



# GUNNEDAH SOLAR FARM LANDSCAPING PLAN-V10



Armidale Tree Group

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**Version Completed On:** 23/04/2020

**Client:** PCL Constructions P/L

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## APPENDICES

*Appendix A General Layout of Development Plan (SSD 8658)*

*Appendix B Landscape Location Plan*

*Appendix C Consultation with Gunnedah Shire Council*

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### 1 Summary

This Landscaping Plan (LP) has been prepared for the Gunnedah Solar Farm and addresses the Conditions of Consent.

This plan was prepared based on a desktop analysis of the project addresses with the methodology and recommendations to meet conditions 10 and 11 of the DC. A site inspection will be carried out prior to implementation of the LP.

### 2 Background

Development Consent for the Gunnedah Solar Farm (SSD 8658) was granted on 12<sup>th</sup> March 2019. The following Conditions of Consent were issued in the DA with respect to the requirements of the LP.

#### **Vegetation Buffer: Schedule 3, Condition 10.**

The Applicant must establish and maintain a mature vegetation buffer (landscape screening) at the locations outlined in the figure in Appendix 1, to the satisfaction of the Secretary. This vegetation buffer must:

- (a) be planted prior to the commencement of operations;
- (b) be wholly contained in Lot 2 of the site (see Appendix 5);
- (c) consist of species that facilitate the best possible outcome in terms of screening the view of the solar panels and ancillary infrastructure on site from surrounding residences;
- (d) be effective at screening views within 3 years of the commencement of construction; and
- (e) be properly maintained with appropriate weed management.

**Landscaping Plan: Schedule 3, Condition 11.**

Prior to the commencement of construction, the Applicant must prepare a detailed Landscaping Plan for the development in consultation with Council and to the satisfaction of the Secretary. This plan must include:

- (a) a description of measures that would be implemented to ensure that the vegetation buffer achieves the objectives of condition 10 (a) – (e) above;
- (b) include a program to monitor and report on the effectiveness of these measures, including if additional locations for further landscape screening are required to achieve the objectives of Condition 10 (c) and (d) above; and
- (c) include details of who would be responsible for monitoring, reviewing and implementing the plan; timeframes for completion of actions.

Following the Secretary’s approval, the Applicant must implement the Landscaping Plan.

**EIS Mitigation Measures**

In addition to the Conditions of the Consent the following Mitigation Measures relevant to landscaping were committed to in the Environmental Impacts Statement prepared in support of the Development Approval Application.

*Table 1 Relevant EIS Mitigation Measures*

Reference	Mitigation Measure	Comment
A7	Establish and maintain ground cover in accordance with the Land Management Plan for the site.	Addressed in Section 6.4 and Appendix D of this Plan
B1	A 10-m buffer shall be established between the perimeter of the remnant vegetation stands (V1, V2 and V3) and the works footprint.	Addressed in 6.3 of this Plan
B2	The works (e.g. plant, material stockpiling) should not encroach into remnant vegetation and buffer areas.	Addressed in 6.3 of this Plan
L1	Managed grazing will be used to maintain the height of ground cover during operation of the solar farm.	Addressed in Section 6.5 of this Plan
L2	Create and implement a remediation plan during end of operation and decommissioning.	To be submitted at this time
L3	Implement the Landscape Plan	Replaced by this plan
L4	All pesticides will be used in accordance with the <i>Pesticides Act 1999</i> , such that only registered pesticides are used based on label instructions that are designed to minimise impacts on surrounding land	Addressed in Section 5.3 and 6.5 of this Plan
S8	Undertake soil amelioration and vegetation improvement works in line with the requirements of a Land Management Plan. This should include undertaking required land	Addressed in Section 6.4 and Appendix D of this Plan

