TERRAIN SOLAR

Claire Golder
Town Planner/Strategic Projects Officer
Temora Shire Council

Via: Email
Date: 19th July 2018

Dear Claire,

Southern Joint Regional Planning Panel – Request for Further Information

Terrain Solar received a request for further information (RFI), from the Southern Joint Regional Planning Panel (SJRPP), on the 6th of June 2018. Terrain Solar have now completed the required studies and compiled the necessary information to complete the response. The response includes the following:

1. A ***Visual Impact Assessment***, undertaken by Iris Visual Planning and Design, that examines the visual impact of the Junee Solar farm on the surrounding landscape. The study concluded that the solar farm would have very limited visibility from the surrounding landscape and that there would be a negligible visual impact experienced in views from adjacent rural areas.

2. The Visual Impact Assessment also provides recommendations on the screening to be implemented which is detailed in an included ***landscape plan and landscape cross sections***.

3. The ***Solar Farm Plan*** was updated to adopt the screening recommendations from the Visual Impact Assessment and other requests from the SJRPP. It also includes a ***Detail Plan*** to provide dimensions of key structures.

4. A ***letter*** to justify the proposed tracker spacing.

As always, please feel free to contact me at any time if you have any questions on the supplied material.

Kind Regards,

Simon Ingram
Managing Director – Terrain Solar P/L

IRIS Visual Planning + Design

Junee Solar Farm

Visual Amenity Assessment

Terrain Solar

July 2018

Table of Contents

1. Introduction

The purpose of this study is to provide a visual impact assessment of the proposed solar farm on Old Sydney Road, Junee.

2. Proposal scope

This solar farm would comprise the following elements:

- Solar arrays, with each panel up to 2.6 metres tall, dark grey with galvanised frames and posts
- Inverter stations of a shipping container size and style (approx. 2.5 metre height)
- Substation (approximately 50 x 15m) located on the northern site boundary
- Operations and maintenance building at the north eastern corner of the site, accessed from Old Sydney Road
- Chainwire site perimeter fencing (2.4 metre-high), including an access gate at Old Sydney Road
- Gravel internal maintenance access tracks.

Approximately 13 trees would be cleared to install the solar farm.

All existing blocks of vegetation on the fields surrounding the site would be retained. In addition, the following vegetation would be provided:

Native screening vegetation

- 5-metre wide corridor with a mix of trees, shrubs and grasses (up to 5 metres tall) along the northern site boundary, parallel to the mature trees in the Old Sydney Road verge
- 5-metre wide corridor (trees, shrubs and grasses up to 5 metres tall) along the southern and eastern site boundaries, linking existing corridors of vegetation.

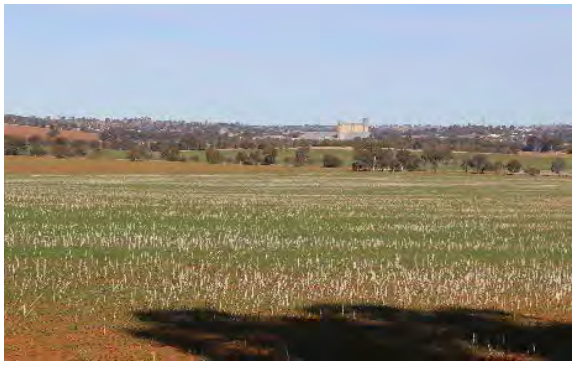
Note: The location and width of this screening vegetation has been determined by the potential visibility of the site. (refer to Figure 6-1 and 6-2)

Refer Figure 2-1 Landscape Concept Plan, Figure 2-2 Landscape concept sections and Figure 2-3 Plant list and landscape notes.

3. Existing environment

The site is located approximately 5 kilometres north of Junee. Junee is a small regional centre in the Riverina region of western NSW. Established as a railway town, Junee has a historic town centre and numerous heritage listed buildings. Most notably this includes the Roundhouse Rail and Transport Museum, to the south of town, and a grand train station (built in 1880's) in the centre of town.

On the northern outskirts of Junee, the land uses transition to service and industrial uses along Lord Street, Old Junee Road and Queen Street. The town is surrounded by rich productive agricultural land.



INDUSTRY ON THE NORTHERN OUTSKIRTS OF JUNEE

The site is located on the lower slopes of a small ridgeline extending north from the outskirts of Junee and alongside Danswans Lane. The site gently falls from the southern field boundary to Old Sydney Road in the north.

The landform to the south and east of the site is undulating with several vegetated hills with arable fields and pastures. There are several homesteads within the rural landscape surrounding the site. This includes two properties to the south and two properties to the south east. These residences are all over 1 kilometre from the site and therefore have distant views to the site filtered through intervening vegetation.

UNDULATING LANDSCAPE TO THE SOUTH AND EAST OF THE SITE

The site comprises of an arable field, with a powerline easement passing over the site. There are several corridors and blocks of vegetation surrounding the site to the west, south and east.

VIEW SOUTH ALONG THE POWERLINE EASEMENT THROUGH THE SITE

BLOCK OF EXISTING VEGETATION TO THE NORTH WEST OF THE SITE

Old Sydney Road is surfaced road which runs parallel to the northern boundary of the site. It has wide verges which include a dense corridor of mature trees.

DENSE EXISTING VEGETATION ALONG OLD SYDNEY ROAD

Beyond Old Sydney Road, to the north of the site, the landform flattens out around a dry creek corridor. The landform then rises in the Junee Reefs area, to an undulating landscape of arable fields with scattered trees.

UNDULATING LANDSCAPE TO THE NORTH OF THE SITE, JUNEE REEFS

To the west, beyond the Goldfields Way (B85) and the township of Old Junee, the landform rises to a ridgeline which is aligned generally north to south. From this elevated vantage point there are views across the valley and to the distant ranges in the east. Refer to Figure 3.1 Topography.

VIEWS FROM THE RIDGELINE WEST OF OLD JUNEE

4. Planning context

The following review identifies key documents which provide the planning context for the visual assessment of the solar farm site. This should read in conjunction with the statutory review in the Junee Solar Farm Statement of Environmental Effects.

4.1. Junee Shire Local Environmental Plan, 2012

The proposal site is located 5 kilometres north of Junee, including part of two adjoining lots, south of Old Sydney Road. The site is zoned for Primary Production (RU1), containing predominantly cleared land used for cropping and grazing.

Key relevant objectives for this rural land include:

- "*To allow for the development of non-agricultural land uses that are compatible with the character of the zone*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones*" (Zone RU1 Primary Production).

There are no heritage items within or nearby the proposal site.

4.2. Junee Shire Development Control Plan, 2015

The Junee Development Control Plan (DCP) supports the Junee LEP by providing additional objectives and controls for administering development.

Although the Junee DCP has no specific guidelines or objectives for development within rural areas, the following general principles for development are relevant to this project:

- "*Use the attributes of the site; slope, orientation and visual or landscape quality*
- *Retain established trees and vegetation where possible*
- *Maintain views and privacy as well as to those of your neighbours. Use screens, planting and walls for visual privacy*" (clause 1.2).

5. Methodology

The following assessment identifies the potential visual influence of the proposal on the surrounding landscape and an assessment of views from these locations.

5.1. Zone of visual influence

This assessment begins with the identification of a **Zone of visual influence (ZVI).** This establishes the theoretical area from which the proposal may be visible. It is created using topographic data and the height of the proposal elements.

5.2. Visual absorption capacity

The **Visual absorption capacity** of the landscape surrounding the site and across the ZVI area is then determined. Visual absorption capacity is the ability for a landscape to accommodate change without the loss of its valued attributes. The visual absorption capacity of the landscape surrounding the proposal site has been described and the valued attributes identified.

5.3. Assessment of representative viewpoints

An assessment of views which are representative of the potential views has been undertaken. This assessment was undertaken in the following steps:

- Identify the **sensitivity** of the viewer (Refer Table 5-1)
- Identify the **magnitude of change** created by the proposal (Refer Table 5-2)
- Combine these characteristics to assign a level of **likely visual impact** (Refer Table 5-3)

Sensitivity refers to the susceptibility of a view to accommodate change without losing valued attributes. The 'values' of a view refer to any aspect of landscape or views people consider to be important. Visual values may be reflected in local, state or federal planning regulations, other published documents, be established through community consultation and engagement, or as professionally assessed. (refer Table 5-1)

TABLE 5-1 VISUAL SENSITIVITY LEVELS

Visual sensitivity level	Description
Low	Views where visual amenity is important at a neighbourhood scale, such as views seen from local roads, briefly glimpsed views to landscape features, and views from small groups of residences.
Medium	View of high quality or experienced by concentrations of residents and/or local recreational users, and/or large numbers of road or rail users.
High	Heavily experienced view to a feature or landscape that is iconic to a major portion of a city or a non-metropolitan region, or an important view from an area of regional open space.

Magnitude of change refers to the extent of change that would be experienced by receptors. This change can be adverse or beneficial. Factors that could be considered in assessing magnitude are: the proportion of the view which is affected; the size and scale of the change; the rate and duration of the change; the level of contrast and compatibility.

A number of principles have been identified that relate to how well a solar farm can be absorbed into the landscape and what is considered to be more or less visually harmonious. The principles that will be applied generally to the visual assessment, are summarised in Table 5-2 Typical indictors of visual modification.

TABLE 5-2 TYPICAL INDICATORS OF VISUAL MODIFICATION

Visual impact is the combined result of sensitivity together with the magnitude of the change. The visual impact may be adverse or beneficial and at a level of very high through to negligible. (refer table 5-3)

TABLE 5-3 VISUAL IMPACT LEVELS

		Sensitivity		
		Low	Medium	High
Modification	High	Moderate adverse	High adverse	High adverse
	Medium	Minor adverse	Moderate adverse	High adverse
	Low	Negligible	Minor adverse	Moderate adverse
	Negligible	Negligible	Negligible	Negligible
	Improvement	Minor benefit	Moderate benefit	High benefit

6. Visual impact assessment

6.1. Zone of visual influence

A Zone of Visual Influence (ZVI) has been used to establish the theoretical area from which the solar farm may be visible. This theoretical extent is based on several reference points on the solar farm site, assuming the maximum height of the solar panels is 2.6 metres. The analysis uses a digital terrain model to identify the areas from which views to the site may be possible.

This model was based on data to a 5 metre accuracy. The blocks and corridors of vegetation surrounding the site have been modelled (at an assumed height of 10 metres) to incorporate the screening effect of this vegetation.

The ZVI shows that the proposal is enclosed to the north by vegetation along Old Sydney Road. However, there are some areas of potential visibility to the north in rural properties on the upper slopes of Junee Reefs.

The zone of visual influence extends east across adjacent fields between the site and Danswans Lane, and south to the west facing upper slopes of the hills to the south east of the site. To the south, there may be views from adjacent fields and over the low-lying plains to Old Junee Road.

