

# Agricultural Assessment Report

## Tharbogang Solar farm

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### Executive Summary

This Agricultural Assessment Report examines the impact of the installation of a proposed solar farm on the eastern side of Berecra Road, Tharbogang.

The site is part of an irrigated property, allotment 206 DP 756035, and covers approximately 20ha of the allotment. The site has previously been used for irrigated cropping (wheat) and rice. As a result of its long term irrigated cropping history, the site would be expected to have high fertility levels compared with its original undeveloped state. The soils have poor infiltration rates which makes them suitable for rice production but can impact on winter cereal production in wet years.

There is no BSAL overlay on the soils.

The loss of production from the site during its planned 30 year life is negligible in terms of regional and state crop production.

The proposed solar farm at this site would have no long term detrimental effect on the productive capacity of the soil, nor would it have a significant impact on the overall productivity of the region or state, nor impact on the ability of neighbouring businesses to operate.

### Background

An agricultural assessment of the site for a 5MW solar farm at Tharbogang has been requested by ACEnergy Pty Ltd.

The NSW Large-Scale Solar Energy Guideline<sup>1</sup> recommends that large-scale solar energy development applicants consider the location and nature of important agricultural lands, including Biophysical Strategic Agricultural Land (BSAL), irrigated cropping land and land capability classes 1, 2 and 3 in the site selection and design process. The guideline also recommends that consideration be given to any significant fragmentation or displacement of agricultural industries and any cumulative impacts of multiple developments.

The preparation of the report has been informed by the planning requirements of the Griffith Shire Planning Scheme and considering the State's Biophysical Strategic Agricultural Land (BSAL) overlay. The site falls within the Rural Zone (RU1).

The requirements for this zone outlined in the Griffith planning scheme are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.

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<sup>1</sup> <https://www.energy.nsw.gov.au/nsw-plans-and-progress/major-state-projects/shift-renewables/solar-energy>  
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- 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.

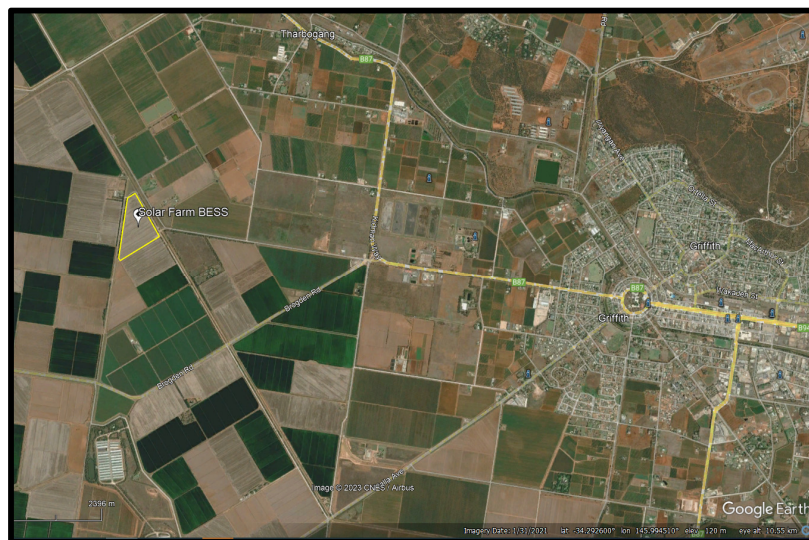
Griffith Council is considering an amendment to their Local Environment Plan regarding the impact of “electrical generating works including solar farms could have on prime agricultural land”<sup>2</sup>.

As such, the report also considers aspects including:

- the impact on the loss of the site if it has high quality soils, particularly soils that are niche to a type of crop or other agricultural activity
- the potential loss of reliable, accessible water (such as irrigated areas) and its impact at a local or regional scale.
- the impact of fragmentation and a change of land use to non-agriculture activity on local and regional productivity and output.
- the impact of a change of land use on recent and/or current efforts to modernise and reform agricultural activity in the area.
- whether the land has specifically been set aside or defined for agricultural use and development in a planning scheme or other strategic document.
- whether the change in land use is to the detriment of a government’s previous or existing investment and support for the site or the area.
- whether the proposed solar energy facility can co-locate with other agricultural activity, to help diversify farm income without reducing productivity.

In preparing this report I have examined relevant information sources which are referenced as footnotes and interviewed the owner of the land.