	<p>or vegetation improvement works at an appropriate stage during solar farm development. For example, soil amelioration and fertilising might be most practically undertaken prior to solar panel installation. For similar reasons the desired pasture crop should be sown before solar panel installation.</p>	
S12	<p>Implement a Land Management Plan that addresses the ongoing land management and maintenance activities (Refer <b>Appendix G</b>). This would address:</p> <ul style="list-style-type: none"> <li>• ongoing agronomic management of the land including stock, water, vegetation and soils management</li> <li>• measures required to maintain healthy soil and plant systems and maintain the agricultural capability of the land</li> <li>• stock management programs and infrastructure (eg fencing, watering points)</li> <li>• soil amelioration, pasture management and weed control</li> <li>• monitoring programs for soil fertility and groundcover measures to manage the site before, during and after a flood.</li> </ul>	<p>Requirements of Land Management Plan attached at Appendix D are being implemented through this Plan as relevant.</p>
V2	<p><i>Minimise and repair ground disturbance</i></p> <ul style="list-style-type: none"> <li>• Minimise grading across the Site and undertake the minimum levelling necessary to install panel supports</li> <li>• Rehabilitate exposed ground surfaces as soon as possible.</li> </ul>	<p>Minimise grading across the site addressed in Civil design process.</p> <p>Rehabilitation of exposed areas addressed in Section 6.4 and Appendix D of this Plan</p>
V3	<p>Implement Concept Landscape Plan which includes visual screening prior to commencing construction works, where possible.</p>	<p>Replaced by this plan</p>
V4	<p>Retain all existing trees</p>	<p>Addressed in Section 6.3 of this Plan</p>
V5	<p>Retain as much existing ground cover (pasture grasses) beneath solar panels as possible.</p>	<p>Addressed in Section 6.4 and Appendix D of this Plan</p>
V6	<p>Progressively stabilise disturbed area with pasture grasses.</p>	<p>Addressed in Section 6.4 and Appendix D of this Plan</p>

BF13	Vegetation fuel levels internal to the APZ and throughout the solar farm will be maintained by grazing, slashing or mowing	Addressed in Section 6.5
SW3	Design solar panel arrays to allow sufficient space between panels to establish and maintain ground cover beneath the panels and facilitate weed control	The Gunnedah Solar Farm is using single axis tracking solar technology which requires minimum clear space of approximately 6 metres between the rows to avoid shadowing between rows and also meeting this requirement.

### 3 Purpose

This LP is written in order to satisfy Conditions 10 and 11 as listed above. Its purpose is to make recommendations as to the implementation and maintenance of the vegetation buffer.

### 4 Objectives

The key objective of this LP is to ensure that the vegetation buffer is planned and completed as required.

To achieve this objective, a suitably experienced contractor/organisation will carry out the following:

- Ensure appropriate planning and procedures are implemented during preparation and establishment of the buffer area; and
- Manage the buffer area over time, which will include both maintenance of the buffer and evaluation of its performance against the deliverable criteria measured above.

These points are expanded on in detail in the sections below.

### 5 Landscape Screening

Planting will be as required by the Conditions of Consent in the form of vegetation buffers on the northern and eastern edge of the solar farm (see map in Appendices A & B).

#### 5.1 Location and timing: (Deliverables 'a' and 'b' of Condition 10)

The vegetation screening will be planted prior to the commencement of works where possible.

The vegetation screening will consist of six planting lines, contained in Lot 2 of the site (see Appendices A & B). Planting must occur prior to the commencement of operations. The exact number of the planting lines may be adjusted if space is a consideration.

The vegetation buffer area must be excluded from stock access, beginning at the commencement of site preparation (spraying). Stock will be continued to be excluded from the site for a minimum of five years, to allow establishment of the vegetation buffer.

### 5.2 Species and maintenance: (Deliverable ‘c’ and ‘d’ of Condition 10)

The following species recommendations were selected based on the native vegetation communities identified on page 5 of the **Land Management Plan** prepared by Pitt and Sherry and attached at Appendix D of this Plan. Critical factors for inclusion included growth characteristics, such as density and height at maturity and suitability for being planted in a flood zone. As such, some of the recommended species do not naturally occur in the two vegetation communities identified on site.