In the west, there are long range views from the upper slopes of the ridge west of Old Junee including Pikedale, Murrulebale and Coolamon roads.

This area formed the basis of field investigations to identify views to the proposal. Refer to Figure 6-1 Zone of visual influence and 6-2 Viewsheds.

6.2. Visual absorption capacity

Visual absorption is the ability of a landscape to accommodate change without the loss of its valued attributes. The valued attributes of this landscape include views across the undulating rural landscape, views enclosed by the mature vegetation along Old Sydney Road, and scenic views to the distant ranges in the east.

Trees within road reserves, blocks of vegetation within the fields, and along field boundaries somewhat enclose and break-up views from the lower lying areas. Whereas in elevated locations to the south east, north east and west the views are open and multilayered, extending to hills in the west and a mountainous horizon in the east.

The valley includes small clusters of farm buildings and homesteads, and an intensification of transmission lines and light industrial development on the northern outskirts of Junee.

The site is considered to have a medium visual absorption capacity due to the undulating landform, roadside vegetation and scattered blocks of vegetation on the site.

6.3. Assessment of representative viewpoints

The following viewing locations were selected as representative of the range of views to the proposal:

- Views from Danswans Road and rural properties in the east
- Views from Old Sydney Road
- Views from Millbank Lane in the south west
- Views from Junee Reefs Road and rural properties in the north
- Views from Coolamon Road, west of Old Junee.

Refer to Figure 6-2 Viewpoint location plan.

6.3.1. Views from Danswans Road and rural properties in the east

Danswans Road is aligned generally north to south and follows the eastern slopes of the ridgeline created by a series of hills to the south east of the site. This road connects the Olympic Highway at Junee in the south with Old Sydney Road and the rural areas of Junee Reefs in the north.

Due to the landform, the site is screened in views from much of this rural road. In the north, where the landform descends to Old Sydney Road and landform opens up views to the west, existing vegetation on intervening fields obstruct views to the site. (Refer to Viewpoint 1 and 2, Figure 6-3)

Additional corridors of vegetation along the eastern and southern boundary of the site would further add to this screening.

Due to the landform, intervening existing and proposed vegetation there would be a negligible magnitude of change in the amenity of these views, from this road which is of low sensitivity, resulting in a **negligible visual impact**.

There are several residences to the west of Danswans Road, oriented northwest over the site. Whilst not publicly assessible, it is possible that there would be views towards the site from these properties. The site is located at a distance of over 1 kilometre from the site and therefore would be seen in the middle to background of these views. These views would be filtered through intervening trees, and partly screened by the additional native screen planting proposed along the southern and eastern field boundaries.

Furthermore, as the landform slopes to the north, it is expected that only the panels on the southern and eastern edge of the site would be visible. Any visible panels would be set below the height of the mature vegetation along Old Sydney Road. The backdrop of this vegetation would assist in the visual absorption of the panels when viewed at a distance.

Due to the distance, landform, and intervening vegetation, there would be a low magnitude of change in the amenity of these views, from this road which is of low sensitivity, resulting in a **negligible visual impact**.

6.3.2. Views from Old Sydney Road

Old Sydney Road forms the northern boundary of the site. This road is a small, surfaced, rural road lined with mature trees. The site can be seen in the middle ground of views from Old Sydney Road, glimpsed through this dense vegetation.

The cultivated arable fields of the site contrast somewhat with the mature native roadside vegetation. There is a break in the roadside vegetation, to the east of the site, and an existing powerline easement can be seen crossing the site and north over the road in these views. (Refer to Viewpoint 3 and 4, Figure 6-5)

The solar farm would be seen in southerly views from Old Sydney Road, in areas directly adjacent to the site. As the land is relatively flat, the panel arrays would sit low in the view, and visually merge together. The panels would not rise

above the glimpses in the hills to the south east of the site, which would remain as a backdrop to the site.

The heavily vegetated corridor limits visibility to the site which would be further screened by a corridor of additional vegetation, mainly shrubs and small trees, and the low-lying nature of the the site limits views to this solar farm. Overall, there would be a low magnitude of change in the amenity of these views. This road is of low sensitivity, resulting in a **negligible visual impact**.

6.3.3. Views from Millbank Lane in the south west

Millbank Lane is a small, surfaced, rural road which runs generally north to south. It extends south from Old Sydney Road, at a point approximately 500 metres west of the site. It has some mature trees within its wide verges and offers intermittent views across the arable fields to the east.

Due to several blocks of intervening vegetation, the site cannot be seen from areas to the north of Millbank Lane. There are some glimpses to the site, however, in views from the south of the Lane at a private property access road, where views across the fields are more open. (Refer to Viewpoint 5 and 6, Figure 6-6)

In this view, the site can be seen in the middle to background of the view, partly obstructed by blocks of trees in the fields to the south.

As the site is on the lower lying areas of the view, and much of the northern and eastern areas of the site are sloping away from the viewer, the southern most edge of the site is all that can be seen.

Additional corridors of vegetation along the southern boundary of the site would screen this visible edge so that the solar farm would be largely absorbed into the view. Any visible panels or inverters would be set well below and viewed against the vegetated backdrop of the mature trees along Old Sydney Road.

Due to the landform, intervening existing and proposed vegetation, and vegetated backdrop, there would be a negligible magnitude of change in the amenity of these views. This road is of low sensitivity, resulting in a **negligible visual impact**.

6.3.4. Views from Junee Reefs Road and rural properties in the north

To the north of the site, the Junee Reefs area is an undulating rural landscape, rising to east from Houlagahans Creek. Views across this landscape are broad and open across arable fields with scattered trees. (Refer to Viewpoint 7: Figure 6-7).

There are views to the site, south from Junee Reefs Road, at a distance of over two kilometres. In these views, the hills to the south of the site can be seen in the background, rising above the undulating landform of the middle ground of the view. The vegetation along Old Sydney Road, is also visible in the background of the view, glimpsed between the intervening landform. Above this roadside vegetation, a small portion of the site can be seen, alongside the existing transmission line and in the background of the view.

Additional vegetation proposed for the southern boundary of the site would visually enclose the site and ensure the panel arrays do not rise above the skyline, allowing the panels to be visually absorbed into the background vegetation.

Due to the distance, and small area of the solar farm that would be visible, this would result in a low magnitude of change to these views. This view is of low sensitivity, resulting in a **negligible visual impact**.

6.3.5. Views from Coolamon Road, west of Old Junee

To the west of Old Junee the landform rises to a ridgeline which runs generally north to south. From these rural roads and properties there are

expansive easterly views across the plains and to distant mountain ranges. From this elevated vantage point the southern and eastern areas of the site are visible over existing vegetation to the west of the site. It is located in the middle to background of the view, seen amongst a patchwork of arable fields. (Refer to Viewpoint 8, Figure 6-7)

The solar arrays and inverters would be visible. The solar arrays would have a strong regular pattern, similar to the visual characteristics of the adjacent cropping landscape. The solar panel arrays would have a low-profile, following the contours of the site which fall to the north. The panels would be seen against the proposed native vegetation corridor planting proposed for the eastern site boundary. The dark colour of the panels would allow them to recede and be visually absorbed into the surrounding backdrop of vegetation.

Due to the distance, the small area of the solar farm that would be visible within broad panorama, and this would result in a low magnitude of change to the view. As there are scattered properties and rural roads from which this view is possible, it is of low sensitivity. This would result in a **negligible visual impact**.

7. Conclusions

The solar farm would have very limited visibility from the surrounding landscape due to the visual enclosure of the site by existing mature vegetation and landform. The additional proposed vegetation would further enclose and reduce views to the solar farm over time.

Where visible, proposed solar farm would be seen within the patchwork of agricultural fields and blocks of vegetation. In this landscape there are other built elements such as other residences, sheds, and power lines. This landscape has a moderate visual absorption capacity for development such as this.

Due to the low height of the panel arrays (approximately 2.6 metres tall) the panels and inverters would sit below the surrounding vegetation.

There would be a **negligible visual impact** experienced in views from adjacent rural areas, including Danswans Road and properties in the east, Old Sydney Road and Junee Reefs Road in the north, and Millbank Lane in the south west due to intervening landform and vegetation limiting views to the site.

In more distant views, such as from Coolamon Road, west of Old Junee, the site would be visible. However, it would be absorbed into a broad view and the surrounding hills and mountain ranges would continue to be the focal point of views across this valley. This would result in a **negligible visual impact**.

In conclusion, the proposed Junee Solar Farm is compatible with the character of this area and would not result in an adverse visual impact.

TABLE 7.1 SUMMARY OF VISUAL IMPACT

Viewing location	Sensitivity	Magnitude	Impact
Views from Danswans Road and rural properties in the east	Low	Negligible	Negligible
Views from Old Sydney Road	Low	Low	Negligible
Views from Millbank Lane in the south west	Low	Negligible	Negligible
Views from Junee Reefs Road and rural properties in the north	Low	Low	Negligible
Views from Coolamon Road, west of Old Junee	Low	Low	Negligible

8. References

Junee Shire Council, 2012, Junee Shire Local Environmental Plan, URL: https://www.legislation.nsw.gov.au/EPIs/2012-674.pdf, (accessed 17/07/2018).

Junee Shire Council, 2015, Junee Shire Development Control Plan, URL: http://www.junee.nsw.gov.au/f.ashx/Junee_Shire_DCP_2015.pdf, (accessed 17/07/2018).