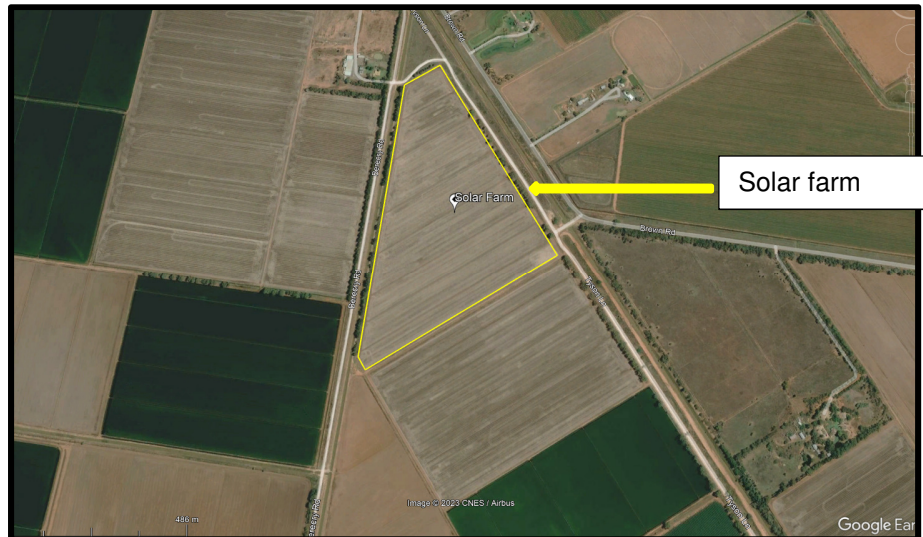
The proposed site (shown in [Figure 1](#)) is located approximately 6.5 km west of the Griffith town centre, between Tyson Lane, on the eastern boundary, and Berecra Road on the western boundary.



**Figure 1 Location of the Tharbogang solar farm.**

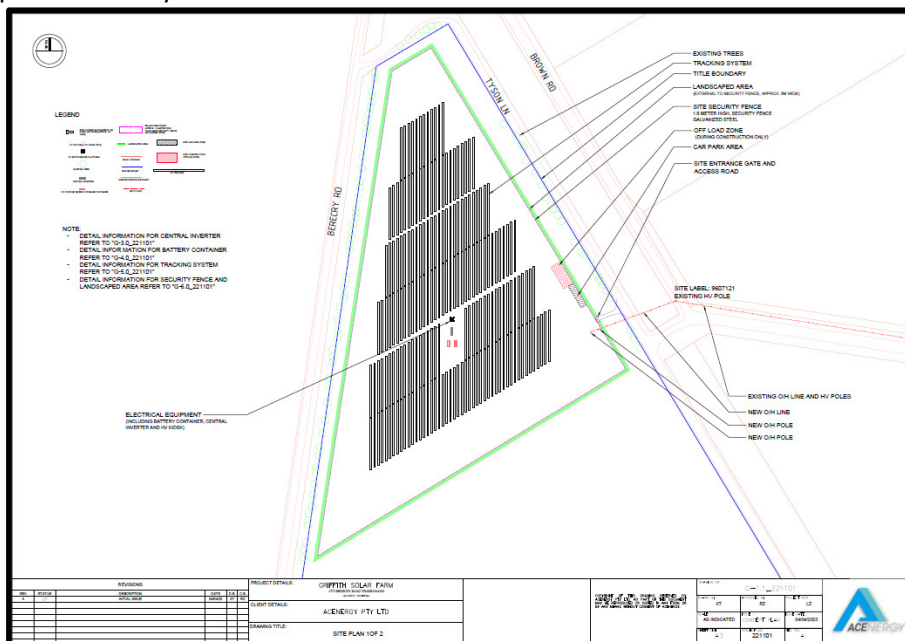
The location of the solar farm site is shown in more detail in [Figure 2](#).

<sup>2</sup> Griffith Local Strategic Planning Statement, Sept 2020



**Figure 2 Paddock location of the Tharbogang solar farm.**

Figure 3 shows the indicative layout of the solar farm. It will contain approximately 11,000 solar panels and operate for 30 years.



**Figure 3. Site plan for the solar farm**

The area occupied by the by the solar farm will be approximately 20ha.

## Regional and State Planning Considerations

At a regional level, land with high quality soil and water resources capable of sustaining high levels of productivity has been identified as Biophysical Strategic Agricultural Land (BSAL).

