



SUNTOP SOLAR FARM

MODIFICATION APPLICATION 1
DEVELOPMENT CONSENT SSD 8696

JULY 2019

PREPARED FOR SUNTOP SOLAR FARM PTY LTD

Prepared by



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Energy Forms

Level 8, 91 William St, Melbourne

P O Box 23040 Docklands 8012

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1. EXECUTIVE SUMMARY

Suntop Solar Farm Pty Ltd is the proponent of the Suntop Solar Farm (**Project**). Development consent for construction and operation of the Project was granted by the Minister for Planning on 4th under Section 4.38 of the *Environmental Planning and Assessment Act 1979* (NSW), reference SSD 8696. (**EP&A Act**).

The purpose of this report is to support the application to the Minister to modify the Development Consent under Section 4.55 (1) & (1A) of the *Environmental Planning & Assessment Act 1979*.

The application to modify the development consent involves relocation of the substation and ancillary infrastructure, increased landscaping, a minor administrative change to the Site Plan and modifications to the originally submitted subdivision layout corresponding with the substation relocation.

An updated Site Plan is provided in Figure 1 below and at Appendix 1 for reference. An updated subdivision plan is provided at Appendix 3 for reference. Additional detailed plans have been provided to further show the details of the proposed modification. These plans are relevant to the impacts of the proposed modification.

It is considered the proposed modification will not result in any unreasonable additional environmental impacts than assessed under the original development and represents substantially the same development.

2. PROJECT SUMMARY

PROJECT TITLE **Suntop Solar Farm**

ADDRESS	909 Suntop Road, Wellington NSW on, Lots 1,2 and part Lot 3 DP 506925, Lot 122 DP 753238 and Lot 90 DP 657805
REGIONAL PLAN	Central West and Orana
LOCAL GOVERNMENT	Dubbo Regional Council
ENVIRONMENTAL PLAN	Wellington Local Environmental Plan 2012
ZONING	Primary Production (RU1)
APPROVAL	Development Consent SSD 8696 Approved 04-12-2018

3. PROPOSED MODIFICATION AND JUSTIFICATION

PROPOSED MODIFICATION

The application to modify the development consent involves the following proposed changes to the approved development:

1. Relocation of the substation and changes to its layout
2. Increased landscaping along the western boundary
3. Administrative changed to the Site Plan (correcting errors)
4. Amending the subdivision plan, creation of an access easement and subsequent formal consent of the proposed subdivision by condition in Development Consent

1. Relocation of the substation and layout change

The substation is proposed to be relocated from its approved location and moved approximately 400m to the north east away from the existing waterway as shown below in Figure 1 and attached at Appendix 1. A comparison site plan showing the approved and proposed location of the substation is provided below in Figure 2 below and also attached at Appendix 1.

The components of the substation will remain the same, however an allowance has been made for up to 4 switchgear and 2 auxiliary buildings (40 ft container style buildings) as opposed to a single switchgear and a single auxiliary building as outlined in the Suntop Solar Farm Environmental Impact Statement.

The modification also increases the overall size of the land area allocated to the substation to allow for increased setbacks as required by TransGrid. Furthermore, the substation is now proposed to be housed in two discrete areas to facilitate different ownership responsibilities for the two key elements of the substation.

The elements within these two discrete areas will be as follows:

- 1) The main substation, containing the transformer(s) and connection into the grid. The site area of this component is 175m x 125m. A typical layout and elevation plan for the substation is provided in the Indicative Substation Layout plan and General Substation Arrangement and Elevation plans for a 132kV substation attached at Appendix 2 for reference. This is indicative of the substation that will be constructed on the site and is based on ongoing discussions with TransGrid. This final design is subject to ongoing detailed design to be completed with TransGrid.
- 2) Switching gear and auxiliary equipment, an area containing between 2 and 6 X 40 ft shipping container size and style buildings to house medium voltage (MV) and low voltage (LV) switchgear as well as auxiliary equipment. The site area of this component is 80m x 125m.

To further assist with understanding the changes associated with the proposed substation relocation, a comparison site plan has been provided at Appendix 1 and comparison plan showing a close up of the substation area is provided at Appendix 2. These plans show the original and proposed position of the substation area for the project to assist in understanding the changes proposed under this modification and their potential impacts. In addition an environmental impact assessment is provided below in Section 5 below.

The separation of the substation into two discrete elements is the result of ongoing negotiations with TransGrid and their requirements with respect to how this infrastructure is to be owned and operated. All of these elements were described in the original EIS submission for the Suntop Solar Farm and it was noted that these elements would be subject to further detailed design.

Whilst the land area for the proposed substation has been increased to allow for increased setbacks from the substation fence, the total footprint of the substation is proposed to be generally the same with the exception of the four additional shipping container style buildings in the "Switching gear and auxiliary equipment". The necessity for these additional buildings in the Switching gear and auxiliary equipment is to be determined through the final detailed design process for the substation.

The proposed relocation of the substation is entirely within the assessed Development Footprint of the Suntop Solar Farm. The revised location for the substation is largely replacing an area proposed to be a solar field under the originally approved development. The comparison Site Plan comparing the originally approved and proposed substation location and layout is provided in Figure 2 below and at Appendix 1 and close up plan of this area is provided at Appendix 2 for reference. Whilst the modification will result in a reduction in the solar field area, it is anticipated that the impacts on the total capacity of the solar farm can be recovered through the detailed design and design optimisation processes.

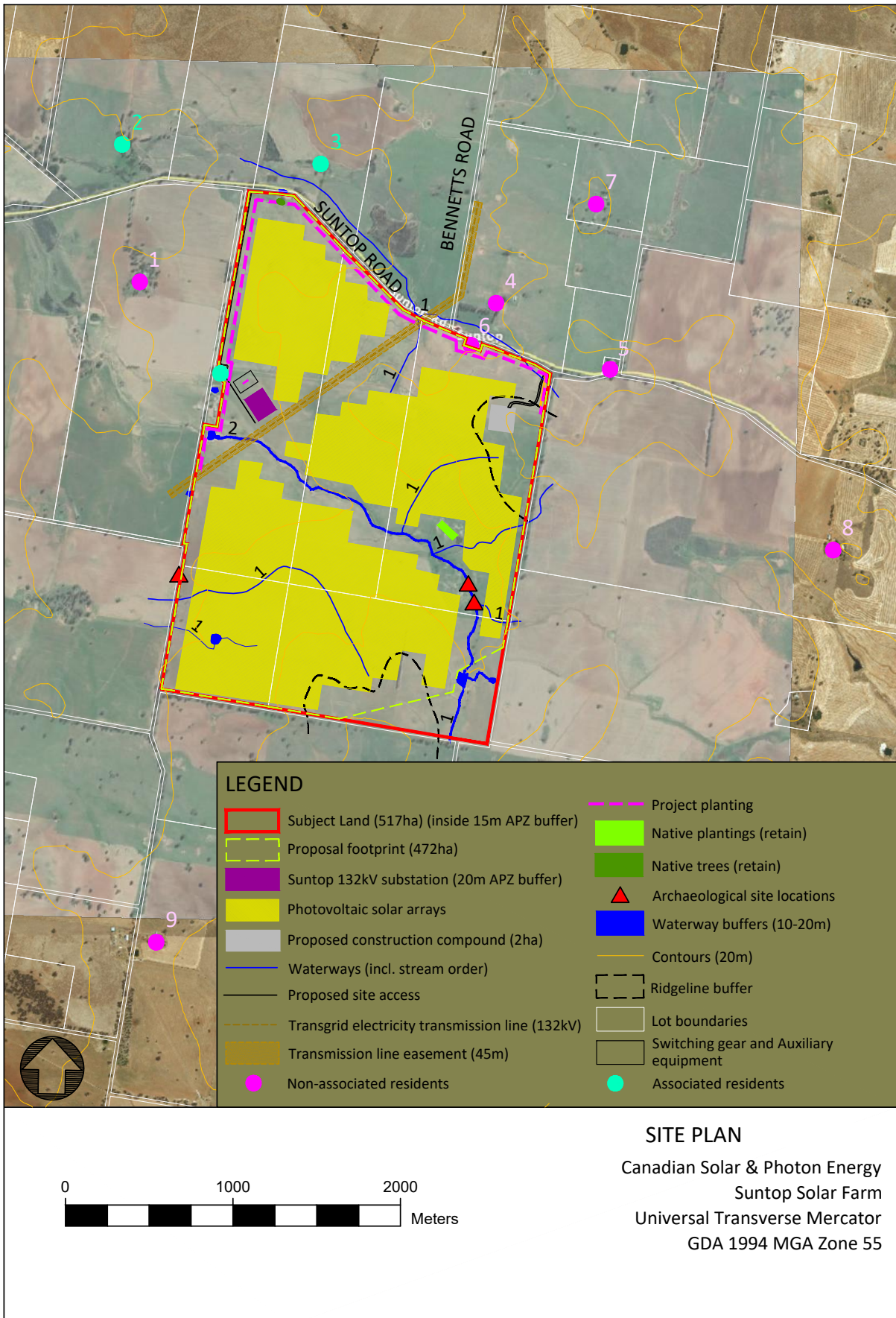
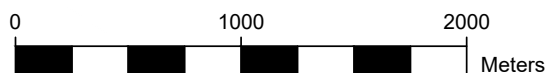
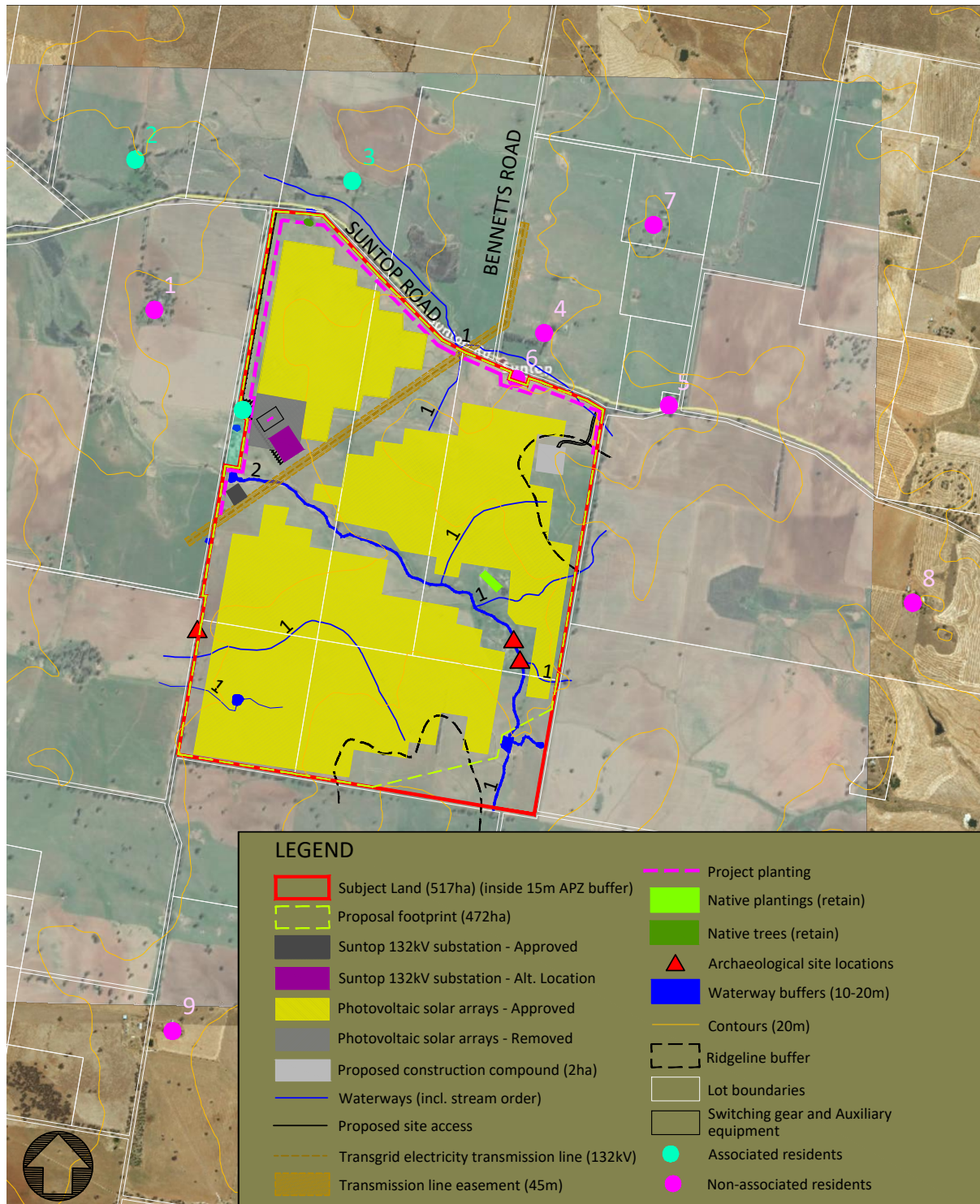


FIGURE 1 SITE LAYOUT RELOCATED SUBSTATION AND ANCILLARY BUILDINGS



SITE PLAN COMPARISON

Canadian Solar & Photon Energy
Suntop Solar Farm
Universal Transverse Mercator
GDA 1994 MGA Zone 55

FIGURE 2: SITE LAYOUT PLAN SHOWING COMPARISON OF APPROVED AND PROPOSED SUBSTATION LOCATION

2. Increased landscaping along western boundary

The modification proposes a minor change to the proposed vegetation screening along the western boundary to increase the screening for the revised substation location. Also shown in Figure 1 above and attached at Appendix 1. It is now proposed to implement a contiguous landscaped screen along the western boundary of the site from the front to the northern edge of the 132kV Powerline easement. Under the approved plan, this planting was infill planting only.

3. Administrative change to the Site Plan

The modification also proposes a minor administrative change to the Site Plan. This change involves rectifying a minor drafting error in the location of the site boundary around the existing vacant dwelling on the Suntop Solar Farm Site. Due to the high-level scale of this plan, the boundary currently unintentionally excludes the dwelling from the site in the approved General Layout of Development Plan and the Green dot indicating this dwelling is incorrectly positioned. As detailed in the EIS assessment and several figures and other associated plans, the intention was always to include this dwelling in the solar farm site. To this end, the submitted Site Plan at Figure 1 below and at Appendix 1 has been updated to rectify this minor error by moving the site boundary to the south of this dwelling so it is included in the solar farm site and moving the green dot indicating the location of this dwelling into the correct position.

4. Amending the subdivision plan, creation of an access easement and subsequent formal consent of the proposed subdivision by condition in Development Consent

Finally, the modification proposes changes to the subdivision plan in alignment with the proposed relocation of the substation, requirements from TransGrid and formalisation of the subdivision in the Development Consent.

Proposed Modification to Subdivision Layout & Creation of Access Easement

The Suntop Solar Farm EIS proposed a subdivision of the existing five lots into three lots.

The subdivision was detailed as follows:

- Lot 1 - formerly a 4ha portion of Lot 3 DP 506925 comprising an access road and farm buildings; and
- Lot 2 – an 80m x 60m lot for the substation
- Lot 3 – the remaining 513ha of Lot 3 DP506925 plus Lots 1 and 2 DP 506925, Lot 122 DP 753238 and Lot 90 DP 657805 including agricultural paddocks and a vacant residential building.

The originally submitted subdivision is shown below in Figure 3 below and attached at Appendix 3 for reference.

Subsequent to the Development Consent, the proposed substation relocation now requires a change to location and dimension of Lot 2 and TransGrid have advised they also require permanent right of access to the substation.

The modification therefore proposes the following changes to the plan of subdivision:

- Relocation of the proposed lot for the substation in the subdivision to align with the proposed substation relocation

- Increase the size of the substation lot area to allow for the setbacks required by TransGrid
- Creation of an access easement to the substation from Suntop Road for TransGrid.

A revised plan of subdivision is shown below in Figure 4 and attached at Appendix 3 for reference. The subdivision is effectively a merging of the existing five lots (Lot 3 DP506925, Lot 122 DP753238, Lot 90 DP657805, Lot 2 DP506925, Lot 1 DP506925) into three lots as per the original Development Consent.

The three lots in the proposed modification to the subdivision are described as follows:

- Lot 1 - formerly a 4ha portion of Lot 3 DP 506925 comprising an access road and farm buildings; and
- Lot 2 – approximately 2ha portion of Lot 3 DP 506925 for the substation
- Lot 3 – the remaining 512ha of Lot 3 DP506925 plus Lots 1 and 2 DP 506925, Lot 122 DP 753238 and Lot 90 DP 657805 including agricultural paddocks and a vacant residential building and creation of an access easement over the solar farm access road in this lot in benefit of the owners of Lot 2 (TransGrid).

Include Subdivision in Development Consent

The proposed subdivision was submitted as part of the EIS and assessed through this approval process but no formal request was made to formalise the approval in the Development Consent. As such, in addition to the above proposed subdivision modifications it is considered appropriate to formally request that Schedule 2 of the Development Consent (SSD 8696) be updated to include a condition that formalises consent of the subdivision.

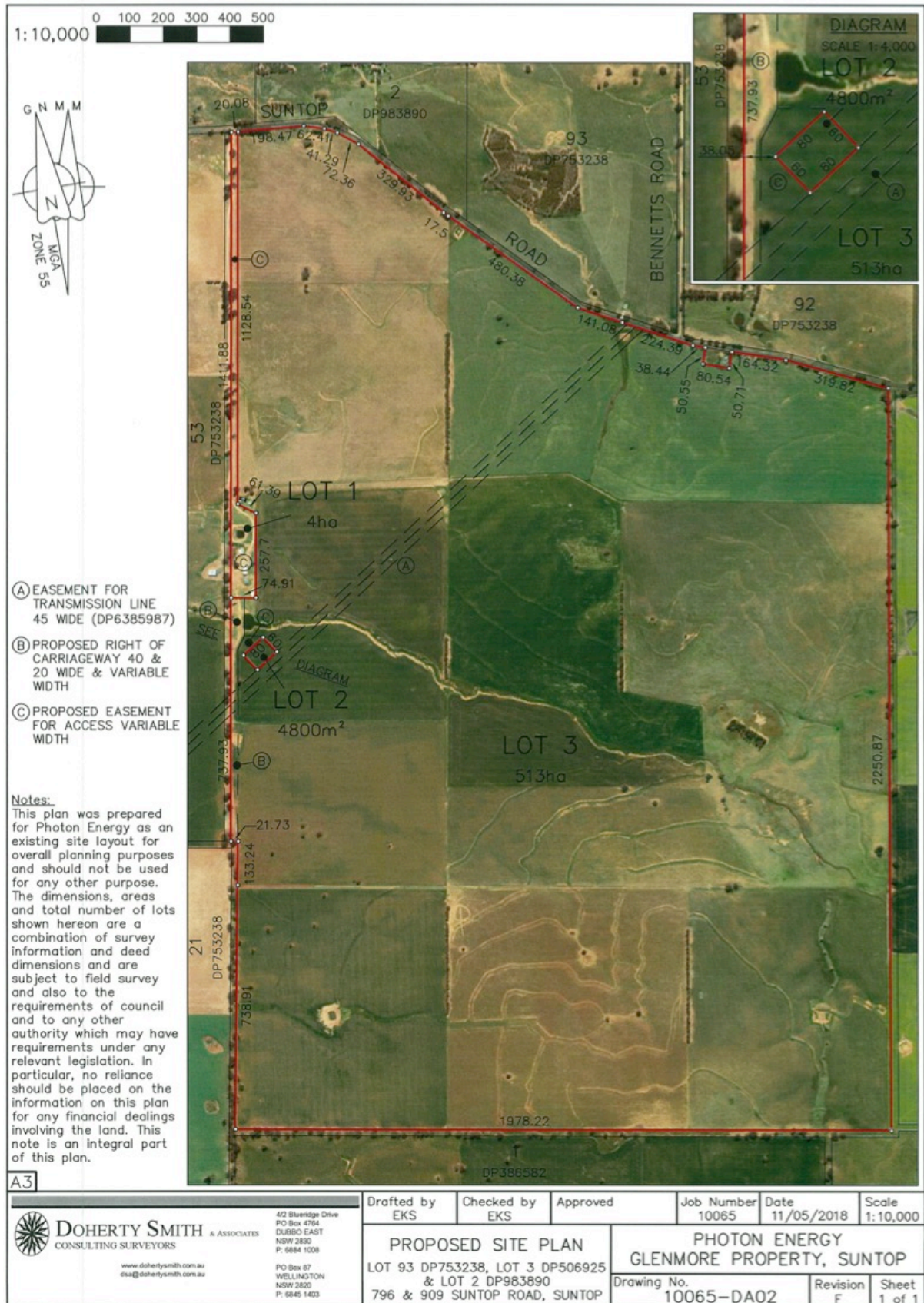


FIGURE 3: ORIGINAL SUBDIVISION LAYOUT (3 LOTS)

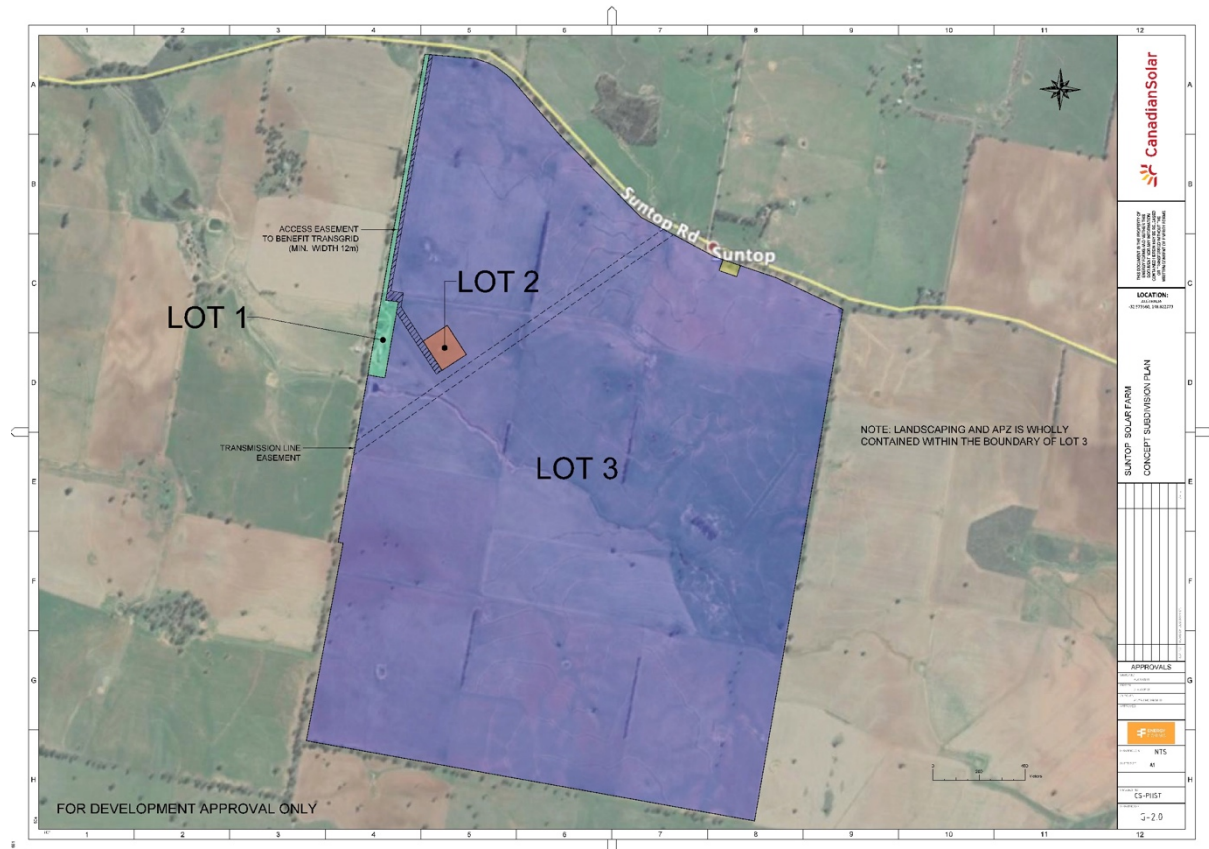


FIGURE 4: PROPOSED MODIFICATION TO SUBDIVISION RELOCATING LOT FOR THE SUBSTATION AND CREATING AN ACCESS EASEMENT TO THE SUBSTATION (3 LOTS)

Summary

Based on the information provided above, the proposed modification is considered to represent substantially the same development as the approved development and will not result in an increase in environmental impacts. The application to modify the Development Consent is therefore considered to meet the requirements for an application under Section 4.55 (1) & (1A) of the *Environmental Planning & Assessment Act 1979*.

MODIFICATION JUSTIFICATION

The relocation of the substation will result in a net improvement in environmental outcomes for the site and surrounds based on the following:

- The proposed changes under the modification are entirely within the approved Development Footprint
- Increased setbacks from the waterway resulting in reduced potential for impacts on the waterway;
- The proposed substation access road as shown in the modified plans will now not be required to be built over the waterway, reducing any potential impacts on this waterway;
- The relocation area:
 - Is clear of any archaeological sites
 - will only require minor additional earthworks but in a location that is set further away from sensitive interfaces and will not have any additional soil and water impacts compared with the works proposed under the approved development
 - is largely replacing an area that was proposed to be occupied by the solar field
 - does not require in the removal of any native trees or plantings and will not change the amount
 - is further away from the Asset Protection Zone (APZ) around the boundary of the site;
- The relocation area and accessway will retain and increase the existing project planting areas;
- The relocation will not result in any increase in visual impacts on the relevant sensitive receivers associated with the project;
- Changes to the vegetation screening will ensure the amenity of the respective sensitive receivers is protected; and
- The submitted layout in the EIS was concept and anticipated changes to the layout based on ongoing grid connection negotiations and the detailed design process.

The Environmental Impact Statement prepared for the Suntop Solar Farm included a visual impact assessment from a number of public and private viewpoints analysing visual impacts and proposing mitigation measures to be integrated into the development, including planting on the northern and western site boundaries. These landscaping requirements now form part of the approval.

These approved landscape measures will continue to assist in minimising the impact of the relocated substation and ancillary building areas given these areas will be located in the north west portion of the site. The modification proposes to further enhance these landscape measures along the western boundary to provide additional protection to the respective sensitive receiver on the respective neighbouring property to the west.

It is noted that whilst the modification increases the setback from the western boundary the nearest part of the substation will be approximately 400m closer to the northern site boundary (abutting Suntop Road), decreasing the setback of this element of the project from approximately 1.5km to approximately 1.1km. However, over this distance any additional impact on Suntop Road (as a sensitive receiver) is considered to be negligible.

Envisage Consulting undertook a Visual Impact Assessment for the Suntop Solar Farm and their Assessment report formed part of the submitted EIS for the project. Envisage Consulting were further engaged to review the net impacts of the proposed modification with respect to their original assessment of the now approved development. The conclusion from this analysis is that there will be no impact resulting from the proposed modification excluding a modest increase in visibility of the substation from the neighbours to the immediate west, however this was considered to represent an increase in visual impacts from the now approved development. Envisage therefore concluded there would be no change to their impact ratings from their original assessment and summarised these findings in a Memorandum attached at Appendix 4 for reference.

The potential impacts of the relocation of the substation and ancillary buildings area to nearby sensitive receptors (NSRs) are mitigated through:

- the revised location increases western boundary setbacks
- the relocated substation and ancillary buildings area will continue to be screened by proposed plantings and additional plantings along the north and west boundaries;
- the revised location remains approximately 1.1km from Suntop Road with many rows of panels in this 1.1km area.

Along with a Memorandum from Envisage Consulting, the relevant photomontages prepared as part of the original Visual Impact Assessment (VIA) submitted with the EIS for the project have been revised to reflect the impacts of the proposed substation relocation.

The EIS submission and assessment for Suntop Solar Farm included a three-lot subdivision. The modification to the subdivision relocates the proposed freehold parcel for the substation and proposes an access easement benefiting the ultimate owner of the substation parcel. These changes will not have any adverse environmental impacts but are necessary for the substation asset to be transferred into the ownership of TransGrid and for their ongoing permanent access for operations and maintenance purposes.

The creation of this lot will only proceed in association with the development of the solar farm and therefore this will not lead to any unreasonable fragmentation of rural land, as with the approved proposed lot for the farm buildings. The proposed access easement to the benefit of TransGrid will ensure their independent access is protected in perpetuity to allow ongoing operation and maintenance of this infrastructure. This road will be shared with the proposed solar farm access roads.

4. COMPARATIVE ANALYSIS

Table 1 below provides a comparative analysis between the approved development and the development in the proposed modification. In addition to the above comparison plan at figure 2, an extract of the site layout and proposed modified layout are provided side by side below at Figure 4 for reference.

TABLE 1 COMPARATIVE ANALYSIS BETWEEN APPROVED SOLAR FARM AND PROPOSED MODIFICATION

Project Element	Originally Approved Development	Proposed Modification
Development size, scale and footprint	<p>170MW(AC) solar farm on approximately 517 Hectares constructed single axis tracking mounting structures.</p> <p>The development footprint allowed for an area of approximately 472 Hectares.</p> <p>Approved Substation is in the south west of the site near the western boundary on the south side of the waterway with an area of 60m x 80m.</p>	<p>No change to development size and scale alteration to the general location and footprint of ancillary infrastructure such as roads. A minor administrative change to the site plan is proposed to rectify a drafting error.</p> <p>Relocation of the substation to the north side of the waterway to include a substation area 175m x 125m with adjacent switching gear and auxiliary equipment area with 125m x 80m. These land areas are significantly larger than what will be required for the final footprint of the substation and Switching gear and auxiliary equipment. The key change in terms of indicative footprint is the addition of between 2 and 4 additional shipping container style buildings which will serve as switching station/auxiliary buildings. It is noted that the substation and switching gear and auxiliary equipment are being located in areas that are currently occupied by a solar array under the approved layout. On this basis the footprint of the overarching project is not being increased.</p> <p>The relocation also requires the access road to this infrastructure to be moved to provide ongoing access to the substation. In addition, since the granting of the Development Consent, Transgrid has requested this access be formalised as an easement.</p> <p>The relocation allows for improved access without impact on the existing waterway & increased setbacks from the waterway.</p> <p>The proposed substation infrastructure in its relocated position will occupy an area that was designated as solar photovoltaic arrays in the approved General Layout Plan.</p>

Project Element	Originally Approved Development	Proposed Modification
		<p>Only part of the security fence for the substation will project outside of the original indicative footprint for the proposed solar field. This is evident in the Comparison Layout Plan of the approved and proposed layouts provided at Appendix 2 for reference. This is a negligible change with no potential for adverse environmental or amenity impacts given its location within the site and being a farm paddock set well away from any sensitive receivers.</p> <p>The modification also proposes a minor administrative change to the Site Plan. This change involves rectifying a minor drafting error in the location of the site boundary around the existing vacant dwelling on the Suntop Solar Farm Site. As detailed in the EIS assessment and several figures and other associated plans, the intention was always to include this dwelling in the solar farm site. To this end, the submitted Site Plan at Figure 1 below and at Appendix 1 has been updated to rectify this minor administrative error.</p> <p>It is anticipated that the impacts on the total capacity of the solar farm can be recovered through the detail design/design optimisation process to be completed for the project.</p>
Key infrastructure	Solar arrays: approximately 550,000 solar panels supported by a mounting system installed on single axis trackers.	No increase in solar panels, potentially a decrease, to be informed by the final detailed design/design optimisation process.
	The panels would be installed including single axis tracking system facing east-west and tilted (to a maximum) 60° along the north-south axis.	No change.
	Up to 60 central inverters located throughout the development. Indicatively located adjacent to the 132kV powerline.	No change.