Key:

1. Existing vegetation

2. Native screen planting (5 metres wide) alongside vegetation on Old Sydney Road

3. Native screen planting (5 metres wide)

Trees to be removed

N

0m 50m 100m 150m

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Junee Solar Farm, Old Sydney Road, Junee, NSW

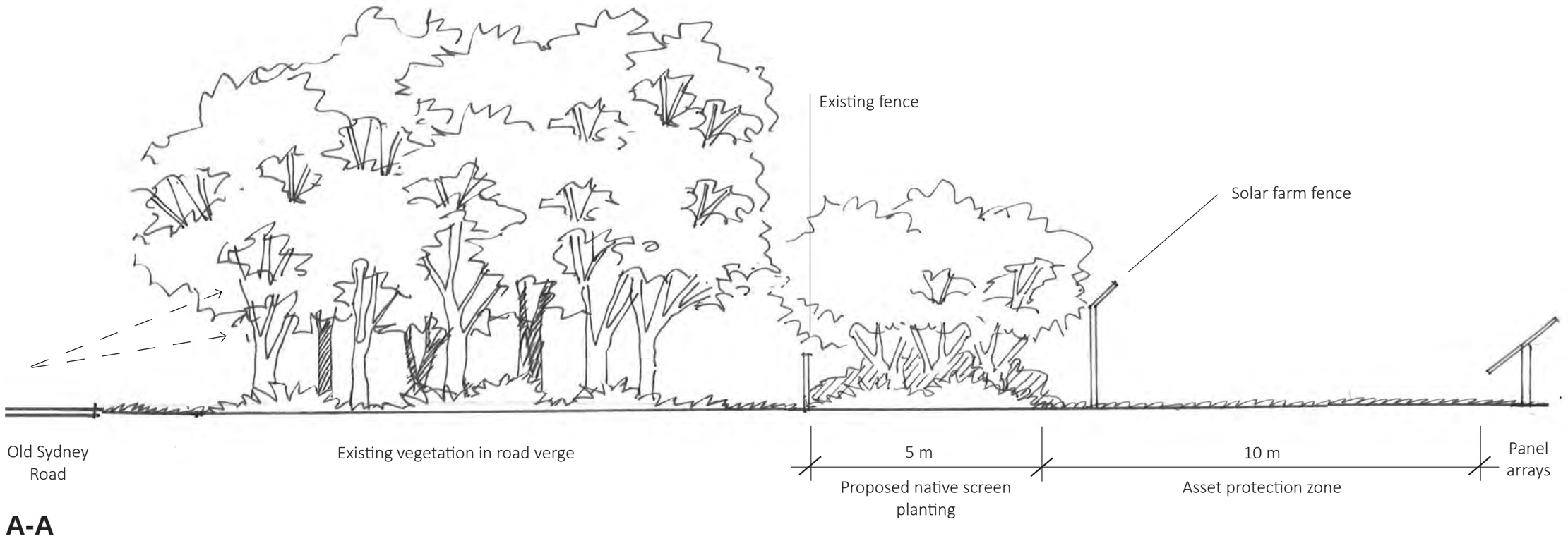
Terrain Solar

FIGURE 2-1: LANDSCAPE CONCEPT PLAN

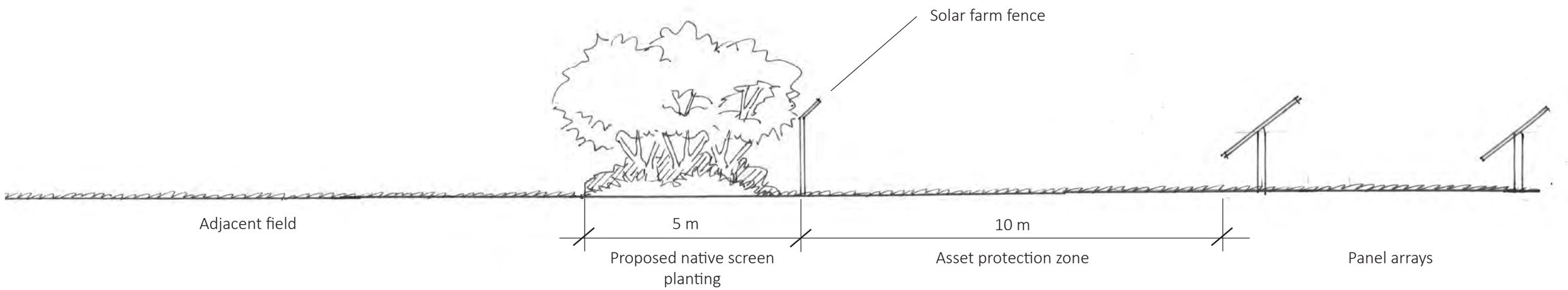
Date: July 2018
Job Number: 2018-108
Scale: NTS

Drawn: PK
Issue: DRAFT
Dwg Number: 2018108-05

A-A



B-B



Scale: 0m 1 2 5m

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Bomen Solar Farm, East Bomen Road, Wagga Wagga, NSW

Terrain Solar

FIGURE 2.2: LANDSCAPE CONCEPT SECTIONS

Date: July 2018
Job Number: 2018-108

Drawn: PK
Issue: DRAFT
Dwg Number: 2018108-06

PLANT COMMUNITY TYPES

According to the NSW BioNet Vegetation Map Collection there are three existing Plant Community Types (PCTs) in areas surrounding the site. These are the:

- *Blakelys Red Gum - Yellow Box grassy tall woodland of the NSW South Western Slopes Bioregion*
- *Yellow Box grassy tall woodland on alluvium or parna loams and clays on flats in NSW South-western Slopes Bioregion*
- *White Box grassy woodland in the upper slopes sub-region of the NSW South-western Slopes Bioregion*

The following plant lists include plant species found in these PCTs, and also identified in the Junee Shire Roadside Vegetation Survey and Management Guidelines, Greening Australia NSW (2002). This will ensure they are suited to local site conditions, including soils, aspect and rainfall.

PLANT LIST

A mix of trees, shrubs and grasses have been selected, with a maximum height of 5 metres, and including species with a dense habbit to provide a maximum screening effect whilst not extensively shading the solar arrays.

Proposed plant list:

Trees and shrubs

Acacia dealbata
Acacia decora
Acacia deanei subsp. paucijuga
Acacia implexa
Dodonaea viscosa subsp. cuneata
Maireana microphylla
Myoporum montanum
Santalum acuminatum

Grasses
Aristida ramosa sens. lat.
Austrodanthonia setacea
Austrostipa bigeniculata
Bothriochloa macra
Poa sieberiana
Themeda australis

NOTES

- New planted areas are to be cultivated to a minimum 150mm depth.
- Individual planting holes are to excavated one and a half times the depth and twice the width of the pot. Plant pot so that the base of the plant is level with the surrounding ground and backfill with ameliorated site soil. Form a shallow basin around each plant to retain water.
- All planting areas to have a 100mm depth organic mulch.
- Organic mulch shall be free from deleterious material, including rocks, plastic and any material toxic to plant growth. Mulch shall comply with the requirements of AS4454 Composts, soil conditioners and mulches.
- Install proprietary Tree guard sleeves (Tree Max or approved equivalent) and stakes for each tree & shrub. Install as per manufacturer's specification.
- Install 1 x Agriform tablet (or approved equivalent) per plant as per manufacturers specification.
- Maintain setbacks from services as shown on the engineering plans.
- A star picket, or durable temporary fence, is to be erected around the perimeter of the drip line of retained trees in accordance with AS4970 Protection of trees on development sites.
- No materials or equipment are to be stored at the base of the retained trees.
- Areas outside the construction footprint which are impacted during construction should be reinstated.
- All plant stock to be minimum 50x50x120mm tubestock. Plants are to be healthy and well formed. No rootbound stock.
- A planting density of 2 x plants per m^2 (1 x grass and 1 x tree or shrub) will be achieved for native vegetaiton screening.
- Plant Establishment Period is to be 13 weeks commencing from the date of Practical Completion.
- The establishment period is to include watering, weeding, and replacement of failed or damaged plants.
- Tree guard sleeves and stakes to be removed upon establishment.

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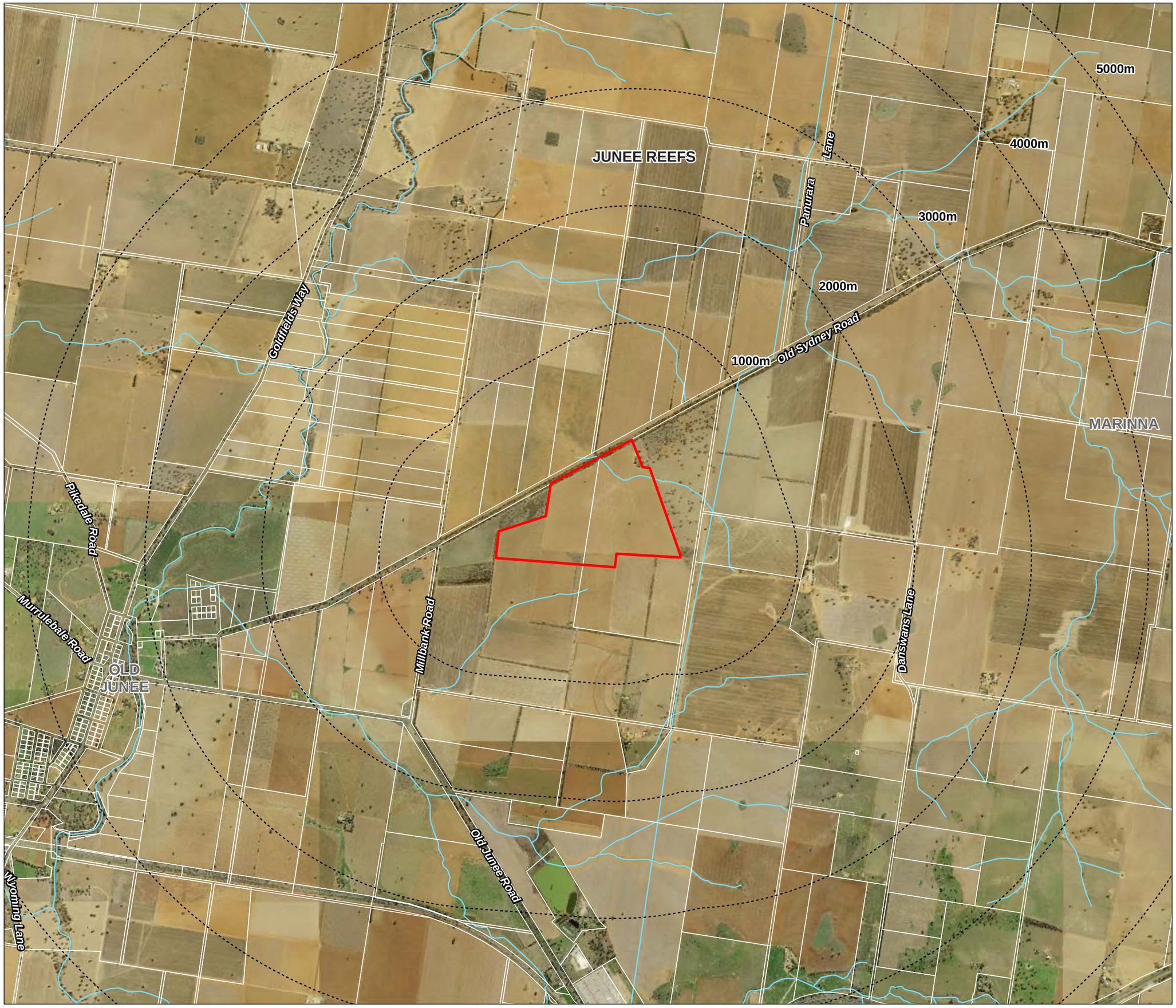
Junee Solar Farm, Old Sydney Road, Junee, NSW
Terrain Solar

FIGURE 2-3: PLANT LISTS & LANDSCAPE NOTES

Date: July 2018
Job Number: 2018-108
Scale: NTS
Drawn: PK
Issue: DRAFT
Dwg Number: 2018108-07