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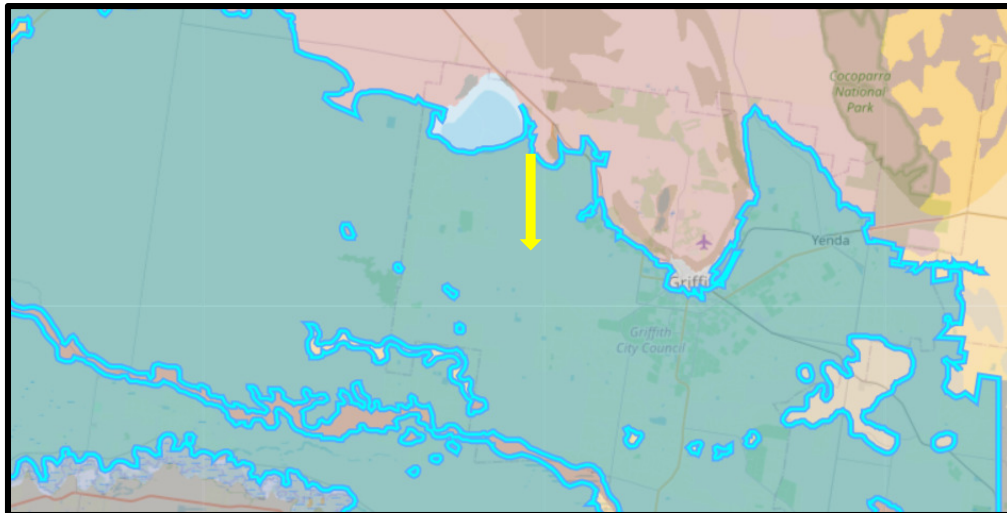
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These lands intrinsically have the best quality landforms, soil and water resources which are naturally capable of sustaining high levels of productivity and require minimal management practices to maintain this high quality. The site is not designated as having BSAL.<sup>3</sup>

## Site Characteristics

The site is flat.

The soil associations for the Griffith area are shown in Figure 4.<sup>4</sup>



**Figure 4. Soils of the Griffith area. (Solar farm site arrowed)**

The soils at the site are derived recent sediments and are classified as vertosols. Vertosols are deep clay soils with shrink-swell properties that exhibit strong cracking when dry. The depth of clay is important to reduce infiltration when sown to rice and reduce the amount of irrigation water required. The poor draining characteristics of the soil however, can create waterlogging issues for winter crops.

The land cap ability of the site is shown in Figure 5. The landscape at this site has a capability rating of “3”<sup>5</sup>.

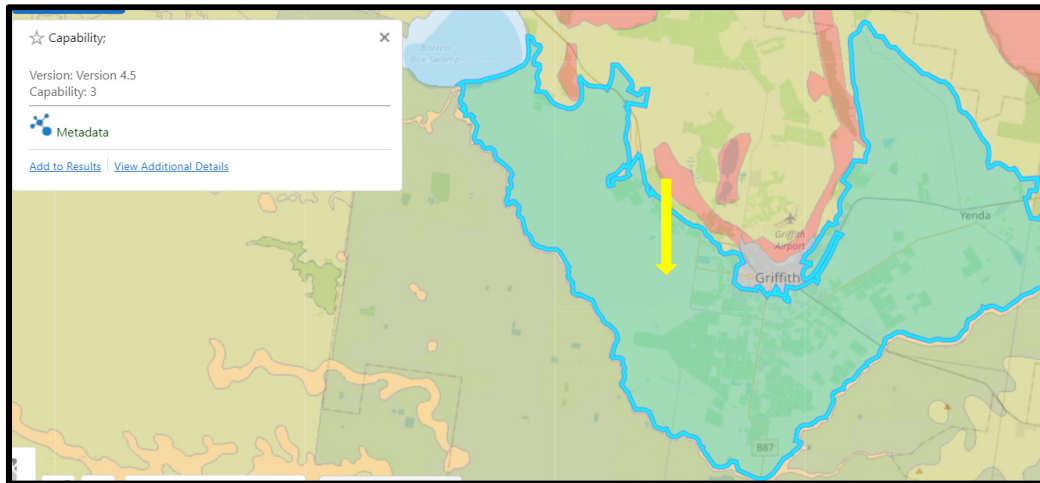
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<sup>3</sup>[https://geo.seed.nsw.gov.au/Public\\_View/index.html?viewer=Public\\_View&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED\\_Catalog.79.SALBiophysical](https://geo.seed.nsw.gov.au/Public_View/index.html?viewer=Public_View&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED_Catalog.79.SALBiophysical)