Representative species include:

Trees	Shrubs/Small Trees
<ul style="list-style-type: none"> <li>• <i>Eucalyptus camaldulensis</i></li> <li>• <i>E. melliodora</i></li> <li>• <i>E. blakelyi</i></li> <li>• <i>E. populnea</i></li> <li>• <i>E. microcarpa</i></li> <li>• <i>E. crebra</i></li> <li>• <i>E. sideroxylon</i></li> <li>• <i>Angophora floribunda</i></li> <li>• <i>Casuarina cunninghamiana</i></li> <li>• <i>Casuarina cristata</i></li> </ul>	<ul style="list-style-type: none"> <li>• <i>Callistemon linearis</i></li> <li>• <i>C. viminalis</i></li> <li>• <i>C. brachyandrus</i></li> <li>• <i>C. sieberi</i></li> <li>• <i>Melaleuca bracteata</i></li> <li>• <i>Allocasuarina littoralis</i></li> <li>• <i>Acacia paradoxa</i></li> <li>• <i>Acacia cultriformis</i></li> <li>• <i>Acacia implexa</i></li> </ul>

### 5.3 Density and Planting Methods: (Deliverable ‘d’ and ‘e’ of Condition 10)

Appropriate site preparation is crucial for the long-term success of the vegetation buffer. Ideally, site preparation will begin 6-9 months prior to planting. Weeds must be controlled by spraying with Glyphosate, approximately 1.5-2m wide along each planting row. This will suitably control pasture grasses and weeds. All pesticides will be used in accordance with the *Pesticides Act 1999*, such that only registered pesticides are used based on label instructions that are designed to minimise impacts on surrounding land.

Additional weed control may be required for any woody weeds occurring in the planting area. Rows will be a minimum of 2m between centres and 1.5m from fences. Depending on local site and weather conditions, the site may need to be sprayed out twice before ripping.

Ripping will be done with a tractor, on two to three separate passes for each row, approximately 50 - 60cm deep. Ripping will only occur when the soil is dry, in order to avoid smearing, a detrimental potential outcome of ripping when the soil is too wet. After ripping, there will be a second flush of weeds, which will need to be controlled prior to planting.

Given the average temperature and rainfall patterns for Gunnedah, it is recommended that hardened hiko stock be planted out mid to late August. This will avoid the worst of the winter frosts and allow the plant roots to slightly establish before the heat of summer. All plants will be watered in at the time of planting. Follow up watering will occur approximately two weeks after planting.

Plants will be protected with a Corflute tree guard. Corflute guards are UV stabilised and have been shown to provide the optimal protection for young trees. Corflute guards create a microclimate around the immature plant, increasing the growth rate. Corflute guards will also protect from climatic extremes, browsing pests and spray drift from follow up weed control. Monitoring of the site will include assessments of both the integrity of the guards and the height of the plants. Guards will be removed before vegetative growth of the plant restricts their removal.

## 5.4 Monitoring and Inspection

Deliverables 'b' and 'c' of Condition 11.

A suitably qualified and preferably local contractor/organisation will be responsible for the management schedule. To ensure optimum survival, and in order to meet the obligations under Schedule 3, condition 10 of the consent, the site will be maintained for 3 years as detailed below. Dates provided for follow up inspections, including watering and weeding requirements, will be refined depending on seasonal conditions and recommendations based on visual inspections. All scheduled inspections will assess multiple conditions at the site, including plant and weed growth, subsurface moisture, plant losses and tree guard integrity as well as report on whether the buffer is progressing in line with expectations.

Seedlings will be monitored for 3 years with follow up watering and weed control carried out as necessary.

Trees will be monitored for mortality every 3 months during establishment with inspection. Any mortalities greater than 10%, or gaps greater than 5m will be replaced at each inspection to ensure the screening is fully established and serving its intended function.

A 12-month watering schedule must be maintained while the plants are establishing. Depending on local rainfall, this could require 6 – 12 visits. Additional watering in the second and third year may be necessary, depending on weather conditions and plant establishment.

A 12-month weed management program will include assessment of both woody weeds and pasture/grassy weeds occurring in and between the planting rows. Depending on local conditions and rainfall, weed control may be required on three separate visits post planting, roughly occurring during late spring, summer and autumn. Additional weed control in the second and third year may be necessary, depending on weather conditions and weed growth.