Project Element	Originally Approved Development	Proposed Modification
	Above and/or below ground onsite cabling and electrical connections.	No change.
	Support buildings indicatively located alongside the substation including communications equipment and switchgear within an area of 60m x 80m.	Three additional switchgear containers and one additional auxiliary building container are proposed to allow flexibility in the final detailed substation design prepared by TransGrid.
	Onsite access tracks.	Onsite access tracks will be slightly reduced due to the relocation of the substation access track in association with the relocation of the substation to the north side of the waterway. It will no longer be necessary to create a crossing over the waterway to allow access to the substation. The new section of the access track is within the approved Development Footprint and will not result in an increase in environmental impacts.
	Substation containing a 132kV transformer and associated 33kV switchgear and directly connected into the existing 132 kV transmission line.	No change.
	Perimeter fence (security fence approximately 2.5 m high);	No change.
	Vegetation screening along the northern and western boundaries of the site.	This screening has been increased to ensure screening of the proposed new substation location is provided as per the attached revised site plan. A full landscape screen now extends along the western boundary from the frontage of the site to the northern edge of the powerline easement. Originally infill planting was proposed along this boundary and stopped at northern side of the waterway.
	15 metre defendable space around the perimeter of the site.	No change.
	Three lot subdivision proposed creating one lot for farm buildings and an associated independent access road, a second lot for the substation and third for Suntop Solar Farm.	<p>The proposed modification to the subdivision proposes to relocate the lot for the substation and create an associated access easement for the substation lot.</p> <p>The purpose of this lot and easement is to enable transfer of the substation asset into the ownership of TransGrid as per</p>

Project Element	Originally Approved Development	Proposed Modification
		<p>their requirements (TransGrid will Build, Own and Operate the substation).</p> <p>All other aspects of the previously proposed 3 lot subdivision will remain the same excluding a small reduction in the land area associated with the solar farm lot which will be reduced by the lot being created for the substation being increased.</p>
Intensity of production	Approximately 379GWh per annum.	No change.
Primary, secondary and ancillary use	The proposed primary use is a solar farm and there are no secondary uses and ancillary uses include a substation and operations and maintenance and storage buildings.	No change.
Project life and hours of operation	30-year life span operation during daylight hours.	No change.
Extent, duration and severity of impacts.	Comparison of impacts are assessed in Table 2 below.	

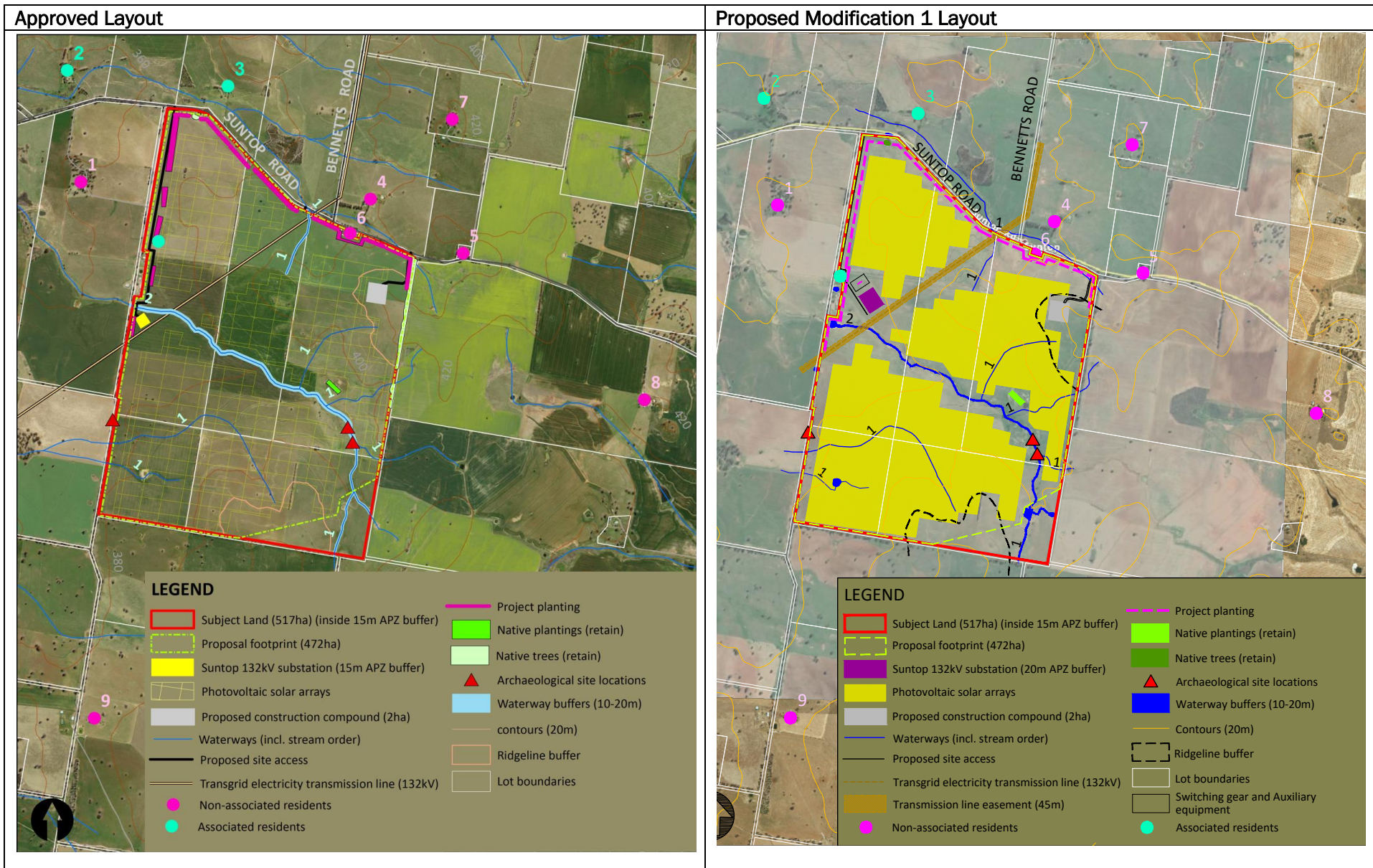


FIGURE 5 COMPARISON OF INDICATIVE LAYOUT FROM ORIGINAL APPROVAL VERSUS PROPOSED LAYOUT FOR MODIFICATION

5. ENVIRONMENTAL IMPACT ASSESSMENT

An updated Environmental Impact Assessment for the proposed modification is provided below in Table 2 below.

TABLE 2 ENVIRONMENTAL IMPACT ASSESSMENT FOR PROPOSED MODIFICATION

Issue	Response	Environment Impact
Land	<p>The proposed modification occupies an area that is entirely within the approved development footprint. The substation relocation is largely occupying an area that is shown as a solar field area in the approved general layout. In the proposed layout, only part of the substation security fence extends outside of what was originally an indicative solar field area. It is noted the Development Consent requires the final detailed plans be submitted to the Secretary, including any details of siting of solar panels and ancillary infrastructure.</p> <p>This modified layout shows the substation in the proposed new location. Approval of this layout is required to continue with the grid connection and other development activities for the project and allow for appropriate setbacks for the substation as required by TransGrid. The potential additional two - six shipping container scale buildings within the "Switching gear and auxiliary equipment" are within the footprint of the approved development and will not require any significant increase in the level of excavation than already contemplated by the approved development. In addition, these works will be further set away from the existing waterway on site.</p> <p>A further detailed design layout will be submitted to the Department for approval prior to the commencement of works on the site in accordance with Schedule 2, Condition 5 of the Suntop Solar Farm Development Consent.</p> <p>The proposed modification does not alter potential impacts to land resources beyond those assessed within the original Environmental Impact Assessment.</p>	No increased impact.
Biodiversity	<p>The proposed modification occupies a footprint that is generally within the approved project footprint, with a small section of the substation and the substation access road projecting south of the indicative solar field in the approved layout. The proposed position for the substation relocation will not impact on any existing native vegetation and will be set further away from existing native vegetation than the approved substation location.</p> <p>Biodiversity impacts of the project development footprint were assessed as part of the Environmental Impact Statement including a Biodiversity Assessment</p>	No increased impact.

Issue	Response	Environment Impact
	<p>Report(BAR) prepared by Flora Search (May 2018). A copy of this BAR report is attached to this Modification Application at Appendix 5 for reference. Page 17 of this BAR includes a plan that details the location of the native vegetation paddock trees to be removed as part of the development. This includes 3 trees to the immediate south west of the proposed new location for the substation (Two <i>Callitris columellaris</i> trees and one <i>Eucalyptus albens</i> tree).</p> <p>Furthermore, the insertion of aerial imagery into the updated Substation Layout at Appendix 2 provides further evidence that no additional native vegetation will be impacted by the proposed modification application.</p> <p>The BAR also calculates the appropriate offset credits based on the appropriate Biodiversity Assessment Method (BAM) which remains unchanged as a result of the proposed modification application.</p> <p>This report confirms that there is no other native vegetation located in the new substation location that will be impacted by the modification. There are no other aspects of the proposed modification that would change the biodiversity impacts of the development footprint assessed under the BAR.</p> <p>The additional landscaping along the western boundary will provide opportunity to deliver additional biodiversity outcomes above and beyond the approved development.</p>	
Heritage	The proposed modification has no impact on known historic heritage values of the site identified in the Aboriginal Heritage Assessment undertaken as part of the Environmental Impact Assessment for the project.	No increased impact.
Transport	<p>The proposed modification does not alter site access or transport arrangements or traffic volumes associated with the project. It is noted that the proposed relocation will improve internal access arrangements for the substation including avoiding the need to traverse the existing waterway as per the approved development.</p> <p>The improved substation access will reduce complexities with respect to transporting key substation components such as the transformer to the substation site.</p>	Reduced impact.
Visual	In considering the visual impacts of the proposed substation relocation it was determined necessary to re-issue relevant photomontages based on the modified layout to understand the potential impacts and also revisit the visual impacts on each of the sensitive receivers reviewed as part of the Visual Impact Assessment prepared for the project. The specialist	No increased impact.

Issue	Response	Environment Impact
	<p>consultants who prepared the photomontages and Visual Impact Assessment (Cambium Group and Envisage Consultants) were re-engaged to undertake this work.</p> <p>Updated photomontages for the potentially affected sensitive receivers and an assessment of the proposed modification against the original Visual Impact Assessment are provided in Appendix 4 for reference.</p> <p>The summary of findings is as follows:</p> <p><i>“The proposed modification to the substation location would result in two private viewpoints (VP13 and VP38) seeing the substation whereas previously they had no view of the approved substation. However, both viewpoints are distant (over approximately 2.5km away), and the substation is still on lower-lying land with trees in the foreground along the property boundary. At this distance the substation would be barely perceptible from other solar farm infrastructure and would not be prominent in the view, and therefore, the original rating given for these viewpoints has not changed.</i></p> <p><i>From the public viewpoint (VP Suntop Road) there would also be views of the substation whereas previously there was no view. However, locations from Suntop Road with views to the substation are very limited, and only the top few metres of the substation would be seen. Therefore, the original rating given for this viewpoint has not changed.</i></p> <p><i>The only other viewpoint that would see the proposed modified substation is VP1, which already viewed the approved substation. Overall the revised proposal does not represent a substantial change to the approved proposal when viewed from this residence, and therefore, the original rating has not changed. To further mitigate the visual impact to VP1 in the longer term, additional landscaping has been proposed along the western boundary closest to the substation in consultation with this landholder. Over time this landscape planting would break-up views of the substation in addition to the screening originally proposed, however, the taller elements of the substation would remain visible.”</i></p> <p>In addition to the above, it is noted the assessment completed by Envisage did not result in any changes to impact level for any of sensitive receivers when comparing the approved development with the proposed modification.</p> <p>It is also noted the additional vegetation screening will further mitigate any increased visibility of the substation from the sensitive receiver to the immediate west. Furthermore, the land to the immediate west is now the basis for the proposed and associated Suntop 2 Solar Farm.</p>	

Issue	Response	Environment Impact
	On this basis it is concluded that the modification will not result in any net increase in impacts on the sensitive receivers associated with the proposed development.	
Water	<p>The proposed modification does not alter the potential impacts to water resources or aquatic ecology as assessed within the Environmental Assessment. The increased setback from the watercourse will ensure that environmental impact is reduced. The revised location is not positioned within a waterway and natural drainage line.</p> <p>The substation relocation is also determined to be less prone to any salinity impacts than the approved location and therefore will not require the same level of protection and mitigation measures with respect to salinity risks.</p>	Reduced impact.
Noise	<p>The proposed modification does not alter the potential noise impacts as assessed within the Environmental Assessment. The substation in the proposed new location will remain substantially set away from the nearest sensitive receiver.</p> <p>In addition, this nearest sensitive receiver is now the subject of the associated Suntop 2 Solar Farm EIS.</p>	No increased impact.
Hazards	The proposed modification does not alter the potential hazards as assessed within the Environmental Assessment. The substation relocation will increase the buffer of the substation from existing native vegetation on site and will be further setback from the site boundary and the waterway.	No increased impact
Subdivision	<p>The proposed subdivision relocates the lot for the substation and creates an access easement to the substation for TransGrid. This will not have any adverse environmental impacts and is necessary for substation asset to be transferred into the ownership of TransGrid. A three-lot subdivision was submitted and assessed as part of the original Environmental Impact Assessment process for Suntop Solar Farm and created a Lot that is smaller than 400 Hectares to allow the excision of farm buildings on the site along with a lot for the substation in its original area. This modification is simply relocating the substation lot, slightly increasing the size and creating the access easement to benefit the ultimate owner of the substation (TransGrid).</p> <p>The subdivision will only proceed should the development of the solar farm go ahead and therefore will not result in any unreasonable fragmentation of rural land.</p> <p>In addition, the modification proposes to update Schedule 2 of the Development Consent to formalise consent of the</p>	No increased impact

Issue	Response	Environment Impact
	<p>subdivision by way of a specific condition. The subdivision has already been assessed as part of the EIS and the proposed changes will not result in any additional environmental and land-use impacts.</p> <p>It is understood that whilst the subdivision condition would formally allow the subdivision, the applicant would still be required to obtain a Subdivision Certificate through Dubbo Regional Council.</p>	

6. STATUTORY CONSIDERATIONS

The following legislation, regulations and policies are considered to be relevant to the modification:

- Environment Planning & Assessment Act 1979
- Application for modification of development consent (cf clause 71A of EP&A Regulation 1994)
- Large-Scale Solar Energy Guideline for State Significant Development, December 2018
- Wellington Local Environmental Plan 2012
- Zone and Lot Size

Environment Planning & Assessment Act 1979

This request for a modification is being made under Section 4.55 (1) & (1A) of the Environmental Planning & Assessment Act 1979.

Section 4.55(1A) of the EP&A Act identifies that *for modifications involving minimal environmental impact, a consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:*

- a) it is satisfied that the proposed modification is of minimal environmental impact, and
- b) it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which the consent was originally granted and before that consent as originally granted was modified (if at all), and
- c) it has notified the application in accordance with:
 - I. the regulations, if the regulations so require, or
 - II. a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and
- d) it has considered any submissions made concerning the proposed modification within any period prescribed by the regulations or provided by the development control plan, as the case may be.

Environmental Planning and Assessment Regulation 2000.

Division 12, Clause 115, Application for modification of development consent (cf clause 71A of EP&A Regulation 1994)

- 1) An application for modification of a development consent under section 4.55 (1), (1A) or (2) or 4.56 (1) of the Act must contain the following information:
 - a. the name and address of the applicant,
 - b. a description of the development to be carried out under the consent (as previously modified),
 - c. the address, and formal particulars of title, of the land on which the development is to be carried out,
 - d. a description of the proposed modification to the development consent,
 - e. a statement that indicates either:
 - f. that the modification is merely intended to correct a minor error, misdescription or miscalculation, or
 - g. that the modification is intended to have some other effect, as specified in the statement,
- g1. a description of the expected impacts of the modification,

- h. an undertaking to the effect that the development (as to be modified) will remain substantially the same as the development that was originally approved,
 - i. in the case of an application that is accompanied by a biodiversity development assessment report, the reasonable steps taken to obtain the like-for-like biodiversity credits required to be retired under the report to offset the residual impacts on biodiversity values if different biodiversity credits are proposed to be used as offsets in accordance with the variation rules under the Biodiversity Conservation Act 2016,
 - j. if the applicant is not the owner of the land, a statement signed by the owner of the land to the effect that the owner consents to the making of the application (except where the application for the consent the subject of the modification was made, or could have been made, without the consent of the owner),
 - k. a statement as to whether the application is being made to the Court (under section 4.55) or to the consent authority (under section 4.56),
 - l. and, if the consent authority so requires, must be in the form approved by that authority.
- 2) The notification requirements of clause 49 apply in respect of an application if the consent of the owner of the land would not be required were the application an application for development consent rather than an application for the modification of such consent.
- 3) In addition, if an application for the modification of a development consent under section 4.55 (2) or section 4.56 (1) of the Act relates to residential apartment development and the development application was required to be accompanied by a design verification from a qualified designer under clause 50 (1A), the application must be accompanied by a statement by a qualified designer.

Large-Scale Solar Energy Guideline for State Significant Development, December 2018

The guideline notes that some sites may require the subdivision of land to support the proposed development. For example, subdivisions may be required for substations within a project site, or for land that will be leased for longer than five years. Local councils are generally the relevant consent authorities for subdivisions and applicants should discuss subdivision options with the relevant council and the Department. Based on this consultation, applicants may wish to include the subdivision in the scope of their State Significant Development application.

Wellington Local Environmental Plan 2012 **Zone and Lot Size**

Under the Wellington LEP the subject land falls under a RU1 Primary Production Zone and within the Lot Size category AF which has a minimum lot size of 400ha. Section 2.6 of the Wellington LEP outlines that the size of a lot resulting from the subdivision of land to which this clause applies is not to be less than the applicable area shown on the Lot Size Map.

The proposed subdivision will result in a lot smaller than 400ha. However, Section 4.38 of the EP&A Act allows the consent authority to grant development consent to a State Significant Development which may include activities which are restricted by an environmental planning instrument. The Development Consent approved the proposed subdivision and there will be no new dwelling entitlements attached to the newly created Lots.

As detailed, the proposed subdivision will allow the Substation area to be transferred to and managed by TransGrid.

The following sections of the Wellington Local Environmental Plan apply:

2.6 Subdivision—consent requirements

- 1) Land to which this Plan applies may be subdivided, but only with development consent.
- 2) Development consent must not be granted for the subdivision of land on which a secondary dwelling is situated if the subdivision would result in the principal dwelling and the secondary dwelling being situated on separate lots, unless the resulting lots are not less than the minimum size shown on the Lot Size Map in relation to that land.

The definition of **secondary dwelling** in the Dictionary requires the dwelling to be on the same lot of land as the principal dwelling.

4.2 Rural subdivision

- 1) The objective of this clause is to provide flexibility in the application of standards for subdivision in rural zones to allow land owners a greater chance to achieve the objectives for development in the relevant zone.
- 2) This clause applies to the following rural zones:
 - a. Zone RU1 Primary Production,
 - b. Zone RU2 Rural Landscape,
 - Baa. Zone RU3 Forestry,
 - c. Zone RU4 Primary Production Small Lots,
 - d. Zone RU6 Transition.
- 3) Note. When this Plan was exhibited, it did not include Zone RU2 Rural Landscape or Zone RU6 Transition.
- 4) Land in a zone to which this clause applies may, with development consent, be subdivided for the purpose of primary production to create a lot of a size that is less than the minimum size shown on the Lot Size Map in relation to that land.
- 5) However, such a lot cannot be created if an existing dwelling would, as the result of the subdivision, be situated on the lot.
- 6) A dwelling cannot be erected on such a lot.

Note: A dwelling includes a rural worker's dwelling (see definition of that term in the Dictionary).

7. CONSULTATION

COMMUNITY CONSULTATION

Extensive consultation was undertaken as part of the initial Environmental Impact Statement/Development Consent process and the information provided above indicates no increased impact will be caused with some reduced impacts from the modifications. As such, given the relatively minor nature of the modification and negligible net environmental impacts, it was determined that a further detailed and broad ranging consultation process with respect to the modification was not required.

On this basis consultation regarding the relocation of the substation and ancillary buildings was undertaken with the immediate adjoining neighbours of the project shown in Figure 5 below.

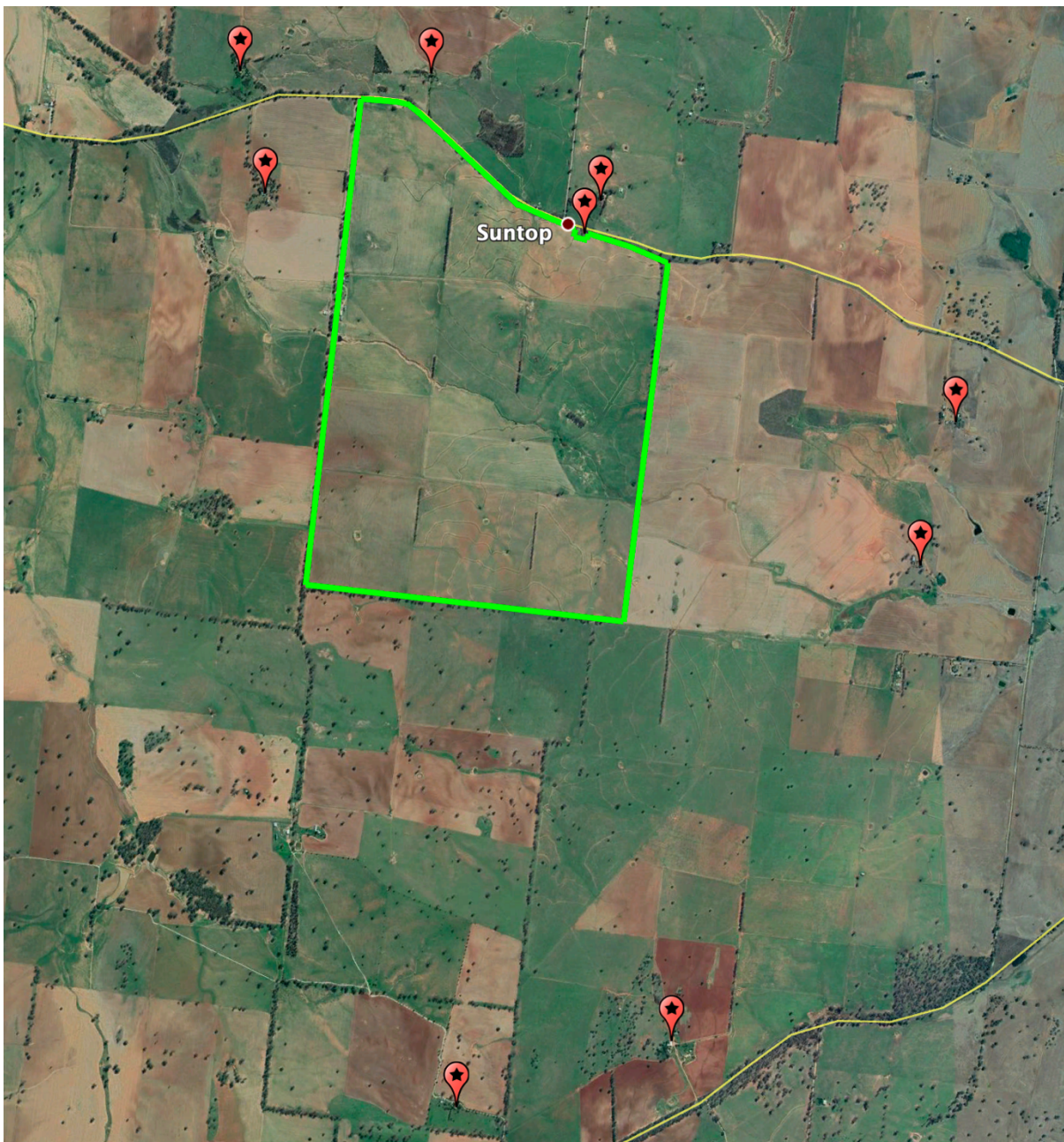


FIGURE 5: ADJOINING NEIGHBOURS CONSULTED REGARDING MODIFICATION

All immediately adjoining neighbours shown in Figure 5 above were contacted by phone or email to advise them of the proposed application to modify the Development Consent and information forwarded via email as requested. A meeting was held with the immediate neighbour to the west as they were considered to be the only potentially affected party by the modification. It is noted these landowners are now associated landowners through the proposal of the Suntop 2 Solar Farm.

The only issues raised during this consultation was from the landowners to the immediate west. They noted that if Suntop 2 Solar Farm goes ahead then they would have no concerns with the modification however if it doesn't then their original objections to the project would remain and extend to the proposed modification because the substation would be partly still visible and closer to their dwelling on this site.

The visual impact analysis and photomontages completed for the proposed modification revealed that whilst the substation will be closer to this property (dwelling) the net visual impact of the substation relocation will be consistent with the original approval on the following basis:

- The substation would be visible in the approved development and in the proposed modification, albeit closer to the dwelling, and the net impact level was considered to remain unchanged.
- The new location for the substation will replace an area that is occupied by a solar field in the current approved layout.
- Additional landscape screening proposed along the respective boundary that would assist with screening the substation over time.

It is also noted that this land is now also a subject site for a proposed solar farm (Suntop 2 Solar Farm) that is associated with Suntop Solar Farm.

Finally, the relocated lot proposed in the subdivision is solely associated with the proposed substation and will not have any adverse impacts on the farming activities in the area through unreasonable fragmentation of land.

On this basis it is concluded that the modification will not result in any additional impact on the visual amenity of the respective sensitive receiver.

KEY STAKEHOLDER CONSULTATION

Dubbo Regional Council - were consulted regarding the proposed modification and raised no objection in principal subject to formal notification from the Department.

TransGrid - were consulted regarding the proposed modification and are supportive as it aligns with their current requirements for the connection of Suntop Solar Farm to their electricity network.

8. CONCLUSION

The above assessment and associated appendices are considered to demonstrate the proposed modification is substantially the same development as the originally approved development and that potential impacts associated with the proposed modification are minimal. Furthermore, with the implementation of the proposed mitigation actions (in addition to those already identified within the original Environmental Impact Assessment), the potential environmental impacts of the modification are considered to be the same or less than that of the approved development.

Based on the details and plans provided in this submission, it is anticipated that the proposed modification could be approved under Section 4.55 (1) & (1A) of the EP&A Act.

As required, a Political Donations Disclosure Statement accompanies this application.

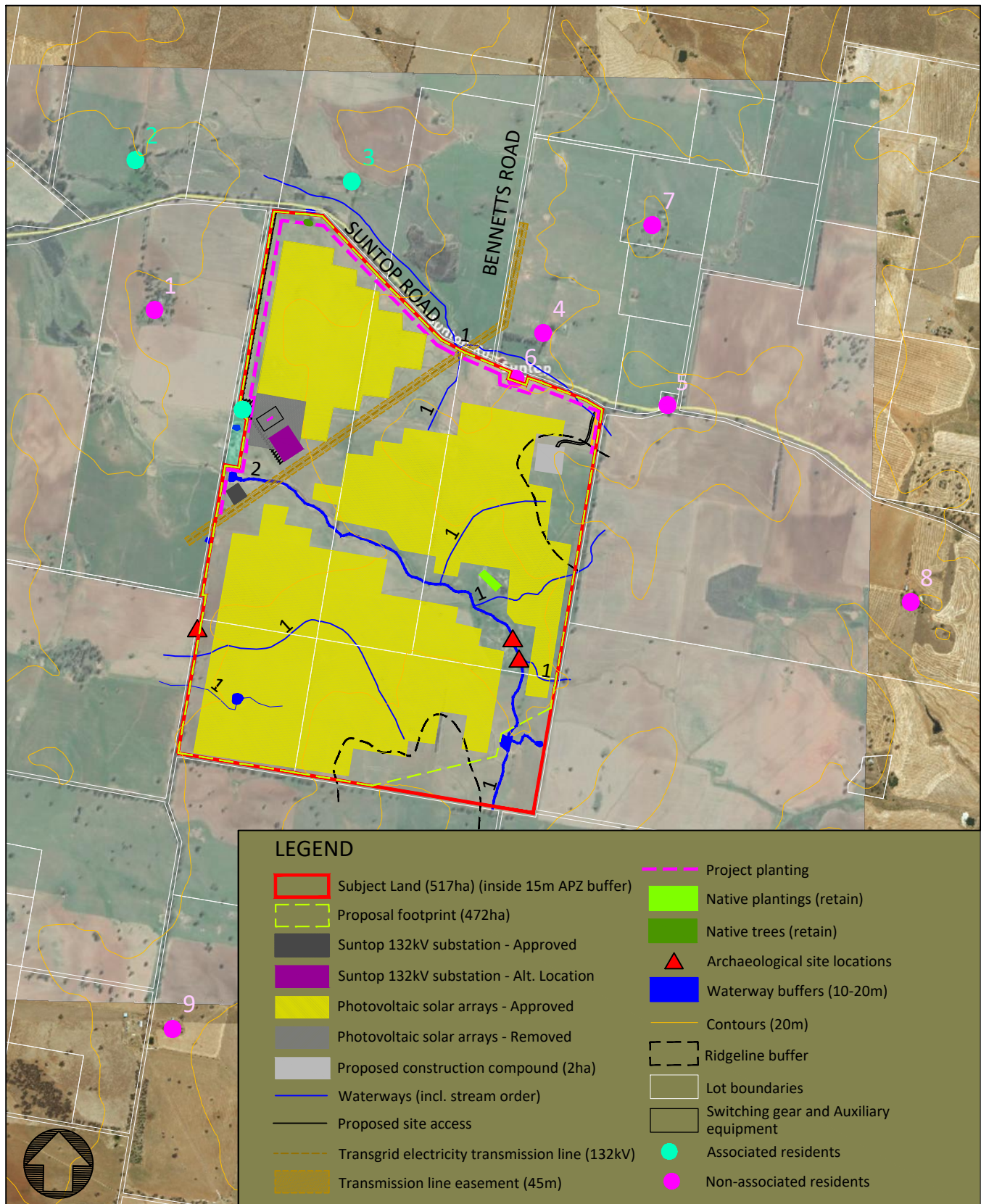
APPENDIX 1 – REVISED SUNTOP SOLAR FARM SITE PLAN & COMPARISON SITE PLAN (APPROVED VS PROPOSED)

APPENDIX 2 – INDICATIVE SUBSTATION LAYOUT PLAN, GENERAL SUBSTATION ARRANGEMENT
AND ELEVATION PALNS FOR A 132KV SUBSTATION & COMPARISON SUBSTATION LAYOUT PLAN
(APPROVED VS PROPOSED)

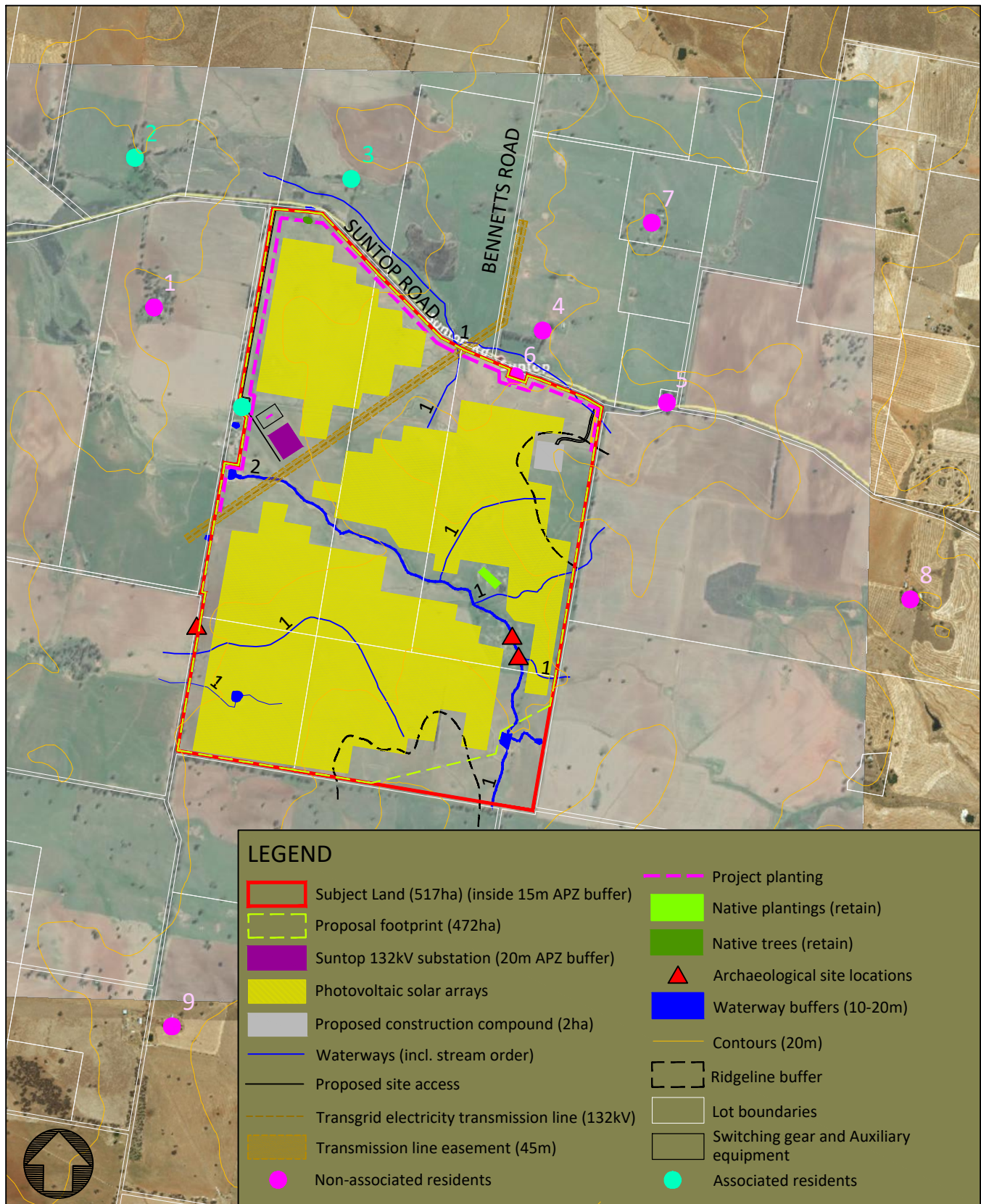
APPENDIX 3 – PROPOSED SUBDIVISION LAYOUT