<sup>4</sup> [https://geo.seed.nsw.gov.au/Public\\_View/index.html?viewer=Public\\_View&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED\\_Catalog.107](https://geo.seed.nsw.gov.au/Public_View/index.html?viewer=Public_View&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED_Catalog.107)

<sup>5</sup> [https://geo.seed.nsw.gov.au/Public\\_View/index.html?viewer=Public\\_View&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED\\_Catalog.111](https://geo.seed.nsw.gov.au/Public_View/index.html?viewer=Public_View&locale=en-AU&runWorkflow=AppendLayerCatalog&CatalogLayer=SEED_Catalog.111)





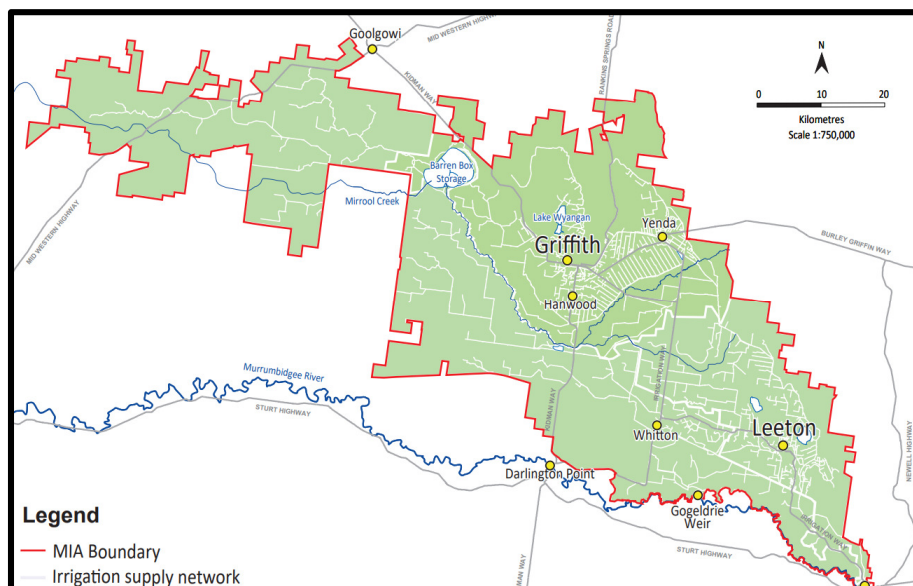
**Figure 5. Land capability of solar farm site. (Solar farm site arrowed)**

Land in this category 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.

## Agricultural Context

### Regional

The site falls within the Murrumbidgee Irrigation Area (Figure 6).



**Figure 6 Murrumbidgee Irrigation Area 6**

The agricultural background to irrigated farming in the Murrumbidgee catchment is outlined below.

*“The irrigated annual and perennial crops planted in the catchment adjust to market forces that result in the shifts in water and land uses over time. Water availability in the southern Murray-Darling Basin is strongly influenced by rainfall in the upper catchments, which varies significantly between years. Allocations of available water among crops are decided by individual farmers who may have contracts for rice or cotton production or less flexible contracts for fixed perennial crops of citrus, grapes or nuts. Most flexible are the choices to grow other annual crops which can be altered year to year according to water availability and price, as well as anticipated commodity prices.*

*The most significant water user in the Murrumbidgee catchment has been the rice industry, which faced the greatest cutbacks during the drought years (2007-09). Cotton areas have expanded to the point of recently exceeding the total water use by rice or any other crop. Grapevines have maintained relatively constant water use over time. Almond plantations are an emerging presence in the catchment with regard to water use; many young plantations are expected to require greater water volumes as they mature.”<sup>7</sup>*

## **Current agricultural use**

The site is a small section of a 1000ha irrigated cropping property. The initial block was purchased in the mid-1970s, with additional subsequent purchases resulting in its current size.

When there is adequate water available, a three year rotation of one crop of rice following by two years of wheat is undertaken. The irrigation water for rice is applied at a rate of 9-10ML/ha. Yields obtained by the owner are around 12.5t rice/ha. The wheat crops are irrigated when required, and on average, achieve a yield of between six and seven tonnes per hectare.

The actual cropping program is dependent on the allocation of water within a year. The owner has advised that it is very rare to get a full allocation of water for the property. In years where water entitlements are low and consequently very expensive, water is traded downstream to higher value crops (such as almonds) and rice is not grown in that year. When this happens, the rice crop is substituted with a winter canola crop to maintain the rotation.