A monitoring report on the progress of the landscaping screen establishment shall be provided to Gunnedah Shire Council at 6 month intervals during the first 3 years. This report will detail mortality rates and replacement plantings undertaken to address any planting losses during this period.

If there are any remaining gaps in the landscape screening at the end of the 3 year establishment period, temporary screening measures will be implemented until these gaps can be addressed with additional plantings and remain in place until these plantings have reached sufficient maturity. Any temporary measures shall be determined in consultation with Gunnedah Shire Council.

## 5.5 Evaluation

The key performance criteria with respect to the buffer's screening effectiveness and proper maintenance are listed within Condition 10. Notably this is **deliverable 'd' and 'e'**:

It is against these two key deliverables that the screen will be evaluated at each of the site inspection and maintenance visits.

1. Is growth on par as to what would be expected since planting? (describe growth and describe any issues)
2. Will the growth be effective at screening views of the solar panels? (describe)

3. Given current levels of growth, is the vegetative buffer growth expected to be effective at screening views of the solar panels within 3 years of the commencement of construction?
4. Is additional landscape screening required to meet Condition 10 'c' and 'd'?
5. What is the current condition of the site regarding weed growth? (describe and recommend actions)

## 5.6 Post Establishment Monitoring and Management

The following ongoing monitoring and management measures shall be implemented after the 3 year landscape screen establishment period.

- More than 10% of mortality in the Landscape Screen will be replanted with a selection of the same species and then managed and monitored as per Section 6.1 above.
- Every 6 months the Landscape Screen will be checked for weed levels and appropriate weed management measures implemented as required.
- During periods of drought the Landscape Screen will be inspected on a 6 monthly basis to determine if additional watering is required to ensure their survival.

# 6 General Landscaping Management & Maintenance

## 6.1 Management and Maintenance Requirements

Condition 13 of the DA includes the following deliverables for ongoing management of maintenance of landscaping across the site:

- (a) restore the ground cover of the site as soon as practicable;
- (b) maintain the ground cover with appropriate perennial species; and
- (c) manage weeds within this groundcover

## 6.2 Site description

Section 2.2.2 of the **Land Management Plan** prepared by Pitt & Sherry and provided an Appendix D for reference describes the existing site as follows:

“The Site and surrounding land is cleared agricultural land which has historically been used for grazing agriculture and is currently used for cropping agriculture. It is located on a floodplain and as such has a very flat topography. Highpoints in the area include the Kelvin Hills located 1.9km to the north of the Site and nearby water courses include the Namoi River which is located approximately 900m south of the Site with no other defined water courses in the general locality.

The vegetation and soils of the Site have been significantly disturbed by construction of roads, farming activities (landform changes), and construction of rural infrastructure including residential dwellings, sheds and silos.

The Site is largely devoid of native vegetation with only small, isolated stands of remnant vegetation.

Target weeds recorded in the vicinity include African Boxthorn (*Lycium ferocissimum*) which has already been identified on the site under current agricultural conditions and is subject to ongoing treatment to remove it from the site.

A total of 2 native vegetation communities were recorded on the Site, these being:

1. River Red Gum (*Eucalyptus camaldulensis*) – Yellow Box (*Eucalyptus melliodora*) Dry Sclerophyll Woodland/Open Woodland; and
2. Bimble Box (*Eucalyptus populnea* subsp. *bimbil*) Dry Sclerophyll Open Woodland.”

The following measures are based purely on information contained in the provided reports and will be taken as general recommendations only.

### 6.3 Retention of Existing Vegetation

The Native Vegetation Areas shown on the General Layout of Development Plan attached at Appendix A to this Plan shall be retained as part of the Development as follows:

- Protective barriers shall be erected during construction a minimum of 10 metres from the drip line of this vegetation so as to protect this vegetation or its roots systems from any access, damage or storage use during construction. These barriers shall remain in place until the completion of the construction process
- The requirement for the protection of this vegetation shall be included in site induction and toolbox training sessions where relevant.
- Any stock grazing on the site shall be prevented from entering these protected remnant native vegetation areas.
- The requirement for ongoing protection of this vegetation shall form an obligation in the ongoing Operation and Maintenance Environmental Management Plan (OEMP) for the project.

