupported software
- Inadequate training for employees on data security/privacy/cyber risk. No or inadequate background checks conducted on employees/various service providers/suppliers etc.
- Compliance and control issues - possible lapses on policies, procedures and protocols on cybersecurity and related matters (if applicable)
- Cyber threat relating to - Bring your own devices, download and install personal or unauthorised software, use of USB or other media devices etc.
- Extra expenses following a cyber incident, including forensic investigation costs, crisis management expenses, notification and monitoring expenses, remediation/other extra expenses
- Brand and reputational damage following a cyber-attack/data breach
- Security lapses in company websites – cyber threat to own hardware and software; cyber threat to visitors of the website
- Lack of security measures including a combination of technology (e.g. IT security) and physical security at the premises.

Business Interruption

Low risk: 3/10

Loss of insured's premises, or tools may create a business interruption as they are important to everyday operations.

Loss of insured's premises, or tools may create a business interruption as they are important to everyday operations. Vehicles are generally not covered by property or business interruption insurance, though nonetheless may interfere with operations in the event of a loss. However, exposure is assessed as low due to the unspecialised nature of equipment and location of premises. Equipment can be easily replaced, and alternative premises in the case of relocation are likely to be easily sourced. Furthermore, contractors may not have permanent professional premises, which reduces this interruption. Avoiding loss of records can be managed with solid backup and storage practices. Industries with high levels of competition need to consider retention of reputation through expert service, following a loss.

General Liability: Premises and Operations

Low risk: 3/10

Depending on the size and location of the operation, in most cases, public liability is low risk due to the unlikelihood of large numbers of visitors to the premises.

Depending on the size and location of the operation, in most cases, public liability is low risk due to the unlikelihood of large numbers of visitors to the premises. Exceptions would include training programs, meetings, or seminars, where the average number of visitors and frequency of those events may need to be taken into account. Most businesses in this industry will have a regular clientele which assists in managing the risk.

Crime

Low risk: 2/10

The main source of loss is petty cash, tools or equipment.

The main source of loss is petty cash, tools or equipment. However, for most businesses, invoices will be paid by cheque or direct debit, limiting the cash kept on premises. Employee fidelity could be an exposure managed through careful staff selection procedures.

General Liability: Products - Completed Operations

Low risk: 2/10

Industries in this category are often services based with a tendency for low product liability exposure.

Industries in this category are often services based with a tendency for low product liability exposure. Main exposures relate to third parties and overseas suppliers.

NATURAL CATASTROPHE DETAILED DESCRIPTIONS

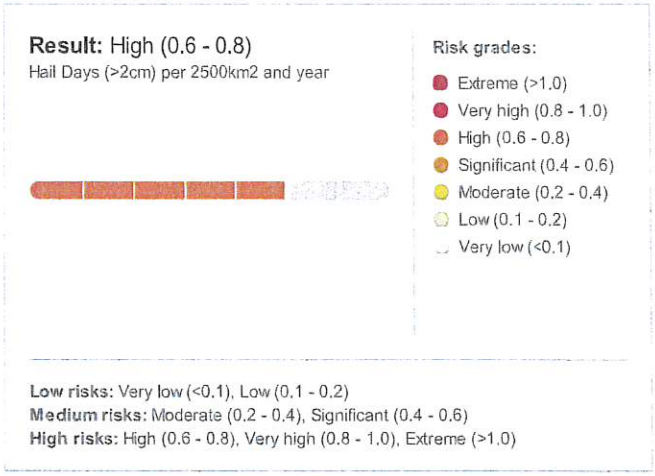
Hailstorm

High risk

The expected number of hail days per year with a hail diameter larger than 2 centimeters related to an area 50km x 50km is shown.

Sources:

Scientific literature about the global and regional climatological distribution of hail frequency and severity; Swiss Re's internal claims and hail model data; reports of severe hail events; expert judgement of Swiss Re's Atmospheric Peril Specialists



Bushfire/Wildfire

Medium risk

The Wildfire Map shows the likelihood for the occurrence of wildfires in a certain area, depending on the intrinsic characteristics of the region. The layer resolution is 300m at the equator. The measure of land susceptibility to fire for this model is based on historic fire frequency per unit area (2001-2019), trend in climate change as a proxy for fire danger levels (2001-2020) and wildland-urban interface (WUI). Burned area and fire danger levels integrate event frequency, while WUI focus on the variable of interest from a damage perspective. Property in the wildland-urban interface (WUI), or regions adjacent to or within undeveloped natural areas, is particularly more susceptible to wildfire hazard given the proximity to vegetative fuels and the adopted set of predisposing factors.

Sources:

- MODIS MCD64CMQ Climate Modeling Grid Burned Area Product (MCD64A1 User's Guide (umd.edu). Accessed from University of Maryland fuoco SFTP (formerly FTP) server.
- Daily Fire Weather Index (FWI) data (https://effis.jrc.ec.europa.eu/about-effis/data-license). Accessed from Copernicus Climate Change Data Store (https://cds.climate.copernicus.eu/cdsapp#!/home).
- ESA-CCI Land cover v2.1.1 Epoch 2019 (https://cds.climate.copernicus.eu/api/v2/terms/static/satellite-land-cover.pdf). Accessed from Copernicus Climate Change Service (Land cover classification gridded maps from 1992 to present derived from satellite observations (copernicus.eu))

Result: Significant

Risk grades:

- Very Extreme
- Extreme
- Very High
- High
- Significant
- Moderate
- Low
- Very Low
- Negligible

Low risks: Negligible, Very Low, Low
Medium risks: Moderate, Significant
High risks: High, Very High, Extreme, Very Extreme

Lightning

Medium risk

The global lightning hazard layer shows the mean annual flash rate per square kilometer.

Sources:

- NASA Earth Science Data and Information System (ESDIS) Project
- Global Hydrology Resource Centre (GHRC)
- Distributed Active Archive Centre (DAAC)

Result: Significant (7-10)

Annual flash rate per km2

Risk grades:

- Extreme (>50)
- Very high (36-50)
- Very high (26-35)
- High (21-25)
- High (16-20)
- Significant (11-15)
- Significant (7-10)
- Moderate (4-6)
- Low (1-3)
- Very low (<1)

Low risks: Very low (<1), Low (1-3)
Medium risks: Moderate (4-6), Significant (7-10), Significant (11-15)
High risks: High (16-20), High (21-25), Very high (26-35), Very high (36-50), Extreme (>50)

Earthquake

Low risk

The earthquake hazard layer is a global map of Peak Ground Acceleration (PGA) in units of g for a return period of 475 years at 1-kilometer spatial resolution for reference site condition. Additional information provided in Modified Mercalli Intensity (MM). The data are provided by the Global Earthquake Model (GEM) Global Seismic Hazard Map (version 2018.1)

Sources:

- Global Earthquake Model (GEM) Global Seismic Hazard Map (version 2018.1)

Result: Very Low (0.014 - 0.045)

MMI & PGA (g)

Risk grades:

- Very extreme (> 0.750)
- Extreme (0.551 - 0.750)
- Very high (0.401 - 0.550)
- High (0.291 - 0.400)
- Significant (0.161 - 0.29)
- Moderate (0.085 - 0.160)
- Low (0.046 - 0.084)
- Very low (0.014 - 0.045)
- Negligible (< 0.014)

Low risks: Negligible (< 0.014), Very low (0.014 - 0.045), Low (0.046 - 0.084)
Medium risks: Moderate (0.085 - 0.160), Significant (0.161 - 0.29)
High risks: High (0.291 - 0.400), Very high (0.401 - 0.550), Extreme (0.551 - 0.750), Very extreme (> 0.750)

Landslide

Low risk

The global landslide layer reflects both the landslide susceptibility and landslide runout risk. As a result, the likelihood of terrain failure, the propagation of risk down slope and deposition areas of possible landslides are depicted in the layer, whereby primarily earthquake-induced landslide processes are considered. In this model, the term 'landslide' refers to mass movement processes including rockfall, debris flow sand mud slides(Varnes1978). While the visualization provides information on the overall landslide risk, the risk lookups enable the user to get details on the underlying susceptibility and runout hazard values. The layer has global coverage (upto +59.9°N) at 1 second of arc of resolution (~30m at the equator).