APPENDIX 4 – VISUAL IMPACT ASSESSMENT & PHOTOMONTAGES

APPENDIX 5 – BIODIVERSITY ASSESSMENT REPORT PREPARED FOR EIS SUBMISSION



SITE PLAN COMPARISON
 Canadian Solar & Photon Energy
 Suntop Solar Farm
 Universal Transverse Mercator
 GDA 1994 MGA Zone 55



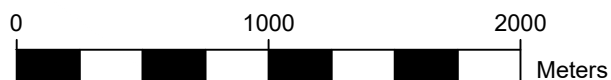
SITE PLAN

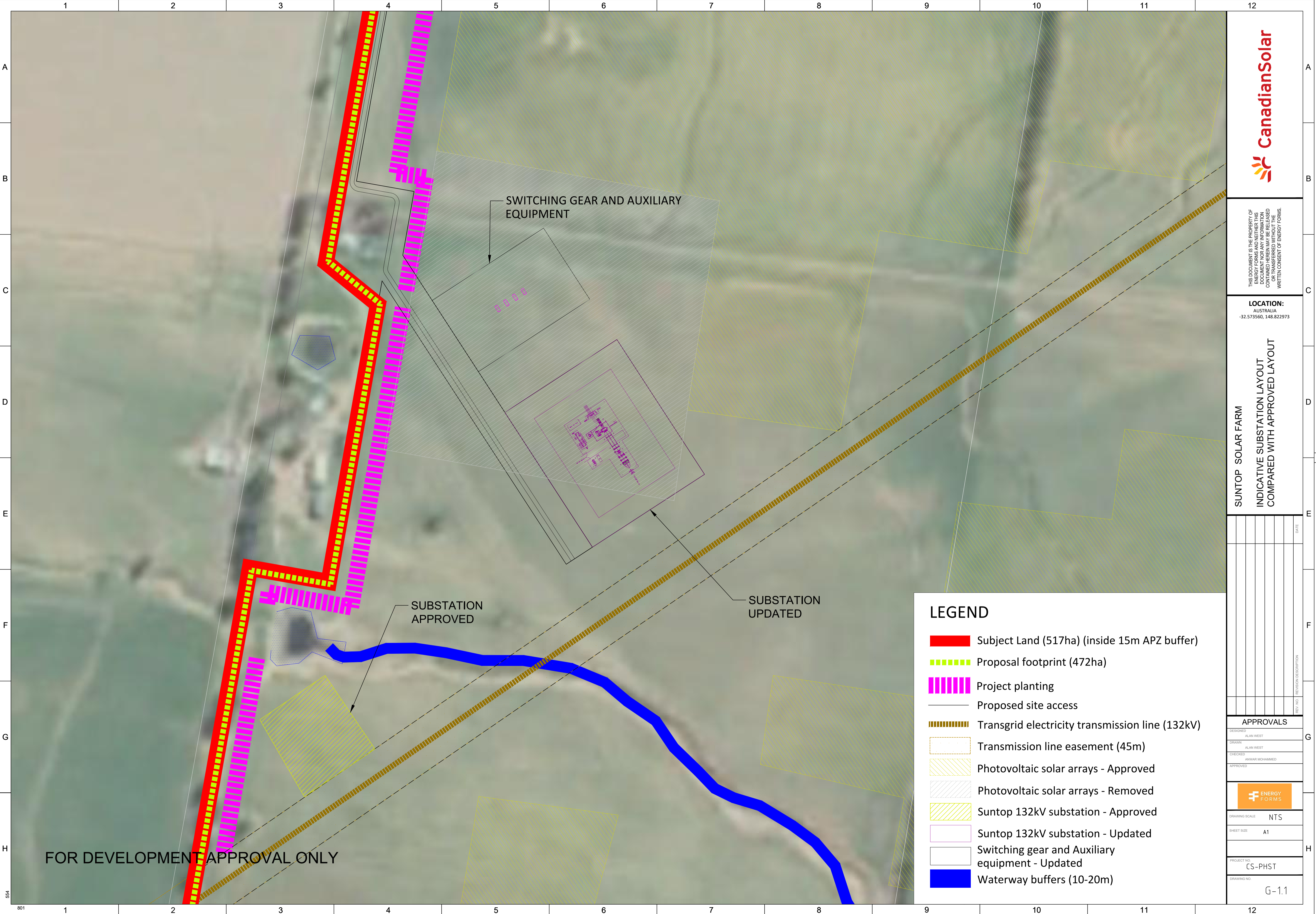
Photon Energy

Suntop Solar Farm

Universal Transverse Mercator

GDA 1994 MGA Zone 55





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-32.573560, 148.822973

SUNTOP SOLAR FARM
INDICATIVE SUBSTATION LAYOUT
COMPARED WITH APPROVED LAYOUT

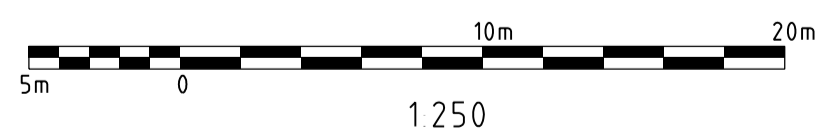
REV	AND	REVISION DESCRIPTION	DATE

APPROVALS

DESIGNED	ALAN WEST
DRAWN	ALAN WEST
CHECKED	ANWAR MOHAMMED
APPROVED	

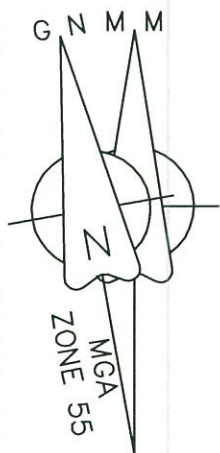


DRAWING SCALE	NTS
SHEET SIZE	A1
PROJECT NO.	CS-PHST
DRAWING NO.	G-1.1

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SOURCE DESIGN FILE: N:\Build HV Network\ENG SS HIGH VOLTAGE DESIGN\Tenders\Suntop Solar Farm\Contestable\New folder\MTZ-100102 02.DGN

1:10,000



- (A) EASEMENT FOR TRANSMISSION LINE 45 WIDE (DP6385987)
- (B) PROPOSED RIGHT OF CARRIAGEWAY 40 & 20 WIDE & VARIABLE WIDTH
- (C) PROPOSED EASEMENT FOR ACCESS VARIABLE WIDTH

Notes:

Notes.
This plan was prepared for Photon Energy as an existing site layout for overall planning purposes and should not be used for any other purpose. The dimensions, areas and total number of lots shown hereon are a combination of survey information and deed dimensions and are subject to field survey and also to the requirements of council and to any other authority which may have requirements under any relevant legislation. In particular, no reliance should be placed on the information on this plan for any financial dealings involving the land. This note is an integral part of this plan.

A3



DOHERTY SMITH & ASSOCIATES
CONSULTING SURVEYORS

www.dohertysmith.com.au
dsa@dohertysmith.com.au

4/2 Blueridge Drive
PO Box 4764
DUBBO EAST
NSW 2830
P: 6884 1008

PO Box 87
WELLINGTON
NSW 2820
P: 6845 1403

Drafted by
EKS

Checked by
EKS

Approved

Job Number	10065
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Date
11/05/2018

Scale
1:10,000

PROPOSED SITE PLAN

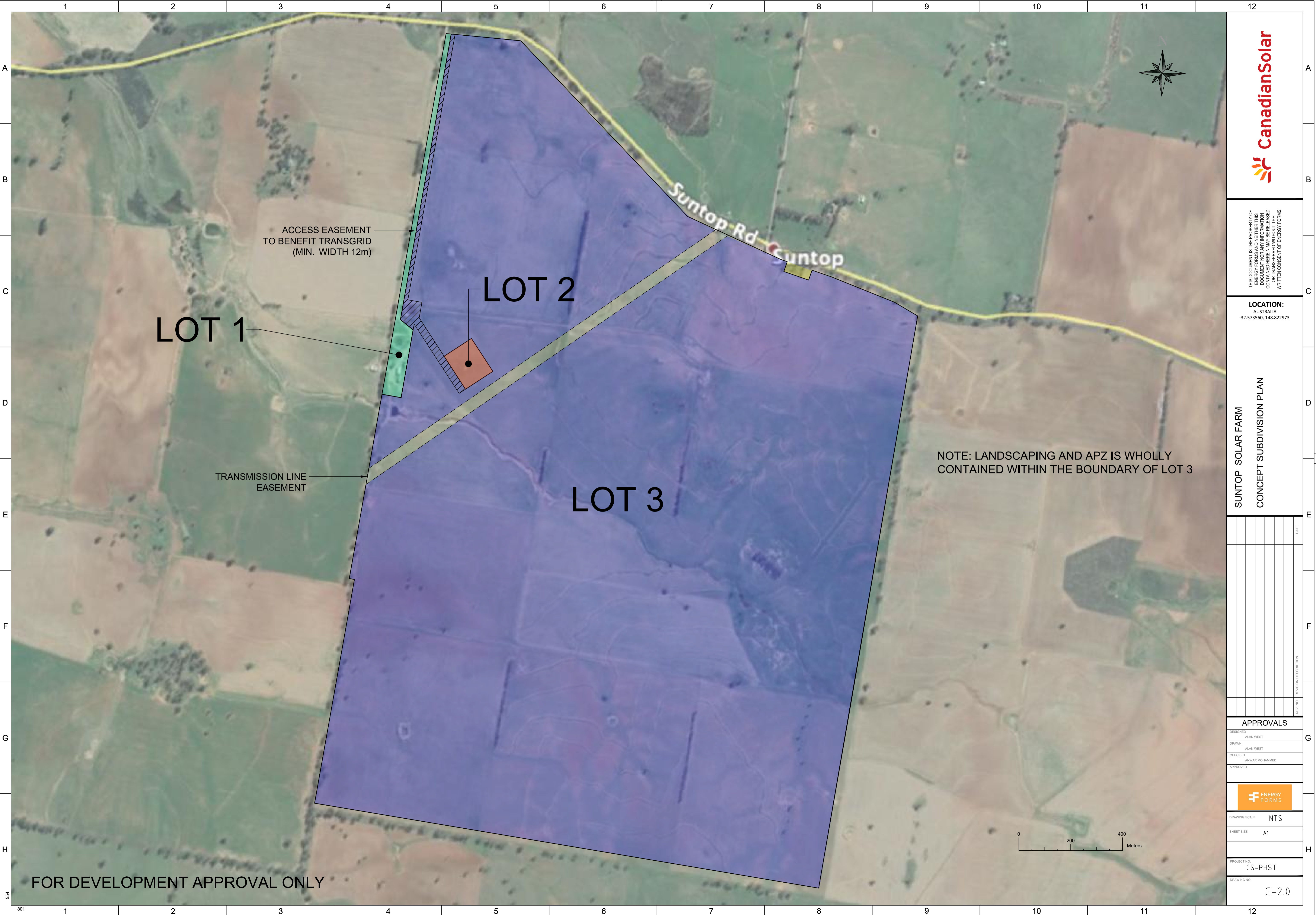
LOT 93 DP753238, LOT 3 DP506925
& LOT 2 DP983890
796 & 909 SUNTOP ROAD, SUNTOP

PHOTON ENERGY
GLENMORE PROPERTY, SUNTOP

Drawing No.
10065-DA02

Revision	F
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Sheet
1 of 1



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LOCATION:
AUSTRALIA
-32.573560, 148.822973

SUNTOP SOLAR FARM
CONCEPT SUBDIVISION PLAN

REV	AND	REVISION DESCRIPTION	DATE

APPROVALS

DESIGNED: ALAN WEST
DRAWN: ALAN WEST
CHECKED: ANWAR MOHAMMED
APPROVED:



DRAWING SCALE: NTS

SHEET SIZE: A1

PROJECT NO: CS-PHST

DRAWING NO: G-2.0

**MEMORANDUM**

19 July 2019

Attention: Shane Melotte, Energy Forms

Reference

From: Stacey Brodbeck

14019/MemRev05

RE: SUNTOP SOLAR FARM MODIFICATION – UPDATE TO ORIGINAL
VISUAL IMPACT ASSESSMENT FINDINGS

Dear Shane

This memo presents the findings of our assessment of the proposed modification to the Suntop solar farm. This assessment has been prepared for Energy Forms to assist their preparation of the EIS for the modification.

1. Background

A solar farm at Suntop was approved December 2018 (NSW Development Consent SSD 8696, issued 4 December 2018). Envisage Consulting prepared the Visual Impact Assessment for the approved solar farm (Envisage Consulting Pty Ltd, May 2018).

A modification to the approved solar farm is now proposed. This assessment of the proposed modification is, in part, based upon the original findings of the Suntop Visual Impact Assessment.

2. Proposed Modification

The approved position of the substation is shown **FIGURE 1** (Appendix 1 of the Development Consent).

The proposed modification involves:

- the relocation of the substation to the north west side of the Transgrid transmission line and north of the waterway. The proposed modified position of the substation is shown **FIGURE 2**.
- Separation of the substation into two key components being:
 - The main substation containing the transformer(s) and connection into the grid (shown in red on **FIGURE 2**)
 - The E-house containing up to 4 X 40ft containers to house medium voltage (MV) and low voltage (LV) switchgear as well as auxiliary equipment (shown in blue on **FIGURE 2**).
- An increase in the overall size of the substation area (approximately six times larger):
 - The site area of the main substation would be 165m x 215m (35,475m²) including the APZ buffer (21,875m² excluding the buffer)
 - The site area of the E-house would be 125m x 80m (10,000m²). An allowance has been made for up to two switchgear and two auxiliary buildings (40 ft containers).
- Increased landscaping along the western boundary:

- Following discussions between the proponent and the landholder to the immediate west of Suntop 1, the landholder has advised their preference for a continual line of landscape planting along the western boundary of the project site as opposed to the approved "broken" sections of landscaping along this boundary.

There is no change to the proposed height of substation components. For assessment purposes, a height of approximately 10m has been assumed over the substation area based on advice from Energy Forms.

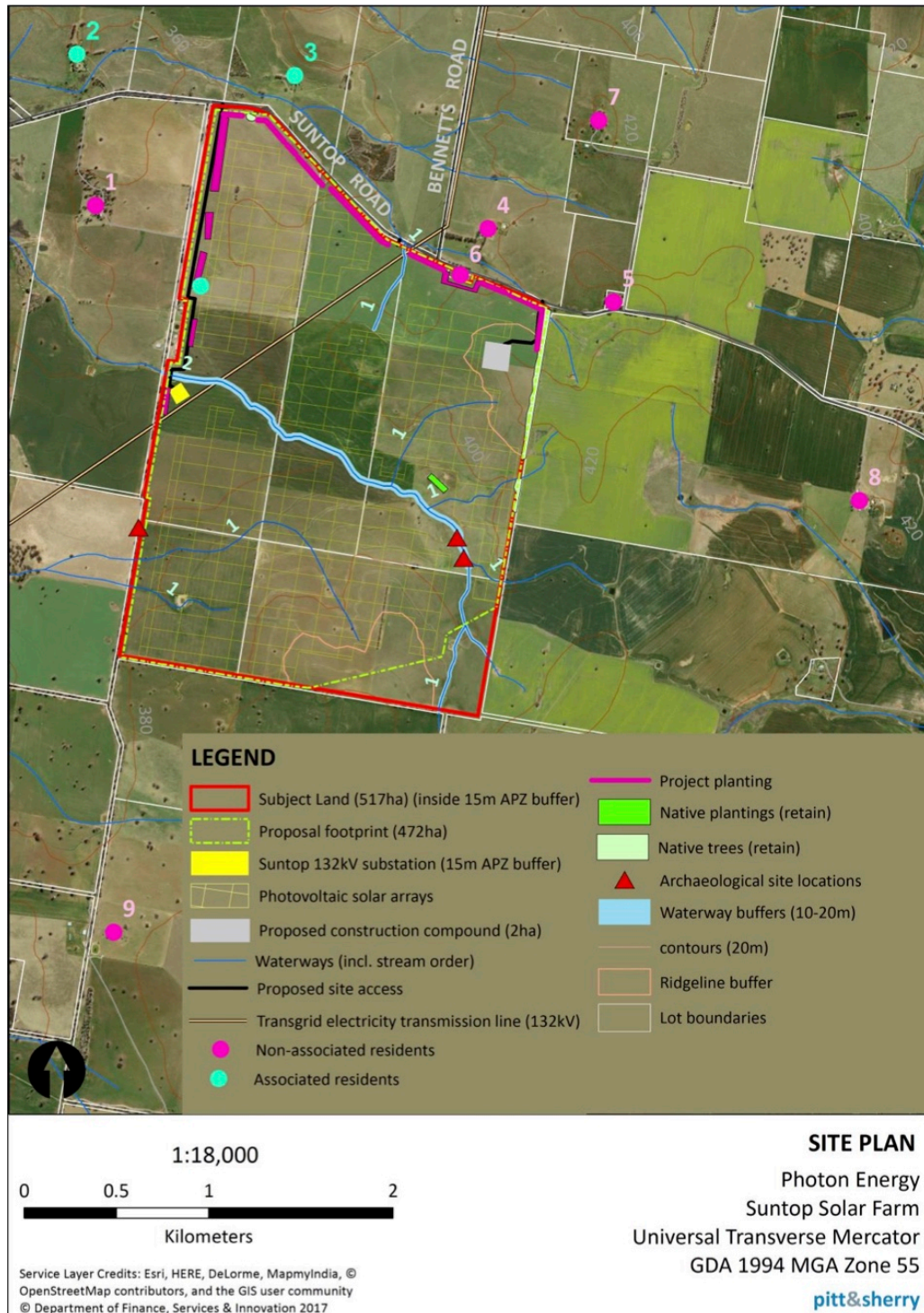


FIGURE 1: APPROVED PROJECT LAYOUT (APPENDIX 1, Development Consent SSD 8696)

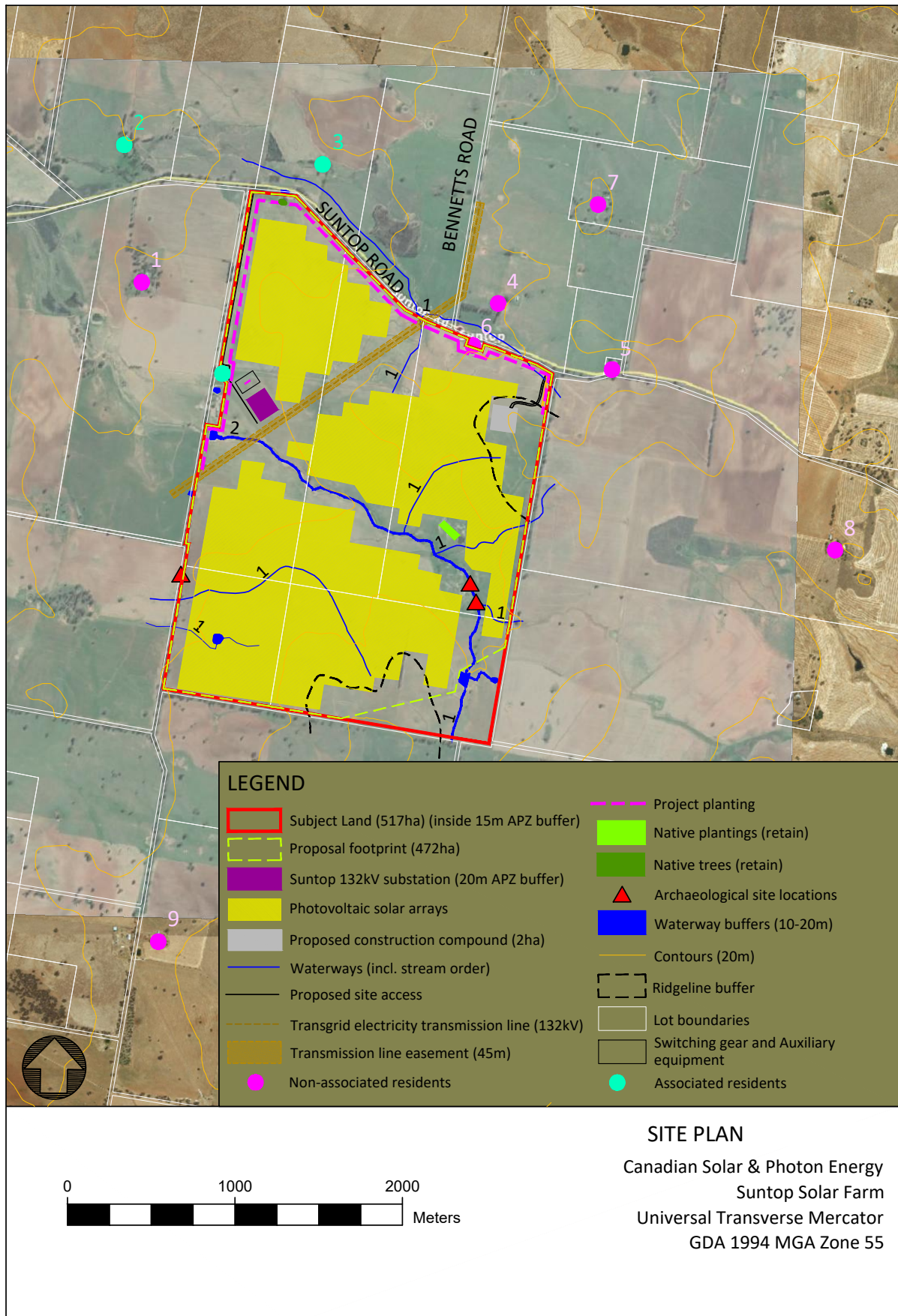


FIGURE 2: PROPOSED MODIFIED SUBSTATION LOCATION (provided by EnergyForms, 19 July 2019)

3. Summary of visual changes

A comparison of the key visual changes between the approved Project and the proposed modification is presented in **TABLE 1**.

TABLE 1: SUMMARY OF KEY VISUAL CHANGES

	Approved Project	Proposed modification
Location of substation	<p>Installed in the vicinity of the existing TransGrid electricity transmission lines and waterway:</p> <p>North of the lines and south of the waterway</p> <p>Approximately 1.5km from Suntop Road</p>	<p>Installed in the vicinity of the existing TransGrid electricity transmission lines and waterway:</p> <p>North of the lines and north of the waterway</p> <p>Approximately 850m from Suntop Road</p>
Configuration of substation	<p>A single 132kv substation on a concrete slab, including two transformers and associated 132kv switchgear (two shipping-container-sized buildings).</p> <p>An image of the likely appearance of the substation was included in the original VIA and is shown at FIGURE 3.</p>	<p>Two substation areas: An E-house; and the main substation containing transformers</p> <p>It is understood the E-house would include four shipping-container-sized buildings (switching rooms and auxiliary buildings).</p> <p>Based on the TransGrid Plan and Elevation provided by Energy Forms (Source Design File:\\vsw08323\ics_sgare\$\4\25901_35\MTZ-100201_00.DGN) we have been advised the appearance of the substation would be largely as described in the original EIS and similar to the image shown at FIGURE 3.</p>
Size of substation	<p>The substation footprint is approximately 60m x 80m in size (4,800m²)</p> <p>There would be a concrete pad with gravel placed around the equipment and fence to restrict vegetation growth and provide a safe working environment in accordance with Australian Standards.</p>	<p>The overall substation footprint is 31,875m² including the APZ buffer:</p> <ul style="list-style-type: none"> - The main substation would be 175m x 125m (21,875m² excluding the buffer). - The site area of the E-house would be 125m x 80m (10,000m²). <p>It is understood that the substation components would not occupy all of the land area set aside for the substation, and that the substation would be largely as described in the original EIS.</p>
Access to substation	The main access road off Suntop Road would provide access to the substation	No change
Security	3m high security fencing around the substation	No change
Safety	A 20m asset protection zone (APZ) would be maintained around the substation with no internal vegetation	No change

	Approved Project	Proposed modification
	One water supply tank outside the APZ with a capacity of 50,000L will be located near the substation	
Bunding	Ensure the substation is suitably banded	No change
Construction of the 132kV substation	<ul style="list-style-type: none"> – Site Establishment and clearing (if required) – Bulk earthworks via a range of plant that may include scrapers, bulldozers, excavators, rollers, trucks and loaders – Detailed civil works including drainage, earthing, foundations etc. generally using excavators, piling rigs, trucks and cranes 	No change
Landscaping along the western boundary	The approved Concept Landscape Plan was illustrated in Figure 9-1 of the original Visual Impact Assessment and included "broken" landscape planting along the western boundary.	A continual line of landscape planting is now proposed along the western boundary.

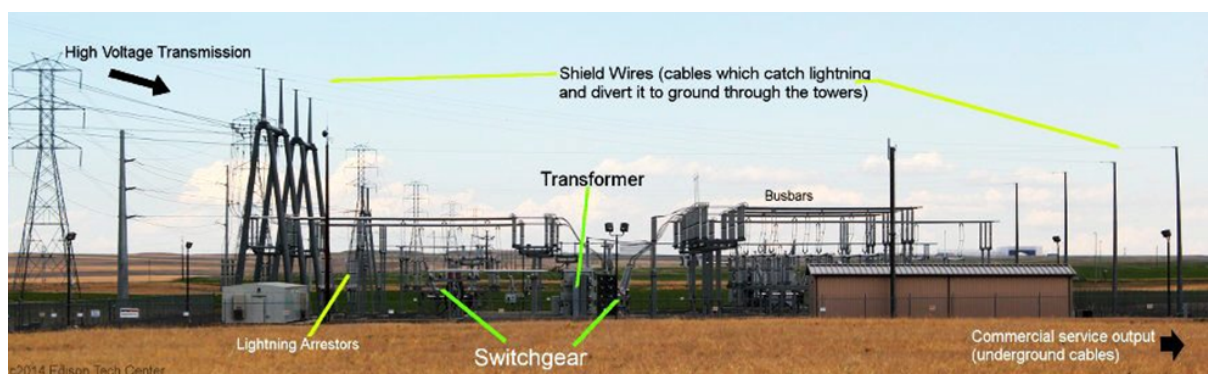


FIGURE 3: EXAMPLE OF A SIMILAR SUBSTATION TO THAT PROPOSED (IMAGE FROM PHOTON ENERGY)

4. Viewpoints

In the original assessment of the approved Suntop solar farm, 26 private viewpoints were found to have potential views of the solar farm. Only one private viewpoint (of the 26 assessed) was found to have potential views of the substation. This viewpoint was identified as Viewpoint 1 (VP1) and was located immediately west of the approved Suntop solar farm. A map of viewpoint locations and their predicted impact rating is provided at **APPENDIX A**.

Two properties - VP2 and VP3 - have become 'associated residents' since the approval of Suntop solar farm. These properties are 'associated' with the proposal as they have been purchased by the Suntop 1 landowner. 'Associated residents' generally have greater resilience to visual changes associated with the proposal.

5. Assessment of proposed modification

The assessment of the proposed modification follows the same assessment methodology presented in the original VIA. The methodology presented in the original VIA is provided at **APPENDIX B**.

The originally assessed impact rating of Suntop 1 (following construction and following implementation of recommended mitigation measures such as planting and colouring of ancillary structures) is summarised for each viewpoint in **TABLE 2**. The Table also presents the assessed impact ratings for each viewpoint including the proposed modification (following construction and following implementation of recommended mitigation measures). Note that the predicted magnitude of change reflects the complete proposal, that is, the originally proposed solar farm together with the proposed modification.

The 'associated resident' viewpoints are identified in **TABLE 2** by grey colouring.

Photomontages

Photomontages were prepared by Cambium Group for two private viewpoints (VP1 and VP7) to illustrate the potential changes associated with the proposed modification to those residents. The original and revised photomontages are included as **Appendix C**. Photomontages compare the original Suntop 1 proposal with the Suntop 1 modification proposal. Photomontages do not include recommended mitigation measures.

The photomontages were prepared independently by Cambium Group and have been used to inform this report.

TABLE 2: ASSESSED VIEWPOINTS AND PREDICTED VISUAL IMPACT LEVELS

Viewpoint (VP)	Approved Project – Assessment from Original Visual Impact Assessment ¹				Assessment of Proposed modification ²		
	Sensitivity (criteria in TABLE 2-1)	Magnitude of change (criteria in TABLE 2-2)	Impact level of approved project (criteria in TABLE 2-3)	Impact level of approved project with mitigation measures implemented	Magnitude of change (criteria in TABLE 2-2)	Impact level of proposed modification (criteria in TABLE 2-3)	Impact level of approved project with mitigation measures implemented
VP1 (associated resident) Lot 53 DP 753238	<p>HIGH</p> <p>Approximately 490m from the Site boundary</p> <p>The residence is on an elevated ridge</p> <p>Direct views from the house are generally not possible due to the surrounding garden</p> <p>The Site is seen from the paddock east of the residence</p>	<p>MODERATE</p> <p>From this viewpoint which is just east of the residence, a moderately large proportion of the PV solar farm could be seen</p> <p>Could potentially see the substation</p> <p>The closest row of the panels would be half a kilometre away</p>	MODERATE-HIGH	<p>MODERATE</p> <p>The approved Concept Landscape Plan included "broken" landscape planting along the western boundary.</p> <p>Views of the PV panels (particularly the rows closest to VP1) and the original substation would reduce through planting, however, panels would remain visible above the height of screen planting.</p>	<p>MODERATE</p> <p>From VP1, the approved location of the substation would be visible, and the proposed modified location of the substation would be visible.</p> <p>The modified substation would replace some of the area previously proposed for solar panels and therefore result in more land seen as pasture when viewed from this viewpoint. However, it would be slightly closer (150 - 200m).</p>	MODERATE-HIGH No change to impact level	<p>MODERATE</p> <p>A continual line of landscape planting is now proposed along the western boundary.</p> <p>Proposed planting would reduce views of the closest PV panels (particularly the rows closest to the western boundary). Additionally, ancillary structures associated with the substation are recommended to be colour-treated to better match the surrounding and decrease visibility and contrast. Panels and taller substation structures would remain visible above the height of screen planting.</p>
VP2 (associated resident) 898 Suntop Road,	<p>HIGH</p> <p>Approximately 780m from the Site boundary</p>	<p>LOW</p> <p>A moderate proportion of the solar farm would be seen, although obstructed by existing</p>	MODERATE	MODERATE-LOW	<p>LOW</p> <p>No change.</p>	LOW Impact has reduced as VP2 is now an	LOW

¹ Extract from Table 7-1 *Proposed Suntop Solar Photovoltaic (PV) Farm, Visual Impact Assessment*, Envisage Consulting, 7 May 2018

² The sensitivity of 'associated residents' has decreased since the original VIA. VP2 and VP3 were both rated as having HIGH sensitivity in the original VIA. Their sensitivity has now decreased to LOW.