### 6.4 Ground Stabilisation

To mitigate potential erosion and sediment runoff of the site, a mix of appropriate perennial pasture grasses and legumes will be sown into areas of soil disturbance.

The recommendations provided in Section 5.2.2 of the Land Management Plan (LMP) annexed at Appendix D will be followed regarding species and establishment of pasture. Critically, the following key outcomes will be achieved:

- Disturbed areas will be progressively stabilised with pasture throughout the construction process where it is likely the areas will not be further disturbed.

- As much of the existing ground cover (pasture grasses) beneath solar panels as possible throughout the construction process.

## 6.5 Grazing and Weed Control

Grazing with sheep can be considered for keeping grass under control, alternatively, a mix of mowing and slashing with a tractor can be utilised. If sheep are to be used, it will be necessary to exclude them from landscape screen planting areas and ensure access to water points.

Fuel loads in the 10 metre Asset Protection Zones (APZs) around the perimeter of the site and 20 metre APZ around the substation will be managed using the above techniques and in accordance with Section 5.2.3 of the Land Management Plan attached at Appendix D and any further requirements set out in the Fire Management & Emergency Response to be prepared in response to Schedule 3, Condition 29 of the Development Consent.

An inspection of the site for noxious weeds will be undertaken every 6 months. Any noxious weeds detected on-site will be managed using appropriate methods.

Where this requires the application of pesticides GSF will ensure:

- an appropriately accredited (ChemCert) local contractor is engaged
- a copy of the contractor's application treatment will be retained and filed by GSF

– this treatment record will detail the date, chemical applied and at what rates, weather conditions and the weed species sprayed.

All pesticides will be used in accordance with the *Pesticides Act 1999*, such that only registered pesticides are used based on label instructions that are designed to minimise impacts on surrounding land

Noxious weeds as identified by the Noxious Weeds Act 1993 will be notified to the relevant authority as required in accordance with the Act. If weeds are becoming an issue, advice will be sought from DPIE or local agronomists for the best strategies. Regular monitoring will be required as proposed, as weeds are more easily controlled when they first germinate.

Ongoing requirements for maintenance of the pasture across the site in accordance with the Land Management Plan at Appendix D will also be included in the Operations and Maintenance Environmental Management Plan (OEMP) for the project following the 3 year establishment period.

## 7 Consultation

This plan has been developed in consultation with Gunnedah Shire Council required by Schedule 3 Condition 10. Evidence of this consultation is attached at Appendix C for reference.

## 8 Extension of Vegetation Buffer

Schedule 3 Condition 12 of the Development Consent makes provision for a nearby residence to the development (residence VP1) to make a request for the vegetation buffer to be extended should it not be adequately minimising the visual impactors of the development as follows:

*Within 3 years of the commencement of operations, the owner of residence VP1 may request the Applicant to extend the vegetation buffer on Lot 2 of the site (see condition 10 above and Appendix 5) to minimise the visual impacts of the development on the residence.*

*Within 3 months of receiving such a request in writing from the owner, the Applicant must:*

*(a) update the approved Landscaping Plan for the development in consultation with the owner;*

*(b) ensure the updated plan:*

- *clearly identifies the extended vegetation buffer;*
- *describes the measures that would be implemented to ensure the extended vegetation buffer meets the objectives in condition 10 (b), (c) and (e);*
- *includes a program for the implementation of the extended vegetation buffer; and*

*(c) submit the updated plan to the Secretary for approval.*

*Following the Secretary's approval, the Applicant must implement the updated Landscaping Plan. Note: To identify the location of residence VP1, see the figure in Appendix 1.*

The location of residence VP1 is shown in General Layout of Development Plan which forms Appendix 1 to the Development Consent (SSD 8658) attached at Appendix A to this Plan.