Junee Solar Farm

FIGURE 3-1:
SITE LOCATION & CONTEXT

IRIS Visual Planning + Design

Site boundary

Watercourse

SOURCE:
Cadastral Boundaries: (c) NSW Land & Property Information 2018
Watercourse: Geoscience Australia 2015
Aerial Photo: (c) NSW Land & Property Information 2014

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Kilometers

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GEOVIEW
GIS & mapping solutions for infrastructure, town planning & environmental management

Junee Solar Farm

FIGURE 3-2: TOPOGRAPHY

IRIS Visual Planning + Design

- Site boundary
- Watercourse
- Contour (20m)
- Contour (5m)

SOURCE:
Cadastral Boundaries: (c) NSW Land & Property Information 2018
Watercourse: Geoscience Australia 2015
Surface analysis: Derived from TARCUTTA and WAGGA WAGGA 2kmx2km 5 metre Resolution Digital Elevation Model 2014

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Kilometers

A3 Scale: 1:30,000

File:JuneeSolarFarm_FIG2_Elevation_180616 Date: 16/06/2018

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Junee Solar Farm

FIGURE 6-1: ZONE OF VISUAL INFLUENCE & VIEWPOINT LOCATION PLAN

IRIS Visual Planning + Design

- Site boundary
- Watercourse
- Contour
- Observer location (+2.6m)
- 6 Viewpoint location
- Zone of Visual Influence

SOURCE:
Cadastral Boundaries: (c) NSW Land & Property Information 2018
Watercourse: Geoscience Australia 2015
Aerial Photo: (c) NSW Land & Property Information 2014
Surface Analysis based on JUNEE, 2kmx2km 5 metre Resolution Digital Elevation Model 2015

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Kilometers

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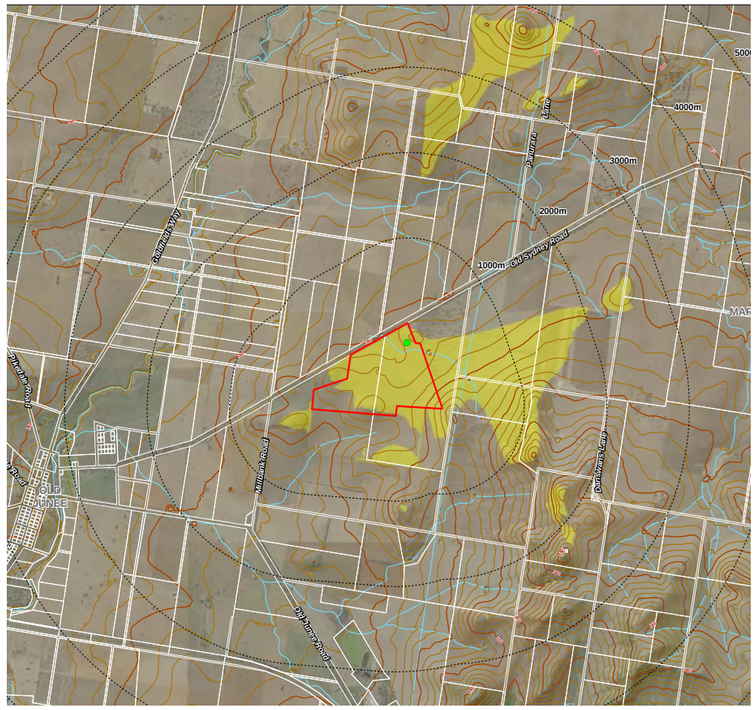

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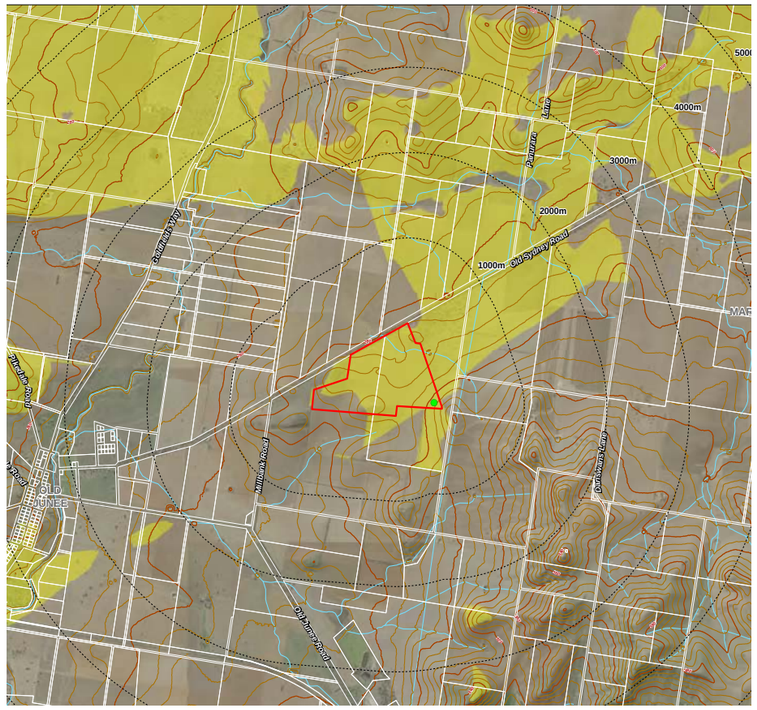
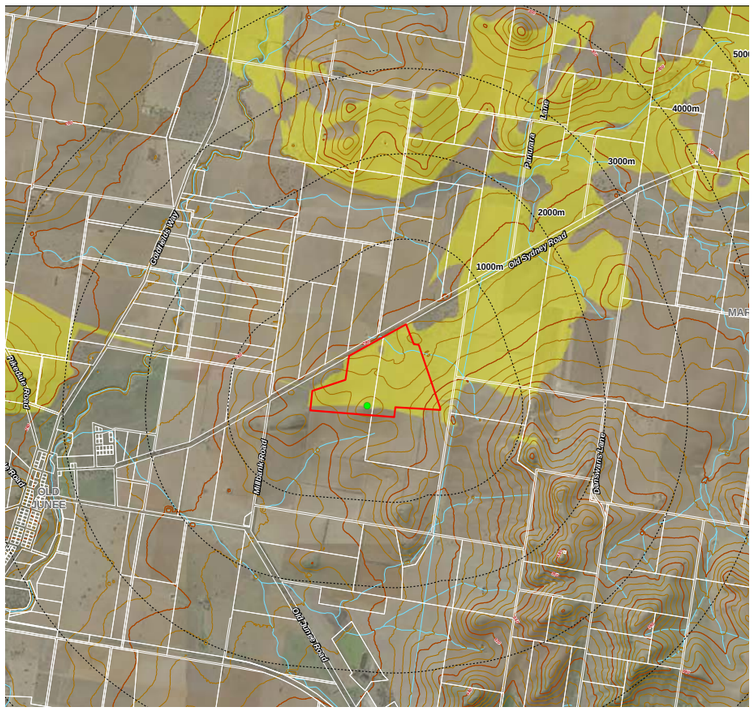
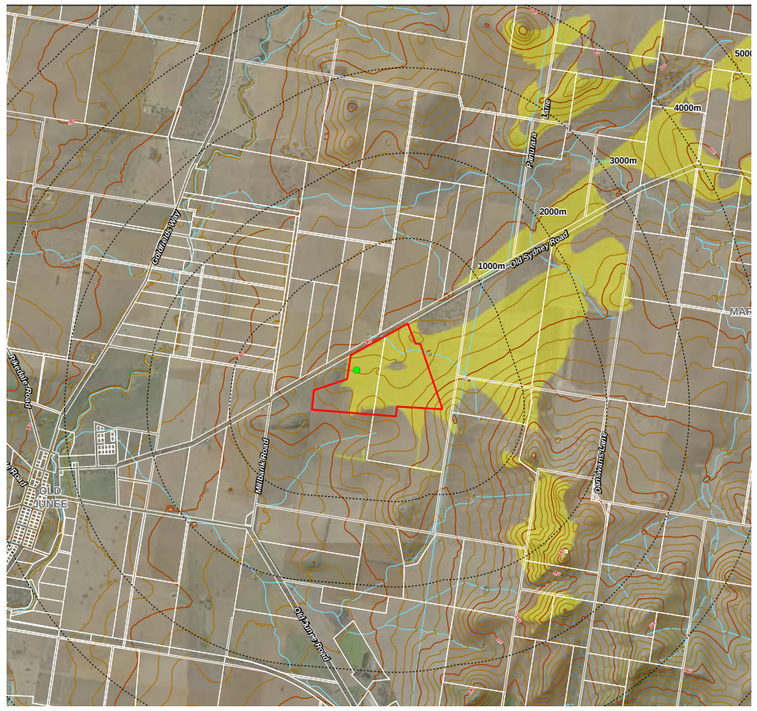


B.



C.

D.



E.

IRIS Visual Planning + Design

Landscape Planning | Visual Assessment | Landscape Architecture

www.irisvisual.com.au | 0404558501 | 78 Macgregor Terrace, Bardon, 4065

Junee Solar Farm, Old Sydney Road, Junee, NSW

Terrain Solar

FIGURE 6-2: VIEWSHEDS

Date: June 2018
Job Number: 2018-108
Scale: NTS

Drawn: GeoView
Issue: DRAFT
Dwg Number: 2018108-01

A. View south across the site

A.

B. View southeast across the site

B.

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Junee Solar Farm, Old Sydney Road, Junee, NSW

Terrain Solar

FIGURE 6-3: SITE PHOTOGRAPHS

Date: June 2018
Job Number: 2018108
Scale: NTS

Drawn: SR
Issue: DRAFT
Dwg Number: 2018108-02

1. View north west from Danswans Road

1.

2. View west from Danswans Road

2.

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Junee Solar Farm, Old Sydney Road, Junee, NSW

Terrain Solar

FIGURE 6-4: VIEWPOINTS

Date: June 2018
Job Number: 2018108
Scale: NTS

Drawn: SR
Issue: DRAFT
Dwg Number: 2018108-02

3. View west from Old Sydney Road

3.

4. View east from Old Sydney Road

4.

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Junee Solar Farm, Old Sydney Road, Junee, NSW

Terrain Solar

FIGURE 6-5: SITE PHOTOGRAPHS

Date: July 2018
Job Number: 2018-108
Scale: NTS

Drawn: SR
Issue: DRAFT
Dwg Number: 2018108-04

5. View east from Millbank Lane

5.

6. View north east from Millbank Lane

6.

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Junee Solar Farm, Old Sydney Road, Junee, NSW

Terrain Solar

FIGURE 6-6: SITE PHOTOGRAPHS

Date: June 2018
Job Number: 2018108
Scale: NTS

Drawn: SR
Issue: DRAFT
Dwg Number: 2018108-02

7. View south from Junee Reefs Road

7.

8. View east from Coolamon Road, Old Junee

8.