Suntop (Lot 97 DP 753238)	The viewpoint is a private home; however, existing vegetation within the property and along Suntop Road obstructs much of the view	vegetation, reducing the view substantially Is unlikely to see the substation		would reduce views into the Site	Was unlikely to see the approved substation location Remains unlikely to see the proposed modified substation	'associated resident'. VP2's sensitivity to the proposal has decreased to low. The low sensitivity ranking, combined with the low magnitude of change, leads to an overall <u>low</u> level of impact.	
VP3 (associated resident) 796 Suntop Road, Suntop (Lot 2 DP 983890)	HIGH Approximately 160m from the Site boundary Is generally at same elevation as Suntop Road Existing trees along Suntop Road may substantially reduce views to the Site from the residence. However, access to the house was not possible during the Site inspection to confirm this, therefore, a worst case has been assumed	MODERATE A relatively small proportion of the Site would be seen In close proximity to proposed panels and inverters (350m to nearest panels) Is opposite the Site entry (which would also be a second entry during construction) Is unlikely to see the substation	MODERATE-HIGH	MODERATE-LOW Views into the Site would reduce via screen planting along the northern 'Suntop Road' boundary	MODERATE No change. Was unlikely to see the approved substation location Remains unlikely to see the proposed modified substation	MODERATE-LOW Impact has reduced as VP3 is now an 'associated resident'. VP3's sensitivity to the proposal has decreased to low. The low sensitivity ranking, combined with the moderate magnitude of change, leads to an	LOW Views into the Site would reduce via screen planting along the northern 'Suntop Road' boundary

						overall moderate-low level of impact.	
VP4 14 Bennetts Road, Suntop (Lot 92 DP 753238)	<p>HIGH</p> <p>The viewpoint is in close proximity to the Site boundary (270m);</p> <p>Existing trees within VP4 property and along Suntop Road potentially reduce views to the Site from the residence</p>	<p>MODERATE</p> <p>The nearest panels would be approximately 400m away</p> <p>A relatively small proportion of the Site would be seen</p> <p>The substation is unlikely to be seen</p>	MODERATE - HIGH	<p>MODERATE-LOW</p> <p>Views would reduce via proposed screen planting along the northern 'Suntop Road' boundary, and planting within VP6 property</p>	<p>MODERATE</p> <p>No change.</p> <p>Was unlikely to see the approved substation location</p> <p>Remains unlikely to see the proposed modified substation</p>	<p>MODERATE - HIGH</p> <p>No change to impact level</p>	<p>MODERATE-LOW</p> <p>No change to post-mitigation impact level</p>
VP5 Lot 51 DP 1082497	<p>HIGH</p> <p>Private home approximately 380m east of the Site boundary</p> <p>The closest panels to the viewpoint would be half a kilometre away</p> <p>Trees between the property and the solar farm would likely limit views</p>	<p>LOW</p> <p>A relatively small proportion of the Site would be seen</p> <p>The substation is unlikely to be seen</p>	MODERATE	<p>MODERATE-LOW</p> <p>Views into the Site would potentially reduce via screen planting along the northern 'Suntop Road' boundary</p>	<p>LOW</p> <p>No change.</p> <p>Was unlikely to see the approved substation location</p> <p>Remains unlikely to see the proposed modified substation</p>	<p>MODERATE</p> <p>No change to impact level</p>	<p>MODERATE-LOW</p> <p>No change to post-mitigation impact level</p>
VP6 Lot 90 DP 657805	<p>HIGH</p> <p>Located immediately north of (adjoining) the Site, on the southern side of Suntop Road</p> <p>This is the closest residence to the proposed panels and inverters</p>	<p>HIGH</p> <p>A relatively small proportion of the solar farm would be seen, however, views of the panels would be possible from three sides of the property</p> <p>The substation would not be seen</p>	HIGH	<p>MODERATE</p> <p>Planting is proposed within the VP6 property. Planting includes shrubs and trees to create a dense screen along the three sides of the property bordering the Site. Screen</p>	<p>HIGH</p> <p>No change.</p> <p>Was unlikely to see the approved substation location</p> <p>Remains unlikely to see the proposed modified substation</p>	<p>HIGH</p> <p>No change to impact level</p>	<p>MODERATE</p> <p>No change to post-mitigation impact level</p>

	<p>The property is lower in elevation than the surrounding solar farm Site</p> <p>The property faces north, and views are directed northward, away from the proposed solar farm</p>	<p>VP6 would also be in close proximity to the proposed construction compound and would be the closest residence to the construction area.</p>		<p>planting is expected to substantially reduce views into the Site</p>			
<p>VP7</p> <p>582 Suntop Road, (Lot 50 DP 753238)</p>	<p>MODERATE</p> <p>Approximately 950m north of the Site</p> <p>over a kilometre from the nearest panels and inverters</p> <p>It is a private residence in an elevated position, however direct views to the Site from the house are not possible</p> <p>The solar farm site would be seen from the paddock west of the residence</p>	<p>MODERATE</p> <p>A moderate proportion of the Site potentially seen</p> <p>The substation would not be seen</p>	MODERATE	MODERATE	<p>MODERATE</p> <p>No change.</p> <p>Was unlikely to see the approved substation location</p> <p>Remains unlikely to see the proposed modified substation</p>	MODERATE	MODERATE
<p>VP Group A</p> <p>VP13, VP15 and VP16</p>	<p>LOW</p> <p>This group of viewpoints is within 2.5km of the Site boundary (approximately)</p> <p>From the residence at VP13, views of the proposed Suntop solar farm are screened by existing, dense vegetation.</p>	<p>LOW</p> <p>Small to moderate proportion of the Site potentially visible</p> <p>Substation unlikely to be seen</p>	LOW	LOW	<p>VP13: LOW</p> <p>In the original assessment, VP 13 was unlikely to see the approved substation location</p> <p>The proposed modified substation location, however, now results in the substation being in view.</p> <p>The substation would be seen behind the existing site homestead, and</p>	VP13: LOW	LOW

	Approximately 250m south of the residence, away from the trees, wide views of the Suntop solar farm site are possible.				<p>above and between trees along the western property boundary.</p> <p>The substation would be a moderate distance from VP13. The substation is approximately 1.8km from the VP13 property boundary, and approximately 2.4km from the viewing location south of the residence.</p> <p>At this distance, the substation would not be prominent. Therefore, there is no change to the magnitude of change rating.</p>		
					<p>VP15 and VP16: LOW</p> <p>No change. Was unlikely to see the approved substation location. Remains unlikely to see the proposed modified substation.</p>	<p>VP15 and VP16: LOW</p> <p>No change to impact level</p>	<p>LOW</p> <p>No change to post-mitigation impact level</p>
VP Group B VP28³, VP32 and VP38	<p>LOW</p> <p>More distant from Site boundary (2.5 to 5km)</p> <p>Located west of the Site</p> <p>Existing vegetation likely to reduce potential viewing area</p>	<p>LOW</p> <p>Large extent of Site potentially visible although Site unlikely to be prominent in the view</p> <p>Potential views of the panels would have minimal visibility</p>	LOW	NEGLIGIBLE	<p>VP38: LOW</p> <p>In the original assessment, VP 38 was unlikely to see the approved substation location</p> <p>The proposed modified substation location, however, now results in part of the substation being in view.</p>	<p>VP38: LOW</p> <p>No change to impact level</p>	<p>NEGLIGIBLE</p> <p>No change to post-mitigation impact level</p>

³ VP28 was originally thought to be a residence, however, it has been since the original assessment was done, it was confirmed as a shed. It has been included in the table for consistency and to allow a direct comparison of results

		Views of the substation unlikely			Although partially visible, the viewpoint is more than approximately 4.3km from the substation, so views are distant, and the substation would not be prominent		
					<p>VP28 and VP32: LOW No change.</p> <p>Was unlikely to see the approved substation location</p> <p>Remains unlikely to see the proposed modified substation</p>	VP28 and VP32: LOW	<p>NEGLECTIBLE</p> <p>No change to post-mitigation impact level</p>
<p>VP Group C</p> <p>VP20, VP30, VP31, VP34, VP35, VP55, VP56</p>	<p>LOW</p> <p>More distant from the Site boundary (5km or more), located north-east to north-west of the Site,</p>	<p>NEGLECTIBLE</p> <p>only small proportion of the Site potentially seen</p> <p>Substation would not be seen</p>	NEGLECTIBLE	NEGLECTIBLE	<p>NEGLECTIBLE</p> <p>No change.</p> <p>Due to the distance from the proposal site, and the moderately low profile of the substation, the proposed modified substation remains unlikely to be discernible</p>	NEGLECTIBLE	NEGLECTIBLE
<p>VP Group D</p> <p>VP40 and VP41</p>	<p>LOW</p> <p>Over 5km from the Site</p> <p>Located west of the Site</p> <p>Views likely to be obscured by trees</p>	<p>LOW</p> <p>A moderate proportion of the Site possibly seen</p> <p>Substation unlikely to be seen</p> <p>Solar farm unlikely to be prominent in the view</p>	LOW	NEGLECTIBLE	<p>LOW</p> <p>No change.</p> <p>Due to the distance from the proposal site, and the moderately low profile of the substation, the proposed modified substation remains unlikely to be discernible</p>	<p>LOW</p> <p>No change to impact level</p>	NEGLECTIBLE
VP Group E	LOW	NEGLECTIBLE	NEGLECTIBLE	NEGLECTIBLE	<p>NEGLECTIBLE</p> <p>No change.</p>	NEGLECTIBLE	NEGLECTIBLE

VP26, VP42, VP50, VP52	<p>Distant from the Site (over 5km)</p> <p>Located south of the Site</p>	<p>Moderate proportion of the Site seen</p> <p>Substation would not be seen</p> <p>Solar farm unlikely to be prominent in the view</p>			<p>Due to the distance from the proposal site, and the moderately low profile of the substation, the proposed modified substation remains unlikely to be discernible</p>	<p>No change to impact level</p>	
VP Suntop Road	<p>MODERATE</p> <p>Travellers using Suntop Road pass immediately to the north of the Site</p> <p>The road is in close proximity to the Site, however, the distance to the proposed panels and inverters ranges from 75m to 200m or more as the viewer travels along the road</p>	<p>MODERATE</p> <p>The PV modules would be in rows perpendicular to the road. Therefore, when travelling past the solar farm, the viewer is likely to see the colour of the panels change rapidly from black to various shades from blue to white, lightening in appearance as the viewer position changes. This visual change would be seen if looking directly down the rows when travelling past at speed, and would be momentary</p> <p>Views are temporary</p> <p>Substation would not be seen</p> <p>A relatively small proportion of the Site seen</p>	MODERATE	MODERATE-LOW	<p>MODERATE</p> <p>In the original assessment, VP Suntop Road was unlikely to see the approved substation location</p> <p>The proposed modified substation location, however, now results in the substation being in view along a short section of Suntop Road.</p> <p>When driving west along Suntop Road, views of the proposed modified substation would be prevented by a ridge within Suntop 1 between the substation and Suntop Road (around 11m higher in elevation compared to Suntop Road)</p> <p>When driving east along Suntop Road, views of the proposed modified substation are limited by vegetation within the adjacent property and along the entrance driveway to the Suntop solar farm</p> <p>There is a short section of Suntop Road (approximately 500m long)</p>	MODERATE	MODERATE-LOW

					<p>in the vicinity of the Suntop 1 entrance driveway where views of the substation would be possible</p> <p>These limited viewing locations are over a kilometre from the substation, and only the very top (1-2m) of the substation would be visible due to the location of the Substation on lower-lying land and the more-elevated land between the viewer (on Suntop Road) and the substation</p> <p>This small increase in the proposal seen from this distance (over 1km) from the substation, does not impact the rating previously determined.</p>		
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6. Summary

A comparison of ratings (prior to implementation of recommended mitigation measures) for viewpoints assessed in the original proposal, and assessed for the proposed modified substation location, are summarised in **TABLE 3**.

The proposed modification to the substation location would result in two private viewpoints (VP13 and VP38) seeing the substation whereas previously they had no view of the approved substation. However, both viewpoints are distant (over approximately 2.5km away), and the substation is still on lower-lying land with trees in the foreground along the property boundary. At this distance the substation would be barely perceptible from other solar farm infrastructure and would not be prominent in the view, and therefore, the original rating given for these viewpoints has not changed.

From the public viewpoint (VP Suntop Road) there would also be views of the substation whereas previously there was no view. However, locations from Suntop Road with views to the substation are very limited, and only the top few metres of the substation would be seen. Therefore, the original rating given for this viewpoint has not changed.

The only other viewpoint that would see the proposed modified substation is VP1, which already viewed the approved substation. Overall the revised proposal does not represent a substantial change to the approved proposal when viewed from this residence, and therefore, the original rating has not changed. To further mitigate the visual impact to VP1 in the longer term, additional landscaping has been proposed along the western boundary closest to the substation in consultation with this landholder. Over time this landscape planting would break-up views of the substation in addition to the screening originally proposed, however, the taller elements of the substation would remain visible.

TABLE 3: SUMMARY OF RATINGS

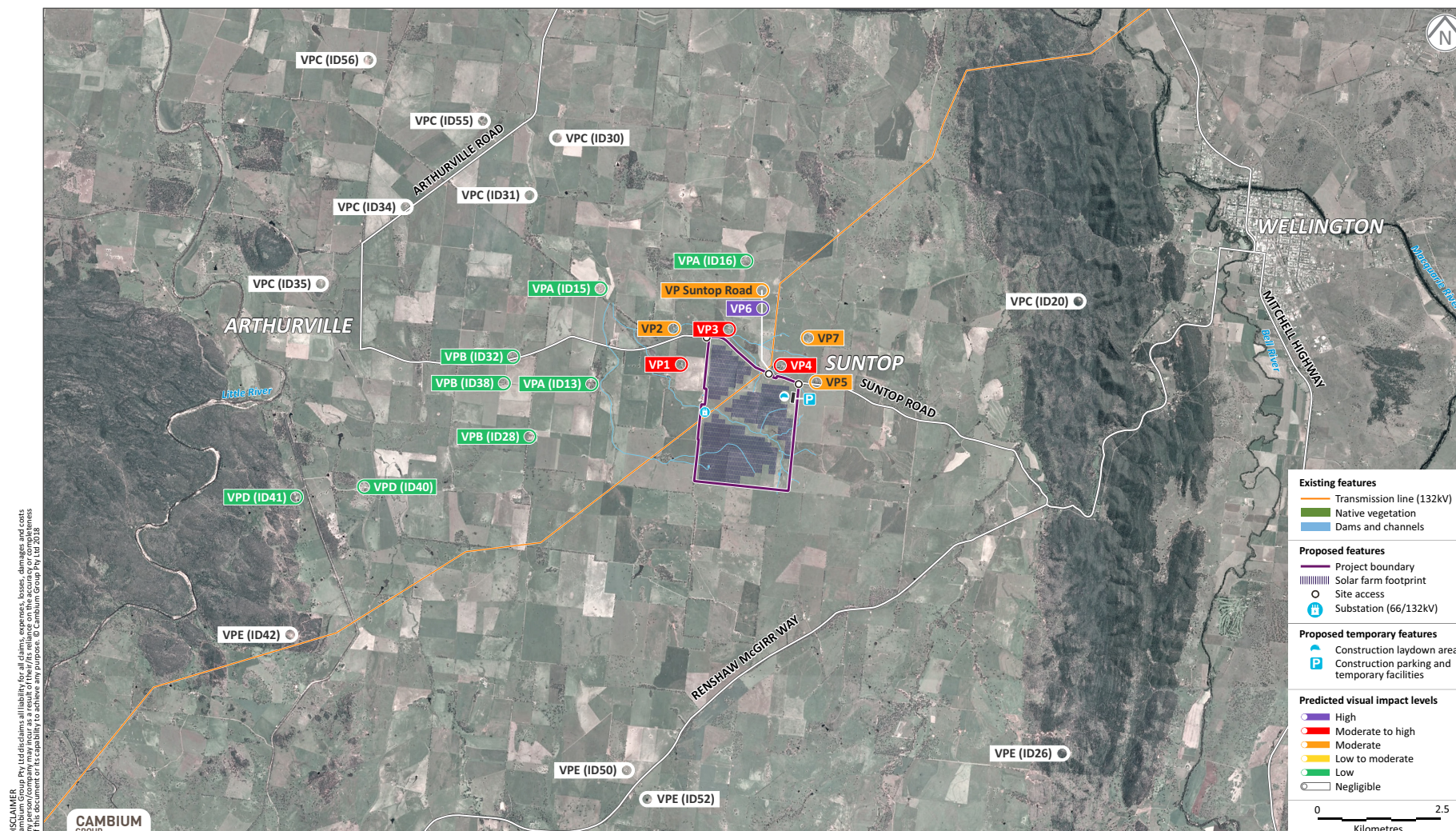
Rating	Approved Project	Proposed Modification
High	<ul style="list-style-type: none"> 1 private viewpoint with a high impact (VP6) 	<ul style="list-style-type: none"> 1 private viewpoint with a high impact (VP6)
Moderate-high	<ul style="list-style-type: none"> 3 private viewpoints (VP1, VP3 and VP4) <p>A photomontage of the approved project from VP1 is shown at Figure 6, Appendix C.</p>	<ul style="list-style-type: none"> 2 private viewpoints with a moderate-high impact (VP1 and VP4) <p>VP1 would see proposed substation. VP1 also had views of the approved substation. There is no change to impact level.</p> <p>A photomontage of the proposed modification project from VP1 is shown at Figure 8, Appendix C.</p> <p>VP3 is now an 'associated resident', therefore impact has decreased.</p>
Moderate	<ul style="list-style-type: none"> 3 private viewpoints with a moderate impact (VP2, VP5, VP7) 1 public viewpoint with a moderate impact (VP Suntop Road) <p>A photomontage of the approved project from VP7 is shown at Figure 11, Appendix C.</p>	<ul style="list-style-type: none"> 2 private viewpoints with a moderate impact (VP5, VP7) 1 public viewpoint with a moderate impact (VP Suntop Road) <p>VP Suntop Road would see proposed substation (whereas it did not see the original substation), however, there is no change to impact level</p>

Rating	Approved Project	Proposed Modification
		<p>A photomontage of the proposed modification project from VP1 is shown at Figure 13, Appendix C.</p> <p>VP2 is now an 'associated resident', therefore impact has decreased.</p>
Moderate-low	<ul style="list-style-type: none"> No viewpoints with a moderate-low rating 	<ul style="list-style-type: none"> 1 private viewpoint with a moderate-low rating (VP3)
Low	<ul style="list-style-type: none"> 8 private viewpoints with a low impact rating (VP13, VP15, VP16, VP28, VP32, VP38, VP40 and VP41) 	<ul style="list-style-type: none"> 9 private viewpoints with a low impact rating (VP2, VP13, VP15, VP16, VP28, VP32, VP38, VP40 and VP41) <p>VP13 would see the proposed substation (whereas it would not see the approved substation), however, views are quite distant (around 2.4km away), and the substation would not be prominent.</p> <p>VP38 would see part of the substation (whereas it would not see the approved substation), however, the viewpoint is more than approximately 4.3km from the substation, so views are distant, and the substation would not be prominent.</p>
Negligible	<ul style="list-style-type: none"> 11 private viewpoints with a negligible impact rating (VP20, VP30, VP31, VP34, VP35, VP55, VP56, VP26, VP42, VP50 and VP520) 	<ul style="list-style-type: none"> 11 private viewpoints with a negligible impact rating (VP20, VP30, VP31, VP34, VP35, VP55, VP56, VP26, VP42, VP50 and VP520)

7. Recommendations

In addition to the recommendations for the detailed landscape plan provided in the original visual impact assessment, we recommend increasing the width of landscape screening along the western boundary so that it is a minimum width of 5m at the ground surface.

APPENDIX A: PREDICTED VISUAL IMPACT LEVELS TO IDENTIFIED VIEWPOINTS⁴



⁴ FIGURE 7-1, Proposed Suntop Solar Photovoltaic (PV) Farm, Visual Impact Assessment, Envisage Consulting, 7 May 2018.

APPENDIX B: METHODOLOGY

The methodology below is an extract of **Section 2.0** of the original VIA for the Project, *Proposed Suntop Solar Photovoltaic (PV) Farm, Visual Impact Assessment*, Envisage Consulting, 7 May 2018. It was used in the original assessment and also in this assessment of the modification to the substation location.

2.1 General

The assessment methodology used in this report is based broadly on the NSW Road and Maritime Services' (Roads and Maritime, 2013) Environmental Impact Assessment Practice Note: Guideline for Landscape Character and Visual Impact Assessment EIA-N04, March 2013.

Under the guideline, two main types of visual effects (or impacts) are assessed:

- effect on the landscape character
- effect on key viewpoints (visual impact).

The guidelines describe these impacts as follows:

"Landscape character and visual assessment are equally important. Landscape character assessment helps determine the overall impact of a project on an area's character and sense of place. Visual impact assessment helps define the day to day visual effects of a project on people's views."

2.2 Detailed assessment methodology

The determination of the effect on landscape character and viewpoints are based on the combination of two criteria – the sensitivity and the magnitude of change, defined by Roads and Maritime (2013) as:

- *Sensitivity - The sensitivity of a landscape character zone or view and its capacity to absorb change. In the case of visual impact this also relates to the type of viewer and number of viewers.*
- *Magnitude - The measurement of the scale, form and character of a development proposal when compared to the existing condition. In the case of visual assessment this also relates to how far the proposal is from the viewer.*
- For the purposes of this assessment, the criteria developed to determine sensitivity are listed in **Table 2.1**. Criteria used to determine magnitude are listed in **Table 2.2**. These criteria have been defined for sensitivity and magnitude of change for both the assessment of landscape character and the visual impact to viewpoints. The combination of sensitivity and magnitude provide the rating of the level of impact, as shown in **Table 2.3** (as adapted for this type of project from Roads and Maritime, 2013).

Indicative images (photomontages) have been prepared to illustrate the likely visual changes from key viewpoints and are included where relevant.

TABLE 2-1: SENSITIVITY RANKING CRITERIA

Sensitivity	Criteria (general guide only, some or all may apply)
High	<ul style="list-style-type: none"> ▪ Landscape or cultural heritage of high to very high conservation value ▪ Landscape with characteristics that are highly sensitive and highly affected by large-scale development ▪ Public views with a high to very high number of users and/or in close proximity ▪ Private views in close proximity (generally less than 1km) with mostly unimpeded views
Moderate	<ul style="list-style-type: none"> ▪ Landscape or cultural heritage of moderate conservation value ▪ Landscape with characteristics moderately affected by large-scale development ▪ Public views with a moderate to high number of viewers and/or viewers are in close or moderate proximity (generally less than 2.5km away) ▪ Private views in moderate proximity (generally 1-2.5km) with some views, or a further distance (2.5-5km) with mostly unimpeded views
Low	<ul style="list-style-type: none"> ▪ Some landscape or cultural heritage conservation value but of lower visual value ▪ Landscape characteristics not greatly affected by large-scale development ▪ Public views for a small number of users and/or viewers more distant (generally over 2.5km away) ▪ Private views in more distant proximity (generally 5km+) with some unimpeded views
Negligible	<ul style="list-style-type: none"> ▪ Landscape has no or very little cultural heritage, conservation or visual value ▪ Characteristics relatively unaffected by large-scale development ▪ Very few people can view ▪ Viewers are a long distance from site (generally over 5km with no obvious views) ▪ Private views generally not affected.

TABLE 2-2: MAGNITUDE OF CHANGE RANKING CRITERIA

Magnitude	Criteria (general guide only, some or all may apply)
High	<ul style="list-style-type: none"> ▪ Significant scale (bulk and height) and extent of area affected ▪ Permanent and irreversible change ▪ The site has a high visual prominence (is a key feature of the view) ▪ The viewer position in relation to the proposal is substantially elevated and from a northern, eastern or western location ▪ The viewer sees a large proportion of the facility (typically more than half (50%)) ▪ The proposal forms a significant and immediately apparent part of the scene, and one that significantly contrasts in scale and character (either existing or planned) and is severely detrimental to the quality of the scene.
Moderate	<ul style="list-style-type: none"> ▪ Moderate scale (bulk and height) and extent of area affected ▪ The site is visually prominent (a recognisable feature of the view) ▪ The viewer position in relation to the proposal is elevated ▪ The viewer sees a moderate proportion of the facility (typically a quarter to a half (25-50%)) ▪ Temporary, or if permanent, effects which may reduce over time

Magnitude	Criteria (general guide only, some or all may apply)
	<ul style="list-style-type: none"> The proposal becomes a noticeably dominant feature of the scene, and one that contrasts in scale and character (either existing or planned), possibly reducing the quality of the scene.
Low	<ul style="list-style-type: none"> Small in scale (bulk and height) and extent of area affected Temporary, or if permanent, visual effects able to be reduced substantially over time The site is less visually prominent The viewer position is usually to the south of the facility The viewer sees a small portion of the facility (typically less than a quarter (25%) and/or from a further distance) The proposal forms a visible and recognisable new element within the overall scene, yet one that is relatively compatible with the surrounding character (either existing or planned) and would not generally reduce the quality of the scene.
Negligible	<ul style="list-style-type: none"> The proposal constitutes only a minor component of the wider view, which might be missed by the casual observer or receptor. Awareness of the proposal would not have a marked effect on the overall quality of the scene.

TABLE 2-3: LEVEL OF IMPACT

Matrix of relationship between sensitivity and magnitude					
		Magnitude			
			HIGH	MODERATE	LOW
Sensitivity	HIGH	High	Moderate - high	Moderate	Negligible
	MODERATE	Moderate - High	Moderate	Moderate -Low	Negligible
	LOW	Moderate	Moderate - Low	Low	Negligible
	NEGLIGIBLE	Negligible	Negligible	Negligible	Negligible

APPENDIX C: PHOTOMONTAGES prepared by Cambium Group)

Viewpoint (VP) locations are shown **Appendix A.**

Photomontages have been prepared for VP1 and VP7. For each viewpoint, the following images are provided:

- The existing view toward the Proposal
- Analytical view of approved project - using the same image as the existing view, the analytical image shows the location of the approved solar farm in pink
- Photomontage of approved project – this image shows the likely view following construction of the approved solar farm
- Analytical view of proposed modified project
- Photomontage of proposed modified project



031146_Sun_FB-2_to_FB-21_180422_v04

FIGURE 4 – VP1 Existing view



Figure 5: VP1 - Analytical view of likely visibility of approved project



Figure 6: VP1 - Photomontage of likely view of approved project post construction



Figure 7: VP1 – Analytical view of proposed modified project



Figure 8: VP1 – Photomontage of proposed modified project



Figure 9: VP7 – Existing view



Figure 10: VP7 - Analytical view of likely visibility of approved project



Figure 11: VP7 - Photomontage of likely view of approved project post construction



Figure 12: VP7 - Analytical view of likely visibility of proposed modified project



Figure 13: VP7 - Photomontage of likely view of approved project post construction



SUNTOP SOLAR FARM

BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Prepared for Pitt & Sherry Pty. Ltd.

by C.C. Bower
Principal Consultant Ecologist

MAY 2018

FloraSearch

37 Kent Avenue, Orange, NSW 2800
PO Box 300, Orange, NSW 2800

Tel: 0263690252
Mob: 0428263274
E-mail: colbower@bigpond.net.au
ABN: 43060913622

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LIST OF ATTACHMENTS

Attachment 1. Fauna Survey and Assessment Report

Attachment 2. BAM Credit Summary Report

EXECUTIVE SUMMARY

FloraSearch was commissioned by Pitt and Sherry Pty. Ltd. on behalf of Suntop Solar Farm to conduct biodiversity surveys and an ecological assessment on the site of a proposed solar farm at Suntop, approximately 10 kilometres (km) south west of Wellington town centre in the central west of New South Wales. The Project is a State Significant Development for which approval is being sought under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act). The survey and assessment were conducted using the Biodiversity Assessment Method (BAM) (OEH, 2017a) under the NSW *Biodiversity Conservation Act 2016* (BC Act). Owing to the small areas of native vegetation to be impacted on the Site, the assessment uses the *Streamlined Assessment Module* of the BAM (OEH, 2017a).

Suntop Solar Farm propose to construct and operate a 200 megawatt (MW) solar farm (the Proposal) using photovoltaic (PV) technology at a 517 hectare site (the Study area) in Suntop, NSW (Figure 1). The Proposal would be located adjacent to Suntop Road and contained within Lots 1, 2 and 3 DP506925, Lot 122 DP753238 and Lot 90 DP657805 (the Subject Land) within the Dubbo Regional Council Local Government Area (LGA). The solar farm would occupy 472 hectares (the Site) of the 517 hectares (approximately 91.3% of the Study area).

The survey comprised three days of field survey (29 November 2017, 15 January 2018 and 8 May 2018), searches of relevant State and Commonwealth databases and a literature review to determine which threatened biodiversity has potential to occur on the investigation area.

The key findings of the survey were:

Flora

- No patches of remnant vegetation occur within the solar farm footprint, which is confined to cleared agricultural land entirely made up of cultivation paddocks for wheat and lucerne production.
- All that remains of the pre-European native vegetation within the solar farm footprint are 25 scattered remnant old growth paddock trees, 10 of which have hollows suitable for wildlife denning and nesting.
- The Site also has five linear plantings and two small block plantings of native trees totalling 477 individuals, some endemic to the local area and some native to other regions.
- Three introduced species regarded as High Threat Exotic weeds under the BAM (OEH, 2018a) were recorded on the Site, Khaki Weed, Bathurst Burr and Saffron Thistle. None are listed as Priority Weeds under the NSW *Biosecurity Act 2015* or as Weeds of National Significance by the Australian Weeds Committee.
- The original dominant vegetation community on the study area is considered to be Plant Community Type (PCT) 267; *White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion*.
- Upgrade of the intersection of Suntop Road and Renshaw-McGirr Way would disturb remnants of PCT277; *Blakelys Red Gum – Yellow Box grassy tall woodland in the NSW South Western Slopes Bioregion*.

Threatened Biodiversity

- No threatened flora species, populations or critical habitat listed under the BC Act or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were identified on the investigation area by the survey, or by a survey of fauna by Biosphere Environmental Consultants Pty. Ltd (Attachment 1).
- No suitable habitat was considered to be present on the Site for any of the threatened flora species returned by the BAM Credit Calculator as having potential to occur.
- Five ecosystem credit fauna species were considered to have a low potential to use the limited resources on the Site; the Little Lorikeet, Swift Parrot, Regent Honeyeater, Scarlet Robin and Flame Robin.
- No species credit fauna species were considered to have potential to utilise the Site owing to a lack of breeding resources.
- One threatened ecological community (TEC) listed under the BC Act and the EPBC Act is considered to once have occupied the Site, but has been reduced by clearing for agriculture to a few scattered paddock trees;

White Box Yellow Box Blakely's Red Gum Woodland Endangered Ecological Community (BC Act), and

White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community (EPBC Act).

- Remnant woodland of the above EEC/CEEC, commonly known as Box-Gum Woodland, occupies the disturbance area at the intersection of Suntop Road and Renshaw – McGirr Way.

Impact Avoidance and Mitigation

Impact avoidance measures that would be implemented for the Project include;

- Protection measures to avoid damage to discontinuous patches of mature native perimeter trees on all boundaries of the Site.
- Avoidance and protection of the block of planted native eucalypts in Paddock 12.
- Retention and avoidance of a clump of three Fuzzy Box trees within the northern boundary of Paddock 1.

Mitigation measures include:

- Supervised removal of trees with hollows.
- A Vegetation Management Plan to protect old growth trees on the margins of the Site.
- Vegetation enhancement through strategic replanting.
- Development of a weed management strategy.
- Monitoring for feral animals and control as necessary.
- Prohibition of domestic pets on site.
- A site closure and rehabilitation plan.

Project Impacts

Direct impacts of the Proposal on biodiversity include;

- Loss of 1.25 ha of eucalypt plantings and six isolated planted eucalypts.
- Loss of 0.04 ha of Box-Gum Woodland at the junction of Suntop Road and Renshaw – McGirr Way.
- Loss of 25 remnant paddock trees and up to 10 isolated roadside trees.

Cumulative Impacts

The cumulative impacts of the project on remnant native vegetation loss are negligible whether remnant woodland or plantings of native windbreak trees are considered.

Biodiversity Credit Report

The biodiversity credit report of the BAMC indicated that the plantings, which were assumed to represent PCT267 in order to run the calculator, are valued at 20 credits.