## 9 Updates to the Plan

Schedule 4, Condition 2 of the Development Consent sets out the requirements for updating any strategy when before undertaking any upgrade or decommissioning works on the site as follows:

The Applicant must:

(a) update the strategies, plans or programs required under this consent to the satisfaction of the Secretary prior to carrying out any upgrading or decommissioning activities on site; and

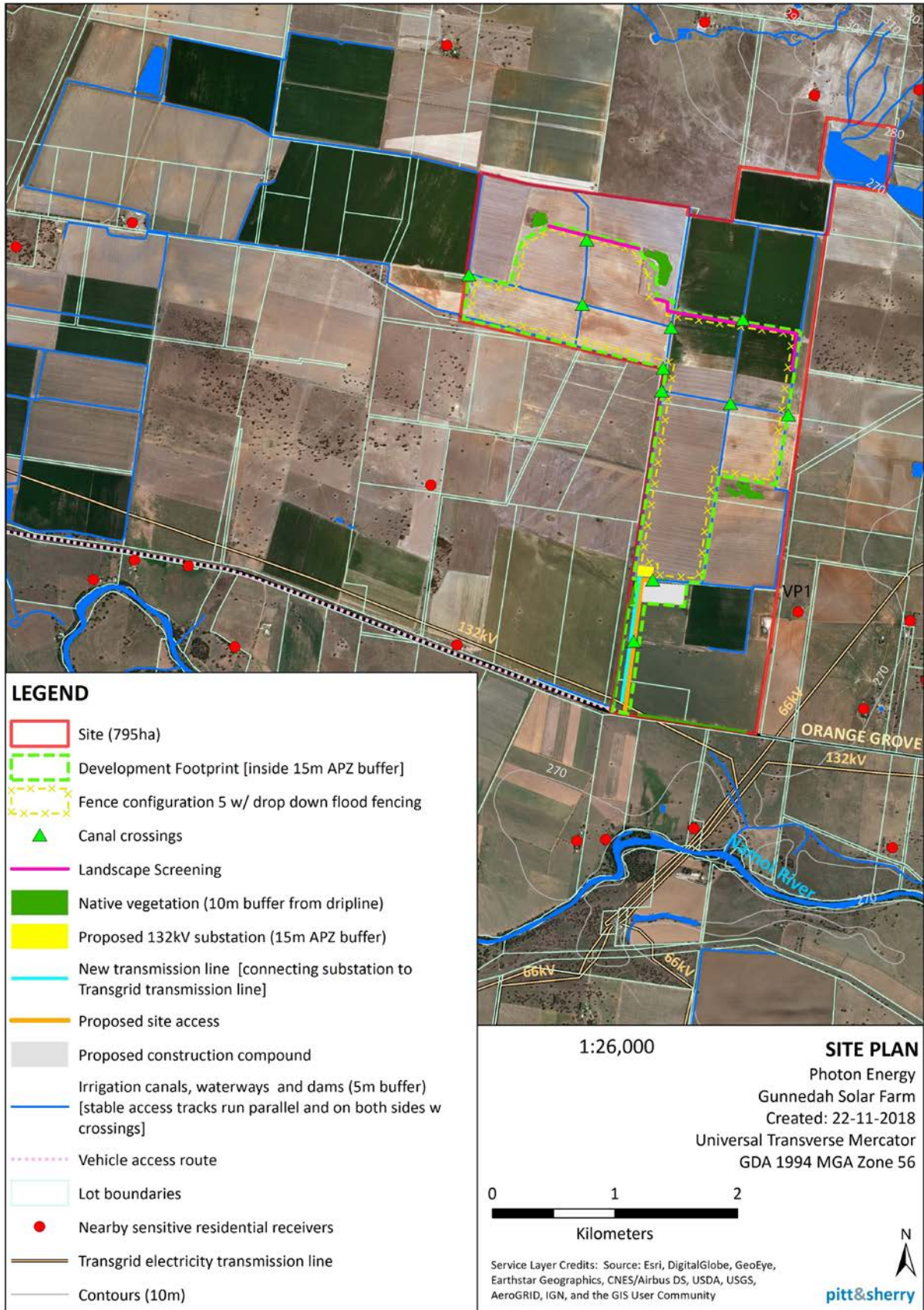
(b) review and, if necessary, revise the strategies, plans or programs required under this consent to the satisfaction of the Secretary within 1 month of the:

- submission of an incident report under condition 4 of Schedule 4;
- submission of an audit report under condition 7 of Schedule 4; or

- any modification to the conditions of this consent.