IRIS Visual Planning + Design

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Junee Solar Farm, Old Sydney Road, Junee, NSW

Terrain Solar

FIGURE 6-7: SITE PHOTOGRAPHS

Date: June 2018
Job Number: 2018108
Scale: NTS

Drawn: SR
Issue: DRAFT
Dwg Number: 2018108-02

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ORANGE
154 PEISLEY STREET
P.O. BOX 1963
ORANGE NSW 2800
orange@geolyse.com
www.geolyse.com
Ph. (02) 6393 5000
Fx. (02) 6393 5050

GIS PROJECT DETAILS

Datum: GDA 1994 MGA Zone 55 (EPSG: 28355)
Directory: O:\Projects\217\217514\Out\GIS\217514.qgs
Data Source: NSW Spatial Services (Aerial Imagery)
Project Number: 217514

DRAWING SCALE

0 50 100 150 200 m

A3

APPROVAL AUTHORITY

junee

Southern Joint Regional Planning Panel

CLIENT

TERRAIN SOLAR

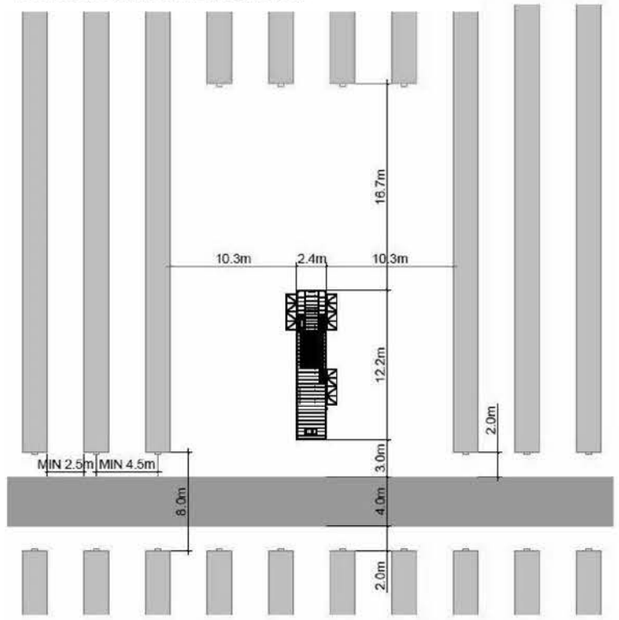
PROJECT

JUNEE SOLAR FARM

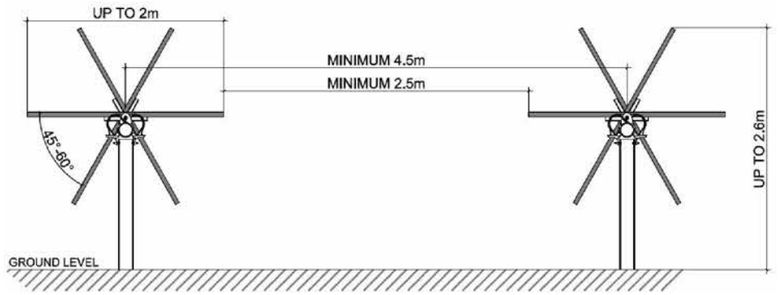
DRAWING

Name: Concept Farm Plan
Reference: 217514_03A_EV01-EV02
Sheet: EV01 of EV02
Status: Final
Date: 19/07/2018

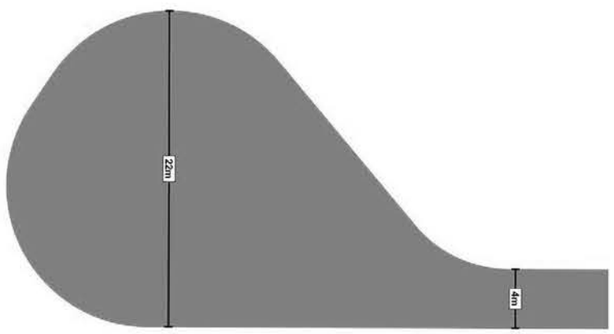
INSET A - TYPICAL INVERTER BLOCK



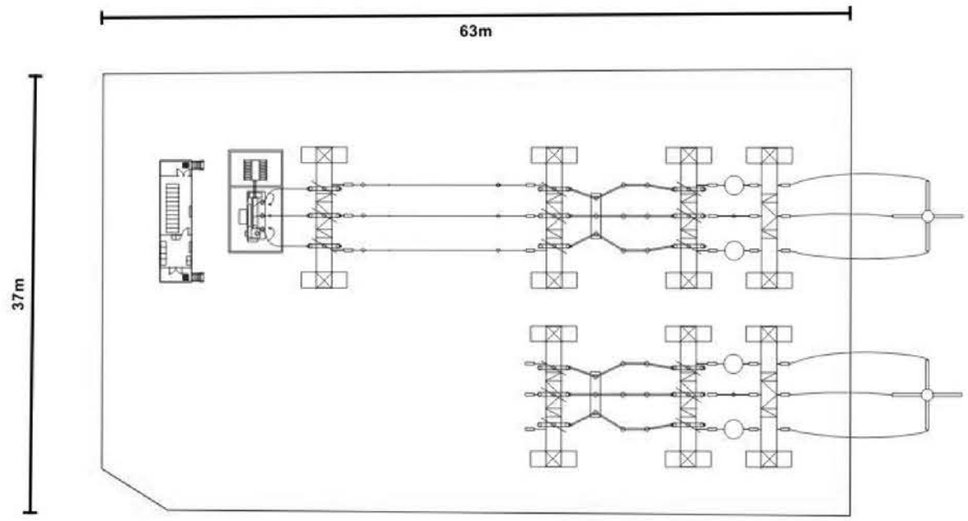
INSET B - TYPICAL TRACKER SECTION



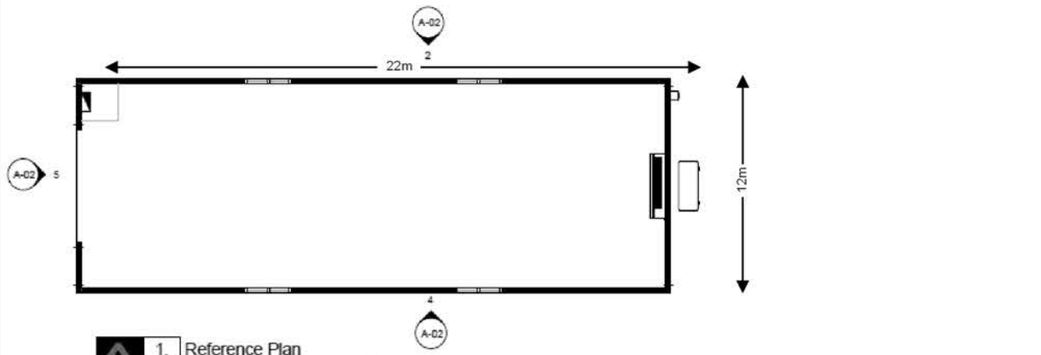
INSET C - INTERNAL ACCESS ROAD & TURNING CIRCLE DIMENSIONS



INSET D - SUBSTATION



INSET E - OPERATIONS & MAINTENANCE BUILDING



GEOLYSE
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GIS PROJECT DETAILS

Datum: GDA 1994 MGA Zone 55 (EPSG: 28355)
Directory: O:\Projects\217\217514\Out\GIS\217514.qgs
Data Source: Terrain Solar
Project Number: 217514

DRAWING SCALE

Note: Infrastructure as shown is indicative and subject ot detailed design

APPROVAL AUTHORITY

junee

Southern Joint Regional Planning Panel

CLIENT

TERRAIN SOLAR

PROJECT

JUNEE SOLAR FARM

DRAWING

Name: Detail Views
Reference: 217514_03A_EV01-EV02
Sheet: EV02 of EV02
Status: Final
Date: 19/07/2018

TERRAIN SOLAR

Claire Golder
Town Planner/Strategic Projects Officer
Temora Shire Council

Via: Email
Date: 18th July 2018

Dear Claire,

Row Spacing Between Trackers.

With regard to tracker and module spacing, to supplement the information sent on the 22nd of June 2018, I'm including an additional level of detail to justify the tracker separation proposed for the Junee Solar Farm.

Our previous letter acknowledged the commitment in the Statement of Environmental Effects to manage a healthy groundcover - including fuel load and weed management and noted that ground cover could be managed by mechanical slashing and/or crash grazing. This letter provides more context as to why the elected tracker separation has been used.

It is common practice in New South Wales is to have a tracker/row spacing (also referred to as Pitch) of approximately 4.5 to 5 meters or row-to-row clearance of at least 2.5 meters. As noted in the attached email from NexTracker (see attachment 1) this tracker separation is required to balance yield and structural integrity. This is evidenced by approvals at both the NSW Department of Planning & Environment level and the Joint Regional Planning Panel level. It's worth noting that Beryl Solar Farm was approved, by the NSW Independent Planning Commission, without having made reference to a tracker or module spacing in the Environmental Impact Assessment. This is the also the case with the majority of approved State Significant Projects. Please see below a table detailing approved NSW Solar Farms and their corresponding module spacing or tracker spacing. The relevant sections of these documents are attached to this letter (see attachment 2).

Table 1: Tracker and Module Separation on Approved NSW Solar Farm Development Applications

Solar Farm	Approval Date	Consent Authority	Module Spacing	Tracker Spacing (Pitch)
Wellington	25 May 2018	NSW Department of Planning and Environment	NA	4.15m - 4.75m
Jemalong	18 May 2018	NSW Department of Planning and Environment	NA	3m - 9m
Beryl	5 December 2017	NSW Independent Planning Commission	NA	NA
Gidginbung (Modification)	13 March 2018	Southern Joint Regional Planning Panel	NA	5m
Bomen	17 May 2018	Southern Joint Regional Planning Panel	2.5m	NA
Corowa	14 June 2018	Western Joint Regional Planning Panel	Min 2.5m	Min 4.5m

The most recently constructed solar farm that utilises 5m tracker separation is the Oakey Solar Farm in South East Queensland, 25km north west of Toowoomba. A photo of an Oaky Solar Farm tracker corridor has been provided in attachment 3. This photo was taken during construction and has been included to provide a visual representation of the width of the trackers positioned with 5m separation. Note that the corridor vegetation has been temporarily removed however the retained vegetation under the trackers is prospering in the lower light conditions. The corridor will receive greater access to light during operations, and groundcover will restore once construction ceases and operations commence.

Also provided in attachment 4 is a photo of the University of Queensland's Gatton campus solar farm (55km east of Oakey Solar Farm) to show the condition of the grass on a solar farm that has been operational since 2015 and actively manages groundcover.

I hope this additional information is helpful in understanding that a tracker spacing of 4.5m – 5m is not only common in modern NSW Solar Farms, but is an industry standard for a range of engineering and site management reasons.