Paddock trees for removal were assessed according to Appendix 1 of the BAM (2017a), which valued them at 27.75 credits.

The total credit liability for the Project is 47.75 credits.

Offset

Suntop Solar Farm propose to acquit the liability of 47.75 credits by making a lump sum payment of equivalent value to the Biodiversity Conservation Trust Fund.

Commonwealth Environment Protection and Biodiversity Conservation Act (EPBC Act)

Two threatened species considered to have potential habitat on the investigation area are listed under the EPBC Act; the Swift Parrot and the Regent Honeyeater. Neither species would be dependent on the site for breeding and foraging visits would occur rarely, if at all. The small loss of potential habitat on the site is highly unlikely to have an adverse impact on either species and referral of the Project to the Department of Energy and the Environment is not required.

SEPP 44

Three of the remnant eucalypt species on and around the Subject Land are recognised as secondary Koala food trees (OEH, 2018e), viz. Inland Grey Box, Fuzzy Box and White Box. The last of these is listed as a Koala feed tree in Schedule 2 of SEPP 44. However, the Site does not have an extant Koala population (Attachment 1) and therefore is not 'core' Koala habitat so that a SEPP 44 plan of management is not required.

1 INTRODUCTION

FloraSearch was commissioned by Pitt and Sherry Pty. Ltd. on behalf of Suntop Solar Farm to conduct biodiversity surveys and an ecological assessment of the site of a proposed solar farm at Suntop, approximately 10 kilometres (km) south west of Wellington town centre in the central west of New South Wales (Figure 1). The Project is a State Significant Development for which approval is being sought under Part 4 of the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act). The survey and assessment were conducted using the Biodiversity Assessment Method (BAM) (OEH, 2017a) under the NSW *Biodiversity Conservation Act 2016* (BC Act).

1.1 PROJECT OVERVIEW

Suntop Solar Farm propose to construct and operate a 200 megawatt (MW) solar farm (the Proposal) using photovoltaic (PV) technology at a 517 hectare site (the Study area) in Suntop, NSW (Figure 1). The Proposal would be located adjacent to Suntop Road and contained within Lots 1, 2 and 3 DP506925, Lot 122 DP753238 and Lot 90 DP657805 (the Subject Land) within the Dubbo Regional Council Local Government Area (LGA). The solar farm would occupy 472 hectares (the Site) of the 517 hectares (approximately 91.3% of the Study area) (Figure 2).

An estimated up to 550,000 PV panels would be installed on a single axis tracker system across the Site. The single axis tracker system would consist of groups of east-west facing PV modules tilted at +/- 60° angle (each approximately 2m x 1m in area) on mounting structures approximately 2 m in height. The mounting structure would be piled steel posts that would extend 1.6 to 4 m below soil surface depending on substrate conditions. The maximum height of the panels during tracking movement would be 4 m.

The following works and infrastructure would be required to support the construction and operation of the solar farm:

- Construction of an access road for all access and egress for the Site and substation.
- Installation of Electrical infrastructure including:
 - A 132kV Substation including two transformers and associated 132kV switchgear.
 - Inverters to collect and convert DC to AC.
 - Cabling and other electrical infrastructure (e.g. security systems).
- A maintenance compound and buildings.
- Fencing, landscaping and environmental works.
- Upgrade of the intersection of Suntop Road and Renshaw-McGirr Way (Figure 3).

Power generated by the facility will be transmitted via existing 132kV transmission lines, in an easement owned by TransGrid that traverses the Site and extends through to the Wellington substation approximately 15 kilometres to the north. A tee off connection will be used to connect the new substation on Site to the existing TransGrid 132kV transmission line via a short section of transmission line.

The operational life of the solar farm is expected to be approximately 30 years at which point the panels are either replaced and operations continue or removed and the site decommissioned and rehabilitated as required.

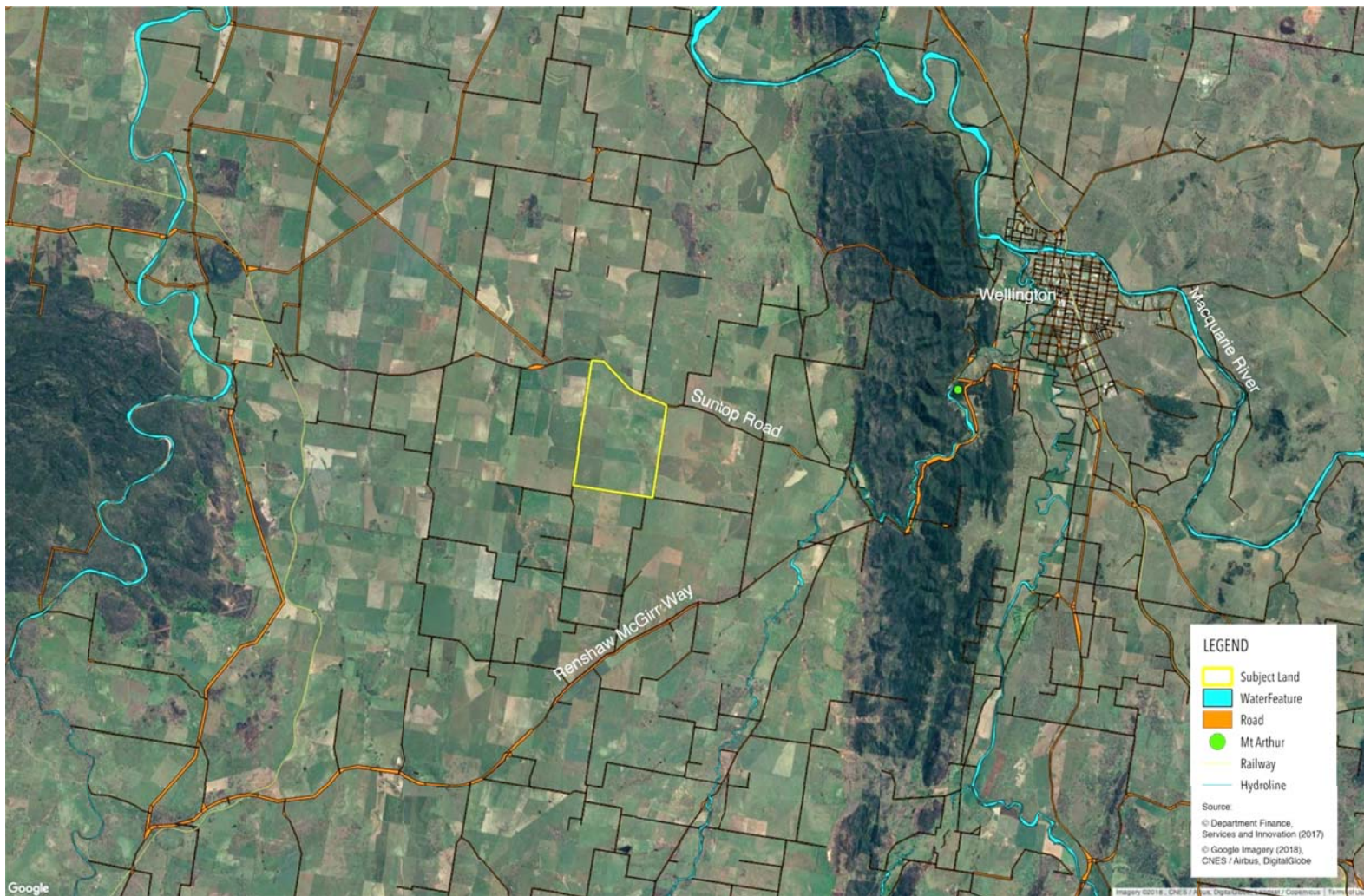


Figure 1. Regional Location of the Project Site.

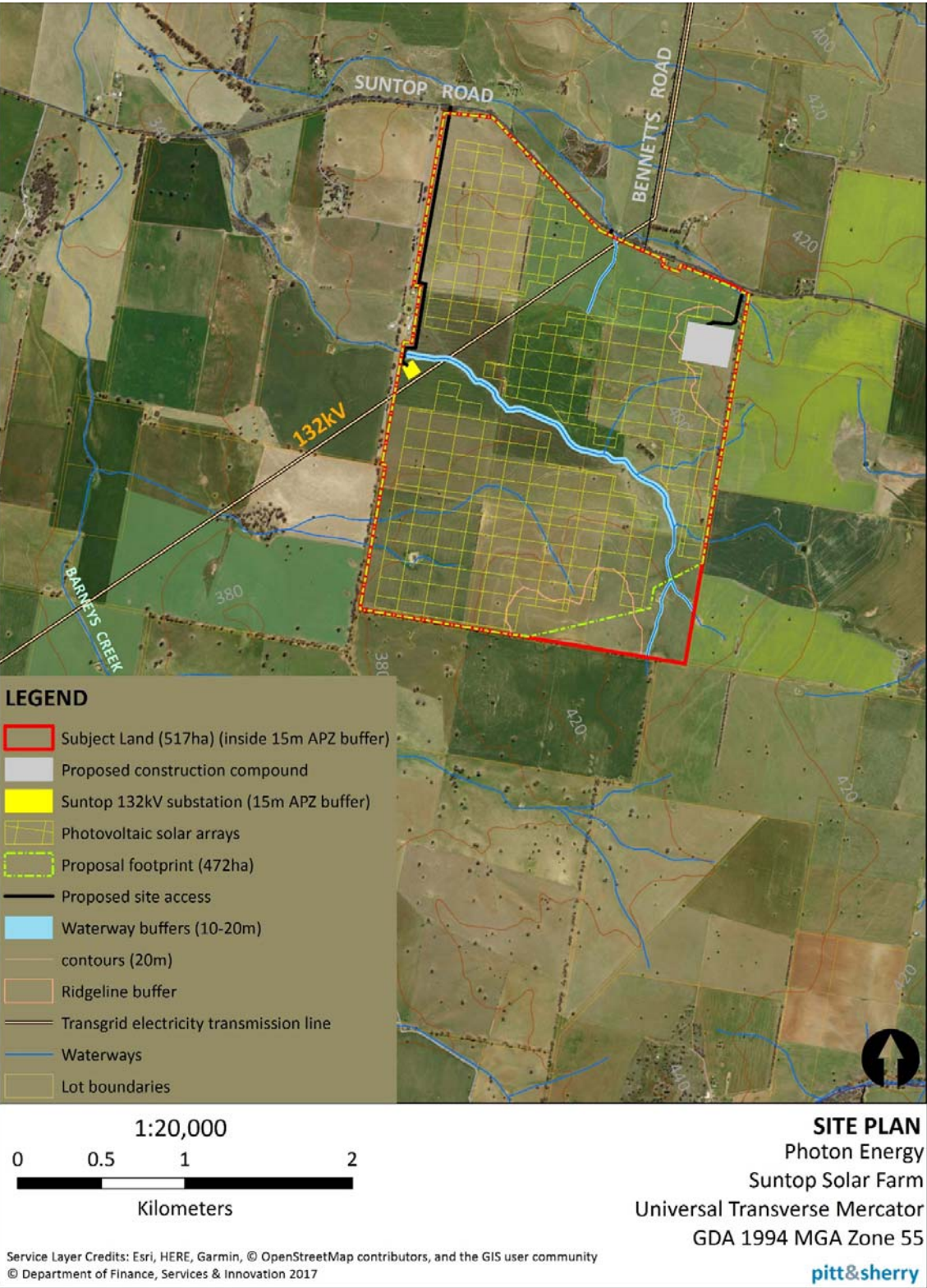


Figure 2. Site Layout.



Figure 3. Proposed Widening of Renshaw - McGirr Way at the Suntop Road Intersection.

1.2 BIODIVERSITY ASSESSMENT METHOD

The Environmental Assessment Requirements issued on behalf of the Secretary of the NSW Department of Planning and Environment to Suntop Solar Farm require that the assessment of impacts from this Project on biodiversity should be conducted in accordance with the Biodiversity Assessment Method (BAM) (OEH, 2017a) established under the *Biodiversity Conservation Act 2016* (BC Act). The BAM outlines the methodology that underpins the NSW Biodiversity Offsets Scheme established under Part 6 of the BC Act.

The BAM (OEH, 2017a) requires the use of an online program (calculator) to assess biodiversity impacts and determine the biodiversity offset requirements for those impacts. The *Biodiversity Assessment Method Calculator* (BAMC or the Credit Calculator) was used for this assessment.

As specified by the BAM (OEH, 2017a), three stages of assessment are outlined in this report:

- Stage 1 summarises the biodiversity values of the BDAR Footprint that are entered into the Credit Calculator (e.g. landscape features, native vegetation and threatened species) (Section 2);
- Stage 2 assesses potential impacts on biodiversity, describes impact avoidance and mitigation measures and determines offset requirements (Section 3); and
- Stage 3 describes the Biodiversity Offset Strategy (Section 4).

This Biodiversity Development Assessment Report (BDAR) has been prepared by Dr Colin Bower (FloraSearch), who is an accredited assessor under section 6.10 of the BC Act (assessor accreditation number BAAS18048).

1.3 GENERAL DESCRIPTION OF THE DEVELOPMENT SITE

The Biodiversity Development Assessment Report Site Footprint (BDAR Footprint) (Figure 2) is the development Site construction and operational area comprising approximately 472 hectares (ha). An existing TransGrid easement runs in a north-easterly direction across the Site from the western boundary of Lot 3 DP 506925, through Lot 122 DP 753238, and exiting near the north-eastern corner of Lot 122 (Figure 2). This easement contains existing TransGrid 132kV powerlines on wooden pole structures connecting to the Wellington substation approximately 15km to the north-east of the Site.

The land is divided into 15 fenced paddocks currently used for agriculture, including cropping (e.g. wheat and lucerne) and grazing (Figure 4). It is proposed that grazing activities would continue on the land occupied by the solar farm. The Site has been almost entirely cleared of its original vegetation except for a few scattered paddock trees. Various plantings of eucalypts have been made on the property including a woodlot in the centre east, which will remain within the solar farm, and five narrow linear plantings two tree rows wide along fence lines, which are proposed to be removed (Figures 2 and 4). In addition, some of the scattered paddock trees have been planted historically. The remnant paddock trees and plantings comprise the only native vegetation on the Site.

Plates 1 to 18 illustrate the current condition of the vegetation across the Site according to the paddock numbering in Figure 4. The photos demonstrate that the whole property including two access laneways has been regularly cultivated, cropped and heavily grazed, and lacks remnants of native ground cover.



Figure 4. Paddock Arrangement on the Development Site.
[Note the access laneways between paddocks 2/3 and 5/7 in the north
and paddocks 9/11 and 13/14 in the south]



Plate 1. Lucerne crop in Paddock 1.



Plate 2. Paddock 2 recently cultivated.



Plate 3. Lucerne crop in Paddock 3 and tree planting between Paddocks 2 and 3.



Plate 4. Lucerne crop in Paddock 4.



Plate 5. Fallow after wheat crop in Paddock 5.



Plate 6. Fallow after wheat crop in Paddock 6.



Plate 7. Lucerne crop in Paddock 7.



Plate 8. Lucerne crop in Paddock 8.



Plate 9. Stubble after wheat crop in Paddock 9.



Plate 10. Mature lucerne crop in Paddock 10.



Plate 11. Lucerne in Paddock 11.



Plate 12. Fallow after cropping in Paddock 12.



Plate 13. Drought affected wheat crop in Paddock 13.



Plate 14. Weed dominated lucerne in Paddock 14.



Plate 15. Weedy lucerne in Paddock 15.



Plate 16. Weed dominated ground cover in northern laneway.



Plate 17. Weed dominated ground cover in southern laneway.



Plate 18. Eucalypt planting between Paddocks 12 and 13.

2 STAGE 1 – BIODIVERSITY ASSESSMENT

Stage 1 of the biodiversity assessment summarises the biodiversity values of the BDAR Footprint that are inputs into the Credit Calculator.

2.1 LANDSCAPE FEATURES

Landscape features relevant to the Project are described in this section and illustrated on Figures 5 (Site Map) and 6 (Location Map).

This Site is assessed using the site-based assessment module within BAMC. Accordingly, a 1.5 km buffer zone was used to assess the landscape around the development Site (Figure 6).

2.1.1 Regional Setting

The Project is located approximately 10.5 km west south west of Wellington town centre in central western NSW (Figure 1), entirely within the following regions:

- the New South Wales South Western Slopes Bioregion and Upper Slopes Sub-region of the Interim Biogeographic Regionalisation for Australia (IBRA) (Thackway and Cresswell, 1995); and
- the Dubbo Regional LGA.

2.1.2 Mitchell Landscapes

Details of the Mitchell Landscapes within the solar farm footprint are provided in Table 1 and shown on Figure 6. The footprint is predominantly within the Nangar Ranges Mitchell Landscape (OEH, 2018a) (Table 1).

Table 1. Mitchell Landscapes in the BDAR Footprint

Landscape Name	Percentage Cleared Estimate ¹	Area (ha)	Percent (%) of BDAR Footprint Covered by Landscape
Nangar Ranges	84	408.3	94.3
Macquarie Alluvial Plains	78	24.7	5.7

¹ Sourced from the 'Over-cleared Landscapes Database' within the BioNet Vegetation Classification Database (OEH, 2018b).

2.1.3 Native Vegetation Extent

The Project is located in a highly cleared agricultural region. The 1.5 km buffer zone around the Project area encompasses 1,696.4 ha, of which only 50.3 ha (3.0%) is remnant native woodland (Figure 6). Within the development Site the only patches of native vegetation are the five linear plantings and two other small plantings which total 1.1 ha in area, or 0.23 percent of the Site area.

2.1.4 Connectivity

No vegetation corridors exist within the Project area or immediate surrounds (Figure 6).





Figure 6. BAM Location Map of Subject Land.

2.2 NATIVE VEGETATION

Native vegetation on the BDAR Footprint is described in this section based on site visits undertaken by FloraSearch on 29 November 2017 and 15 January 2018 (solar farm), and 8 May 2018 (intersection of Suntop Road and Renshaw – McGirr Way).

2.2.1 Plant Community Types

All that remains of the original pre-European tree cover on the solar farm Site are 28 remnant scattered paddock trees and remnant perimeter trees on the eastern boundary (Figure 7). From these it is possible to determine what were the likely original Plant Community Types (PCT) (BioNet, 2018a). The remnant paddock trees comprise;

- Fuzzy Box (*Eucalyptus conica*) – a clump of 3 trees in Paddock 1 (not to be removed).
- White Box (*Eucalyptus albens*) – 8 scattered trees on the higher parts of the Site.
- Kurrajong (*Brachychiton populneus*) – 2 trees.
- White Cypress Pine (*Callitris glaucophylla*) – 15 scattered trees in the south west corner of the Site in Paddocks 6, 9 and 13.

In addition, it was observed that the native trees remaining along the main access corridor just outside the western boundary of the Site and along Suntop Road are mainly Inland Grey Box (*Eucalyptus microcarpa*) with some White Box and Fuzzy Box. The above observations suggest that three PCTs are likely to have occurred on the Site prior to its clearance (Table 2) (BioNet, 2018a). All of these PCTs represent Threatened Ecological Communities (Table 2). However, no structurally or floristically representative remnants of these PCTs remain on the Site. Accordingly, it was not possible to conduct flora quadrat sampling to provide data for input to the BAMC.

The native vegetation in the proposed disturbance area at the intersection of Suntop Road and Renshaw – McGirr Way is a roadside remnant of the Box-Gum Woodland Endangered Ecological Community, dominated by Yellow Box (*Eucalyptus melliodora*) (Figure 8, Table 2). This vegetation was in moderate to good condition, was sampled with a single BAM flora quadrat and treated as a separate vegetation zone for input of data to the BAMC.

2.2.2 Streamlined Assessment Module

This section provides justification for using the streamlined assessment module of the BAM for this Project. The native vegetation on the Site comprises scattered remnant paddock trees and five linear plantings (1.18 ha) of native trees along fence lines, two small patches (0.07 ha) of plantings and a small area (0.04 ha) of Box-Gum Woodland at the intersection of Suntop Road and Renshaw – McGirr Way (Figures 7 and 8). The total area of the plantings is 1.29 ha, which is above the minimum threshold (1.0 ha) for application of the Biodiversity Offsets Scheme and below the 5 ha maximum area limit for application of the streamlined assessment module (BAM, Appendix 2 [OEH, 2017a]) on a site with a minimum Lot size of 40 ha. Accordingly, this report follows the requirements of the BAM streamlined assessment module (OEH, 2017a), which is applied in two parts;

- The streamlined assessment module for the on-site plantings and the Box-Gum Woodland (Suntop Road intersection), and
- the paddock tree module for;
 - 25 paddock trees that would be removed from the Site, and
 - up to 10 additional roadside trees that would be removed on Renshaw – McGirr Way to improve line of sight for motorists and to facilitate road and culvert widening (Figure 8).

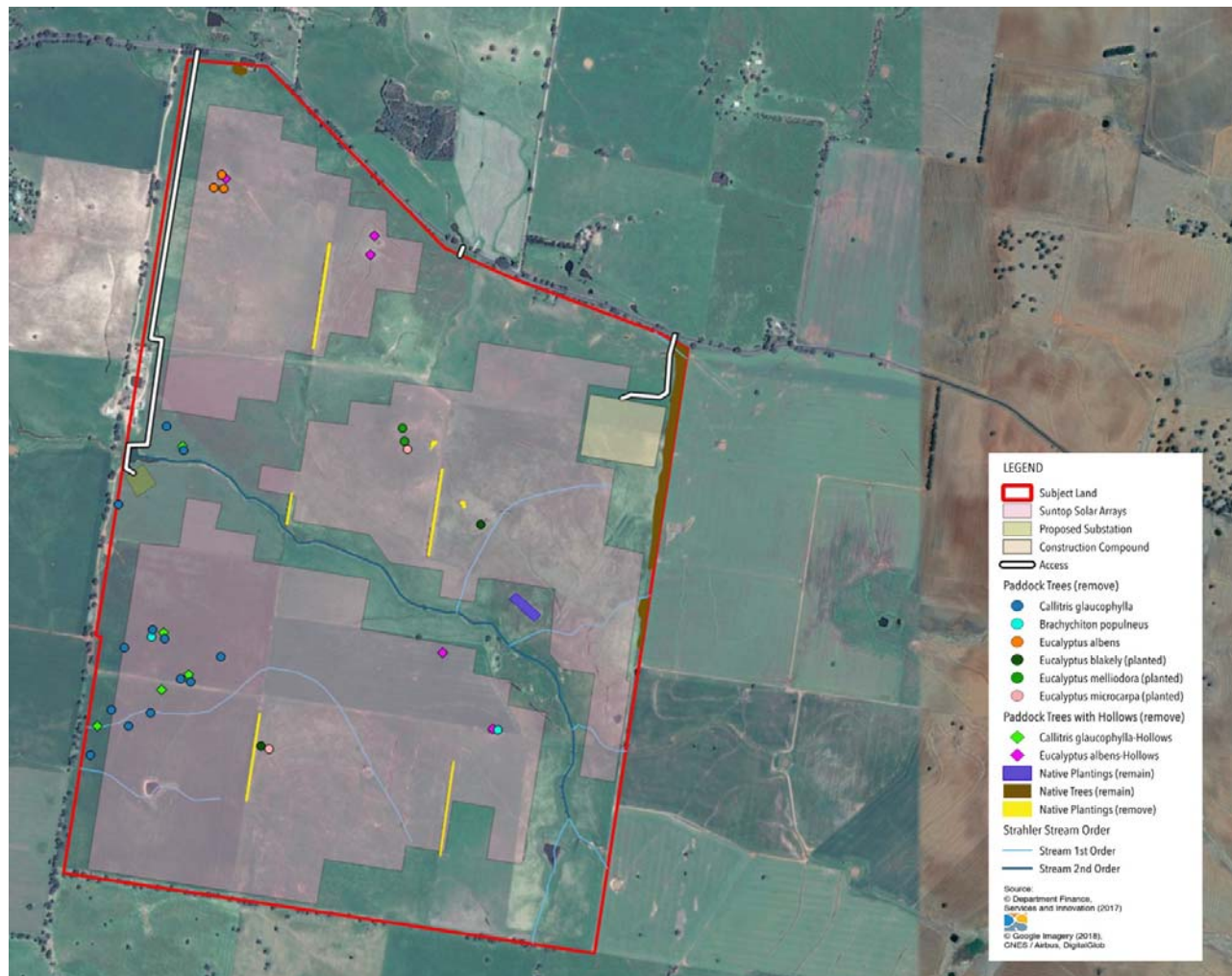


Figure 7. Native Vegetation on the Subject Land.



Figure 8. Flora Quadrat Site, Box-Gum Woodland EEC and Locations of Trees for Removal.

Table 2. Likely Pre-European Plant Community Types on the Development Site (BioNet, 2018a).

Vegetation Formation	Vegetation Class	PCT		Dominant tree species	Justification	Threatened Ecological Communities
		No.	Name			
Grassy Woodlands	Western Slopes Grassy Woodlands	201	Fuzzy Box Woodland on alluvial brown loam soils mainly in the NSW South Western Slopes Bioregion.	<i>Eucalyptus conica</i> , <i>E. microcarpa</i> <i>E. melliodora</i>	The north-western tip of the Site is mapped as part of the Macquarie Alluvial Plains Mitchell Landscape (OEH, 2018a), which is habitat for PCT201.	<i>Fuzzy Box Woodland on alluvial Soils of the South Western Slopes, Darling Riverine Plains and Brigalow Belt South Bioregions Endangered Ecological Community</i> (BC Act)
		267	White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion.	<i>E. albens</i> <i>E. microcarpa</i> <i>Callitris glaucophylla</i>	The dominant three species of PCT 267 are the dominant trees remaining on and close to the Site, making PCT 267 a good fit for the lower parts of the site, excluding the north west corner.	<i>White Box Yellow Box Blakely's Red Gum Woodland Endangered Ecological Community</i> (BC Act)
		266	White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion.	<i>E. albens</i> <i>Brachychiton populneus</i> <i>E. blakelyi</i>	The higher parts of the Site appear to have been dominated originally by White Box with some Kurrajong.	and <i>White Box – Yellow Box – Blakely's Red Gum Grassy Woodland and Derived Native Grassland Critically Endangered Ecological Community</i> (Environment Protection and Biodiversity Conservation Act 1999 [EPBC Act]). [This community is commonly known as Box-Gum Woodland.]
		277	Blakelys Red Gum – Yellow Box grassy tall woodland in the NSW South Western Slopes Bioregion.	<i>E. melliodora</i> <i>E. blakelyi</i> <i>E. bridgesiana</i>	The native vegetation beside watercourses and on lower slopes at the intersection of Suntop Road and Renshaw – McGirr Way is dominated by <i>E. melliodora</i> with occasional <i>E. blakelyi</i> , best matching PCT277.	

2.2.3 Plantings

The plantings comprise a total of 477 surviving trees within an area of 1.25 ha. Tree stem diameter at breast height was measured on 167 (35%) of these trees to determine the size distribution of trees across plantings (Table 3). Measurements were spread evenly across all plantings and tree species within them. The data in Table 3 were used to estimate the number of trees in each size class within a representative 1000m² for input to the BAMC (Table 3).

Other parameters for input to the BAMC were estimated qualitatively as per paragraph 5.3 of Appendix 2 of the BAM (OEH, 2017a) (Table 4). Owing to the small area of the plantings (1.25 ha), an overall estimate of the condition of the plantings was required for the equivalent of one set of quadrat data (Table 4). The estimates were based on field observations across all plantings.

Table 3. Size Distribution of Planted Native Trees.

Planting	Diameter at Breast Height (DBH)						
	< 5 cm	5 - 9 cm	10 – 19 cm	20 – 29 cm	30 – 49 cm	50 – 79 cm	80 + cm
1	0	1	6	5	6	1	1
2	0	1	11	4	3	4	2
3	0	2	11	16	1	1	0
4	0	2	11	15	3	0	0
5	0	1	12	19	7	1	0
Total	0	7	51	59	20	7	3
Estimate / 1000m ²	0	2	15	17	6	2	1

Table 4. Estimates of Inputs to BAMC for Farm Plantings.

BAM attribute (400m ²)	No. of species	Foliage cover (%)
<i>Trees</i>	3	30
<i>Shrubs</i>	0	0
<i>Grasses / grass-like</i>	2	2
<i>Forbs</i>	2	0.2
<i>Ferns</i>	0	0
<i>Other</i>	0	0
<i>High Threat Weeds</i>	2	1
<i>Litter cover (1000m²)</i>	-	10
<i>Length of logs</i>	-	0 m

For the purposes of inputting the plantings data to the BAMC, it was assumed the plantings represent the likely original dominant PCT on the Site, i.e. PCT267, *White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion*, which they were intended to replace. The resulting vegetation integrity statistics from the BAMC are given in Table 5.

Table 5. Vegetation Integrity Statistics for Plantings (PCT267).

Statistic	Score
Composition	22.4
Structure	33.1
Function	36.7
Vegetation Integrity	30.1

2.2.4 Roadside Woodland on Renshaw – McGirr Way

One BAM flora quadrat was conducted in remnant Box-Gum Woodland in the disturbance area for road widening on Renshaw – McGirr Way (Tables 6 and 7).

Table 6. Inputs to BAMC for Roadside Woodland.

BAM attribute (400m ²)	No. of species	Foliage cover (%)
<i>Trees</i>	1	40
<i>Shrubs</i>	2	0.3
<i>Grasses / grass-like</i>	4	20.6
<i>Forbs</i>	9	1.1
<i>Ferns</i>	1	0.1
<i>Other</i>	1	0.1
<i>High Threat Weeds</i>	1	3
<i>Litter cover (1000m²)</i>	-	95
<i>Length of logs</i>	-	4 m

Table 7. Tree Size Distribution in Roadside Woodland.

	Diameter at Breast Height (DBH) (cm)						
	< 5	5 - 9	10 – 19	20 – 29	30 – 49	50 – 79	80 +
No. of trees	8	2	8	2	3	0	1
No. with hollows	0	0	0	0	0	0	0

Because this BDAR utilises the streamlined assessment module of the BAM, the credit calculator is configured for only one PCT, the dominant PCT on the Site. For the purposes of inputting the roadside woodland data to the BAMC, it was assumed the woodland belonged to PCT267 instead of PCT277. This is justified on the grounds that the two PCTs belong to the same EEC; Box-Gum Woodland. The planting and woodland data were entered as two separate zones in the calculator. The vegetation integrity statistics for the roadside vegetation are given in Table 8.

Table 8. Vegetation Integrity Statistics for the Roadside Box-Gum Woodland.

Statistic	Score
Composition	72.5
Structure	81.0
Function	65.9
Vegetation Integrity	72.9

2.2.5 Paddock and Roadside Trees

The scattered remnant trees on the Site are treated as paddock trees for this assessment (Figure 7). Their diameters at breast height (DBH) and the presence of any hollows suitable for wildlife were recorded for input to the Paddock Tree module of the Streamlined Assessment (Appendix 1, BAM [OEHL, 2017a]) (Table 9). Some very large remnant trees, probably dating to pre-European times, occur across the Site (Table 9) and around its perimeter. All but one of the remnant paddock trees exceed the lower limit (50 cm) for classification as large trees in PCT267.

In addition to native remnant trees, six isolated planted paddock trees were also recorded (Figure 7, Table 9). The origins of these trees were evident from the remains of tree guards and stakes left over from planting.

Up to ten trees would be removed from the south side of Renshaw – McGirr Way to improve line of sight for motorists to the Suntop Road intersection and as part of the road widening and upgrading works (Figure 8). Eight trees that lie within the road widening disturbance area of 0.04 ha are not considered here. The impact of the project on these trees is accounted for in the BAMC for vegetation clearance.

Table 9. Paddock and Roadside Tree Sizes and Presence of Hollows.