Sources:

Data Set		Description	Vintage	Source
Global Landslide Inventory	Global Disastrous Landslides	Landslide data collected by NASA	2007 and younger	Nasa Data
	Global Landslide Polygons	Dataset created by Emanuel Büechi	Regularly updated	Dave Petley's Landslide Blog
Local Landslide Inventory	Nepal 2015	Landslides which happened after the Gorkha Earthquake 2015	2015 or Younger	Landslide Blog
	Japan 2016	Landslides which happened after the Kumamoto earthquake 2016	2016 or younger	Landslide Blog
	El Salvador 2001	Landslides that happened after an earthquake in February 2001	2010	Ministerio de Medio Ambiente y Recursos Naturales
	Cordillera Blanca	Peruvian Lanskide inventory of Cordillera Blanca as established by Emmanuel for his Master Thesis	2018	Bueechi et al 2018
	Austria_Hora	Landslide inventory of the Natural Hazard Overview & Risk assessment Austria (HORA)	reguarly updated	HORA
Slope	InterMap 30 m DEM	The Intermap DEM with 30m resolution was used for computation		intermap

Geology	GLiM	Glim: Global Lithology Map, University of Hamburg	2015	GLiM hosted by CGMW
Earthquake Risk	Internal EQ-Layer	Model developed internally	2015	Catnet
Rainfall Risk	Open Weather Map	Relevant since water-content in soil can be a decisive triggering factor		Internal Layer can be found here

Tornado

Low risk

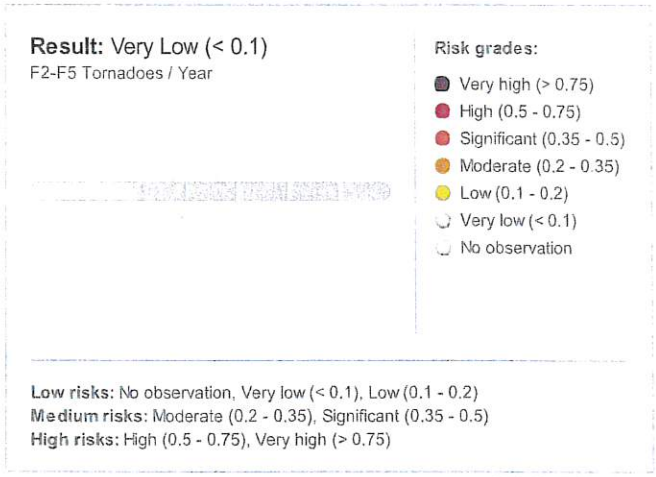
The hazard map consists of three parts with different data granularity:

United States & Canada

Data represents the average yearly tornado occurrence (F2-F5) within a grid cell of 50km x 50km based on 64 observation years and 30 years respectively

Rest of the world

Data for the calculation was derived from numerous scientific documentations, observations and expert knowledge



Sources:

- **USA:** data from NOAA's Storm Prediction Center (SPC), NOAA's National Hurricane Center
- **Canada:** Paper from 'Environment Canada' (David Sills)
- **Rest of the World:** combination of the knowledge of Swiss Re's Atmospheric Perils Specialists, own interpretations of tornado models, recent event observations

Wind Speed/Cyclone

Low risk

The wind speed data shows the 3 seconds peak gust with a return period of 50 years.

Sources:

- Hazard module of Swiss Re's proprietary wind loss models; Global reanalysis dataset
- '20th century reanalysis project' designed by the Physical Sciences Division of the Earth System Laboratory of NOAA

Result: Low (25-30 m/s)

Local 50 Year Peak Gust Speed

Risk grades:

- Extreme (>70 m/s)
- Very high (60-70 m/s)
- High (50-60 m/s)
- Significant (40-50 m/s)
- Moderate (35-40 m/s)
- Moderate (30-35 m/s)
- Low (25-30 m/s)
- Low (20-25 m/s)
- Very low (<20 m/s)

Low risks: Very low (<20 m/s), Low (20-25 m/s), Low (25-30 m/s)
Medium risks: Moderate (30-35 m/s), Moderate (35-40 m/s), Significant (40-50 m/s)
High risks: High (50-60 m/s), Very high (60-70 m/s), Extreme (>70 m/s)

Coastal Flood

No risk data

Swiss Re's Coastal Flood Layer depicts coastal regions that are potentially affected by storm surges or tsunami, defined by the 'distance to the coast' and the 'elevation above mean sea level'.

Sources:

- 90 m resolution SRTM DTED1 digital elevation model;
- SRTM Water Body Data Set

Result:
Coastal Flooding

Risk grades:

- Very High Risk
- High Risk
- Moderate Risk
- Low Risk
- Outside

Low risks: Outside, Low Risk
Medium risks: Moderate Risk
High risks: High Risk, Very High Risk

Pluvial Flood

No risk data

Swiss Re's Global Pluvial Flood Zones provide information about the extent and frequency of flooding due to direct rainfall, minor channel and flash flooding. The zones are available worldwide (from 60°S to 60°N) at the high resolution of 10 meters in USA and Europe and 30 meters for the rest of the world.

Sources:

- Copernicus Climate Change Service (C3S) (2018): *ERA5: Fifth generation of ECMWF atmospheric reanalyses of the global climate*. Copernicus Climate Change Service Climate Data Store (CDS), accessed June 2020, https://cds.climate.copernicus.eu/cdsapp#!/home
- Guidolin, M., Chen, A. S., Ghimire, B., Keedwell, E. C., Djordjevic, S., & Savic, D. A. (2016). A weighted cellular automata 2D inundation model for rapid flood analysis. *Environmental Modelling & Software* 84, 378-394.
- Intermap 10 and 30m digital elevation model.
- NOAA Atlas 14 (2018): *Precipitation-Frequency Atlas of the United States*. NOAA's National Weather Service, accessed June 2020, https://www.nws.noaa.gov/oh/hdsc/index.html
- Ross, C.W., L. Prihodko, J.Y. Anchang, S.S. Kumar, W. Ji, and N.P. Hanan. 2018. Global Hydrologic Soil Groups (HYSOGs250m) for Curve Number-Based Runoff Modeling. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1566
- U.S. Geological Survey. *National Hydrography Dataset*.

Result:
Return Period

Risk grades:
- 50 year
- 100 year
- 200 year
- 500 year
- Outside

Low risks: Outside, 500 year
Medium risks: 200 year, 100 year
High risks: 50 year

River Flood

No risk data

River flood zones are based either on Swiss Re Global Flood Zones™ (based on Swiss Re's proprietary and patented multiple regression approach) or on flood zones that are officially used or developed by the insurance industry (available for Austria, Czech Republic, Hungary, Italy, Luxemburg, Poland, Romania, Slovenia, Slovakia, Switzerland, UK, and USA).