## Appendix A – General Layout of Development Plan (SSD 8658)




# APPENDIX 1: GENERAL LAYOUT OF DEVELOPMENT



## Appendix B – Landscaping Location Plan

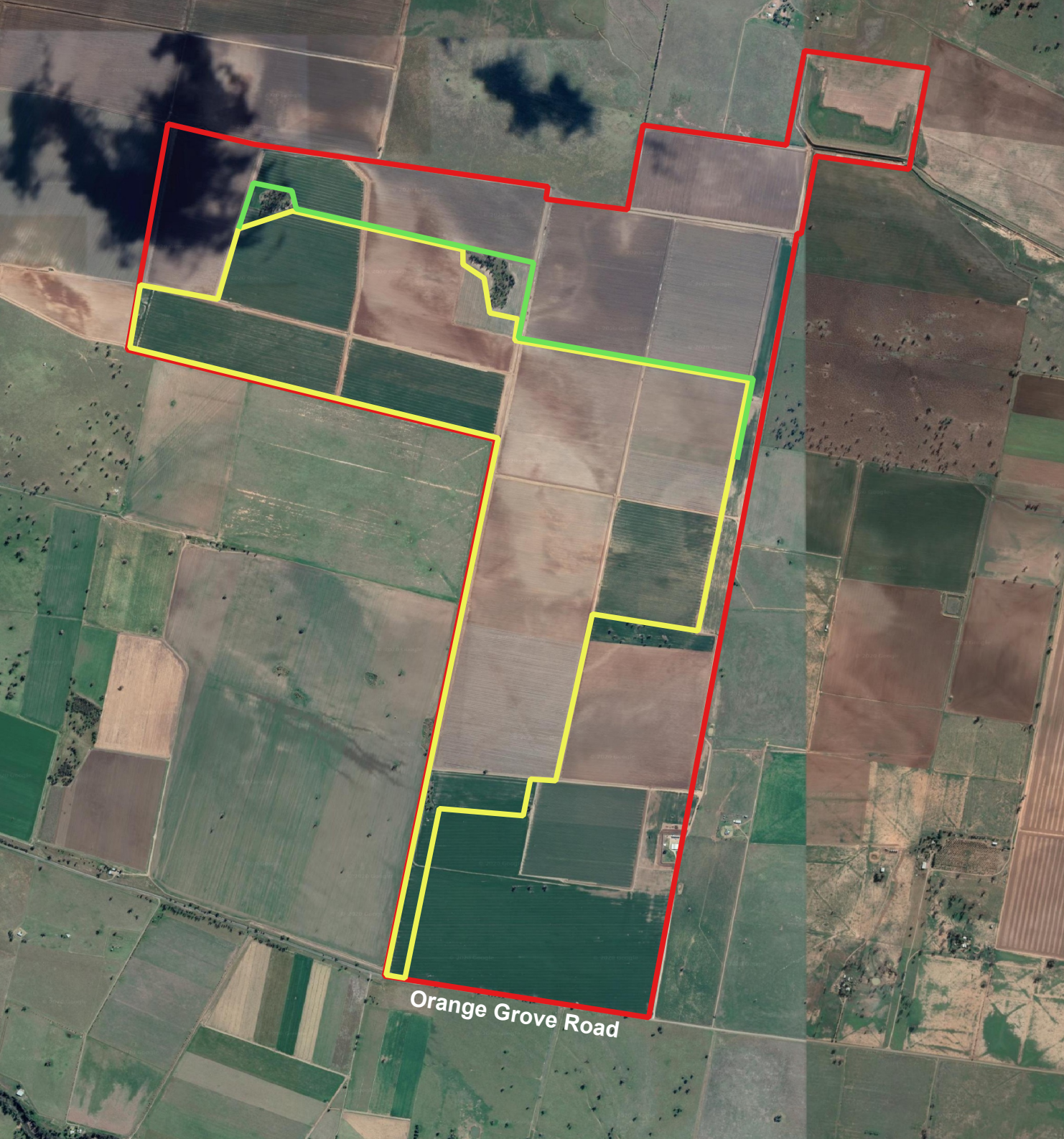
# Gunnedah Solar Farm

## Landscaping Location Plan

-  Landscape Screening
-  Development Footprint
-  Site Boundary

Google Earth

0 250 500 m



Orange Grove Road

## Appendix C – Consultation with Gunnedah Shire Council

**Subject:** RE: Gunnedah Solar Farm - Landscaping Plan - Council Consultation  
**Date:** Friday, 3 April 2020 at 3:48:49 pm Australian Eastern Daylight Time  
**From:** Hudson - Wade  
**To:** Shane Melotte  
**Attachments:** image006.jpg, image007.jpg, image008.jpg, image009.jpg, image010.jpg, image011.jpg, image012.png, image013.jpg, GSF Landscaping Plan Gunnedah Solar Farm\_V8\_02042020.docx

Hi Shane,

I have reviewed the latest version of the provided Landscaping Plan and note that the suggestion by Council have been considered and incorporated into this plan. Council is satisfied that if complied with, the attached plan will satisfy the provision of Schedule 3 Conditions 10 and 11.

Kind Regards



**Wade Hudson Senior Development Officer**

**Gunnedah Shire Council**

**T** +61 2 6740 2100 **E** [wadehudson@infogunnedah.com.au](mailto:wadehudson@infogunnedah.com.au)

PO Box 63 (63 Elgin Street), GUNNEDAH NSW 2380  
[www.gunnedah.nsw.gov.au](http://www.gunnedah.nsw.gov.au) or [www.facebook.com/gunnedahshire](https://www.facebook.com/gunnedahshire)

I acknowledge the Kamilaroi Aboriginal Nation as the traditional custodians of the land on which I live, work and play. I pay my respect to Elders past and present.



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**From:** Shane Melotte [mailto:shane.melotte@energyforms.com.au]  
**Sent:** Thursday, 2 April 2020 3:40 PM  
**To:** Hudson - Wade  
**Cc:** Benjamin Cushnie  
**Subject:** Re: Gunnedah Solar Farm - Landscaping Plan - Council Consultation

Hi Wade,

Thank you for your time on the phone just now.