Species	Tree Diameter at Breast Height (cm) (number of trees)					
	≤ 20	21 – 50	51 - 90	91 - 130	131 - 170	Total
Remnant native trees						
<i>Brachychiton populneus</i>	-	-	1	-	1	2
<i>Callitris glaucophylla</i>	-	-	14	1	-	15
<i>Eucalyptus albens</i>	-	-	3	4	1	8
Total	0	0	18	5	2	25
No. with hollows	0	0	4	5	1	10
Isolated planted trees						
<i>Eucalyptus blakelyi</i>	2	1	1	-	-	4
<i>Eucalyptus melliodora</i>	-	1	-	-	-	1
<i>Eucalyptus microcarpa</i>	-	1	-	-	-	1
Total	2	3	1	0	0	6
No. with hollows	0	0	0	0	0	0
Roadside trees						
<i>Eucalyptus melliodora</i>	4	-	3	2	-	9
<i>Brachychiton populneus</i>	1	-	-	-	-	1
Total	5	0	3	2	0	10
No. with hollows	0	0	1	1	0	2
TOTAL TREES	7	3	22	7	2	41
TOTAL with hollows	0	0	5	6	1	12

2.2.6 High Threat, Priority and Nationally Significant Weeds

Three introduced flora species are considered to be High Threat Exotic weeds by OEH (2018g), Khaki Weed, Bathurst Burr and Saffron Thistle. No weeds listed as Priority Weeds for the Dubbo Regional LGA under the NSW *Biosecurity Act 2015* were identified by the survey (DPI, 2018). Similarly, no weeds listed as Weeds of National Significance by the Australian Weeds Committee of the Commonwealth Government (www.weeds.org.au) were identified.

2.3 THREATENED SPECIES

Threatened species relevant to the Project are identified in this section. The BAM recognises two categories of threatened species:

- ecosystem credit species (i.e. species predicted to be present based on the PCTs present on the Site); and/or
- species credit species (i.e. species that cannot be reliably predicted by PCTs) (OEH, 2017a).

Threatened species that are ecosystem credit species and/or species credit species are pre-determined in the Credit Calculator and *BioNet Threatened Species Profile Database* (OEH, 2018c).

2.3.1 Data Sources

Three data sources were used to compile lists of threatened flora and fauna that may potentially occur on the Site (Tables 10 and 11):

- BAM online calculator – Lists of ecosystem credit species and species credit species generated by the BAMC from the BioNet databases using inputs on IBRA subregion, Site location and vegetation integrity (OEH, 2018d).
- BioNet website – Searches of the NSW Atlas of Wildlife, NSW State Forests, Australian Museum and Royal Botanic Gardens Sydney databases (BioNet, 2018b). The search area comprised a 20 × 20 km square centred on the study area. This search returned a list of threatened species records from within the search area and shown on Figure 9.
- Commonwealth Department of the Environment and Energy (DoEE) website – Protected Matters Search Tool (PMST) (DoEE, 2018a). The search area comprised the same 20 × 20 km square as for the BioNet search. The PMST uses actual records and habitat modelling to return a list of 'protected matters' that are known or predicted to occur in the search area, including threatened species, migratory species, ecological communities, wetlands of international significance, and national and world heritage properties.

BAMC returned 16 ecosystem credit species, all fauna; and 14 species credit species, four flora and 10 fauna species (Tables 10 and 11). Four fauna species are dual ecosystem and credit species. All species returned by the BAMC require assessment within the calculator of the suitability of the habitat on the Site for them.

The BioNet database search returned records of one flora species, the Sandhill Spider Orchid (*Caladenia arenaria*) and one fauna species, the Glossy Black Cockatoo (*Calyptrorhynchus lathamii*), close to the Site that were not identified by BAMC (Figure 9). The potential for habitat of these species to occur on the Site is also assessed in Tables 10 and 11.



Figure 9. Locations of Threatened Species within 10 km of the Subject Land.

Table 10. Threatened Flora Species Returned by Database Searches of the Surrounding Region.

Scientific Name	Common Name	Data Source			Conservation Status		Ecosystem OR Credit Species ⁵	Likelihood to be on Study Area	Assessment of Likelihood
		BAMC ²	BioNet ³	PMST ⁴	BC Act	EPBC Act			
<i>Acacia ausfeldii</i>	Ausfeld's Wattle	✓	-	-	V	-	Sp ¹	Nil	Generally confined to an area between Dubbo, Ulan and Mudgee, where it occurs on sandy soils in dry shrubby forests (OEH, 2018e). It is unlikely to have once occurred on the Site.
<i>Austrostipa wakoolica</i>	-	-	-	✓	E	E	Sp	Nil	Confined to the floodplains of the Lachlan, Murrumbidgee and Murray Rivers in central-western and south-western NSW (OEH, 2018e). It typically occurs on floodplain alluvial and stagnant alluvial soils, which do not occur on the Site.
<i>Caladenia arenaria</i>	Sandhill Spider Orchid		✓	-	E	E	Sp	Nil	Occurs in woodland with sandy soil, especially that dominated by White Cypress Pine (<i>Callitris glaucophylla</i>). There is a record of this species 5.7 km east of the Site in undisturbed Cypress Pine habitat in the Mt Arthur Reserve (Althofer and Harden, 1980, where recorded as <i>C. patersonii</i>). Suitable habitat is absent from the Site.
<i>Commersonia procumbens</i> [syn. <i>Androcalva procumbens</i>]	-	-	-	✓		V	Sp	Nil	Grows in sandy sites in <i>Eucalyptus dealbata</i> and <i>Eucalyptus sideroxylon</i> communities, <i>Melaleuca uncinata</i> scrub, under mallee eucalypts with a <i>Calytrix tetragona</i> understorey (OEH, 2018e). Also occurs in <i>Eucalyptus fibrosa</i> subsp. <i>nubila</i> , <i>Eucalyptus dealbata</i> , <i>Eucalyptus albens</i> and <i>Callitris glaucophylla</i> woodlands north of Dubbo. Habitats absent from Suntop.
<i>Diuris tricolor</i>	Pine Donkey Orchid	✓	-	-	V	-	Sp	Nil	The Pine Donkey Orchid grows in sclerophyll forest among grass, often with native Cypress Pine (<i>Callitris</i> spp.). It is generally found in sandy soils, either on flats or small rises. The nearest record is at Geurie (BioNet, 2018b) at lower altitudes than the Site. It is unlikely to have occurred around Wellington on the upper slopes.

Scientific Name	Common Name	Data Source			Conservation Status		Ecosystem OR Credit Species ⁵	Likelihood to be on Study Area	Assessment of Likelihood
		BAMC ²	BioNet ³	PMST ⁴	BC Act	EPBC Act			
<i>Euphrasia arguta</i>	-	✓	-	✓	CE	CE	Sp	Nil	<i>Euphrasia arguta</i> has been recorded from grassy areas near rivers at elevations up to 700 m above sea level in central western NSW, and grassy forests or regrowth vegetation on the Northern Tablelands (DoEE, 2018b). Suitable habitat is lacking on the Site.
<i>Philotheca ericifolia</i>	-	-	-	✓	-	V	Sp	Nil	<i>Philotheca ericifolia</i> grows chiefly in dry sclerophyll forest and heath on damp sandy flats and in gullies. The species has been collected from open woodland, heathland, dry sandy creek beds and rocky ridge and cliff tops. Preferred soils have a sandy, gravelly or rocky component (DoEE, 2018b). The Site lacks suitable habitat for this species.
<i>Prasophyllum petilum</i>		-	-	✓	E	E	Sp	Nil	Grows in open sites in natural temperate grassland, grassy woodland and in grassy Box-Gum Woodland. Highly susceptible to grazing, being retained only at little-grazed travelling stock reserves and in cemeteries (OEH, 2018e). Habitat occurs on the Site is too disturbed for this species.
<i>Prasophyllum</i> sp. Wybong (Phelps ORG 5269)		-	-	✓	-	CE	-	Nil	<i>Prasophyllum</i> sp. Wybong (C. Phelps ORG 5269) is known from open eucalypt woodland and grassland in northern NSW, exclusively Box-Gum Woodlands (DoEE, 2018b). Suitable habitat is absent from the Site.
<i>Swainsona recta</i>	Small Purple-pea	✓	✓	✓	E	E	Sp	Nil	Before European settlement Small Purple-pea occurred in the grassy understorey of Box-Gum Woodlands and open-forests dominated by <i>Eucalyptus blakelyi</i> , <i>E. melliodora</i> , <i>E. rubida</i> and <i>E. goniocalyx</i> (OEH, 2018e). Populations remain in the Mt. Arthur Reserve, only 6 km north east of the Site, in colluvial and alluvial soils in the lower parts of the reserve. It is not known from cleared and heavily grazed habitats such as those on the Site.

Scientific Name	Common Name	Data Source			Conservation Status		Ecosystem OR Credit Species ⁵	Likelihood to be on Study Area	Assessment of Likelihood
		BAMC ²	BioNet ³	PMST ⁴	BC Act	EPBC Act			
<i>Swainsona sericea</i>	Silky Swainson-pea	✓	-	-	V	-	Sp	Nil	The Silky Swainson-pea was formerly a widespread, common species in Box-Gum Woodlands and is likely to have been common in the Wellington district (OEH, 2018e). However, the high degree of disturbance to the Site means it is highly unlikely to occur there now.
<i>Tylophora linearis</i>	-	-	-	✓	V	E	Sp	Nil	Grows in dry scrub and open forest. Recorded from low-altitude sedimentary flats in dry woodlands of <i>Eucalyptus fibrosa</i> , <i>Eucalyptus sideroxylon</i> , <i>Eucalyptus albens</i> , <i>Callitris endlicheri</i> , <i>Callitris glaucophylla</i> and <i>Allocasuarina lehmannii</i> (OEH, 2018e). On coarse-grained sediments. Distributed to the north of the study area from east of Boggabri, Pilliga Scrub, Peak Hill and Dubbo. Suitable habitat is absent from the Site.

¹ Sp=Species Credit Species² Biodiversity Assessment Method Credit Calculator (OEH, 2018d)³ NSW Atlas of Wildlife (BioNet, 2018b)⁴ Protected Matters Search Tool (DoEE, 2018a)⁵ BioNet Threatened Species Profile Database (OEH, 2018c)

E Endangered.

CE Critically Endangered

V Vulnerable.

Table 11. Threatened Fauna Species Returned by Database Searches of the Surrounding Region.

Scientific Name	Common Name	Data Source			Conservation Status		Ecosystem and/or Credit Species ⁵	Likelihood to be on Study Area	Assessment of Likelihood
		BAMC ²	BioNet ³	PMST ⁴	BC Act	EPBC Act			
<i>Galaxias rostratus</i>	Flathead Galaxia	-	-	✓	CE ⁶	CE	-	Nil	These fish species were all identified by the PMST and are covered by the <i>Fisheries Management Act 1994</i> in NSW. They occur in large permanent rivers with deep waterholes (DoEE, 2018b). No suitable permanent watercourses occur on or near the Site.
<i>Maccullochella macquariensis</i>	Trout Cod	-	-	✓	E ⁶	E	-	Nil	
<i>Maccullochella peelii</i>	Murray Cod	-	-	✓	-	V	-	Nil	
<i>Macquaria australasica</i>	Macquarie Perch	-	-	✓	E ⁶	E	-	Nil	
<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard	✓	-	✓	V	V	Sp ¹	Nil	The Pink-tailed Worm-lizard inhabits sloping, open woodland areas with predominantly native grassy ground layers, particularly those dominated by Kangaroo Grass (<i>Themeda australis</i>). Sites are typically well-drained, with rocky outcrops or scattered, partially-buried rocks (OEH, 2018e). Suitable habitat does not occur on the Site.
<i>Delma impar</i>	Striped Legless Lizard	-	-	✓	V	V	Sp	Nil	Found mainly on the Southern Tablelands and South West Slopes in Natural Temperate Grassland but may also occur in grasslands with a high exotic component. Occasionally found in open Box-Gum Woodland. Shelters beneath logs and/or rocks in winter (OEH, 2018e). Predicted as potentially occurring on the Site by PMST (DoEE, 2018b), but is not known north of Goulburn. Suitable habitat is lacking on the Site.
<i>Leipoa ocellata</i>	Mallee Fowl	-	-	✓	E	V	Ec ¹	Nil	The Mallee Fowl was predicted to potentially occur on the study area by the PMST. Mallee Fowl are found in semi-arid to arid shrublands and low woodlands, especially those dominated by mallee and/or acacias. A sandy substrate and abundance of leaf litter are required for breeding (Benshemesh, 2007). Suitable habitat is absent from the Site and surrounding regions.

Scientific Name	Common Name	Data Source			Conservation Status		Ecosystem and/or Credit Species ⁵	Likelihood to be on Study Area	Assessment of Likelihood
		BAMC ²	BioNet ³	PMST ⁴	BC Act	EPBC Act			
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	✓	-	-	V	-	Sp	Nil	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Prime foraging habitat is lacking close to the site, as are potential nest trees.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	-	-	✓	E	E	Ec	Nil	Favours permanent freshwater wetlands with tall, dense vegetation, particularly <i>Typha</i> spp. and <i>Eleocharis</i> spp. (OEH, 2018e). Suitable habitat is absent from the Site.
<i>Rostratula australis</i>	Australian Painted Snipe	-	-	✓	E	V	Ec	Nil	Australian Painted Snipe inhabits freshwater swamps and marshes (Blakers <i>et al.</i> , 1984). Suitable habitat is absent from the study area.
<i>Calidris ferruginea</i>	Curlew Sandpiper	-	-	✓	E	CE	Ec/Sp	Nil	Forages mainly on coastal estuarine mudflats, but also in inland lakes and lagoons with extensive shallows (OEH, 2018e). Suitable habitat is absent from the Study Area.
<i>Numenius madagascariensis</i>	Eastern Curlew	-	-	✓	-	CE	Ec/Sp	Nil	The Eastern Curlew has a primarily coastal distribution on mudflats in estuaries. The species is found in all states, particularly the north, east, and south-east regions including Tasmania (DoEE, 2017b). Eastern curlews are rarely recorded in inland wetlands, which in any event are absent from the Study Area.
<i>Calyptrorhynchus lathamii</i>	Glossy Black Cockatoo	-	✓	-	V	-	Ec/Sp	Nil	Feeds almost exclusively on the seeds of several species of she-oak (<i>Casuarina</i> and <i>Allocasuarina</i> species), shredding the cones with the massive bill (OEH, 2018e). Casuarinaceae are absent from the Site.
<i>Glossopsitta pusilla</i>	Little Lorikeet	✓	-	-	V	-	Ec	Low	The Little Lorikeet is widespread on the coast, tablelands and western slopes of NSW, where it is usually encountered in larger bushland remnants (BioNet, 2018b). It is a nomadic species that may occasionally occur on the Site when woodland eucalypts are in flower.

Scientific Name	Common Name	Data Source			Conservation Status		Ecosystem and/or Credit Species ⁵	Likelihood to be on Study Area	Assessment of Likelihood
		BAMC ²	BioNet ³	PMST ⁴	BC Act	EPBC Act			
<i>Lathamus discolor</i>	Swift Parrot	✓	-	✓	E	CE	Ec/Sp	Low	The Swift Parrot is a migratory species that breeds in Tasmania and winters on the mainland, where it feeds on flowering eucalypts (OEH, 2018e). On the western slopes Swift Parrots utilise Mugga Ironbark and White Box trees as nectar sources and Grey Box for lerp and scale insects (Saunders and Tzaros, 2011). Favoured winter flowering eucalypts occur on and near the Site.
<i>Polytelis swainsonii</i>	Superb Parrot	✓	✓	✓	V	V	Sp	Nil	The Superb Parrot occurs in tall grassy Box-Gum Woodlands and forests on and west of the Tablelands (Blakers <i>et al.</i> , 1984). There are several records of the species close to Wellington (BioNet, 2018b). Box Woodland and potentially suitable breeding and/or feeding habitat with large old growth trees having hollow limbs is present on the study area. However, the high degree of disturbance of the Site, especially the ground cover, is likely to deter this species.
<i>Climacteris picumnus victoriae</i>	Brown Treecreeper (eastern subspecies)	✓	-	-	V	-	Ec	Nil	The Eastern subspecies of the Brown Treecreeper is widespread through much of NSW avoiding only tall wet forests and alpine regions (BioNet, 2018b). There are multiple records close to Molong (BioNet, 2018b). It favours grassy woodlands with rough-barked trees at close to natural densities, sparse shrub cover and fallen timber on the ground (OEH, 2018e). Habitat in the study areas is considered to be unsuitable.
<i>Pomatostomus temporalis temporalis</i>	Grey-crowned Babbler (eastern subspecies)	✓	-	-	V	-	Ec	Nil	The eastern sub-species of the Grey-crowned Babbler occurs in the Hunter Valley, on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It inhabits open Box Woodlands on the slopes. The study area is at the eastern limits of the known distribution of the species on the upper western slopes (BioNet, 2018e) and the habitat is too disturbed to support it.
<i>Chthonicola sagittata</i>	Speckled Warbler	✓	-	-	V	-	Ec	Nil	A sedentary species of natural relatively undisturbed open woodland on rocky ridges or in gullies. Recorded sparsely but widely in the surrounding region in larger blocks of remnant woodland (OEH, 2018e; BioNet, 2018b). It has been recorded nearby in the Mt. Arthur Reserve but is considered highly unlikely to utilise the Site, which is too highly disturbed.

Scientific Name	Common Name	Data Source			Conservation Status		Ecosystem and/or Credit Species ⁵	Likelihood to be on Study Area	Assessment of Likelihood
		BAMC ²	BioNet ³	PMST ⁴	BC Act	EPBC Act			
<i>Anthochaera phrygia</i>	Regent Honeyeater	✓	-	✓	E	E	Ec/Sp	Low	A nomadic/migratory nectar-dependent species found on flowering eucalypts, which has been recorded rarely in the region around the Site (BioNet, 2018b). It has potential to occasionally visit the study area when Eucalypts are flowering, especially White Box.
<i>Grantiella picta</i>	Painted Honeyeater	-	-	✓	V	V	Ec	Nil	Inhabits Boree/ Weeping Myall (<i>Acacia pendula</i>), Brigalow (<i>A. harpophylla</i>), Box-Gum Woodlands and Box-Ironbark Forests (OEH, 2018e). A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Box Woodland is present, but mistletoes are scarce on the Site. There are very few records on the Central Western Slopes (BioNet, 2018a).
<i>Artamus cyanopterus cyanopterus</i>	Dusky Woodswallow	✓	✓	-	V	-	Ec	Nil	Found in larger blocks of woodland and dry open sclerophyll forests, usually dominated by eucalypts (Scientific Committee, 2017). Also recorded in shrublands, heathlands and regenerating forests. The understorey is typically open with sparse eucalypt saplings, acacias and other shrubs. The habitat on the Site is too highly disturbed for this species.
<i>Melanodryas cucullata cucullata</i>	Hooded Robin (south eastern subspecies)	✓	-	-	V	-	Ec	Nil	The south-eastern subspecies of the Hooded Robin is found throughout much of inland NSW, with the exception of the extreme north-west. It prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas and requires structurally diverse habitats with mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses. There are a few records in the Wellington area (BioNet, 2018e). Site habitats are too disturbed to support this species.
<i>Petroica boodang</i>	Scarlet Robin	✓	-	-	V	-	Ec	Low	Breeds in high altitude eucalypt forest with an open understorey (Blakers <i>et al.</i> , 1984). Juveniles disperse to more open country in autumn. There are relatively few records on the western slopes and one close to Wellington (BioNet, 2018e). It may occasionally occur on the Site in autumn and winter.

Scientific Name	Common Name	Data Source			Conservation Status		Ecosystem and/or Credit Species ⁵	Likelihood to be on Study Area	Assessment of Likelihood
		BAMC ²	BioNet ³	PMST ⁴	BC Act	EPBC Act			
<i>Petroica phoenicea</i>	Flame Robin	✓	-	-	V	-	Ec	Low	The Flame Robin breeds in high altitude forests and disperses to lower more open habitats in winter. It has been recorded sparingly on the western slopes with few records near Wellington (BioNet, 2018a). It may occasionally occur on the Site.
<i>Stagonopleura guttata</i>	Diamond Firetail	✓	-	-	V	-	Ec	Nil	Widespread in open forest and woodland mostly on the inland side of the Great Dividing Range in eastern NSW (Blakers <i>et al.</i> , 1984). Recorded widely in the region around Wellington (BioNet, 2018b). Favours open grassy woodlands. Habitat on the Site lacks the native grasses required by this species.
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	✓	✓	✓	V	E	Ec	Nil	Generally confined to areas of native forest and woodland where it nests in rock caves or hollow logs (Edgar, 1983). Hollow logs and caves are absent from the Site.
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale	✓	-	-	V	-	Sp	Nil	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater. Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates (OEH, 2018e). Suitable habitat is lacking on the Site.
<i>Phascolarctos cinereus</i>	Koala	✓	-	✓	V	V	Ec/Sp	Nil	Koalas are widespread in eastern NSW. However, there are only a few records near Wellington with scattered records further east in the timbered country around Burrendong Dam and south west in the Curumbenya Ranges (BioNet, 2018b). There is no known population recorded from the vicinity of the Site.
<i>Petaurus norfolcensis</i>	Squirrel Glider	✓	-	-	V	-	Sp	Nil	Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas (OEH, 2018e). Prefers mixed species stands with a shrub or Acacia midstorey. Requires abundant tree hollows for refuge and nest sites. The remnant trees on the Site are too scattered, the ground cover is too disturbed and a suitable mid-storey is lacking for this species.

Scientific Name	Common Name	Data Source			Conservation Status		Ecosystem and/or Credit Species ⁵	Likelihood to be on Study Area	Assessment of Likelihood
		BAMC ²	BioNet ³	PMST ⁴	BC Act	EPBC Act			
<i>Petauroides volans</i>	Greater Glider	-	-	✓	V	V	Sp	Nil	There is one record for the Greater Glider south of Wellington BioNet, 2018b). It is found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows (DoEE, 2018a). The Greater Glider favours forests with a diversity of eucalypt species. The study area lacks montane forest and abundant hollows and is unsuitable for this species.
<i>Pteropus poliocephalus</i>	Grey-headed Flying-fox	✓	-	✓	V	V	Ec/Sp	Nil	The Grey-headed Flying Fox mostly occurs on the eastern side of the Great Dividing Range and is rarely recorded on the western slopes (OEH, 2018e). There is one record in BioNet (2018b) of a temporary roost along the Bell River at Wellington in 2012. There is a very low possibility this species would utilise the study area on rare occasions.
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	-	-	✓	V	V	Ec	Nil	Corben's Long-eared Bat was predicted to potentially occur on the study area by the PMST. It is predominantly a western species in NSW, the nearest records to the study area being in the Hervey Nangar Ranges and Goonoo SCA (BioNet, 2018b) which are at lower altitudes than the study area. It has not been recorded on the upper slopes and tablelands.
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	-	-	✓	V	V	Sp	Nil	Large-eared pied Bat is widespread on the Central Coast and Tablelands and reaches its western distributional limit near Wellington (BioNet, 2018b). It roosts in caves, mine tunnels and the abandoned nests of Fairy Martins. The Large-eared Pied Bat forages over areas of continuous forest habitat (Greg Richards and Associates, 2000, 2005). The vegetation on the Site is likely to be too fragmented for this species.

¹ Ec=Ecosystem Credit Species; Sp=Species Credit Species

² Biodiversity Assessment Method Credit Calculator (OEH, 2018d)

³ NSW Atlas of Wildlife (BioNet, 2018b)

⁴ Protected Matters Search Tool (DoEE, 2018a)

⁵ BioNet Threatened Species Profile Database (OEH, 2018c)

⁶ NSW Fisheries Management Act 1994.

E Endangered; CE Critically Endangered; V Vulnerable.

The PMST search returned 8 potentially occurring flora species and 21 fauna species. Assessment of these species is required to determine whether there is any obligation to refer the Project to the Commonwealth Department of the Environment and Energy (DoEE) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The total numbers of potentially occurring threatened species identified by the searches are 12 flora and 34 fauna species.

2.3.2 Likelihood of Threatened Species Occurrence on the Site

BAMC allows the assessor to include or exclude from further consideration the candidate threatened species selected by the calculator on the basis of the presence or absence of suitable habitat, and other constraints, on the BDAR footprint. The likelihood of occurrence of each candidate species has been assessed in Tables 10 and 11 based on distribution records in the NSW Atlas of Wildlife (BioNet, 2018b), and information in both the *Threatened Biodiversity Profile Database* (OEH, 2018e) and referenced scientific publications. Knowledge of the Site is based on three days of site visits and surveys by the assessor (29 November 2017, 15 January 2018 and 8 May 2018).

2.3.3 Habitat Features of the Site

In assessing the suitability of the habitat on the Site for threatened biodiversity, the following attributes of the Site were considered;

- The native vegetation being assessed comprises very small scattered plantings of native eucalypts, some, but not all, of which are native to the location.
- The choice of PCT267 as a description of the vegetation was made to enable the BAMC to run. The plantings clearly are not remnants of PCT267, which is considered likely to have been the dominant PCT on the Site pre-European settlement.
- The plantings individually cover very small areas from 0.02 ha to 0.4 ha and, as such, are highly unlikely to support a population of a threatened species. Their values for threatened species are most likely as stepping stones for fauna moving through the landscape, or for short term foraging of wide ranging nomadic species.
- The plantings all have very large perimeter to area ratios, being long and narrow, mostly two trees wide.
- All the plantings lack a mid-storey, the ground cover is very sparse or absent and comprises mainly exotic species. The surrounds of the plantings are entirely cultivation paddocks supporting wheat or lucerne crops.

2.3.4 Ecosystem Credit Species

No flora species returned by BAMC were ecosystem credit species. Of the 16 ecosystem credit fauna species listed by BAMC, five are considered to have potential foraging habitat on the Site (Table 12).

Table 12. Ecosystem Credit Fauna Potentially Able to Utilise the Site.

Common Name	Scientific Name	Likelihood of Occurrence
Little Lorikeet	<i>Glossopsitta pulchella</i>	Low
Swift Parrot	<i>Lathamus discolor</i>	Low
Regent Honeyeater	<i>Anthochaera phrygia</i>	Low
Scarlet Robin	<i>Petroica boodang</i>	Low
Flame Robin	<i>Petroica phoenicea</i>	Low

The species in Table 12 are only likely to utilise the site rarely to occasionally as nomadic foraging visitors.

2.3.5 Habitat Features for Species Credit Species

The BAMC identifies specific habitat features essential to particular species credit species and the BAM (OEH, 2017a) requires the assessor to determine if those habitat features occur on the site. The BDAR footprint lacks habitat features identified in the *BioNet Threatened Biodiversity Profile Database* (OEH, 2018c) that are critical for many threatened species, including:

- Burrows
- Caves
- Cliffs
- Claypans
- Dunes
- Epiphytes
- Escarpments
- Rocky areas
- Fallen and standing dead timber
- Swamps
- Termite mounds

Important specific habitat features that are present on the Site are:

- Hollow-bearing trees (totalling 10 scattered paddock trees [Table 9, Figure 7])
- Semi-permanent / ephemeral wet areas (including first and second order streams [Figure 5])
- Waterbodies (including one small farm dam per paddock, varying between 0.2 and 0.5 ha in size)

Given the attributes of the native vegetation (section 2.3.3) and the specific site characteristics (section 2.3.5), very few of the candidate threatened species are likely to utilise the area and those that do would utilise it rarely. This is reflected in the very low number of candidate species in Tables 10 and 11 that are considered likely to utilise the Site.

2.3.6 Species Credit Species

The five candidate threatened flora species identified by BAMC are all species credit species and none are considered to have any likelihood of occurring on the Site (Table 10). Accordingly, all have been excluded from further consideration in BAMC.

Only two of the threatened species credit fauna species are considered to have some likelihood of utilising the site, the Little Lorikeet and the Regent Honeyeater (Table 11). However, neither is likely to breed on the Site and are therefore excluded from further consideration as species credit species but remain as ecosystem credit species. Seven other threatened species credit fauna species have also been excluded for further assessment owing to lack of suitable habitat on the Site (Table 11).

2.3.7 Targeted Surveys for Threatened Species

The BAM (OEH, 2017a) requires targeted surveys only for threatened species that are species credit species because ecosystem credit species are predicted to occur based solely on habitat.

All candidate threatened flora listed by BAMC are species credit species, therefore, targeted surveys may be required. However, the assessment applied in Table 10 determined that habitat does not exist on the Site for any of these species so that survey and further consideration in the calculator is unnecessary.

Of the candidate threatened species credit fauna species listed by BAMC, two, the Critically Endangered Regent Honeyeater (*Anthochaera phrygia*) and the Vulnerable Little Lorikeet (*Glossopsitta pusilla*), are considered to have a low probability of utilising the Site. Both are nomadic species that may seek out flowering eucalypts to feed on nectar and may occasionally utilise the Site during a high nectar flow event. Neither species would be able to breed on the Site. Accordingly, they are not regarded as species credit species for this assessment and do not require targeted surveys.

2.3.8 Threatened Species Listed under the EPBC Act

Two fauna species listed as Critically Endangered under the EPBC Act are considered to have a low probability of utilising the Site; the Swift Parrot and the Regent Honeyeater (Table 10). Both are nomadic species that are only likely to use the Site occasionally, if at all, for foraging when eucalypts are in flower. The Site is unsuitable for breeding by the Regent Honeyeater and the Swift Parrot is a winter migrant to the mainland, breeding only in Tasmania. Potential food resources on the Site are quite limited, being restricted to eight isolated mature White Box trees and plantings of mixed eucalypts. These trees are unlikely to be attractive to either species given their isolation and the preference of both birds for intact woodland and forest habitats. Accordingly, the loss of these trees is highly unlikely to result in a significant adverse impact on either species and referral of the Project to the DoEE is not required.

2.3.9 SEPP 44

NSW SEPP 44 aims to protect habitat utilised by the Koala, *Phascolarctos cinereus*, which is known to occur sparsely on the Central West Slopes, mainly in forested habitats (BioNet, 2018b). Three of the remnant eucalypt species on and around the Subject Land are recognised as secondary Koala food trees (OEH, 2018h), viz. Inland Grey Box, Fuzzy Box and White Box. The last of these is listed as a Koala feed tree in Schedule 2 of SEPP 44. Accordingly, there is a requirement under SEPP 44 for consideration of the Site as potential Koala habitat. The Site does not have an extant Koala population (Biosphere Environmental Consultants, 2018). Therefore, it does not include 'core' Koala habitat and a SEPP 44 plan of management is not required.

3 STAGE 2 – IMPACT ASSESSMENT

Stage 2 involves assessing the potential direct and indirect impacts on biodiversity, describing impact avoidance and mitigation measures and determining the offset requirements.

3.1 MEASURES TO AVOID AND MINIMISE IMPACTS

Measures to avoid and minimise Project impacts on biodiversity are summarised in this section and Table 13.

3.1.1 Impact Avoidance

Impact avoidance measures that would be implemented for the Project include;

- Protection measures to avoid damage to discontinuous patches of mature native perimeter trees on all boundaries of the Site.
- Avoidance and protection of the block of planted native eucalypts in Paddock 12 (Figure 7).
- Retention and avoidance of a clump of three Fuzzy Box trees within the northern boundary of Paddock 1.

3.1.2 Vegetation Management Plan (VMP)

A Vegetation Management Plan (VMP) will be prepared to establish measures that will:

- ensure that harm is minimised to wildlife that may be inhabiting hollows in the ten hollow-bearing trees that are proposed for removal. This will include timing of tree removal outside the nesting season of birds and mammals, i.e. autumn/winter, and supervision of the clearance by a qualified animal carer;
- protect the mature eucalypt trees around the perimeter of the site during the construction of the solar farm;
- enhance the habitat values of the perimeter trees through the establishment of vegetation buffer zones; and
- replace removed trees by selective replanting in the buffer zones around the Site.

3.1.3 Weed Management Strategy

A weed management strategy will be developed to prevent unwanted plants from becoming established in and around the solar farm. Several weed control measures will be employed, including regular site inspections, communication with lessees and authorities and annual control of weeds.

3.1.4 Animal Pest Management and Monitoring

A number of animal pest management and monitoring procedures would be established, including the following:

- the maintenance of a clean, rubbish-free environment in order to discourage scavenging and reduce the potential for colonisation by non-endemic fauna (e.g. introduced rodents, predators and birds);
- monitoring for feral animals (including pigs, foxes, dogs, rabbits) every two years;
- undertaking pest animal control where necessary;
- domestic pets prohibited in the solar farm; and
- employees and contractors not permitted to encourage fauna through feeding.

3.1.5 Rehabilitation

At the completion of the life of the solar farm after 25 years, the site will either be refurbished or be dismantled and rehabilitated to arable agricultural land.

3.1.6 Summary of Avoidance and Mitigation Actions

Table 13 summarises avoidance and mitigation actions with expected outcomes, timing and management responsibility.