Sources:

- *Swiss Re GFZ:* Swiss Re's patented Geomorph Approach using Intermap's NEXTMap World 30 digital surface model terrain data
- *Official Flood Zones:*
- Swiss Re's patented Geomorph Approach using MMC's 10m terrain data; CZE, SVK BAFU, CHE
- FEMA's NFHL flood zones provided by FEMA; USA
- Global Water Body Data:EC JRC/Google: Jean-Francois Pekel, Andrew Cottam, Noel Gorelick, Alan S. Belward, High-resolution mapping of global surface water and its long-term changes. Nature 540, 418-422 (2016). (doi:10.1038/nature20584)
- UK Environment Agency
- Natural Resources Wales
- Instituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA)
- Administration de la gestion de l'eau - Division de l'hydrologie (AGE), Luxemburg
- National Authority for Water administration - Poland(Wody.gov.pl)
- National Authority for Water Administration - Hungary(OVF)
- The data belongs to the National Administration "Romanian Waters" http://www.rowater.ro/default.aspx - Romania (ROWATER)
- Institute of Water Slovenia - Slovenia (eVode)

Result:
Official River Flood Zones

Risk grades:

- 5 years
- 10 years
- 20 years
- 30 years
- 50 years
- 100 years
- 200 years
- 250 years
- 500 years
- >500 years
- No Data

Low risks: No data, > 500 years, 500 years
Medium risks: 250 years, 200 years, 100 years
High risks: 50 years, 30 years, 20 years, 10 years, 5 years

Storm Surge

No risk data

Swiss Re's Global Storm Surge Zones provide information about the frequency of flooding due to storm surge from the ocean. The zones are available worldwide (from 60°S to 60°N) and cover all the ocean coastlines (except for the Black Sea and the Caspian Sea)

Sources:

- Intermap 30m digital terrain model
- C-GLORS Global Ocean Reanalysis, using E.U. Copernicus Marine Service Information
- Global Water Occurrence Layer (Jean-Francois Pekel, Andrew Cottam, Noel Gorelick, Alan S. Belward,
- High-resolution mapping of global surface water and its long-term changes. Nature 540, 418-422 (2016). (doi:10.1038/nature20584))

Result:
Return period

Risk grades:

- 50 years
- 100 years
- 250 years
- 500 years
- 1000 years
- No data

Low risks: No data, 1000 years, 500 years
Medium risks: 250 years, 100 years
High risks: 50 years

Tsunami

No risk data

Calculated Swiss Re tsunami hazard zones in CatNet® are available for all countries in the pacific basin on a 30 meter resolution, reflecting the Tsunami hazard in a near-global consistent manner.

Sources:

- Swiss Re proprietary models; NCTR Propagation Database by the NOAA Center for Tsunami Research
- Historic earthquake catalogues (NEIC, Centennial); Swiss Re global 30 m resolution digital elevation model and the Global Surface Water dataset (Jean-Francois Pekel, 2016)

Result:
Tsunami return period

Risk grades:
- 500 years
- 1000 years
- 2500 years
- 5000 years
- 10000 years
- No data

Low risks: No data, 10000 years, 5000 years
Medium risks: 2500 years, 1000 years
High risks: 500 years

Volcano

No risk data

The global map shows the volcanic hazard, represented as the local ash thickness around volcanoes (150km) from a major eruption with a return period of 475y.

Sources:

- SR Models Swiss Re proprietary
- Global Volcanism Program, 2013. Volcanoes of the World, v. 4.4.1. Venzke, E (ed.).
- Smithsonian Institution. Downloaded 9th July 2015. (http://volcano.si.edu/)
- Gonzalez-Mellado, A. O., & Cruz-Reyna, S. (2010): A simple semi-empirical approach to model thickness of ash-deposits for different eruption scenarios. Natural Hazards and Earth System Science, 10(11), 2241-2257.
- Jenkins, S., Magill, C., McAneney, J., &Blong, R. (2012): Regional ash fall hazard I: a probabilistic assessment methodology. Bulletin of volcanology, 74(7), 1699-1712.
- Loughlin, S., Sparks, S., Brown, S., Jenkins, S., & Vye-Brown, C. (Eds.). (2015). Global Volcanic Hazards and Risk. Cambridge University Press.
- Mastin, L. G., Guffanti, M., Servranckx, R., Webley, P., Barsotti, S., Dean, K., ... & Waythomas, C. F. (2009): A multidisciplinary effort to assign realistic source parameters to models of volcanic ash-cloud transport and dispersion during eruptions. Journal of Volcanology and Geothermal Research, 186(1), 10-21.
- Mead, S., & Magill, C. (2014): Determining change points in data completeness for the Holocene eruption record. Bulletin of Volcanology, 76(11), 1-14.
- Newhall, C. G., & Self, S. (1982): The volcanic explosivity index/VEI/ - An estimate of explosive magnitude for historical volcanism. Journal of Geophysical Research, 87(C2), 1231-1238.

Result:
Return Period 475y

Risk grades:

- Extreme (> 100cm)
- Very high (50 - 100 cm)
- Very high (40 - 50 cm)
- High (30 - 40 cm)
- High (20 - 30 cm)
- Significant (10 - 20 cm)
- Moderate (5 - 10 cm)
- Moderate (2 - 5 cm)
- Low (1 - 2 cm)
- Low (0.1 - 1 cm)

Low risks: Low (0.1 - 1 cm), Low (1 - 2 cm)
Medium risks: Moderate (2 - 5 cm), Moderate (5 - 10 cm), Significant (10 - 20 cm)
High risks: High (20 - 30 cm), High (30 - 40 cm), Very high (40 - 50 cm), Very high (50 - 100 cm), Extreme (> 100cm)

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Steadfast
RISK GROUP

iProfileRisk

Risk Hazard and Natural Catastrophe Report

Renewable Energy Farms
Glanmire NSW 2795, Australia

25 November 2023

Section 1.0

Introduction to Steadfast iProfileRisk

Steadfast Risk Group's Framework

What is iProfileRisk?

Objective of this report

Section 2.0

Risk Hazard and Natural Catastrophe Summary

Section 2.1

Risk Hazard Detailed Descriptions

Section 2.2

Natural Catastrophe Detailed Descriptions

Important Notice

iProfileRisk is provided by Steadfast Risk Group Pty Ltd ABN 24 104 693 183.

This report includes information from you and other sources we believe to be correct. The advice in our report relies on this information.

If any of the information is wrong or incomplete, this may affect our advice. Please tell us immediately of any errors or omissions in this information either from you or to your knowledge from other sources.

iProfileRisk hazard ratings are linked to specific industries. These ratings are our opinion after collaboration with recognised data organisations in the insurance industry.

This report is for you only. We do not accept any duty of care to an insurer or other third party for this report.

Our maximum liability for any errors or omissions in our report is $1 million AUD.

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Introduction to Steadfast iProfileRisk

Steadfast Risk Group's Framework

Steadfast offers an end-to-end risk framework for brokers and their clients based on the internationally recognised ISO 31000 standard.

Steadfast Risk Group provides a spectrum of in-house services and solutions ranging from enterprise risk management, risk and natural catastrophe hazard identification, property engineering consultation/services and alternative risk transfer.

Framework diagram

What is iProfileRisk?

iProfileRisk is a data driven and online accessible platform aimed at simplifying risk hazard identification and providing natural catastrophe high level summaries for brokers and their clients.

It empowers proactive risk identification and risk centred conversations between brokers and their clients, through enabling data driven risk decisions and mature financial acumen for insurance risk considerations.

Objective of this report

Utilising iProfileRisk in conjunction with other Steadfast Risk Group offerings enables easy identification of the most prominent risks impacting an industry and SwissRe's natural catastrophe summary for a specific location.

Risk Hazard and Natural Catastrophe Summary

Identifying hazards in the workplace involves finding things and situations that could potentially cause harm to the organization. The following chart is a graphical representation or the likelihood and severity of a loss occurring within any of the classes of insurance listed in the chart.

YOUR SEARCH RESULTS

Risk Hazard rating

Natural Catastrophe

- Hailstorms
  High (0.6 - 0.8)
- Bushfire/Wildfire
  Significant
- Lightning
  Significant (7-10)
- Earthquake
  Very Low (0.014 - 0.045)
- Landslide
  Very Low
- Tornado
  Very Low (< 0.1)
- Wind Speed/Cyclone
  Low (25-30 m/s)

RISK HAZARD DETAILED DESCRIPTIONS

Property

High risk: 9/10

Physical premises are typically difficult to replace, as suitable alternative spaces to conduct business operations may be challenging to locate and replicate.