Kind Regards,

Simon Ingram
Managing Director – Terrain Solar P/L

Simon Ingram <simon@terrainsolar.com>

Project Design Rules

Toby Patterson <tpatterson@nextracker.com>
To: Simon Ingram <simon@terrainsolar.com>

Hi Simon,

NEXTracker has delivered, or is in the process of delivering, over 1.5GWdc of trackers in Australia. These projects are primarily large scale solar sites over 1-2MWdc and up to 275MWdc. We are integrally involved in the design process and usually drive the layouts for these farms. From an engineering perspective, we always suggest a pitch of 4.5-5m as this balances yield versus structural integrity (wind load). We have done extensive wind tunnel analysis of dynamic wind loads the impact of increasing the pitch on pier and torque tube loads is significant.

For your sites I highly recommend a pitch in the 4.5-5m range to optimize your layout.

Best regards,

Toby Patterson

Sales Manager – Australia Pacific

M: +61 439 024 883

NEXTracker
A Flex Company

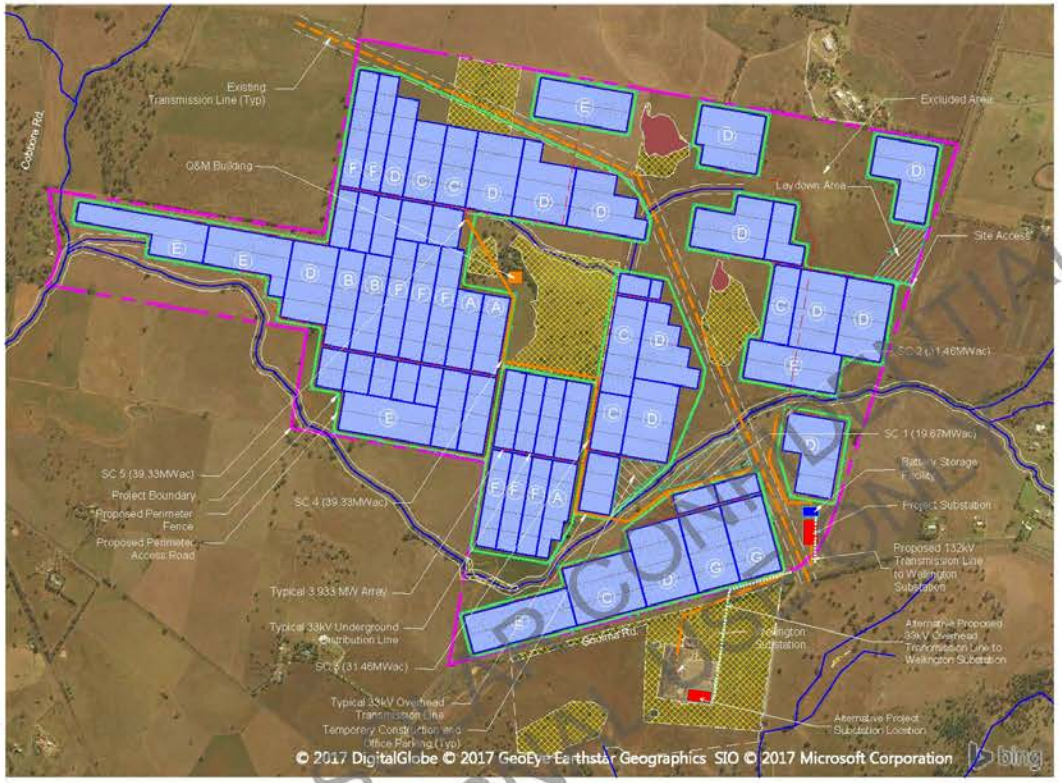
Attachment 2 - Site 1

Country Map
Scale NTS

Key Plan
Scale NTS

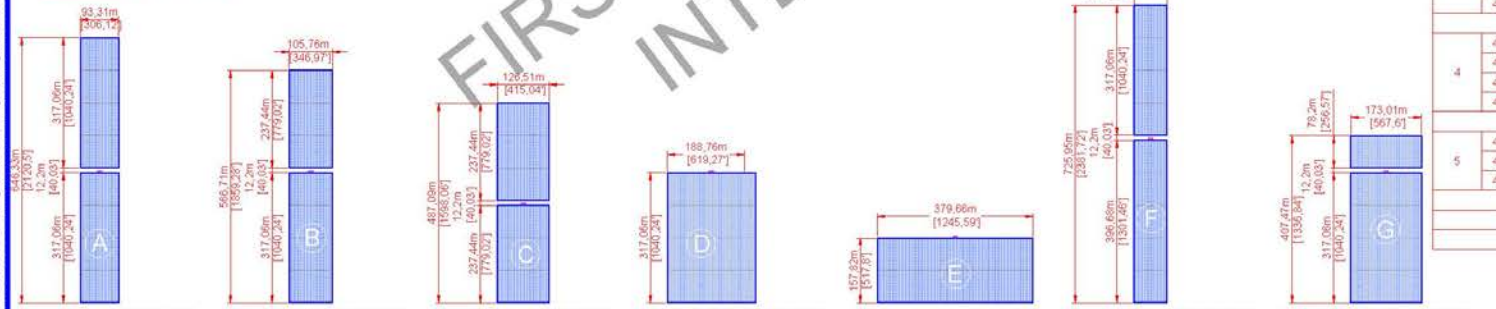
Legend:

- Project Boundary
- AC Elec. Collection Line (Underground)
- AC Elec. Collection Line (Overhead)
- AC Elec. Distribution / Transmission Line
- Existing Distribution / Transmission Line
- Perimeter Fence
- Proposed Access Road (Dirt)
- Stream
- Biodiversity Area
- Rock Constraint



Site Development Plan
Scale 1:10 000

SCALE 1:10000 (METRIC)
150 0 150 300 450 600 750
(SCALE IN METERS)



Typical 3.933 MWac Tracker Array
4747.2 kWdc / 3.933 MWac
1.2070 dc/ac Ratio
205.4 kWdc / Column
23 Columns, 4.75m (15'-6") Row Spacing
430.0 Watt Module - Series 6
6 Modules / String x 10 Strings / Table
8 Tables / Column @ 1 x 60
184 Tables / Array @ 25.8 kWdc / Table

Typical 3.933 MWac Tracker Array
4695.6 kWdc / 3.933 MWac
1.1939 dc/ac Ratio
180.6 kWdc / Column
26 Columns, 4.15m (13'-6") Row Spacing
430.0 Watt Module - Series 6
6 Modules / String x 10 Strings / Table
7 Tables / Column @ 1 x 60
182 Tables / Array @ 25.8 kWdc / Table

Typical 3.933 MWac Tracker Array
4798.8 kWdc / 3.933 MWac
1.2201 dc/ac Ratio
154.8 kWdc / Column
31 Columns, 4.15m & 4.75m Row Spacing
430.0 Watt Module - Series 6
6 Modules / String x 10 Strings / Table
6 Tables / Column @ 1 x 60
186 Tables / Array @ 25.8 kWdc / Table

Typical 3.933 MWac Tracker Array
4747.2 kWdc / 3.933 MWac
1.2070 dc/ac Ratio
103.2 kWdc / Column
46 Columns, 4.15m & 4.75m Row Spacing
430.0 Watt Module - Series 6
6 Modules / String x 10 Strings / Table
4 Tables / Column @ 1 x 60
184 Tables / Array @ 25.8 kWdc / Table

Typical 3.933 MWac Tracker Array
4747.2 kWdc / 3.933 MWac
1.2070 dc/ac Ratio
51.6 kWdc / Column
92 Columns, 4.15m (13'-6") Row Spacing
430.0 Watt Module - Series 6
6 Modules / String x 10 Strings / Table
2 Tables / Column @ 1 x 60
184 Tables / Array @ 25.8 kWdc / Table

Typical 3.933 MWac Tracker Array
4644.0 kWdc / 3.933 MWac
1.1808 dc/ac Ratio
232.2 kWdc / Column
20 Columns, 4.15m (13'-6") Row Spacing
430.0 Watt Module - Series 6
6 Modules / String x 10 Strings / Table
9 Tables / Column @ 1 x 60
180 Tables / Array @ 25.8 kWdc / Table

Typical 3.933 MWac Tracker Array
4773.0 kWdc / 3.933 MWac
1.2136 dc/ac Ratio
129.0 kWdc / Column
37 Columns, 4.75m (15'-6") Row Spacing
430.0 Watt Module - Series 6
6 Modules / String x 10 Strings / Table
5 Tables / Column @ 1 x 60
185 Tables / Array @ 25.8 kWdc / Table

Welington

Wellington, New South Wales, Australia

Product Offering
TBD

Project Developer/Owner Operator
TBD

Project Site Description

491.88	± Hectare Site
256.48	± Hectare Array
Latitude	32° 30' 42" S
Longitude	148° 57' 17" E
Elevation	360 m

Project Climatic Conditions
ASHRAE Station No. 957190

Extreme Max (50 year) Temp	46.0 °C
Extreme Min (50 year) Temp	-5.0 °C
Annual Cooling Design Temp	37.7 °C
Annual Heating Design Temp (ASHRAE 2013)	-0.6 °C

Project Design Data

Snow Load	TBD
Wind Load	TBD
Seismic Load	TBD

Project Interconnection
132 kV Distribution / Transmission Line to Wellington Substation

Photovoltaic System Parameters
161.25 - MWac System Capacity (Nominal Output)
194.07 - MWdc System Capacity (Nominal Output)
161 - 1311 kW / TBD kVA Inverters (1500 Vdc x 630 Vac)
Inverter Model - Ingecon 1640TL B630
41 - 4.0 MVA Transformers (630 V x 33 kV)
5 - 33 kV Sectionalizing Cabinets
1 - 33 kV x 132 kV Transformer

Solar Production
NexTracker Mounting System
141.59 MWac @ 10° Azimuth
33 kV Collection System
1500 Volt dc PV System Design
19.67 MWac @ 345° Azimuth
132 kV Dist. or Trans. System