Table 13. Avoidance and Minimisation Measures, Responsibility and Timing.

Action	Outcome	Timing	Responsibility
During Construction			
1. Place barriers to protect remnant perimeter trees, planting in Paddock 12 and Fuzzy Box clump in Paddock 1 2. Inform all employees and contractors during inductions of trees not to be damaged.	No damage to trees earmarked for protection and retention.	Throughout construction phase.	Site manager
Removal of hollow-bearing paddock trees supervised by trained wildlife carer.	Harm to hollow-dwelling wildlife minimised during tree falling. Injured wildlife cared for and recovered. Displaced wildlife released into appropriate habitat nearby.	During paddock clearing operations, which should be conducted in the non-breeding season (autumn and winter).	Environmental manager or site manager.
During Solar Farm Operation			
Preparation of a Vegetation Management Plan.	Long term vegetation management objectives achieved.	Within 12 months of approval.	Environmental manager.
Enhancement plantings	Biodiversity values of protected patches of remnant trees improved.	Within first two years of operation.	Environmental manager
Weed management	Priority Weeds, Weeds of National Significance and High Threat Exotic weeds controlled.	Annual inspections and control as required.	Environmental manager
Pest Animal Management: Monitoring and control, Maintain site cleanliness	Pest animals, especially rodents, foxes, rabbits, wild dogs, feral cats and pigs controlled.	Every two years, or as needed.	Environmental manager / site manager.
Domestic pets prohibited. Staff and contractors informed during inductions.	No harassment of wildlife or livestock.	Ongoing	Site manager.
Site closure			
Preparation of a site rehabilitation plan	All solar farm infrastructure removed. Land left in a suitable state for resumption of farming.	At least two years prior to shut down	Site manager / environmental manager.

3.2 SUMMARY OF PROJECT IMPACTS ON BIODIVERSITY

3.2.1 Serious and Irreversible Impacts

No threatened ecological communities, populations, flora or fauna species meet the criteria for Serious and Irreversible Impacts as a result of the Project (OEH, 2018f) (sections 2.2 and 2.3).

3.2.2 Vegetation Clearance Requiring Offsetting

The following native vegetation on the Site would be impacted adversely by the Project;

- Loss of 1.25 ha of eucalypt plantings which are assumed to represent PCT267 for the purposes of running BAMC.
- Loss of 0.04 ha of Box-Gum Woodland EEC beside Renshaw – McGirr Way.
- Loss of 25 remnant paddock trees, 6 isolated planted native trees and up to 10 roadside trees.

3.2.3 Vegetation Clearance Not Requiring Assessment or Offsetting

All other vegetation on the site comprises mainly planted crops and some exotic-dominated ground cover in laneways and on paddock margins and does not require assessment or offsetting.

3.2.4 Species Credit Species

No impacts on species credit species are expected.

3.2.5 Cumulative Impacts

The cumulative impacts of the project on remnant native vegetation loss are negligible whether remnant woodland or plantings of native windbreak trees are considered (Table 14).

Table 14. Cumulative Losses of Native Vegetation in Affected Mitchell Landscapes.

Mitchell Landscape	Area of Landscape (ha)	Percent Cleared	Project Clearance (ha)	Additional Clearance (%)
Nangar Ranges	178,920	84	0	0
Macquarie Alluvial Plains	348,198	78	0.04 (remnant woodland) 1.25 (plantings)	0.1×10^{-4} 0.4×10^{-3}

3.3 BIODIVERSITY CREDIT REPORT

3.3.1 BAM Assessment Number

The Assessment Identification Number within the BAM online calculator is 00010097/BAAS180848/18/00010106.

3.3.2 Credits for Removal of Plantings

The biodiversity credit report output from the BAMC for clearance of the blocks of planted trees is provided at Attachment 2. The credit report indicates that the total area of native plantings to be removed from the Site and the roadside of Renshaw – McGirr Way is valued at 20 credits.

3.3.3 Credits for Paddock Tree Removal

The number of native paddock trees on the Site is summarised by species, size (DBH) and the presence of hollows in Table 6. The locations of the trees are shown on Figures 7 and 8. Table 15 presents this data in the form required for use in the *Streamlined Assessment Module – Clearing of Paddock Trees* in the BAM (Appendix 1, OEH [2017a]), which values the paddock trees at 27.75 credits.

Table 15. Paddock Trees Assigned to Classes

	Class 1	Class 2	Class 3
Size range	≤20cm DBH	≥20 cm & ≤50cm DBH	≥50cm DBH
No. of trees without hollows	7	3	19
No. of trees with hollows	0	0	12
No. of ecosystem credits ¹	0	1.5	26.25

¹ Calculated according to Table 12, Appendix 1 of the BAM (OEH, 2017a).

The most likely PCT to which the remnant paddock trees formerly belonged is PCT267; *White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion* (Table 2). This PCT is also assumed for the farm plantings, the roadside woodland and isolated trees on Renshaw – McGirr Way. Accordingly, the remnant paddock trees, farm plantings, roadside woodland and isolated roadside trees are valued at the same rate per credit.

3.3.4 Credit summary

Table 16 summarises the combined credit liability for clearance of the native plantings, roadside woodland, remnant paddock trees and isolated roadside trees.

Table 16. Combined Biodiversity Credits Summary.

IBRA sub-region	PCT common name	No. of ecosystem credits
Plantings		
Upper Slopes	<i>White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion</i>	20
Paddock trees		
Upper Slopes	<i>White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion</i>	27.75
Total credits		47.75

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ATTACHMENT 1

Fauna Survey and Assessment Report

(Biosphere Environmental Consultants Pty. Ltd.)

Executive Summary

Suntop Solar Farm propose to construct and operate a 200 megawatt (MW) photovoltaic solar (PV) farm (the “Proposal”). The Proposal would be located at 909 Suntop Road, Suntop, NSW, 2820 and contained within Lot 1-2-3 DP 506925, Lot 122 DP 753238 and Lot 90 DP 657805 (the “Site”). The Site is approximately 517 hectares and is currently used for agriculture, specifically cropping. The solar farm would occupy approximately 472 hectares (the “development footprint”) out of the 517 hectares (equivalent to approximately 91%) with the remaining land retaining its existing agricultural use.

The construction of the Proposal is estimated to consist of up to 550,000 PV panels which will be installed on a single axis tracker system across the Site. The single axis tracker system option would consist of groups of east-west facing PV modules tilted at +/- 60° angle (each approximately 2m x 1m in area) on mounting structures approximately 4m in height and in rows approximately 11m apart. The mounting structure would be piled steel posts that would extend between 1.6m to 4m below ground depending on geological conditions. The maximum height of panels during tracking movement is approximately 4m.

Associated infrastructure to support the solar farm will include the upgrading of access roads, the construction of a sub-station and power lines to the main electricity grid.

This report presents the results of a fauna assessment of the proposed site. The study involved a desktop assessment and field surveys of the solar farm site and the remainder of the property. It also includes database searches for records of threatened fauna. The current fauna survey included targeted searches for threatened fauna species that could potentially occur on the site and their habitats.

Two broad fauna habitat types were recorded within the site;

- isolated Grey Box (*Eucalyptus microcarpa*) trees were present around the perimeter of the site. These trees could have once been part of a Grey Box Woodland community but no trace remains of the native shrubs and associated vegetation that is normally associated with this community;
- narrow, linear tree plantations comprising an assortment of eucalypts (local and non-endemic species), and
- cleared land with scattered trees. The majority of the project area has been previously cleared for agricultural purposes.

A search of the NSW Wildlife Atlas (26 July 2017) identified 3 listed threatened ecological communities and 3 listed threatened species within 10 km of the Site. A search of the EPBC Act Protected Matters (10 July 2017) identified 2 listed

threatened ecological communities, 27 listed threatened species and 10 migratory species within 10km of the Site.

The EPBC Protected Matters search also identified 16 listed marine species and 29 invasive species.

A fauna assessment of the site was conducted in November 2017 and none of the listed threatened species were found on site. The tree patches around the boundary of the project area could provide seasonal habitat for some of the flying threatened species, including the Regent Honeyeater, Swift Parrot, Painted Honeyeater, Corben's Long-eared Bat and the Grey-headed Flying Fox. The isolated trees inside the project area were too isolated and in poor condition because of their isolation and offered little habitat to these species. The tree plantations on site contained mixed species but were too young to provide hollows or other roosting features for the threatened fauna.

In addition, the surrounds to Dam 5 may provide seasonal habitat for Curlew Sandpipers and Eastern Curlews.

Several mature Western Grey Box (*Eucalyptus microcarpa*) trees occur around the perimeter of the site. This species are regarded as secondary food trees for koalas (OEH 2017a). No evidence was found of koalas in the trees and it appears that the trees are too remote from other koala habitat areas that koalas would be unable to reach them. In addition, the remnant tree patches are quite small, highly exposed and totally surrounded by cleared paddocks. A linear plantation of Yellow Box *E. melliodora* occurs on the site (between fields 2 and 3) but these trees are still young, lack hollows or cavities that could be used by roosting animals but may occasionally flower. This stand will be lost as part of the development of the solar farm.

The main type of impact on fauna that could occur as a result of the Proposal include damage to threatened waterbird potential habitat near Dam 5 and damage to some of the Western Grey Box as a result of vehicle movements about the site. All of the other land to be used for the solar farm is land that has been cleared for agriculture and is devoid of woodland or native grasslands.

The following mitigation measures will be implemented during the preparation of the land for the solar farm:

- tree protection measures will be put in place to conserve the trees around the perimeter of the site;
- enhancement of buffer zones around the perimeter of the site that includes additional planting of replacement trees for those lost due to the clearing of the paddocks;
- protection of Dam 5 such that it is not altered by siltation or wind-blown dust or by accidental spills;

- weed management; and
- animal pest management and monitoring.

The potential impacts of the Proposal are described herein for the range of threatened fauna identified in accordance with the Draft Guidelines for Threatened Species Assessment (DoE, DPI 2005). The results indicate that no threatened fauna are likely to be affected to the point that a local population would be placed at risk of extinction. Key thresholds were assessed as follows:

- The Proposal includes actions to avoid or mitigate impacts by excluding the only mature tree patches (at various locations around the perimeter of the site) from the solar farm footprint,
- All of the threatened fauna that could be potentially affected have been recorded in nearby areas and the tree patches that occur on site are likely to be used as roost sites for Corben's Long-eared Bat or as foraging sites when in flower by Grey-headed Flying Foxes, Swift Parrots, Superb Parrots, Painted Honeyeaters and/or Regent Honeyeaters,
- The Proposal will not place any local population of a threatened species at risk of extinction.
- The Proposal does not affect any critical habitat.

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Introduction

1.1 Overview of the Project

Suntop Solar Farm propose to construct and operate a 200-megawatt (MW) solar farm (the “Proposal”) using photovoltaic (PV) technology at a 517-hectare site (the “Subject Land”) in Suntop, NSW. The solar farm would occupy 472 hectares (the “Site”) out of the 517 hectares (equivalent to approximately 91% of the Site).

The construction of the Proposal is estimated to consist of up to 550,000 PV panels which will be installed on a single axis tracker system across the Site. The single axis tracker system option would consist of groups of east-west facing PV modules tilted at +/- 60° angle (each approximately 2m x 1m in area) on mounting structures approximately 4m in height and in rows approximately 11m apart. The mounting structure would be piled steel posts that would extend between 1.6m to 4m below ground depending on geological conditions. The maximum height of panels during tracking movement is up to 4.03m. The mounting structures for the panels will be 2m high and when the panels are at maximum tilt, the overall height will be approximately 4m.

The following works and infrastructure would be required to support the construction and operation of the solar farm:

- Construction of an access road for all access and egress for the Site and substation
- Installation of Electrical infrastructure including:
 - A 132kV Substation
 - Inverters to collect and convert DC to AC
 - Cabling and other electrical infrastructure (e.g. security systems).
- A maintenance compound and buildings
- Fencing, landscaping and environmental works.

Power generated by the facility will be transmitted via existing 132kV transmission lines, in an easement owned by TransGrid that traverses the Site and extends through to the Wellington substation approximately 15 kilometres to the north. A tee off connection will be used to connect directly into the existing grid located on Site. A tee connector is an electrical connector that joins three cables together.

The operational life of the solar farm is expected to be approximately 30 years at which point the panels are either replaced and operations continue or removed and the site is decommissioned and rehabilitated as required.

The Proposal would be located adjacent to Suntop Road, Suntop, NSW 2820 and contained within Lot 1-2- 3 DP 506925, Lot 122 DP 753238 and Lot 90 DP 657805 (the “Subject Land”). The Proposal is located within the Dubbo Local Government Area (LGA) and is approximately 10km south-west from the Wellington town centre.

The Subject Land is currently used for agriculture including cropping (e.g. wheat and lucerne) and grazing. It is proposed that grazing activities would also continue on the land occupied by the solar farm.

A full description of the Proposal can be found in the Suntop Solar Farm Environmental Impact Statement (EIS).

1.2 Scope and objectives

The primary aim of this assessment is to assess potential impacts on terrestrial fauna, in particular, fauna of conservation significance. Potential impacts of the Proposal on fauna were assessed in accordance with the Guidelines for Threatened Species Assessment (Department of Environment and Conservation and Department of Primary Industries (DEC and DPI, 2005).

Fauna of conservation significance are defined in this report as threatened species or populations listed on the Schedules of the NSW Threatened Species Conservation Act 1995 (TSC Act) and/or are listed as matters of national environmental significance by the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

- The specific objectives of this impact assessment are to consider the terrestrial fauna known or likely to occur in the area that would be affected by the Proposal, including fauna of conservation significance;
- potential impacts of the Proposal on those fauna;
- proposed impact avoidance and mitigation measures.

This scope of this study includes:

- a desktop assessment of the fauna likely to occur in the vicinity;
- fauna surveys and field assessments;

Threatened fauna listed under the NSW Fisheries Management Act 1994 are not discussed further as no habitat exists for threatened fish species on the site.

1.3 Location

The Site is located at 909 Suntop Road, Suntop, NSW, 2820, approximately 10km from Wellington town centre in the Wellington Local Government Area (LGA) and approximately 9km west of the Mitchell Highway (A32). The Site is not located in close proximity to urban or dense residential areas. The Proposal would be contained within Lot 1-2-3 DP 506925, Lot 122 DP 753238 and Lot 90 DP 657805 (Figure 1).

1.4 Site Description

The Site comprises a series of large fenced paddocks containing irrigated crops accessible via Suntop Road to the north. The paddocks have been levelled and largely cleared for agricultural purposes (specifically cropping) and currently contain several built structures including agricultural sheds and one residential dwelling. There is scattered rows and clusters of vegetation across the site as described in Table 1 below.

Table 1
Vegetation Clusters

Isolated trees along boundary	Lot 90 DP 657805
Rows of Mature Trees	Western boundary of Lot 2 and 3 DP 506925 Southern boundary of Lot 1 and 2 DP 506925 Western and eastern boundaries of Lot 122 DP 753238 Eastern border of Lot 90 DP657805
LEP 'Biodiversity Region'	Edge of Suntop Road, located at the northern boundary of Lot 3 DP 506935, Lot 122 DP 753238 and Lot 90 DP 657805.

There are 8 dams within the Site ranging in size from 0.2 ha to 0.5 ha. The two largest dams are contained in the middle of Lot 2 DP 506925, and the south-west corner of Lot 3 DP 506925. Surface hydrology, landform and soils have been heavily modified by the paddock development and It is understood that the development footprint will avoid the existing surface water bodies on the site where possible including a buffer of 20m between infrastructure and any waterway.

Local topography is generally flat with a gentle slope towards the north-west of the site boundary. Highpoints within 10km of the site; Mount Duke (540m), Mount Arthur (525m) and Bushrangers Hill (406m). Mount Arthur is part of the Mount Arthur Reserve, located 5km east of the Site occupying an area of 2,123ha with dense native vegetation.

The closest major water course is the Macquarie River, which is located approximately 7.7km north of the Site. The creek (unnamed) running through the Site flows into Barney's Creek, approximately 2.5km north of the Site. This creek (unnamed) is classified a first order stream, as it is located at the top of a catchment

as a headwater' flow. Barney's creek, flows into Little River which is a major tributary of the Macquarie River. The head waters of Little River have been historically very saline, although the water quality of the creek running through the site may be slightly higher, due to potential flow granite groundwater flow system. There are also several man-made agricultural dams in neighbouring plots.

The environment around the Site is predominantly cleared agricultural land (Figure 3). The dominant land use for Suntop comprises of grazing (55%) and cropping (21%). A region within the neighbouring eastern lots, of approximately 350ha has been identified as Karst landscape. A Karst landscape is characterised by the presence of underground cavern networks created from the dissolution of bedrock by surface water or groundwater.

Figure 1: Location of Solar Farm and Project Area

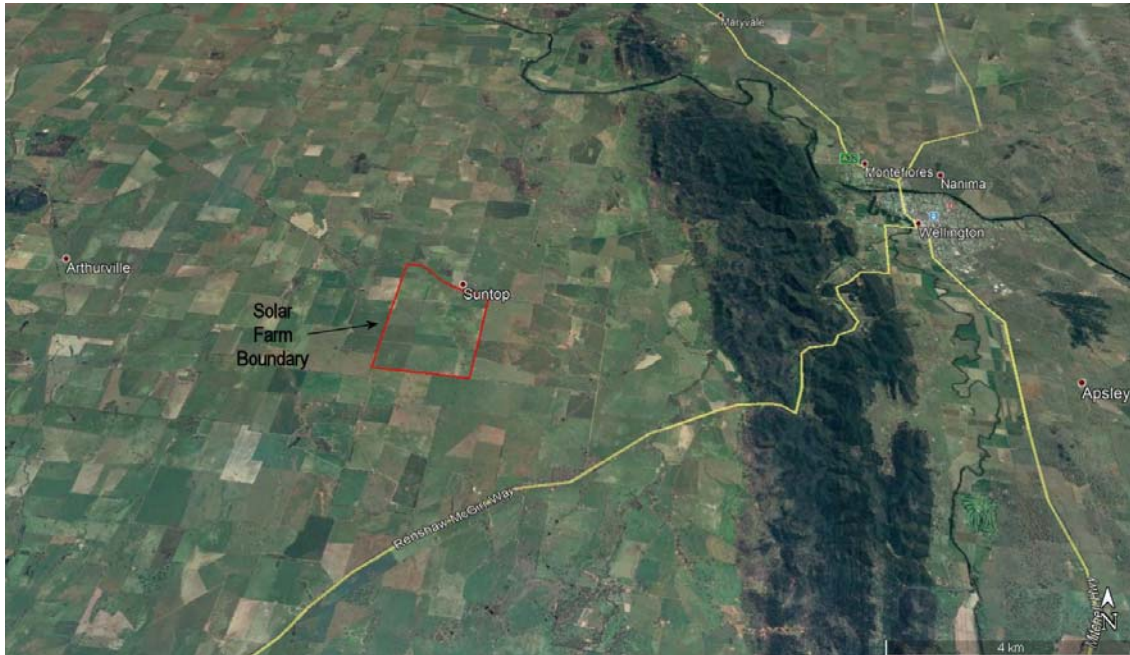


Figure 2: Location of fields and dams on the Suntop site.

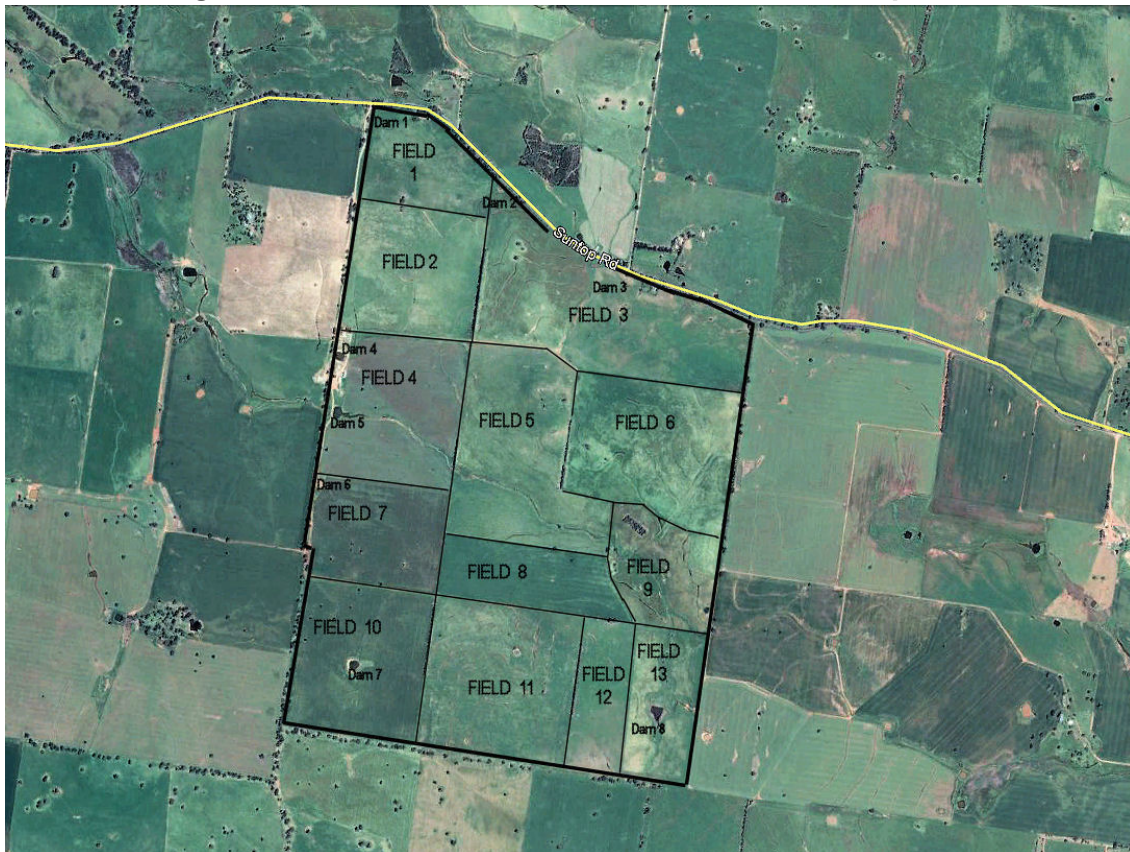


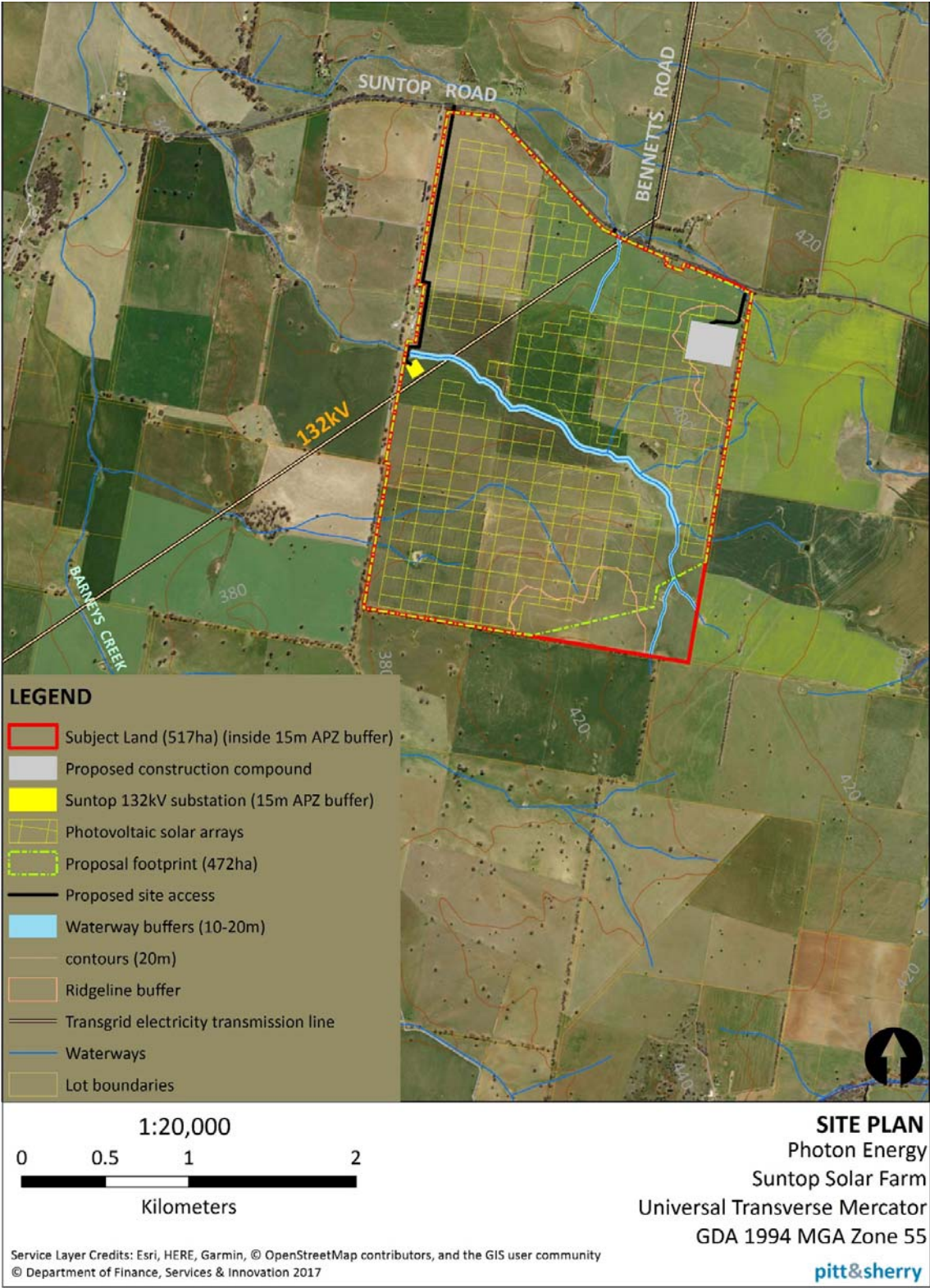
Figure 3: Field 6 looking north



Figure 4: Dam 5



Figure 5: Solar Farm Footprint and Proposed Buffer Zones



There are eight dams on site, many are small and were dry at the time of the site visit in November 2017. Dam 5 is the largest and contains potential habitat for threatened

water birds, Figure 4). Surface hydrology, landform and soils have been heavily modified by the paddock development and irrigation works. Land use within the local area is dominated by rural activities and population density is low.

1.5 Authorship and acknowledgements

This fauna assessment was prepared by Dr. Arthur White of Biosphere Environmental Consultants Pty Ltd. for KMH Environmental.

2 Methodology

2.1 Desktop assessment

A desktop investigation was carried out to identify terrestrial fauna species and habitat that may be affected by the Proposal. This included:

- a search of the Office of Environment and Heritage (OEH) Threatened Species Profiles database (OEH 2017a) for species known or predicted to occur within the Wellington region;
- a search of the OEH Atlas of NSW Wildlife database (OEH 2017b) for records of threatened fauna within the locality;
- a search of the Commonwealth Department of the Environment (DotE) Protected Matters database (DotE 2017) for matters of national environmental significance within the locality (sourced 7 May 2014);
- a search of the Birdlife Australia database for records of threatened birds within the locality (sourced 14 October 2017);

2.2 Previous fauna surveys

No fauna studies have been previously conducted on the site.

2.3 Fauna Assessment

A fauna assessment was carried out on the entire site on the 22nd of November 2017 by Biosphere Environmental Consultants Pty. Ltd. The assessment commenced with a site familiarisation tour in which all of the roads and tracks on the site were traversed by vehicle. Following this, the site was re-traversed so that areas of potential habitat for threatened species could be mapped. As most of the site consisted of cleared paddocks, there were relatively few areas left that could provide potential habitat for native fauna. Each area was then revisited and traversed on foot.

The assessment included non-threatened species as well as threatened species. No trapping or netting of animals was carried out. All animal species encountered were identified and recorded on map of the site. The assessment components consisted of:

- **Arboreal mammals:** a search was made of the trees on site and evidence of the presence of arboreal mammals was searched for: these include scratch marks on trees, the presence of used hollows or drays, faecal droppings and chew marks. A particular emphasis was made to search for evidence of koalas on the site and all Yellow Box, Western Grey Box and Blakely's Red Gums were fully checked for signs of koala scratches or faecal pellets.
- **Terrestrial Mammals:** evidence of terrestrial animals was searched for across the site. This included searching for animal tracks, burrows, digging sites and scats.
- **Bats:** potential food trees for flying foxes were noted. These included trees that either produce edible fruit that flying foxes could eat or produce flowers with edible nectar. For the smaller insectivorous bats, small hollows or loose bark refuge sites on the trees were sought and investigated to see if there were any signs of current or previous occupation by microbats.
- **Diurnal Birds:** A constant watch was kept for birds using field binoculars. Birds were identified and their location noted on the field map.
- **Nocturnal Birds:** No night survey work was conducted. Owl, nightjar and frogmouth roosts were searched for during daylight hours and any potential site found was recorded on the site map.
- **Reptiles:** a hand search for reptiles was carried out in areas where there was ground cover such as fallen bark, branches, logs or scrap timber or metal that could be used as shelter areas by reptiles. Reptiles were not caught unless this was necessary for positive identification. Other reptiles were encountered opportunistically and their location was also recorded on the site map.
- **Frogs:** A search of the channels and water collection points on site was examined to see if any evidence of frogs could be found. Standing water was netted using a long-handled net and if tadpoles were caught they were identified using Anstis (2002). In clay areas near water points, evidence of frog burrows was also searched for and when found recorded on the site map.
- **Fish:** Fish sampling was carried out in the larger farm dams using long-handled nets.

2.4 Assessment of Impacts

Potential impacts of the Proposal on fauna were assessed in accordance with the Guidelines for Threatened Species Assessment (DEC and DPI, 2005). Given the paucity of potential habitat areas for native species on site, the fauna assessment survey methodology undertaken by Biosphere Environmental Consultants Pty. Ltd. was considered to be sufficient to identify the habitat of threatened species on site.

2.5 Limitations

The surveys undertaken by Biosphere Environmental Consultants Pty. Ltd. were short in duration and only conducted during one season (spring). The techniques used were observation-based rather than trapping. Accordingly, it is likely the surveys would not have recorded the full range of fauna on site, particularly those species which may only occur seasonally or occasionally.

3 Results

3.1 Threatened fauna previously recorded or predicted to occur

Appendix A provides a summary of the threatened fauna species that are known or considered to have potential to occur within the locality and/or region. The table indicates which of those species have been recorded previously within the local area between 1996 and 2017. The table also provides an assessment of the likelihood of each species occurring within the Project area or immediate surrounds. Only those species with the potential to occur within the project area were assessed further.

3.2 Habitat types, condition and features

Two broad fauna habitat types were recorded within the Project area or immediate surrounds:

- Tree patches containing Western Grey Box (*E. microcarpa*) occur along the western and southern boundary of the site. These trees are mature and contain hollows.
- Tree patches containing River Red Gum (*E. camaldulensis*) and other eucalypts (probably planted) are present just outside the northern boundary of the site. These are also mature trees with hollows.
- Cleared Land devoid of native vegetation dominates the Project Area. In a few places highly isolated trees may occur but these are in poor condition due to their isolation and exposure.

There are very few rocks on site and no rocky exposures.

3.3 Fauna recorded during the surveys

A total of 26 species of vertebrate fauna were recorded during the current (2017) surveys and are listed in Appendix B. This included 21 species of bird (1 of which was non-native), 2 exotic species of mammal, three species of reptile but no species of frog or fish. No threatened fauna species were recorded within the study area or nearby.

3.4 Migratory species

No migratory species listed under the EPBC Act was recorded nearby the study area during the current surveys. A summary of migratory species recorded within 10 kilometres of the study area and/or locality is provided within Appendix C.

3.5 Endangered populations

There are no endangered populations listed under the TSC Act that are known to occur within the old Wellington Shire boundary, as defined within the NSW OEH Threatened Species Profiles database (OEH 2017a).

3.6 Exotic fauna

Three exotic vertebrate species (excluding livestock animals) were recorded within the Project area. These including the European Red Fox (*Vulpes vulpes*), European Starling (*Sturnus vulgaris*) and House Mouse (*Mus musculus*).