Physical premises are typically difficult to replace, as suitable alternative spaces to conduct business operations may be challenging to locate and replicate. Therefore, exposure is significant. Extensive physical space and infrastructure required to establish renewable energy farms, and often natural landscapes must be changed to suit the bespoke needs of the renewal energy farms. For example, wind turbines must be properly spaced out for efficient and effective energy generation. There is also significant exposure to natural risks, including windstorm, hail and bushfire, depending on location of premises. There may also be high exposure to fire hazard, especially where there is malfunctioning solar equipment. Fire is a common cause of property loss. Reducing fire hazards should be managed by ensuring that equipment does not overheat, that wires and cables are safe and detangled, and that any combustible materials are not kept near ignition sources. No smoking signs should be installed on the premises, with designated areas kept away from equipment and fire hazards. Given that specific and unique space, structural, safety or equipment is required on-premises, it may be financially costly and cause further operational losses. Losses vary according to operations. Furthermore, loss of reputation may occur during the relocation and setup process. Exposures that lead to property damage include malfunctioning equipment, faulty electrical wires and smoking hazards. Valuable equipment and/or items may also be damaged. Any upgrades or maintenance work on renewal energy farms, should follow strict protocol to avoid any unintentional damage to machinery, equipment and infrastructure.

Business Interruption

High risk: 7/10

Loss of insured's premises, equipment or tools creates a business interruption as they are important to everyday operations.

Loss of insured's premises, equipment or tools creates a business interruption as they are important to everyday operations. Renewal energy farms may experience mechanical or electrical equipment breakdown, causing significant operational delays during business hours. Vehicles are generally not covered by property or business interruption insurance, though nonetheless may interfere with operations in the event of a loss. Exposure is assessed as high due to the specialised nature of the equipment used and likely premises location. As operations are 24 hours, 7 days a week, damage is likely to significant financial impacts on the business. Industries in this category can have more specialised equipment and facilities, carrying higher exposures than non-specialised industries, as solar panels, hydro and wind turbines can take time to replace and install, especially if imported equipment or replacements are required. Additionally, the location of alternative facilities are not easily sourced. In some cases, rebuilding may be more practical than complete relocation. Loss of income from machinery breakdown and further loss from replacing machinery may be considerable. Industries with high levels of competition need to consider retention of reputation through expert service, following a loss. For example, businesses may need to consider that clientele may have found other preferences for the same service during the time of rebuilding or relocation. Avoiding loss of records can be managed with solid backup and storage practices. Extra time may be required to rebuild client rapport. The insured should consider strong contingency plans to account for business interruption potential.

Directors' and Officers' Liability/Management Liability

High risk: 7/10

There is significant risk exposure.

There is significant risk exposure. Ensuring the integrity and trust of board members and senior management is crucial, with any personal interests declared and considered when appointing and maintaining their positions. The insured may have administrators that directly influence or control business operations and strategy. Implementing robust risk management frameworks in planning and execution phases of operationalising renewal energy farms is crucial to reduce disruption and delays in planning. There may be increased exposure to claims of alleged wrongful acts, especially as services and business operations conducted may be in industries with higher government or regulatory scrutiny. Management may also be involved in government related contracts, where transparency and ongoing compliance due diligence would be important. It is important for businesses and management to clearly document and train all employees on expected responsibilities on a continual basis, especially in regards to workplace safety, expected workplace culture and legal business conduct. There may be increased risk exposure depending on size and scale of businesses. Some examples of claims may include insider trading claims. Businesses may also interact regularly with shareholders, politicians, consumers, community interest groups etc. Investigations into director, management or employee conduct may result in negative perception and loss of confidence in business integrity and services, leading to reputational damage. Many businesses may also be bound to strict industry, professional body or government regulation standards, whereby tighter and formalised operational management standards may be required.

Inland Marine

High risk: 7/10

Inland marine cargo exposure is high due to transit shipment risks which may be required for the insured.

Inland marine cargo exposure is high due to transit shipment risks which may be required for the insured. Main exposures include:

- Theft;
- Damage to stock or machinery;
- Crushing damage and insufficient packaging of equipment;
- Vehicle collisions

Contaminated or damaged products may cause legal and reputational liabilities, or third party damage may arise due to hazardous spillage during transit. Goods may be expensive in time and financial cost to replace. Exposures will be lower for companies that engage in subcontracted delivery practices of finished products, categorised under a contract where the manufacturer is liable for imports and exports. In that case, manufacturers may be responsible for loss or damage to materials, equipment and deliveries. Cover may need to include stock transfer between premises. Theft of equipment or machinery during transit and non-delivery of high value shipments are of significant risk, and cover for shipping containers is likely to be required. Additional exposures include loss of mobile equipment, records and papers that may be of high value. High-value items may require value estimations. Strong security measures should be installed to deter potential criminals from premises where shipments are handled, including video surveillance and well-trained security. Alarm systems should be considered. The insured should train employees in appropriate handling processes to prevent damage to goods. Vehicles should be stored in secure facilities.

Workers' Compensation/ Employers' Liability

High risk: 7/10

Risk exposure is typically high, though may depend on the size and scale of the business.

Risk exposure is typically high, though may depend on the size and scale of the business. The nature of these industries may expose employees to natural and product hazards. Potential hazards can include cuts or burns, slipping or tripping, wet surfaces or equipment, falling over or falling from heights, electrocution, injuries from repetitive movements, back and neck strain, injuries from falling items. Mental health exposures may include burnout, high stress from job activities, and increased fatigue. For example, workers may be exposed to electrocution, have increased accessibility to malfunctioning solar panels, falling wind turbine parts, and increased exposure to eye and skin irritation. Employers should make occupational health and safety policies a priority and enforceable, always placing the safety of employees central to business operations. This includes personal protective equipment be worn by all employees at all times when on premises.

Workers may need to drive company-owned vehicles, carrying exposure in the case of a road accident. Given that most renewal energy farms are located in remote or regional areas there may be increased risk exposure. These hazards are best managed by appropriate employee training to avoid injuries, guidance in client management when on-premises and distribution of protective equipment practices. Technology and machines associated with the business must be appropriately set up to avoid further exposures. For industries requiring manual labour, muscular or skeletal issues from excessive strain may arise, incurring rehabilitation costs, particularly if the employee can no longer work due to their injuries. Clear instructions and operational guides and procedures should be communicated and strong preventative measures employed to avoid serious injury. Occupational health and safety regulations should be strictly followed at all times to prevent exposures. Hearing protection devices should be distributed when there is a risk of hearing damage or loss due to high noise hazards associated with manufacturing processes, especially in wind and hydro related renewable energy farms. Additionally, correct and regulation approved personal protective equipment is often required in these industries. Automated machinery safety locks, training, supervision and safe work procedures may significantly prevent employee injury.

Environmental Impairment Liability

Medium risk: 6/10

Environmental impairment is a moderate risk for this industry.

Environmental impairment is a moderate risk for this industry. Risk exposures from larger-scale operations could include land degradation due to excessive land clearing, changing the natural landscape of regional or remote areas. Furthermore, there may be risk exposure where natural habitat is impacted negatively, especially if there is impact to natural wildlife that is endangered. Risk exposure may exist during construction, development and operational phases. During the construction phase, careful consideration to procedures should be made to ensure that there is minimal environmental impact. For example from contaminated wastewater and/or polluted water that can cause a significant environmental threat and should be managed accordingly. Environmental laws and guidelines should be followed accordingly to avoid exposure, especially where renewable energy farms are located close to government protected lands.

General Liability: Premises and Operations

Medium risk: 6/10

Depending on the size and location of the operation, in most cases, public liability is moderate.

Depending on the size and location of the operation, in most cases, public liability is moderate. This liability is due to the consistent flow of visitors to the premises in small to medium numbers. Where there were visitors on site, this would be scheduled in advanced, including media, politicians, safety specialists, engineers and technicians etc. There may be higher risk exposure during construction phase of renewal energy farms, where there would be an increased number of contractors on premises. Risks may include slipping and falling hazards, field risks, electrocution, burns etc which should be assessed according to the specific location and business operation.

Automobile Liability

Medium risk: 5/10

Motor exposure in this category varies depending on the size of the operation and its nature.