SC	Module	Row Spacing (m)	kWdc / Table	# of Tables / Array	3.933 MW Array	Sub Total of Tables	MWac	MWdc	dc/ac Ratio
1	430.0	4.75	25.80	184	2	368	7.87	9.49	1.2070
	430.0	4.75	25.80	185	2	370	7.87	9.55	1.2136
	430.0	4.75	25.80	186	1	186	3.93	4.80	1.2201
SC 1 Subtotal					5	924	19.67	23.84	1.2123
2	430.0	4.15	25.80	184	7	1288	27.53	33.23	1.2070
	430.0	4.15	25.80	186	1	186	3.93	4.80	1.2201
SC 2 Subtotal					8	1474	31.46	38.03	1.2087
3	430.0	4.15	25.80	180	3	540	11.80	13.93	1.1808
	430.0	4.15	25.80	184	2	368	7.87	9.49	1.2070
	430.0	4.75	25.80	184	1	184	3.93	4.75	1.2070
	430.0	4.15	25.80	186	2	372	7.87	9.60	1.2201
SC 3 Subtotal					8	1464	31.46	37.77	1.2005
4	430.0	4.15	25.80	180	3	540	11.80	13.93	1.1808
	430.0	4.15	25.80	182	2	364	7.87	9.39	1.1939
	430.0	4.15	25.80	184	3	552	11.80	14.24	1.2070
	430.0	4.75	25.80	184	2	368	7.87	9.49	1.2070
SC 4 Subtotal					10	1824	39.33	47.06	1.1965
5	430.0	4.15	25.80	180	2	360	7.87	9.29	1.1808
	430.0	4.15	25.80	184	6	1104	23.60	28.48	1.2070
	430.0	4.15	25.80	186	2	372	7.87	9.60	1.2201
SC 5 Subtotal					10	1836	39.33	47.37	1.2044
Total System Capacity					41	7522	161.25	194.07	1.2035
Total Net Capacity							160		

Site Plan Data Source

Feature	Description
Boundary	Wellington Indicative Constraints KMZ
Coordinate System	Map Grid of Australia Zone 56, using GDA94 datum
Topography	
Hydrology	
Wetlands	
Geotechnical	
Environmental Constraint	

THIS PRINT IS DESIGNED FOR 24" X 36" PLOTTING

THIS SITE DEVELOPMENT PLAN IS PRELIMINARY AND SUBJECT TO REVISION BASED ON, AMONG OTHER THINGS, CHANGES IN PROJECT SCHEDULE, TECHNOLOGY, AND/OR SITE SPECIFIC CONSTRAINTS.

THIS PRINT IS NOT TO BE USED FOR CONSTRUCTION UNLESS NOTED AND SIGNED OK FOR CONSTRUCTION ABOVE LAST REVISION.

First Solar.
FIRST SOLAR, LLC
350 CROSSING BOULEVARD, 5TH FLOOR
BRIDGEWATER, NJ 08807
PHONE (908) 809-4000
WWW.FIRSTSOLAR.COM

PROFESSIONAL ENGR.

Wellington
Wellington
New South Wales
Australia
160MWac Net Capacity

REV	DATE	REVISION DESCRIPTION	BY	CHK	APP
D	10-27-17	Added Battery Storage & Re-located Site Access	PS	BS	D
C	9-12-17	Re-sized Array Structure	VK	BS	D
B	8-28-17	Added New Constraints & Revised Arrays	VK	BS	D
A	5-2-17	Conceptual Design - Tracker Mounting System	VK	BS	BC

FS JOB #: 0000-0000-00
PROJ. DSGR: VK
PROJ. ENGR: Beth Sorensen
PROJ. MGR:
PROJ. DIR:
SCALE: AS NOTED
SHEET TITLE

Site Development Plan

SD-100-T

SHEET 1 OF 1

Y:\FS_Projects\FS Site Development\First Solar AU\Wellington\Active Drawings\Wellington SD-100-T-Rev D.dwg FS117625 Oct 27, 2017 - 1:57pm

hectare lot for the proposed substation. At the end of the life of the solar plant, once all infrastructure has been removed, it is expected that the leased lot would be reconsolidated back into the property as well as the substation lot, depending on the final requirements of Essential Energy.

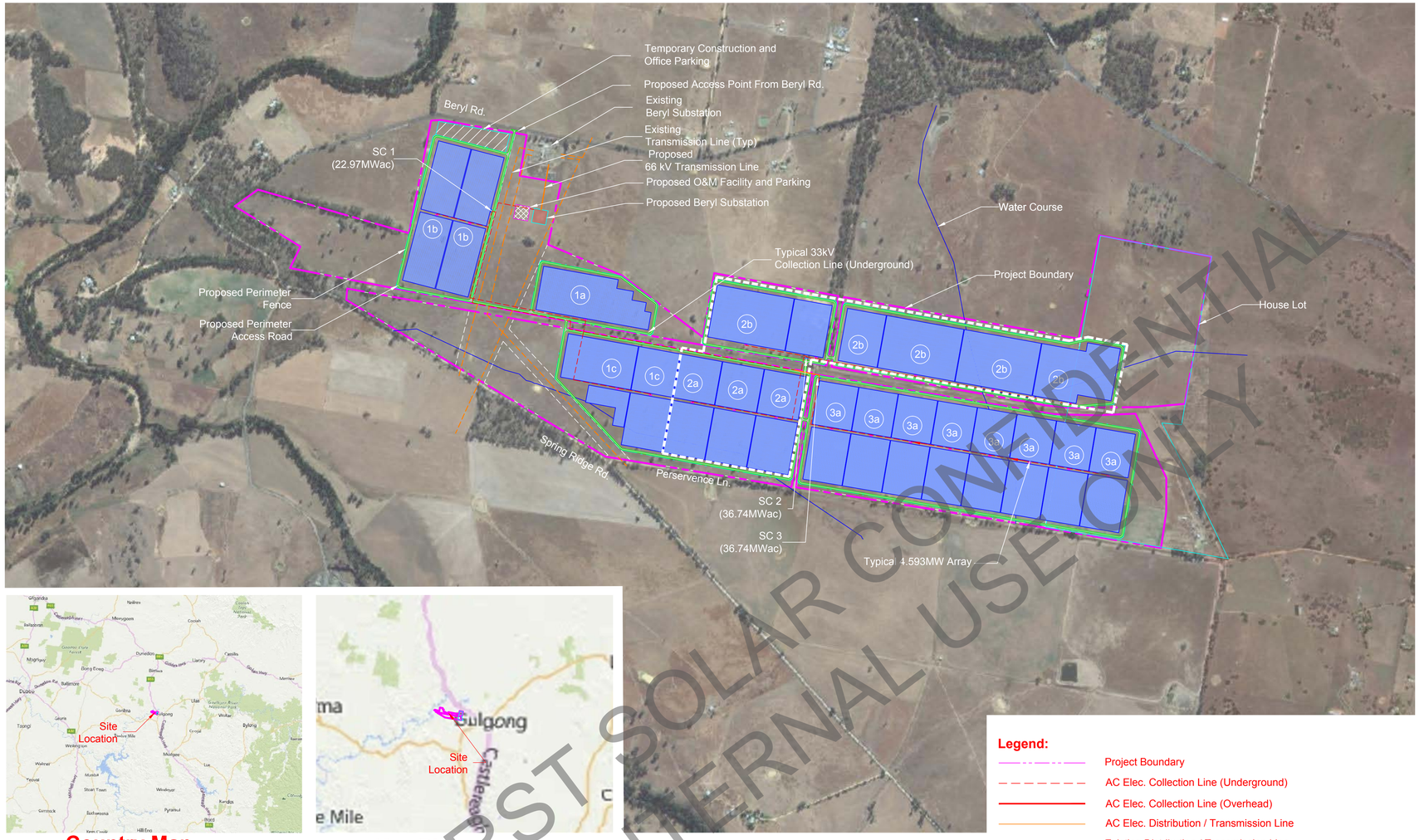
4.1.1 Summary table

The key features of the Proposal are summarised in Table 4-1. Note that component specifications are subject to detailed design and product selection.

Table 4-1 Summary of the key features of the Proposal

Proposal element	Description
Proposal	Jemalong Solar PV Plant
Proponent	Vast Solar Pty Ltd
Capacity	Around 50 MW
Proposal Site area	165 hectares of which the PV Plant will occupy approximately 50% of the site and includes the 5km long 66kV Power Line with a 45m wide buffer surveyed for the Biodiversity Assessment
Site description	The land that will be used for the construction and operation of the Project, comprising parts of the following lots: Lot 13 DP753118, Lot 41 DP 753118, Lot 1 DP 652274, the land known as Naroo Lane, Lot 5 DP 1118332, lot 48 753118, Lot 1 DP 1118332, the land comprising the Cadow Channel and Lot 1 DP 441702. This comprises the land required to construct the substation, the solar field, the proposed internal access tracks, and the corridor for the 66kV power line and connection to the existing West Jemalong substation
Local Government	Forbes Shire Council
Subdivision	The property would be subdivided to create the subdivision of the property to create an approximately 165 hectare lot for the purposes of a lease from the landowner for the main site of the PV Plant and an approximately 0.5 hectare lot for the proposed substation.
Solar array	Approximately 170,000 solar panels mounted in rows up to 100m long, with 3-9m row spacing. The panels would have a maximum height of 3m to 3.5m and the 16,750 array posts would be inserted to a depth of up to 2.4m into the ground.
Substation	An on-site substation occupying around 1 ha with gravelled hardstand and security fencing.
Internal access tracks	Access tracks constructed of engineered fill topped with crushed stone pavement would access the PV Plant infrastructure for maintenance. The driving surface would be 4m wide, plus shoulders and any required drainage.
Operations and maintenance buildings	Buildings would be constructed to provide control, switchroom and storage facilities for the PV Plant.
Security fencing, lighting and CCTV	Continuous security lighting and CCTV cameras would be installed on posts up to 3m high adjacent to the perimeter security fencing and around the operation and maintenance buildings. Security fencing installed around the site would indicatively be 2.3m high.
Construction hours	Standard daytime construction hours would be7.00am to 6.00pm Monday to Friday and 7.00am to 1.00pm on Saturdays.
Construction timing	12 months commencing June 2018
Workforce	Construction – approximately 100 workers Operation - 3-4 full time equivalent staff
Operation period	Up to 30 years
Decommissioning	The site would be returned to its pre-works state. All above ground infrastructure would be removed to a depth of 500mm. The site would be rehabilitated in

Attachment 2 - Site 3



Country Map
Scale NTS

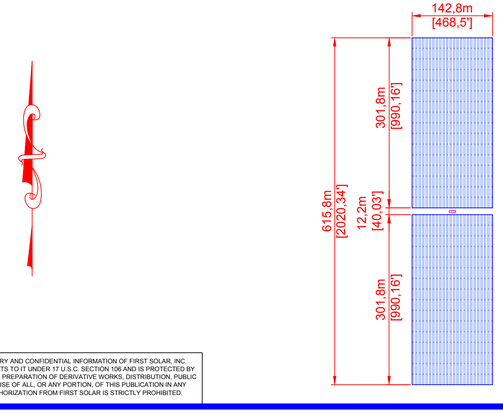
Key Plan
Scale NTS

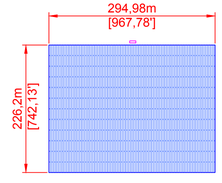
Site Development Plan
Scale 1:10 000

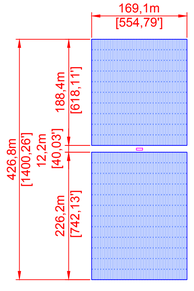
SCALE 1:10000 (METRIC)