The current crop on the solar farm parcel is canola.

## **Agricultural Assessment**

### **Strategic importance of land**

While the land has a Land Capability Rating of “3” it is not unique and has not been identified as BSAL.

### **Agricultural productivity**

The solar farm will occupy 20ha.

Assuming that, in any one year, 330ha is cropped for rice on the farm, this would equate to a yield of 4,125 tonne of rice. Assuming that the solar farm site is cropped for rice every third year, the site would be expected to annually contribute, on average, 83 tonnes of rice to farm production –2% of farm

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<sup>7</sup> <https://www.csu.edu.au/research/grahamcentre/news/newsletters/2020/summer-2020/water-use-and-dollar-values-of-irrigated-crops-in-the-murrumbidgee-catchment>

production. From the farmer's perspective, the solar farm lease income will be greater than the income that would have been returned from a rice crop.

Almost all of Australia's rice is grown in the Murray and Murrumbidgee irrigation districts. A small amount is grown in northern Victoria and a small amount in southern Queensland. The average total rice production for the Murray and Murrumbidgee Irrigation areas (and therefore NSW) for the period 2015-16 to 2019-20 was 312,640 tonnes (range 40,000 – 625,000 tonnes) <sup>8</sup>. Assuming that the solar farm site is cropped for rice every third year, the site would be expected to annually contribute, on average, 83 tonnes or 0.026% of the rice production from the Murray and Murrumbidgee Irrigation areas. This contribution is insignificant when variation within and between farms and between seasons is considered.

Over a three year period, the loss of wheat production from the solar farm site would be 13 tonnes/ha or 4.3tonnes/ha/year, average (i.e. two crops in three years). This is a total of 86 tonnes of wheat for the site. For context, the wheat production for NSW for 2022 was 12,700,000 tonnes and the predicted harvest for the 2023 year is 9,100,000 tonnes<sup>9</sup>. The loss of wheat production to the state is insignificant being 0.0007% of the wheat production for 2022.

The triangular shape of the site is less than ideal for broad acre cropping and its removal from cropping may increase the operational efficiency of the property.

### **Offsite impacts**

The establishment of the site will have no disruptive impact on the long term operation of neighbouring properties or on the operation of the remainder of the owner's property.

The removal of this land from irrigated crop production should not have any impacts on irrigation water delivery infrastructure. Irrigation water used for the site is transferrable on a trading basis and as such there is no loss of irrigation capacity. However it is noted as stated above, water is often transferred out of the area during periods of high water prices.

### **Agrovoltaic considerations**

The paddock vegetation in the solar farm area will require management to reduce fire risk over summer. It is intended that grazing with sheep will be undertaken. The income from grazing will add to the income from the solar farm lease.

### **Impact on future agricultural use of land**

When the solar farm is decommissioned, there will be no residual detrimental impact on the productivity of the site and it can be retained as part of an irrigated cropping operation. Soil fertility will decline over time, but this can be corrected through the addition of suitable amendments.

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<sup>8</sup> [http://www.rmcb.com.au/app/uploads/2020/08/Water-Update-31-July-2020-Southern-Connected-Basin\\_UPDATED-20082020.pdf](http://www.rmcb.com.au/app/uploads/2020/08/Water-Update-31-July-2020-Southern-Connected-Basin_UPDATED-20082020.pdf)

<sup>9</sup> <https://www.statista.com/statistics/1350483/australia-wheat-production-volume-nsw/#:~:text=In%20financial%20year%202022%2C%20wheat,to%20around%209.1%20thousand%20kilotons.>

## Cumulative Impacts.

Data from the NSW Government<sup>10</sup> indicates that the only nearby solar farm is a 36MW solar farm south east of Griffith. There are unlikely to be any cumulative effects on agriculture from the establishment of an additional solar farm at this scale of infrastructure development.

## Conclusion

The proposed Tharbogang solar farm, 6.25 km east of Griffith, will cover an area of 20ha of a large scale irrigated cropping rice growing enterprise.

The site has been used only mainly for cropping under a one year rice/two year wheat rotation.

The loss of production from the diversion of this land to a solar farm will have an insignificant impact on both Griffith LGA and the State's agricultural production and is unlikely to impact on the activities of surrounding farming properties.

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13 July 2023

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<sup>10</sup> <https://www.energy.nsw.gov.au/nsw-plans-and-progress/major-state-projects/shift-renewables/solar-energy#:~:text=There%20are%2016%20major%20operating%20large%2Dscale%20solar%20farms%20in%20NSW>