Motor exposure in this category varies depending on the size of the operation and its nature. Most contractors will be heavily reliant on vehicles as part of their operations given typical remote or regional location, leading to business interruptions in the case of exposure. Many larger operations in this category may own a van or fleet of vehicles, carrying significant exposure. Vehicles may carry heavy items, e.g. equipment, machinery, and specialised wind turbine, solar or hydro parts. The risks associated with them must be considered. There may be increased risk exposure where specialised solar, wind turbine or hydro energy equipment or devices are installed, which may burden significant losses if not transported appropriately. Vehicles generally used for short-distance transport carry lower risks than those used for long-distance transport of passengers, services in case of emergency, or equipment. Ongoing and high standard of fleet management and occupational health and safety policies is essential. Long haul vehicles are prone to high accident rates, in addition to the extensive amount of time on the road, the size and radius of operations, driver fatigue and vandalism at the depot or parking premises. The nature of goods and safe storage and handling of the same are also important considerations. The use of employee vehicles could create indirect liability exposure.

Crime

Medium risk: 5/10

The main source of loss is specialised renewal energy machinery, tools or equipment.

The main source of loss is specialised renewal energy machinery, tools or equipment. Operations with larger premises may not be able to track instances of crime as easily, especially as most renewal energy farms are located in remote, regional or rural areas. There may be potential for vandalism or stolen machinery, however risk exposure can be reduced where physical security infrastructure is present. For example, fences and CCTV. Open-air equipment may be more easily stolen, so storing essential equipment in a secure facility would be beneficial. Machinery and equipment may be expensive and take time to replace, especially where they are imported and require specialised manufacturing. Employee fidelity could be an exposure managed through careful staff selection procedures.

Cyber Insurance

Medium risk: 5/10

Cyber hacks could result in security and privacy breaches.

Cyber hacks could result in security and privacy breaches. There is potential for large volumes of sensitive personal or corporate data to be leaked. This can be prevented by substantial training and compliance protocols for employees, background checks, and strong cyber protection policies and infrastructure. Business interruptions may be significantly increased as a result of cyber attacks, potentially damaging to the insured's reputation.

The risk of cyber threats, hacks and compromise of IT-related breaches are considerable. The nature of work and business operations can be dependent on IT and/or cloud platforms and systems with copious amounts of insured and client-sensitive data.

- Data breach: through electronic devices connected to insured networks. Access to confidential information through human error, lost devices etc.
- External cyber attacks through internal system vulnerabilities/negligence or deliberate acts or external attacks
- Electronic data/software loss/ replacement cost following a cyber attack
- Business interruption/increased in cost of working following a cyber-attack
- Businesses held to ransom before systems are released;
- Cyber-threat from interconnected supply chain business partners/outsourced services providers
- Internal control and other issues – e.g. non-segregation of sensitive data, inadequate user access control/password protection, outdated POS software applications, absence of up to date antivirus software/firewalls, unencrypted data/information/lack of end-to-end encryption
- Possible presence of older devices/computer systems with outdated operating systems and unsupported software
- Inadequate training for employees on data security/privacy/cyber risk. No or inadequate background checks conducted on employees/various service providers/suppliers etc.
- Compliance and control issues - possible lapses on policies, procedures and protocols on cybersecurity and related matters (if applicable)
- Cyber threat relating to - Bring your own devices, download and install personal or unauthorised software, use of USB or other media devices etc.
- Extra expenses following a cyber incident, including forensic investigation costs, crisis management expenses, notification and monitoring expenses, remediation/other extra expenses
- Brand and reputational damage following a cyber-attack/data breach
- Security lapses in company websites – cyber threat to own hardware and software; cyber threat to visitors of the website
- Lack of security measures including a combination of technology (e.g. IT security) and physical security at the premises.

NATURAL CATASTROPHE DETAILED DESCRIPTIONS

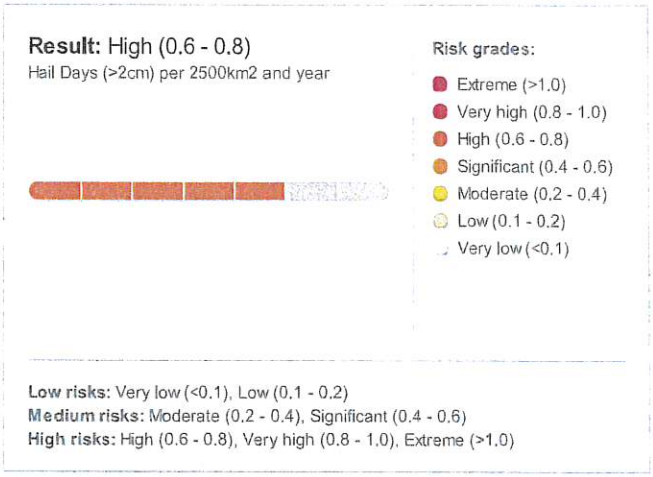
Hailstorm

High risk

The expected number of hail days per year with a hail diameter larger than 2 centimeters related to an area 50km x 50km is shown.

Sources:

Scientific literature about the global and regional climatological distribution of hail frequency and severity; Swiss Re's internal claims and hail model data; reports of severe hail events; expert judgement of Swiss Re's Atmospheric Peril Specialists



Bushfire/Wildfire

Medium risk

The Wildfire Map shows the likelihood for the occurrence of wildfires in a certain area, depending on the intrinsic characteristics of the region. The layer resolution is 300m at the equator. The measure of land susceptibility to fire for this model is based on historic fire frequency per unit area (2001-2019), trend in climate change as a proxy for fire danger levels (2001-2020) and wildland-urban interface (WUI). Burned area and fire danger levels integrate event frequency, while WUI focus on the variable of interest from a damage perspective. Property in the wildland-urban interface (WUI), or regions adjacent to or within undeveloped natural areas, is particularly more susceptible to wildfire hazard given the proximity to vegetative fuels and the adopted set of predisposing factors.

Sources:

- MODIS MCD64CMQ Climate Modeling Grid Burned Area Product (MCD64A1 User's Guide (umd.edu). Accessed from University of Maryland fuoco SFTP (formerly FTP) server.
- Daily Fire Weather Index (FWI) data (https://effis.jrc.ec.europa.eu/about-effis/data-license). Accessed from Copernicus Climate Change Data Store (https://cds.climate.copernicus.eu/cdsapp#!/home).
- ESA-CCI Land cover v2.1.1 Epoch 2019 (https://cds.climate.copernicus.eu/api/v2/terms/static/satellite-land-cover.pdf). Accessed from Copernicus Climate Change Service (Land cover classification gridded maps from 1992 to present derived from satellite observations (copernicus.eu))

Lightning

Medium risk

The global lightning hazard layer shows the mean annual flash rate per square kilometer.

Sources:

- NASA Earth Science Data and Information System (ESDIS) Project
- Global Hydrology Resource Centre (GHRC)
- Distributed Active Archive Centre (DAAC)

Result: Significant (7-10)
Annual flash rate per km2

Risk grades:

- Extreme (>50)
- Very high (36-50)
- Very high (26-35)
- High (21-25)
- High (16-20)
- Significant (11-15)
- Significant (7-10)
- Moderate (4-6)
- Low (1-3)
- Very low (<1)

Low risks: Very low (<1), Low (1-3)
Medium risks: Moderate (4-6), Significant (7-10), Significant (11-15)
High risks: High (16-20), High (21-25), Very high (26-35), Very high (36-50), Extreme (>50)

Earthquake

Low risk

The earthquake hazard layer is a global map of Peak Ground Acceleration (PGA) in units of g for a return period of 475 years at 1-kilometer spatial resolution for reference site condition. Additional information provided in Modified Mercalli Intensity (MM). The data are provided by the Global Earthquake Model (GEM) Global Seismic Hazard Map (version 2018.1)

Sources:

- Global Earthquake Model (GEM) Global Seismic Hazard Map (version 2018.1)

Result: Very Low (0.014 - 0.045)

MMI & PGA (g)

Risk grades:

- Very extreme (> 0.750)
- Extreme (0.551 - 0.750)
- Very high (0.401 - 0.550)
- High (0.291 - 0.400)
- Significant (0.161 - 0.29)
- Moderate (0.085 - 0.160)
- Low (0.046 - 0.084)
- Very low (0.014 - 0.045)
- Negligible (< 0.014)

Low risks: Negligible (< 0.014), Very low (0.014 - 0.045), Low (0.046 - 0.084)
Medium risks: Moderate (0.085 - 0.160), Significant (0.161 - 0.29)
High risks: High (0.291 - 0.400), Very high (0.401 - 0.550), Extreme (0.551 - 0.750), Very extreme (> 0.750)

Landslide

Low risk

The global landslide layer reflects both the landslide susceptibility and landslide runout risk. As a result, the likelihood of terrain failure, the propagation of risk down slope and deposition areas of possible landslides are depicted in the layer, whereby primarily earthquake-induced landslide processes are considered. In this model, the term 'landslide' refers to mass movement processes including rockfall, debris flow sand mud slides(Varnes1978). While the visualization provides information on the overall landslide risk, the risk lookups enable the user to get details on the underlying susceptibility and runout hazard values. The layer has global coverage (upto +59.9°N) at 1 second of arc of resolution (~30m at the equator).