4 Potential impacts

In general, the range of potential impacts associated with the Proposal are either associated with the construction or operation of the solar farm. These impacts may arise from direct and indirect impacts on the fauna.

4.1 Direct impacts

4.1.1 Loss of habitat

Most of the project area is already devoid of native vegetation and the solar farm has been located so that maximal use of previously cleared land is utilised. The Proposal would require the removal of a small few scattered and isolated paddock isolated trees but also the removal of a linear stand of planted Yellow Box (located between fields 2 and 3; Figure 2). The paddock trees are in poor condition, presumably due to their exposure. The Yellow Box trees in the linear plantation are all young trees that lack hollows.

The Yellow Box although young, may provide seasonal habitat for native fauna such as birds and bats when they flower.

Loss of hollow-bearing trees

No mature trees bearing hollows will be removed.

Removal of dead wood and dead trees

The Proposal would result in the removal of two dead standing trees and dead wood on the ground as a part of the clearing of habitat. Dead wood and fallen branches is not common on the site.

4.1.2 Loss of individual animals

The Proposal has the potential to cause mortality of some animals during the removal of fauna habitat. Nocturnal species, species with low mobility, territorial species and some ground-dwelling species (such as lizards and snakes) are particularly susceptible to injury or death during construction and clearing. However, given that the paddock trees to be removed are so depauperate and that there is little fallen timber, this impact should be minimal. Some flying species that use these trees from time to time will lose habitat.

It is considered unlikely that wildlife mortality on roads would substantially increase as a result of the Proposal, given there are existing roads currently in operation with low vehicle speed limits, and no new roads would be created.

4.1.3 Animal Injury

In 2016, Harrison *et al.* reviewed the literature for the impact of solar farms on birds and bats in the United Kingdom. They concluded that the studies were not complete but indicated that reflected polarised light from solar panels can cause injury to some birds (particularly water birds). The reflected polarised light appears to be occasionally misinterpreted by water birds as light being reflected from a standing body of water and the birds may attempt to land on the solar panels. Although this is an uncommon occurrence, the potential for birds to be injured exists. Methods to reduce bird impacts were not discussed but it is likely that the establishment of tree buffer zones around the solar farms will discourage water birds from attempting to land there.

Harrison *et al.* (2016) also noted that certain insects are attracted to the reflected polarised light during daylight hours and this may entice some insectivorous birds towards the solar farms. They did not have evidence of injury to insectivorous birds as a result of the concentration of insects around the solar farms.

4.2 Indirect impacts

4.2.1 Loss of habitat connectivity

Habitat corridors provide essential pathways for the movement of native fauna and play an important role in ensuring the long-term genetic viability of species. The Project is surrounded by occasional mature trees, either inside the property boundary or in road easements along the boundary. These trees provide the only wildlife corridors around the site and no corridors exist across the site because of the removal of so much native vegetation.

Vegetation connectivity in the surrounds of the project area is also highly variable. To the east of the project area is the Mount Arthur Range (Figure 1). These low ranges are fully vegetated and have a continuous tree cover. But there is no vegetated

corridors leading to the Mount Arthur Ranges and so the Suntop site remains quite isolated.

The removal of some paddock trees from the Project area will not interfere with habitat connectivity as these trees are few in number and are widely spaced. The removal of the linear Yellow Box plantation between fields 2 and 3 may impact some flying species as a potential feeding sources will be lost, however the mature tree around the perimeter of the site offer larger (and safer) feeding stations for dispersing birds and bats.

Mobile terrestrial animals such as Eastern Grey Kangaroos (*Macropus giganteus*) would be capable of crossing the agricultural land but would not remain on site because of the lack of cover.

4.2.2 Predation by feral animals

The European Red Fox (*Vulpes vulpes*) was recorded within the project area and throughout the locality. Foxes are a key threatening process under the TSC Act, Predation by the European red fox and Predation by feral cats. The proposed changes to the site are unlikely to result in an increase the impacts of these feral species on native fauna. Few terrestrial species occur in the Project area and the establishment of solar panels there will not assist native species or foxes.

4.2.3 Edge effects

Most of the habitats within the project area are already impacted by edge effects (light, noise, dust, etc.). The removal of the paddock trees will not result in increase in dust, noise or light. The emplacement of the solar panels will provide greater ground coverage than currently exists and this may facilitate weed growth in the paddock. The issue of weed management will be incorporated into a Land Management Plan which will be developed to address this and other land management issues across the Site.

4.2.4 Noise and Air Quality

There will be some increase in noise and air quality impacts during the construction of the solar farm. However, once the construction is completed, both noise and dust levels will be reduced. The main source of noise during the operation of the solar farm will occur near the sub-station to be established on site. Noise and air quality will not be a factor that will negatively impact on native fauna.

4.2.5 Artificial lighting

It is not proposed to undertake works during night time hours therefore, there should be no requirement for night lighting, except for maintenance activities if needed. Artificial lighting during the operation of the solar farm will be negligible and mainly associated with sensor security lighting and ancillary lighting.

4.2.6 Changes to hydrology

Some minor land re-surfacing will occur during the establishment of the solar farm. In general, most of the earth works proposed will be minor and will consist of levelling out minor undulations in the ground surface. These changes will not alter the general hydrology of the project area.

4.3 Cumulative impacts

Cumulative impacts are the successive, incremental and combined impacts (both positive and negative) of an activity on society, the economy and the environment (Franks *et al.*, 2010). They can arise from the compounding activities of a single operation given the interaction of that operation with past, current and future activities that may or may not be related to the existing development. Cumulative impacts may also arise through the interaction of one development with other types of activities and industries, such as grazing and broad scale agriculture. In relation to the Proposal, the cumulative impacts are considered to be the total impact on the environment that would result from incremental impacts (including both direct and indirect impacts) of the Proposal, added to other existing impacts. The main cumulative impact associated with the Proposal will occur during the construction of the solar farm when machinery and vehicle movements will be high. However, the establishment of the vegetation buffers around the perimeter of the site should offset most of this disturbance.

The proposed impact avoidance, mitigation and offset measures described in Sections 5 and 6 of this report are likely to assist with the maintenance of regional fauna biodiversity in the short-term and to potentially enhance it in the medium to long-term once rehabilitation and revegetation programmes become more established.

4.4 Significance of impacts on threatened fauna listed under the TSC Act

A total of 19 species of threatened fauna were considered to have potential to occur within the project area or immediate surrounds (Appendix A). For these species assessments were undertaken to determine the significance of potential impacts. Assessment Approach In accordance with the Draft Guidelines for Threatened Species Assessment (DEC and DPI, 2005) six questions require consideration and assessment in relation to each threatened species that could be impacted by the Proposal:

1. How is the proposal likely to affect the lifecycle of a threatened species and/or population?
2. How is the proposal likely to affect habitat for a threatened species, population or ecological community?

3. Does the proposal affect any threatened species or populations that area at the limit of its known distribution?
4. How is the proposal likely to affect current disturbance regimes?
5. How is the proposal likely to affect habitat connectivity?
6. How is the proposal likely to affect critical habitat?

The potential impacts for each species of threatened fauna is provided in Appendix D. For species where the ecology or habitat requirements are similar, they have been grouped and assessed together.

In relation to 6, the Proposal would not impact on any area of critical habitat. No area of critical fauna habitat occurs near the study area as designated by the Register of Critical Habitat held by the Commonwealth Minister of the DotE (DotE, 2009), Register of Critical Habitat held by the Director-General of the OEH (OEH 2017), or the Register of Critical Habitat held by the Director-General of the DPI-Fisheries (DPI-Fisheries, 2014).

Summary

In summary, the conclusions of the assessment were that the modification would be unlikely to significantly impact any threatened species given;

- the relatively small area of potential habitat that would be impacted (isolated paddock trees);
- this habitat area is not used by many native species, with the exception of flying animals. There are few old growth features observed in the trees and there is scant ground cover available. This area is also highly isolated from other treed areas.
- habitat fragmentation within the locality would be insignificant as a result of the removal of these trees,
- to assist those species that do occur in the local area a vegetation buffer zone will be established around the site, and a buffer zone will be established around the central watercourse that leads to Dam 5.
- impact avoidance and mitigation measures would be implemented.

4.5 Significance of impacts on threatened fauna listed under the EPBC Act

This report identifies potential impacts from the Proposal on threatened fauna listed under the EPBC Act and assessed whether the identified impacts would likely result in a significant impact on any Matters of National Environmental Significance. The conclusion of this assessment is that the proposed Modification is not likely to have a significant impact on any threatened fauna (see Appendix D).

4.6 State Environmental Planning Policy No. 44 – Koala Habitat Protection

There are two important definitions that apply when considering Koala habitat under SEPP 44:

- "core koala habitat" means an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings and historical records of a population; and
- "potential koala habitat" means areas of native vegetation where the trees of the types listed in Schedule 2 constitute at least 15% of the total number of trees in the upper or lower strata of the tree component.

Three Schedule 2 Koala feed trees occur in the Suntop area, namely River Red Gum *Eucalyptus camaldulensis*, Yellow Box *Eucalyptus melliodora* and Western Grey Box *Eucalyptus microcarpa*. The Project site contains a few Western Grey Box *E. microcarpa* near the southern and western boundary of the site. These trees will be conserved and included in the vegetation buffer zone.

There are no historic or current observations of koalas within the Project Site. The isolation of the few tree areas that remain makes it extremely difficult for koalas to reach them and their poor condition and exposure means that if koalas were able to reach these trees they could not remain there for long.

4.7 Migratory species

Twelve migratory bird species listed under the EPBC Act have been recorded within the locality or predicted to occur in the Protected Matters database (Appendix C). There are no records of any of these species being recorded in the project area. The current survey did not detect any of these species but the limited nature of the survey does not preclude their presence from time to time. The Proposal is not likely to significantly impact any listed migratory species under the EPBC Act, on the basis of the following:

- no 'important habitat' exists within the Proposal area for any listed migratory species;
- the Proposal would not result in an invasive species that is harmful to any migratory species becoming established in an area of important habitat; and

- the Proposal would not disrupt the life cycle of an ecologically significant proportion of any population of any migratory species.

5 Mitigation measures

A number of impact avoidance and mitigation measures are proposed to alleviate any potential impacts on native species that occur in or over the project area.

5.1 Land Management plan

A Land Management Plan (LMP) will be prepared to include measures that will:

- protect the mature eucalypts trees around the perimeter of the site during the construction of the solar farm;
- enhance the habitat values of these trees through the establishment of the vegetation buffer zones; and
replace the trees lost from field B1 by selective replanting in the buffer zones around the site.
- prevent unwanted plants from becoming established in and around the solar farm.
- schedule regular site inspections and communication with lessees and authorities;
- undertake annual control of weeds

5.2 Animal pest management and monitoring

A variety of animal pest management and monitoring procedures, including the following:

- the maintenance of a clean, rubbish-free environment in order to discourage scavenging and reduce the potential for colonisation of these areas by non-endemic fauna (e.g. introduced rodents, predators and birds);
- monitoring of feral animals (including pigs, foxes, dogs, rabbits and newly established exotics species);
- undertaking pest animal control where necessary; and
- employees and contractors are not permitted to encourage fauna through feeding.

5.3 Rehabilitation

At the completion of the life of the solar farm, the site will be rehabilitated to either arable agricultural land with/without replanted tree habitat areas.

5.4 Other fauna protection and management measures

Other fauna protection and management initiatives include the following:

- setting speed limits (20 km per hour on roads and tracks);
- installing warning signs on roads and tracks in the vicinity of the solar farm to reduce potential vehicle strikes;
- the maintenance of a clean, rubbish-free area; and
- preparation of procedures which detail how to care for animals found at risk of harm or injured at the solar farm site.

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Appendix A: Likelihood of occurrence of threatened fauna

Scientific Name	Common Name	Conservation Status		Known or predicted occurrence in region		Records from the locality		Survey Records	Potential occurrence in the Modification area or immediate surrounds
		TSC Act	EPBC Act	NSW OEH Database	Protected Matters	Wildlife Atlas NSW	Birdlife Aust.		
<i>Anthrochaera phrygia</i>	Regent Honeyeater	CE	CE	Yes	-	No	No	No	Opportunistic habitat available to Regent Honeyeaters when mature eucalypts around perimeter of site are in flower.
<i>Lathamus discolour</i>	Swift Parrot	E	CE	Yes	-	No	No	No	Mature eucalypts around perimeter of site possible stopping points for Swift Parrots during migration.
<i>Polytelis swainsonii</i>	Superb Parrot	V	V	Yes	-	No	No	No	Opportunistic habitat available to Superb Parrots when mature eucalypts around perimeter of site are in flower.
<i>Calidris ferruginea</i>	Curlew Sandpiper	E	CE	Yes	-	No	No	No	Dam 5 could provide ephemeral habitat.
<i>Numenius madagascarensis</i>	Eastern Curlew	CE	CE	Yes	-	No	No	No	Dam 5 could provide ephemeral habitat.
<i>Grantiella picta</i>	Painted Honeyeater	V	V	Yes	-	No	No	No	Opportunistic habitat available to Painted Honeyeaters when mature eucalypts around perimeter of site are in flower.
<i>Rostratula australis</i>	Australian Painted Snipe	E	E	Yes	-	No	No	No	No habitat available.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	E	E	Yes	-	No	No	No	No habitat available. Insufficient tree cover.
<i>Leipoa ocellata</i>	Malleefowl	V	V	Yes	-	No	No	No	No habitat available.
<i>Maccullochella peelii</i>	Murray Cod	V	V	Yes	-	No	No	No	No habitat available.
<i>Maccullochella macquarensis</i>	Trout Cod	V	V	Yes	-	No	No	No	No habitat available.

<i>Galaxia rostratus</i>	Flathead galaxia	V	V	Yes	-	No	No	No	No habitat available.
<i>Macquaria australasica</i>	Macquarie Perch	V	V	Yes	-	No	No	No	No habitat available.
<i>Petauroides volans</i>	Greater Glider	V	V	Yes	-	No	No	No	No habitat available. Insufficient tree cover.
<i>Phascolarctos cinereus</i>	Koala	V	V	Yes	-	No	No	No	Habitat inaccessible to koalas. Larger tree stands contains secondary food trees, but trees are inaccessible to koalas.
<i>Chalinolobus dwyeri</i>	Large Pied Bat	V	V	Yes	-	No	No	No	No habitat available. Insufficient tree cover.
<i>Dasyurus maculatus maculatus</i>	Spotted-tail Quoll	V	-	Yes	-	No	No	No	No habitat available. Insufficient tree cover or ground cover available.
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	V	V	Yes	-	No	No	No	Mature eucalypts around perimeter of site may provide habitat for these bats.
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	V	V	Yes	-	No	No	No	No habitat available.
<i>Pteropus poliocephalus</i>	Grey-headed Flying Fox	V	V	Yes	-	No	No	No	Opportunistic habitat available to Grey-headed Flying when mature eucalypts around perimeter of site are in flower.
<i>Aprasia parapulchella</i>	Pink-tailed Worm-lizard	V	V	Yes	-	No	No	No	No habitat available. Little surface rock available; no exfoliations.
<i>Delma impar</i>	Striped Legless Lizard	V	V	Yes	-	No	No	No	No habitat available.

CE = Critically Endangered

E = Endangered

V = Vulnerable

Appendix B Fauna Detected On Site

Class	Common Name	Scientific Name	TSC Act	EPBC Act
Mammalia	House Mouse	<i>Mus musculus</i>	I	-
	Red Fox	<i>Vulpes vulpes</i>	I	-
Aves				
	Pacific Black Duck	<i>Anas superciliosa</i>	P	
	Australasian Grebe	<i>Tachybaptus novaehollandiae</i>	P	
	Australian Maned Duck	<i>Chenonetta jubata</i>	P	
	Black-shouldered Kite	<i>Elanus axillaris</i>	P	
	Crested Pigeon	<i>Ocyphaps lophotes</i>	P	
	Eastern Rosella	<i>Platycercus eximius</i>	P	
	Red-rumped Parrot	<i>Psephotus haematonotus</i>	P	
	Galah	<i>Eolophus roseicapilla</i>	P	
	Yellow-rumped Thornbill	<i>Acanthiza chrysorrhea</i>	P	
	Superb Fairy Wren	<i>Malurus cyaneus</i>	P	
	Noisy Miner	<i>Manorina melanocephala</i>	P	
	Blue-faced Honeyeater	<i>Entomyzon cyanotus</i>	P	
	White-plumed Honeyeater	<i>Lichenostomus penicillatus</i>	P	
	Magpie-lark	<i>Grallina cyanoleuca</i>	P	
	Welcome Swallow	<i>Hirundo neoxena</i>	P	
	Australian Reed-warbler	<i>Acrocephalus australis</i>	P	
	Common Starling	<i>Sturnus vulgaris</i>	I	
	Australasian Pipit	<i>Anthus novaeseelandiae</i>	P	
	Grey Butcherbird	<i>Cracticus torquatus</i>	P	
	Australian Magpie	<i>Cracticus tibicens</i>	P	
	Australian Raven	<i>Corvus coronoides</i>	P	
Reptiles	Eastern Brown Snake	<i>Pseudonaja textilis</i>	P	
	Inland Snake-eyed Skink	<i>Cryptoblepharus pannosus</i>	P	
	Grass Skink	<i>Lampropholis guichenoti</i>	P	
Frogs	Spotted Grass Frog	<i>Limnodynastes tasmaniensis</i>	P	
Fish	Nil			

Note: P = protected, V = vulnerable, I = introduced, M = migratory.

Appendix C: Migratory Species known or potential occurrence within the study area and/or locality.

Scientific Name	Common Name	Conservation Status		Known or predicted occurrence in region	Records from the Locality		Current Survey
		TSC Act	EPBC Act		Wildlife Atlas	Birdlife Australia	
<i>Apus pacificus</i>	Forked-tailed Swift	-	M	✓	-	-	-
<i>Hirundapus caudacutus</i>	White-throated Needletail	-	M	✓	-	-	-
<i>Actitis hypoleucos</i>	Common Sandpiper	-	M	✓	-	-	-
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	-	M	✓	-	-	-
<i>Monarcha melanopsis</i>	Black-faced Monarch	-	M	✓	-	-	-
<i>Motacilla flava</i>	Yellow Wagtail	-	M	✓	-	-	-
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	-	M	✓	-	-	-
<i>Pandion haliaetus</i>	Osprey	-	M	✓	-	-	-
<i>Rhipidura rufifrons</i>	Rufous Flycatcher	-	M	✓	-	-	-
<i>Rostratula benghalensis</i>	Painted Snipe	E	M	✓	-	-	-

Note: E = endangered, M = migratory.

Appendix D: Assessments of Significance

Birds

Three of the threatened species that have been recorded within 10 kilometres of the project area have been excluded from this assessment as there is no habitat available for these birds in the project area. Those species were the Australasian Bittern, Mallee Fowl and Australian Painted Snipe.

Wetland-associated Birds

Two threatened wetland bird species have the potential to occur in the Study Area:

- Eastern Curlew *Numenius madagascarensis*
- Curlew Sandpiper *Calidris ferruginea*

Habitat for both of these birds is extremely limited and confined to the area around Dam 5 (Figure 2).

1. How is the proposal likely to affect the lifecycle of a threatened species and/or population?

Both of the threatened birds listed above are known or predicted to occur in the region (Appendix A) but neither were detected during the fauna assessment in November 2017. Habitat for both species is limited to the area around Dam 5. Dam 5 will be excluded from the development footprint. In addition, silt fences will be erected to prevent dust or silt from being transported into the dam and catchment. The proposed establishment of the solar farm is unlikely to affect the lifecycle of these threatened species.

2. How is the proposal likely to affect the habitat of a threatened species, population or ecological community?

No water bodies would be directly impacted by the proposal.

3. Does the proposal affect any threatened species or populations that are at the limit of its known distribution?

Neither of the threatened waterbird species listed above are at the limit of their known distribution (OEH 2017a).

4. How is the proposal likely to affect current disturbance regimes?

As indicated in 4.2 the construction and operation of the solar farm would not result in a significant change to existing disturbance regimes, given impacts would be limited already cleared agricultural land and the loss of trees that will occur will occur in areas not frequented and out of reach of these birds.

5. How is the proposal likely to affect habitat connectivity?

As indicated in 4.2 the construction and operation of the solar farm would not result in an adverse impact on habitat connectivity for these birds. The only dam that provides potential habitat for them will be conserved and protected during the construction and operation of the solar farm.

6. How is the proposal likely to affect critical habitat?

No area of critical fauna habitat occurs near the study area as designated by the Register of Critical Habitat held by the Commonwealth Minister of the DotE (DotE, 2014), Register of Critical Habitat held by the Director-General of the OEH (OEH 2017), or the Register of Critical Habitat held by the Director-General of the DPI-Fisheries (DPI-Fisheries, 2017).

Woodland Birds

Two threatened woodland birds have the potential to occur within the Study Area:

- Painted Honeyeater *Grantiella picta*
- Superb Parrot *Polytelis swainsonii*

1. How is the proposal likely to affect the lifecycle of a threatened species and/or population?

Both woodland species listed above have been recorded or are predicted to occur in the region (Appendix A) but neither were detected on site during the fauna assessment carried out in November 2017. Habitat for these birds is restricted to the few remaining mature eucalypts around the margins of the site and these trees will be retained and conserved. The small tree plantation areas on site are too young to provide habitat for these birds. The proposed establishment of the solar farm is unlikely to affect the lifecycle of these threatened species.

2. How is the proposal likely to affect the habitat of a threatened species, population or ecological community?

The mature trees around the perimeter of the site will be retained and included in a vegetation buffer zone. The management of the buffer zone will improve the habitat value of these trees. The proposal will not adversely affect the habitat of these species.

3. Does the proposal affect any threatened species or populations that are at the limit of its known distribution?

Both of these species have wide distributions in NSW and none are at the limit of their known distribution (OEH 2017a).

4. How is the proposal likely to affect current disturbance regimes?

As indicated in 4.2 the construction and operation of the solar farm would not result in a significant change to existing disturbance regimes, given impacts would be limited already cleared agricultural land and the loss of trees that will occur will occur in areas not frequented and out of reach of these birds. The trees that may provide habitat are located around the margins of the site and will be conserved.

5. How is the proposal likely to affect habitat connectivity?

As indicated in 4.2 the construction and operation of the solar farm would not result in an adverse impact on habitat connectivity for these birds. The mature eucalypts around the perimeter of the project area will remain and be conserved and potential movement corridors will be retained. All potential habitat for these birds will be conserved and protected during the construction and operation of the solar farm.

6. How is the proposal likely to affect critical habitat?

No area of critical fauna habitat occurs near the study area as designated by the Register of Critical Habitat held by the Commonwealth Minister of the DotE (DotE, 2014), Register of Critical Habitat held by the Director-General of the OEH (OEH 2017), or the Register of Critical Habitat held by the Director-General of the DPI-Fisheries (DPI-Fisheries, 2017).

Regent Honeyeater and Swift Parrot

The following birds are considered to have the potential to occur within the Study Area:

- Swift Parrot *Lathamus discolor*
- Regent Honeyeater *Anthochaera phrygia*

1. How is the proposal likely to affect the lifecycle of a threatened species and/or population?

The Swift Parrot is a non-breeding autumn-winter migrant to mainland Australia (breeds in Tasmania), where they forage primarily on nectar from winter flowering plants (OEH 2017a). Similarly, within NSW the Regent Honeyeater is known to breed in the Capertee Valley and the Bundarra-Barraba regions during spring and summer but can move large distances during the non-breeding season to forage on winter nectar resources (OEH 2017a). Both species would forage lerp and/or insects when nectar resources are scarce.

Suitable vegetation for these species within the project area is limited to the few remaining mature eucalypts that occur around the perimeter of the site. These trees will be retained and conserved. The small tree plantation areas on site are too young to provide habitat for these birds. The proposed establishment of the solar farm is unlikely to affect the lifecycle of these threatened species.

2. How is the proposal likely to affect the habitat of a threatened species, population or ecological community?

The mature trees around the perimeter of the site will be retained and included in a vegetation buffer zone. The management of the buffer zone will improve the habitat value of these trees. The proposal will not adversely affect the habitat of these species.

3. Does the proposal affect any threatened species or populations that are at the limit of its known distribution?

Within the Study Area, neither of these species are at the limits of their known distribution (OEH 2017a).

4. How is the proposal likely to affect current disturbance regimes?

As indicated in 4.2 the construction and operation of the solar farm would not result in a significant change to existing disturbance regimes, given impacts would be limited already cleared agricultural land and the loss of the few paddock trees that will occur will occur in areas not frequented by these birds. The trees that may provide habitat for Swift Parrots and Regent Honeyeaters are located around the margins of the site and will be conserved.

5. How is the proposal likely to affect habitat connectivity?

As indicated in 4.2 the construction and operation of the solar farm would not result in an adverse impact on habitat connectivity for these birds. The trees that may provide habitat for Swift Parrots and Regent Honeyeaters are located around the margins of the site and will be conserved. The creation of vegetation buffer zones should enhance potential movement corridors for these birds.

6. How is the proposal likely to affect critical habitat?

No area of critical fauna habitat occurs near the study area as designated by the Register of Critical Habitat held by the Commonwealth Minister of the DoE (DoE, 2014), Register of Critical Habitat held by the Director-General of the OEH (OEH 2017), or the Register of Critical Habitat held by the Director-General of the DPI-Fisheries (DPI-Fisheries, 2017).

Mammals

Four of the threatened species that have been recorded within 10 kilometres of the project area have been excluded from this assessment as there is no habitat available for these birds in the project area. Those species were the Spotted-tail Quoll, Large-eared Pied Bat, Koala and Greater Glider.

Two threatened mammal species have the potential to occur in the Study Area:

- Corben's Long-eared Bat *Nyctophilus corbeni*
- Grey-headed Flying Fox *Pteropus poliocephalus*

Grey-headed Flying-fox

The Grey-headed Flying-fox (*Pteropus poliocephalus*) has the potential to occur within the project area.

1. How is the proposal likely to affect the lifecycle of a threatened species and/or population?

The Grey-headed Flying-fox is known to occur in the region and records exist for the locality. The species was not recorded during the fauna assessment conducted in November 2017. Grey-headed Flying-foxes feed on nectar and pollen of native trees as well as fruits and occur in a wide range of habitats (OEH 2017a). During the day individuals aggregate in camps, which are important for mating, giving birth and rearing young. Camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy (OEH 2017a). The Grey-headed Flying-fox can travel large distances (up to 50 km) from their camp to forage (OEH 2017a). No camps were observed within or near the study area.

The only habitat trees available to the flying foxes are the mature eucalypts that occur around the perimeter of the site. They could provide nectar when in flower. These trees will be retained and conserved. The small tree plantation areas on site are too young to provide much food for these bats. The proposed establishment of the solar farm is unlikely to affect the lifecycle of these threatened species.

2. How is the proposal likely to affect the habitat of a threatened species, population or ecological community?

The mature trees around the perimeter of the site will be retained and included in a vegetation buffer zone. The management of the buffer zone will improve the habitat value of these trees. The proposal will not adversely affect the habitat of these species.

3. Does the proposal affect any threatened species or populations that are at the limit of its known distribution?

The Grey-headed Flying-fox occurs in a 200 km broad band along the east coast of Australia from Bundaberg, QLD to Melbourne, VIC (OEH 2017a). Thus, the species is not at the limits of its known distribution.

4. How is the proposal likely to affect current disturbance regimes?

As indicated in 4.2 the construction and operation of the solar farm would not result in a significant change to existing disturbance regimes, given impacts would be limited already cleared agricultural land and the loss of the few paddock trees that will occur will occur in areas not frequented by these bats. The trees that may provide habitat for flying foxes are located around the margins of the site and will be conserved.

5. How is the proposal likely to affect habitat connectivity?

As indicated in 4.2 the construction and operation of the solar farm would not result in an adverse impact on habitat connectivity for these bats. The trees that may provide habitat for Grey-headed Flying Foxes are located around the margins of the site and will be conserved. The creation of vegetation buffer zones should enhance potential movement corridors for these bats.

6. How is the proposal likely to affect critical habitat?

No area of critical fauna habitat occurs near the study area as designated by the Register of Critical Habitat held by the Commonwealth Minister of the DotE (DotE, 2014), Register of Critical Habitat held by the Director-General of the OEH (OEH 2017), or the Register of Critical Habitat held by the Director-General of the DPI-Fisheries (DPI-Fisheries, 2017).

Corben's Long-eared Bat

Corben's Long-eared Bat (*Nyctophilus corbeni*) has the potential to occur within the project area.

1. How is the proposal likely to affect the lifecycle of a threatened species and/or population?

Corben's Long-eared Bat has not been recorded in the immediate vicinity of Suntop. These bats will often seek shelter in small terminal or mid-branch hollows. The only trees on the project area that have such hollows are the few mature eucalypts that are present around the margins of the site. These trees will be retained and conserved. The small tree plantation areas on site are too young to provide hollows for these bats. The proposed establishment of the solar farm is unlikely to affect the lifecycle of these threatened species.

2. How is the proposal likely to affect the habitat of a threatened species, population or ecological community?

The mature trees around the perimeter of the site will be retained and included in a vegetation buffer zone. The management of the buffer zone will improve the habitat value of these trees. The proposal will not adversely affect the habitat of these species.

3. Does the proposal affect any threatened species or populations that are at the limit of its known distribution?

Corben's Long-eared Bat is widely distributed around the western slopes and semi-arid of New South Wales; its distribution coincides approximately with the Murray Darling Basin with the Pilliga Scrub region being the distinct stronghold for this species (OEH 2017a). Thus, the species is not at the limits of its known distribution.

4. How is the proposal likely to affect current disturbance regimes?

As indicated in 4.2 the construction and operation of the solar farm would not result in a significant change to existing disturbance regimes, given impacts would be limited already cleared agricultural land and the loss of the few paddock trees that will occur will occur in areas not frequented by these bats. The trees that may provide habitat for Corben's Long-eared Bat are located around the margins of the site and will be conserved.

5. How is the proposal likely to affect habitat connectivity?

As indicated in 4.2 the construction and operation of the solar farm would not result in an adverse impact on habitat connectivity for these flying foxes. The trees that may provide habitat for them are located around the margins of the site and will be conserved. The creation of vegetation buffer zones should enhance potential movement corridors for these bats.

6. How is the proposal likely to affect critical habitat?

No area of critical fauna habitat occurs near the study area as designated by the Register of Critical Habitat held by the Commonwealth Minister of the DotE (DotE, 2014), Register of Critical Habitat held by the Director-General of the OEH (OEH 2017), or the Register of Critical Habitat held by the Director-General of the DPI-Fisheries (DPI-Fisheries, 2017).

Reptiles

Two threatened species of legless lizard have the potential to occur in the project area:

- Pink-tailed Worm Lizard *Aprasia parapulchella*
- Striped Legless Lizard *Delma impar*

Habitat does not exist for either species on the project site and so neither species is further assessed for potential impacts.

Fish

Four threatened species of fish have the potential to occur in the project area:

- Flathead Galaxia *Galaxia rostratus*
- Trout Cod *Maccullochella macquarensis*
- Murray Cod *Maccullochella peelii*
- Macquarie Perch *Macquaria australasica*

As no habitat is present on the project site for any of these fish species, they are not considered any further in this assessment.

ATTACHMENT 2

BAM Credit Summary Report



BAM Calculator

App last updated: 26/04/2018 (Version: 1.2.3.00)
BAM data last updated *: 24/02/2018 (Version: 3) * **Disclaimer**

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- [1. Assessment details](#)
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[4. Habitat suitability](#)
[5. Habitat survey](#)
[6. Credits](#)
[7. Credit classes](#)
[8. Price](#)

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	Vegetation integrity loss	Area	Species sensitivity to gain class (for BRW)	Biodiversity risk weighting	Candidate SAIL	Ecosystem credits
White Box - White Cypress Pine - Western Grey Box shrub/grass/forb woodland in the NSW South Western Slopes Bioregion							
1	267_Plantings	30.1	1.3 hectares	High Sensitivity to Potential Gain	2	TRUE	19
2	267_Woodland	72.9	0 hectares	High Sensitivity to Potential Gain	2	TRUE	1
							Subtotal: 20
							Total: 20

Species credits for threatened species

Vegetation zone name	Habitat condition (vegetation integrity) loss	Area / Count	Biodiversity risk weighting	Candidate SAIL	Species credits
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