150 0 150 300 450 600 750

(SCALE IN METERS)







Legend:

- Project Boundary
- AC Elec. Collection Line (Underground)
- AC Elec. Collection Line (Overhead)
- AC Elec. Distribution / Transmission Line
- Existing Distribution / Transmission Line
- Perimeter Fence
- Proposed Access Road (Dirt)

Beryl Solar Plant
Beryl, New South Wales, Australia

Product Offering
TBD

Project Developer/Owner Operator
First Solar

Project Site Description

303.94	± Hectare Site
169.24	± Hectare Array
Latitude	32°21'26" S
Longitude	149°28'17" E
Elevation	420 m

Project Climatic Conditions
ASHRAE Station No. 947270

Extreme Max (50 year) Temp	43.1 °C
Extreme Min (50 year) Temp	-7.7 °C
Annual Cooling Design Temp	34.7 °C
Annual Heating Design Temp	-2.7 °C

(ASHRAE 2013)

Project Design Data

Snow Load	Sg=0
Wind Load	Region A1, Vr=43m/s
Seismic Load	Z=0.08, Kp=0.75

Project Interconnection
66 kV Distribution / Transmission Line to Existing Beryl Substation

Photovoltaic System Parameters
96.45 - MWac System Capacity (Nominal Output)
116.76 - MWdc System Capacity (Nominal Output)

Solar Production
Tracker Mounting System
10° Azimuth
1500 Volt dc PV System Design
33 kV Collection System
66 kV Dist. or Trans. System

Array	Types	Qty
Standard	3	17
Sub-Array	1	1
Custom	3	3

Site Plan Data Source

Feature	Description
Boundary	Beryl PV Site KMZ
Coordinate System	Map Grid of Australia Zone 55, using GDA94 datum
Topography	
Hydrology	
Wetlands	
Geotechnical	
Environmental Constraint	

THIS PRINT IS DESIGNED FOR 24" X 36" PLOTTING

THIS SITE DEVELOPMENT PLAN IS PRELIMINARY AND SUBJECT TO REVISION BASED ON, AMONG OTHER THINGS, CHANGES IN PROJECT SCHEDULE, TECHNOLOGY, AND/OR SITE SPECIFIC CONSTRAINTS.

THIS PRINT IS NOT TO BE USED FOR CONSTRUCTION UNLESS NOTED AND SIGNED OK FOR CONSTRUCTION ABOVE LAST REVISION.

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PROFESSIONAL ENGR.

Beryl Solar Plant
Beryl
New South Wales
Australia, Australia
95MWac Net Capacity

REV	DATE	REVISION DISCRIPTION	BY	CHK	APP
D	3-17-17	Revised Capacity	VK	JH	JH
C	2-20-17	Revised Per Comments	FD	JH	JH
B	11-10-16	Revised Array Layout	FD	JH	JH
A	10-28-16	Conceptual Design - Tracker Mounting System	DK	JH	JH

FS JOB #:	0000-0000-00
PROJ. DSGR:	Daiva Kinneman
PROJ. ENGR:	
PROJ. MGR:	
PROJ. DIR:	John Hartelius P.E.
SCALE:	AS NOTED

SHEET TITLE

Site Development Plan

SD-100-T

SHEET 1 OF 1

Y:\FS_Projects\FS Site Development\First Solar AU\Beryl Solar Plant\Active Drawings\Beryl SD-100-T.dwg FS116425 Mar 17, 2017 - 3:13pm

4 Design Changes

A summary of the design is listed below:

Original design per DA 23/2016	Proposed design	Comments
15MWp	25.6MWp	66% higher
48,960 solar modules	71,148	46% more
300 watt panels	360 watt panels	16.7% higher
30 GWh/year output	50 GWh/year output	66% higher
	5m row spacing	More tightly packed to reduce land area
Containerised inverter station	Containerised inverter station	No change
9 inverter stations	7 inverter stations	Fewer, for reduced noise and visual impact
Single-axis tracking system		No change
2.2m full tilt (max) height		No change
Security fence		No change
Compacted access internal roads		No change
Site access off Taylors Road		No change
44.8 ha fenced area		
22/66kV step-up transformers and substation		No change

Drawing "J1795 100-P1 Concept Site Layout (Gidginbung Solar Farm)" shows the revised layout.

The most significant change has been to move to newer, high efficiency PV modules that use the latest technical advances to increase the conversion rate of electricity. Simply, more electricity is generated from the same physical area. The PV panels still look the same, and have the same form factor and same basic technical underpinnings to silently and reliably convert sunlight into electricity.

The new panels also allow a more efficient configuration of the field wiring which reduces cabling costs and parasitic losses.

The new panels also enable use of more modern, higher capacity inverters. The number of inverters has been reduced from nine (9) to seven (7) with a commensurate reduction in noise and visual impact.

Retention of the same form factor means that the same single-axis tracking equipment will be used. Apart from the increased land footprint, the solar farm will look identical to that put forward in the original DA 23/2016.

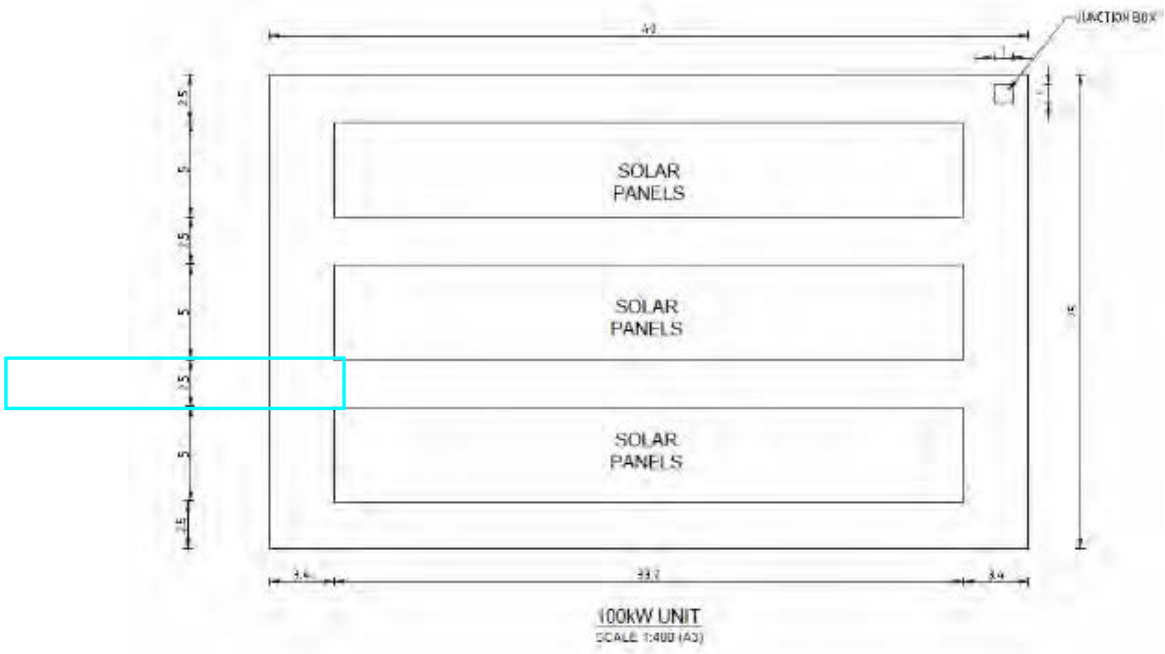
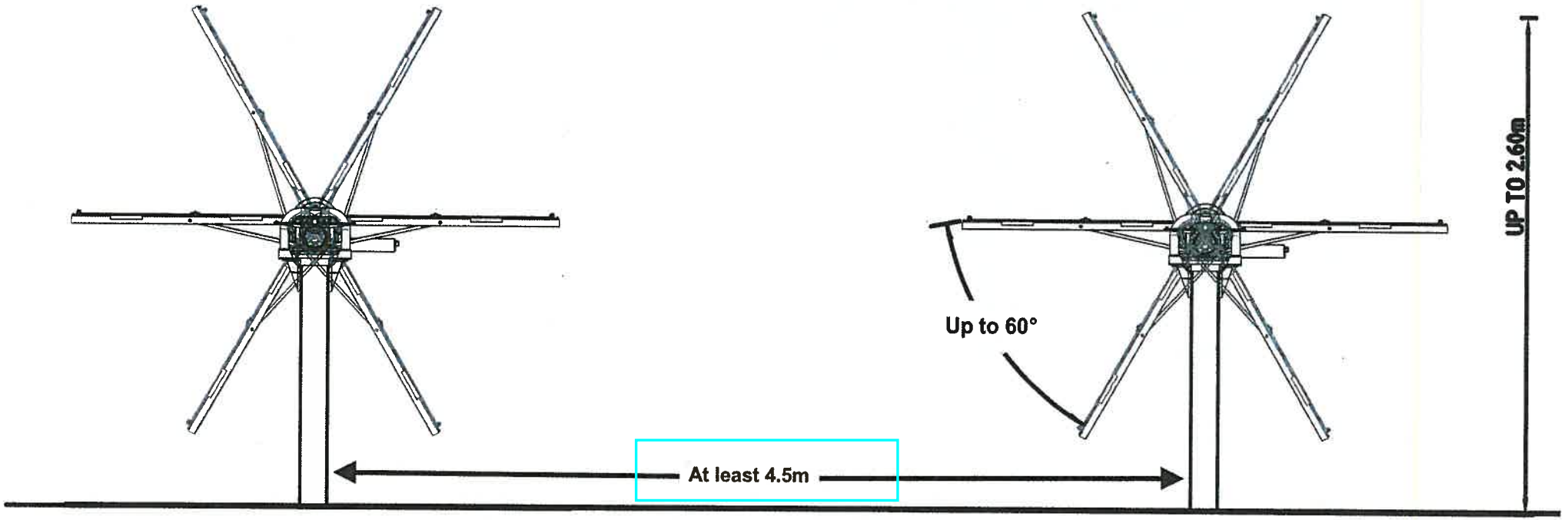


Figure 3: Indicative module layout (not to scale)

A transmission line would connect the plant to the proposed substation for onward connection to the 66kV transmission line (noting that Essential Energy have indicated that this line would be replaced in future by a proposed 132kV line). **Figure 4** demonstrates existing and proposed electricity services in the context of the proposed site. It is noted that the existing 66kV line does not follow the existing easement location and has at some point been diverted centrally to run adjacent to the eastern boundary of Lot 1.



Not to scale

Typical Tracker Cross Section.

FEDERATION COUNCIL
Development Consent No. 2018/32
Plan No. 4 of 5
Planning Officer Klarae
Date 16 JUNE 2018

Attachment 4