Sources:

Data Set		Description	Vintage	Source
Global Landslide Inventory	Global Disastrous Landslides	Landslide data collected by NASA	2007 and younger	Nasa Data
	Global Landslide Polygons	Dataset created by Emanuel Büechi	Regularly updated	Dave Petley's Landslide Blog
Local Landslide Inventory	Nepal 2015	Landslides which happened after the Gorkha Earthquake 2015	2015 or Younger	Landslide Blog
	Japan 2016	Landslides which happened after the Kumamoto earthquake 2016	2016 or younger	Landslide Blog
	El Salvador 2001	Landslides that happened after an earthquake in February 2001	2010	Ministerio de Medio Ambiente y Recursos Naturales
	Cordillera Blanca	Peruvian Lanskide inventory of Cordillera Blanca as established by Emmanuel for his Master Thesis	2018	Buseche i et al 2018
	Austria_Hora	Landslide inventory of the Natural Hazard Overview & Risk assessment Austria (HORA)	regularly updated	HORA
Slope	InterMap 30 m DEM	The Intermap DEM with 30m resolution was used for computation		intermap

Geology	GLiM	Glim: Global Lithology Map, University of Hamburg	2015	GLiM hosted by CGMW
Earthquake Risk	Internal EQ-Layer	Model developed internally	2015	Catnet
Rainfall Risk	Open Weather Map	Relevant since water-content in soil can be a decisive triggering factor		Internal Layer can be found here

Tornado

Low risk

The hazard map consists of three parts with different data granularity:

United States & Canada

Data represents the average yearly tornado occurrence (F2-F5) within a grid cell of 50km x 50km based on 64 observation years and 30 years respectively

Rest of the world

Data for the calculation was derived from numerous scientific documentations, observations and expert knowledge

Sources:

- **USA:** data from NOAA's Storm Prediction Center (SPC), NOAA's National Hurricane Center
- **Canada:** Paper from 'Environment Canada' (David Sills)
- **Rest of the World:** combination of the knowledge of Swiss Re's Atmospheric Perils Specialists, own interpretations of tornado models, recent event observations

Wind Speed/Cyclone

Low risk

The wind speed data shows the 3 seconds peak gust with a return period of 50 years.

Sources:

- Hazard module of Swiss Re's proprietary wind loss models; Global reanalysis dataset
- '20th century reanalysis project' designed by the Physical Sciences Division of the Earth System Laboratory of NOAA

Result: Low (25-30 m/s)
Local 50 Year Peak Gust Speed

Risk grades:

- Extreme (>70 m/s)
- Very high (60-70 m/s)
- High (50-60 m/s)
- Significant (40-50 m/s)
- Moderate (35-40 m/s)
- Moderate (30-35 m/s)
- Low (25-30 m/s)
- Low (20-25 m/s)
- Very low (<20 m/s)

Low risks: Very low (<20 m/s), Low (20-25 m/s), Low (25-30 m/s)
Medium risks: Moderate (30-35 m/s), Moderate (35-40 m/s), Significant (40-50 m/s)
High risks: High (50-60 m/s), Very high (60-70 m/s), Extreme (>70 m/s)

Coastal Flood

No risk data

Swiss Re's Coastal Flood Layer depicts coastal regions that are potentially affected by storm surges or tsunami, defined by the 'distance to the coast' and the 'elevation above mean sea level'.

Sources:

- 90 m resolution SRTM DTED1 digital elevation model;
- SRTM Water Body Data Set

Result:
Coastal Flooding

Risk grades:

- Very High Risk
- High Risk
- Moderate Risk
- Low Risk
- Outside

Low risks: Outside, Low Risk
Medium risks: Moderate Risk
High risks: High Risk, Very High Risk

Pluvial Flood

No risk data

Swiss Re's Global Pluvial Flood Zones provide information about the extent and frequency of flooding due to direct rainfall, minor channel and flash flooding. The zones are available worldwide (from 60°S to 60°N) at the high resolution of 10 meters in USA and Europe and 30 meters for the rest of the world.

Sources:

- Copernicus Climate Change Service (C3S) (2018): *ERA5: Fifth generation of ECMWF atmospheric reanalyses of the global climate.* Copernicus Climate Change Service Climate Data Store (CDS), accessed June 2020, https://cds.climate.copernicus.eu/cdsapp#!/home
- Guidolin, M., Chen, A. S., Ghimire, B., Keedwell, E. C., Djordjevic, S., & Savic, D. A. (2016). A weighted cellular automata 2D inundation model for rapid flood analysis. *Environmental Modelling & Software* 84, 378-394.
- Intermap 10 and 30m digital elevation model.
- NOAA Atlas 14 (2018): *Precipitation-Frequency Atlas of the United States.* NOAA's National Weather Service, accessed June 2020, https://www.nws.noaa.gov/oh/hdsc/index.html
- Ross, C.W., L. Prihodko, J.Y. Anchang, S.S. Kumar, W. Ji, and N.P. Hanan. 2018. Global Hydrologic Soil Groups (HYSOGs250m) for Curve Number-Based Runoff Modeling. ORNL DAAC, Oak Ridge, Tennessee, USA. https://doi.org/10.3334/ORNLDAAC/1566
- U.S. Geological Survey. *National Hydrography Dataset.*

Result:
Return Period

Risk grades:
- 50 year
- 100 year
- 200 year
- 500 year
- Outside

Low risks: Outside, 500 year
Medium risks: 200 year, 100 year
High risks: 50 year

River Flood

No risk data

River flood zones are based either on Swiss Re Global Flood Zones™ (based on Swiss Re's proprietary and patented multiple regression approach) or on flood zones that are officially used or developed by the insurance industry (available for Austria, Czech Republic, Hungary, Italy, Luxemburg, Poland, Romania, Slovenia, Slovakia, Switzerland, UK, and USA).

Sources:

- *Swiss Re GFZ:* Swiss Re's patented Geomorph Approach using Intermap's NEXTMap World 30 digital surface model terrain data
- *Official Flood Zones:*
- Swiss Re's patented Geomorph Approach using MMC's 10m terrain data; CZE, SVK BAFU, CHE
- FEMA's NFHL flood zones provided by FEMA; USA
- Global Water Body Data:EC JRC/Google: Jean-Francois Pekel, Andrew Cottam, Noel Gorelick, Alan S. Belward, High-resolution mapping of global surface water and its long-term changes. Nature 540, 418-422 (2016). (doi:10.1038/nature20584)
- UK Environment Agency
- Natural Resources Wales
- Instituto Superiore per la Protezione e la Ricerca Ambientale (ISPRA)
- Administration de la gestion de l'eau - Division de l'hydrologie (AGE), Luxemburg
- National Authority for Water administration - Poland(Wody.gov.pl)
- National Authority for Water Administration - Hungary(OVF)
- The data belongs to the National Administration "Romanian Waters" http://www.rowater.ro/default.aspx - Romania (ROWATER)
- Institute of Water Slovenia - Slovenia (eVode)

Result:
Official River Flood Zones

Risk grades:
- 5 years
- 10 years
- 20 years
- 30 years
- 50 years
- 100 years
- 200 years
- 250 years
- 500 years
- >500 years
- No Data

Low risks: No data, > 500 years, 500 years
Medium risks: 250 years, 200 years, 100 years
High risks: 50 years, 30 years, 20 years, 10 years, 5 years

Storm Surge

No risk data

Swiss Re's Global Storm Surge Zones provide information about the frequency of flooding due to storm surge from the ocean. The zones are available worldwide (from 60°S to 60°N) and cover all the ocean coastlines (except for the Black Sea and the Caspian Sea)

Sources:

- Intermap 30m digital terrain model
- C-GLORS Global Ocean Reanalysis, using E.U. Copernicus Marine Service Information
- Global Water Occurrence Layer (Jean-Francois Pekel, Andrew Cottam, Noel Gorelick, Alan S. Belward,
- High-resolution mapping of global surface water and its long-term changes. Nature 540, 418-422 (2016). (doi:10.1038/nature20584))

Result:
Return period

Risk grades:

- 50 years
- 100 years
- 250 years
- 500 years
- 1000 years
- No data

Low risks: No data, 1000 years, 500 years
Medium risks: 250 years, 100 years
High risks: 50 years

Tsunami

No risk data

Calculated Swiss Re tsunami hazard zones in CatNet® are available for all countries in the pacific basin on a 30 meter resolution, reflecting the Tsunami hazard in a near-global consistent manner.

Sources:

- Swiss Re proprietary models; NCTR Propagation Database by the NOAA Center for Tsunami Research
- Historic earthquake catalogues (NEIC, Centennial); Swiss Re global 30 m resolution digital elevation model and the Global Surface Water dataset (Jean-Francois Pekel, 2016)

Result:
Tsunami return period

Risk grades:

- 500 years
- 1000 years
- 2500 years
- 5000 years
- 10000 years
- No data

Low risks: No data, 10000 years, 5000 years
Medium risks: 2500 years, 1000 years
High risks: 500 years

Volcano

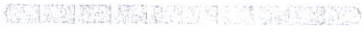
No risk data

The global map shows the volcanic hazard, represented as the local ash thickness around volcanoes (150km) from a major eruption with a return period of 475y.

Sources:

- SR Models Swiss Re proprietary
- Global Volcanism Program, 2013. Volcanoes of the World, v. 4.4.1. Venzke, E (ed.).
- Smithsonian Institution. Downloaded 9th July 2015. (http://volcano.si.edu/)
- Gonzalez-Mellado, A. O., & Cruz-Reyna, S. (2010): A simple semi-empirical approach to model thickness of ash-deposits for different eruption scenarios. Natural Hazards and Earth System Science, 10(11), 2241-2257.
- Jenkins, S., Magill, C., McAneney, J., &Blong, R. (2012): Regional ash fall hazard I: a probabilistic assessment methodology. Bulletin of volcanology, 74(7), 1699-1712.
- Loughlin, S., Sparks, S., Brown, S., Jenkins, S., & Vye-Brown, C. (Eds.). (2015). Global Volcanic Hazards and Risk. Cambridge University Press.
- Mastin, L. G., Guffanti, M., Servranckx, R., Webley, P., Barsotti, S., Dean, K., ... & Waythomas, C. F. (2009): A multidisciplinary effort to assign realistic source parameters to models of volcanic ash-cloud transport and dispersion during eruptions. Journal of Volcanology and Geothermal Research, 186(1), 10-21.
- Mead, S., & Magill, C. (2014): Determining change points in data completeness for the Holocene eruption record. Bulletin of Volcanology, 76(11), 1-14.
- Newhall, C. G., & Self, S. (1982): The volcanic explosivity index/VEI/ - An estimate of explosive magnitude for historical volcanism. Journal of Geophysical Research, 87(C2), 1231-1238.

Result:
Return Period 475y



Risk grades:

- Extreme (> 100cm)
- Very high (50 - 100 cm)
- Very high (40 - 50 cm)
- High (30 - 40 cm)
- High (20 - 30 cm)
- Significant (10 - 20 cm)
- Moderate (5 - 10 cm)
- Moderate (2 - 5 cm)
- Low (1 - 2 cm)
- Low (0.1 - 1 cm)

Low risks: Low (0.1 - 1 cm), Low (1 - 2 cm)
Medium risks: Moderate (2 - 5 cm), Moderate (5 - 10 cm), Significant (10 - 20 cm)
High risks: High (20 - 30 cm), High (30 - 40 cm), Very high (40 - 50 cm), Very high (50 - 100 cm), Extreme (> 100cm)

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Steadfast
RISK GROUP

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23 May 2022

NSW Department of Planning

Dear Mr Quinlivan

Re: Elgin Energy – Solar Proposal at 4823 Great Western Highway, Glanmire Glanmire Action Group

I am writing to complain about:

1. The NSW Department of Planning process; and

2. The conduct of Elgin Energy and the application of the Department's process to Elgin Energy as it appears to be.

Introduction

I reside at 457 Brewongle Lane, Glanmire. I was in practice at the Bar of New South Wales until about 2021. I was in practice for about 50 years, and in the capacity of Senior Counsel for much of that time. I have owned my rural property since 1979.

In my practice I was of course well familiar with our legal "adversarial" system of justice. Given its shortcomings, "mediation" began and has developed in popularity over the past 20-30 years.

Essential to both systems is a well trained Judge or Mediator and the insistence upon integrity and fairness. Lack of integrity can be exposed by questioning overseen by a relevantly trained person.

Turning to the New South Wales planning system, it either calls for or assumes integrity and frankness of, the Solar Proponent, firstly in its dealings with, the impacted community, and then in its reporting to your NSW Department of Planning.

This is, on my observations, a most serious shortcoming particularly having regard to the community who lack the skills that a proponent either has or invests in. The Solar Proponent lacks integrity and frankness and so the process has failed.

I am a member of the "Glanmire Action Group". Our group was formed to oppose the solar plant proposed by Elgin Energy at 4823 Great Western Highway, Glanmire 2975.

I am reasonably familiar with your process, as are many of our Group members. We had been between 2017-2020 involved in opposing a solar proposal by Photon Pty Limited at nearby Brewongle.

In summary, my complaints are multiple but have a clear underlying and common cause – a Planning Authority that appears to be heavily reliant upon a Proponent acting with integrity, BUT in this instance the Proponent falls well short of the Planning Authority's expectations.

1. Meetings with Elgin Energy

   Elgin introduced itself by relying upon its C.V. We sought to ascertain the accuracy of its C.V. but got no answers. We needed, and still need to know the responsible entity in Australia. Just as we are legally accountable for our statements/misstatements so too the entity with whom we are dealing ought to be so liable. We need to know its details and the relevance of the C.V. it described.

   At subsequent meetings and indeed at the CCC it has failed to identify itself or explain the C.V. on which it relies.

   The CCC chairman protected it. He seemed to think the questions were directed to Elgin's financial capacity to construct the plant. They were not and if he had asked he would have been so advised.

   I can confidently report that not one question asked by any member of our Group has received a straight answer from Elgin.

   Of course major issues such as insurance in respect of which we have, consistent with our frankness, provided Elgin with a broker's report have gone unanswered. Any suggestion that it has answered issues we have raised is simply untrue.

2. The Scoping Report

   Before this proposal advanced very far our State Member, the Honourable Paul Toole MP, a man with a farming background and well conscious of the need to preserve good land including cultivation land thoughtfully brought our attention to three matters. He advised that since the Brewongle proposal there had been reforms and so:

   (a) We now have REZs;

   (b) Councils have more say at an earlier point in time;

   (c) Your Authority could indicate "a lame duck" at an earlier point in time.

While I appreciated our MPs assistance he was correct as to (a) but incorrect as to (b) and (c). I appreciated and respected your Authority's advice in this regard.

The Scoping Report, I thought, might support the Minister's propositions (b) and (c) however as events unfolded the Scoping Report was nothing but a "box ticking" exercise. No sooner was it lodged with the Authority than approval was given to Elgin to move to the next stage.

Our letter to your Authority reporting deficiencies in the Scoping Report was, expressly dismissed by the Authority as being of no importance to the Authority at that stage.

The proponent was required to report upon the results of meetings with community and our State member. I have no doubt however that the results were withheld from the Authority, and the Authority was so advised

At a stage your Authority telephoned me and courteously asked for my agreement for it to give to the proponent a copy of my letter (with all expert's reports some of which had already been given to the proponent) for the proponent's response. I agreed but asked that I be given a copy of the proponent's response for my reply. Your Authority agreed to that course.

The fact is however that the Authority did not contact me again. The CCC at a much later stage agreed to follow up the Authority's agreement but again nothing has occurred.

Other distortions of the truth expressed in the so-called Scoping Report were set out in my letter to the Authority. The "site truthing" is a fine example of distortion.

Further the proponent had our agronomist's report provided to it consistent with our goodwill, it arranged soil tests of its own. It failed to invite our agronomist to be present when soil tests were taken, so for example, experts could agree upon sample locations etc and thereafter it had a report done that suggested that 100 years plus of cultivation was misguided, farmers, agents, Department of Agriculture etc. were all misguided and in fact the land was not really Class 2 or 3 but rather it was Class 4 and 5.

What a farce. A report not shared but included in its Scoping Report and the proponent allowed to continue while the at the same time the Authority mouths concerns about community members and their health and wellbeing!

3. One-On-One Meetings

I am advised the Authority still encourages one-on-one meetings.

The track record of this proponent demonstrates that such meetings will not work with it.

Hearsay tells me that this proponent has reported to our State Member at least that community meetings and the CCC have been great successes. If the hearsay is correct then such reports are simply untrue.

One-on-one meetings did not work with the proponent at Brewongle. They were stopped within our New South Wales Police Force many, many years ago and ought not be allowed/encouraged by your Authority. The reasons are multiple and obvious.

Our orderly and disciplined community, with Photon, engaged in a fairly public meeting which indeed appeared to be determinative of Photon's proposal. It never returned.

Our proposed community meeting with Elgin has not been accepted by it. It should be a requirement. Of course if an MC (qualified) is called for we, for our part, would welcome such a person.

4. The Authority's 10 km and 5 km principles

I welcomed the particular recognition of the need to protect such distances from proposals for solar plants but again there is an assumption that a proponent will put to one side its quest for profit and assess the merits of proceeding and the huge detrimental impact upon the community in particular community's health and wellbeing in pursuing a spurious proposal.

Such an assumption is I suggest naïve. Nothing short of a prohibition will stop this proponent.

The legislation should have prohibited such applications but with for example provision to grant a proponent leave to proceed in certain circumstances.

Again hearsay tells me that this proponent hopes to "get around" the five kilometre principle.

5. Our Group many months ago asked Elgin in wring to agree to an open meeting. Elgin reported it would consider it. We in fact have received no further reply or response. A few days ago however Elgin's agent advised that Elgin believed it had already engaged enough. Elgin apparently relied upon two engagements:

(a) The CCC; and

(b) The community meeting held at Bathurst on 18 May.

(a) I will now deal with the CCC:

Some months ago our Group received notice and an invitation to join the CCC. I agreed to represent the Glanmire Action Group but first telephoned Mr David Ross the proposed chairman to explain I would not accept the responsibility of accounting to the community unless the Group was entitled to attend to listen. He reassured me.

At the first meeting certain matters became clear.

i. Mr David Ross was a most pleasant person with no apparent relevant training;

ii. Present were the Proponents, the Group represented by me, two or three other interested persons, and three or four Climate Change and Green persons;

iii. There would be, according to Mr Ross, two or three meetings because Elgin had to meet some planning target time;

iv. Elgin had the floor. Any questions of any significance were ruled out of order;

v. We were asked to record "our main concern", a request I considered was contemptuous of those including myself with multiple "main concerns";

vi. There was an absolute disinterest for our concerns.

Thereafter I was informed the community nor any member of the public was to be allowed to attend.

The procedure was clearly and unambiguously a "box ticking" exercise and loaded in favour of the proponent and I refused to be a party to it. I therefore resigned.

Shortly thereafter another interested person, Christine Curry, resigned and I think the next week another interested person, Ewin Chandler, resigned followed then by Polly Bonanno. In the end result the proponent, a couple of greens and a climate change person, a representative from the Council and one other person was in attendance. All of those who resigned are most responsible and concerned residents but they all considered themselves as simply being used. That was clearly the fact.

We all want to be heard but by a responsible, properly qualified, and impartial body or reporter.

I have since learned via the CCC that the Department has produced a discussion paper – March 2022 and I read, with interest that other people who have attended such CCCs have had adverse experiences.

The CCC ought to be stopped until it is rectified and operates properly and fairly.

No person with integrity could conclude the CCC was a good community consultation.

(b) At the 18 May meeting I attended Bathurst along with about 20 Glanmire Action Group members.

As per the invitation I commenced to ask the proponent questions but he declined to answer or answer straight any of the questions put to him. At a stage a stranger spectator asked the proponent could he tape the conversation. The Proponent mumbled something and left the room and did not /would not return. The proponent's consultant agreed to report that the proponent "aborted" the meeting. Not one question was answered by the proponent.

At a stage the proponent's consultant advised that she had telephoned a number of people within the three kilometre radius of the site and a number were in favour of Elgin's proposal. She thought she contacted ten or more and thought the split was about 60%/40%, but was not sure which way.

She contacted these people, relying in whole or in part, upon a petition that we had supplied to her that had been signed by many hundreds of objectors, and all but 2 within the 3 km radius

We appreciated her, the Consultant's, frankness even though it was quite contrary to the informed signed petition that we had supplied to her.

We are currently checking further.

6. Finally but by no means exhaustively of my complaints I note that Elgin appears to have an inordinate amount of time to prepare its EIS and we on the other hand have been allocated 28 days to reply to its EIS. This timeframe is, I suggest, indicative of the Department's attitude towards opponents. Of course the 28 days is fixed in a setting in which we will not have been provided with any relevant information before the EIS is prepared and lodged.

Conclusion:

1. The common theme seems to me to be your Authority's <u>expectation that a proponent will act fairly and with integrity</u> towards community members and indeed all with whom it engages and then will report honestly to you.

   In this instance the system is not working.

2. The subject proposal ought to be halted at this time and <u>proper community engagement ought be required</u> by, for example:

   (a) <u>Rectifying the CCC</u> by implementing measures to deal with the issues raised by the Department itself in the March 2022 discussion paper and by me in my letter to the Glanmire CCC chairman, a copy of which he said he was sending to the Department of Planning.

(b) Requiring community engagement in a manner the community feels comfortable with.

In this instance a public forum presided over by a mutually agreed MC and to proceed as per a mutually agreed procedure. Our Group is happy to host the event.

(c) The (b) event to be recorded and a certified copy to be provided to the Department.

3. Clear directives for an early exchange of information including:

(a) Number of supporters and particulars as per any petition.

Number of opponents and particulars as per any petition.

(b) Expert's reports, upon receipt of same

(c) Provision for joint expert's reports in certain instances

(d) All information upon which it is intended to rely should be exchanged in a timely manner.

Excellent precedents that could be utilised by the Planning Authority in drawing up such directives may be found in the NSW Supreme Court Practice Rules.

4. How can it possibly be that a properly briefed and instructed agronomist classify land that annually looks like photographs 1 and 2 to be in the class of land that looks like photographs 3 and 4?

This is what we residents have to put up with.

Such a clearly wrong assumption of integrity on an issue that determines whether this proposal ought proceed at all, brings, I suggest, the Department and the system into disrepute.

There ought to be a view of this site, a view will confirm this land is indeed Class 2 and 3.

This Proponent imposition ought, then, be stopped.

Yours faithfully

Peter Hennessy

PS I will forward the photographs and the results of the further Petition, within the next few days.