Please find attached the updated landscaping plan (Version 8) which I believe now meets all of your

requirements including a review at the end of the 3 years period and temporary measures to be implemented to address any gaps in the screening whilst these gaps are addressed with additional planting. As noted the other monitoring measures should ensure that chances of any gaps remaining after 3 years are low.

If you could respond to this email at your nearest convenience that would be greatly appreciated and don't hesitate to contact me anytime in the interim if you would like discuss.

Many Thanks,

Shane

---

**From:** Shane Melotte <[shane.melotte@energyforms.com.au](mailto:shane.melotte@energyforms.com.au)>  
**Date:** Thursday, 2 April 2020 at 11:40 am  
**To:** Hudson - Wade <[wadehudson@infogunnedah.com.au](mailto:wadehudson@infogunnedah.com.au)>  
**Cc:** Benjamin Cushnie <[BCushnie@pcl.com](mailto:BCushnie@pcl.com)>  
**Subject:** Re: Gunnedah Solar Farm - Landscaping Plan - Council Consultation

Hi Wade,

Further to this email we have made a further addition to the monitoring section to provide Council with comfort the landscape screen will be maintained after the initial 3 year establishment period by adding the following requirement:

*"At the end of the 3 year period ongoing requirements for maintenance of the landscape screen will be included in the Operations and Maintenance Plan for the project. These requirements will be developed in consultation with Gunnedah Shire Council to ensure the screen is meeting its intended objectives."*

Hopefully this will further assist in addressing your requirements. Please contact me if you have any questions.

The updated version of the plan is attached for your reference.

Cheers,

Shane

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**From:** Shane Melotte <[shane.melotte@energyforms.com.au](mailto:shane.melotte@energyforms.com.au)>  
**Date:** Tuesday, 31 March 2020 at 3:26 pm  
**To:** Hudson - Wade <[wadehudson@infogunnedah.com.au](mailto:wadehudson@infogunnedah.com.au)>  
**Cc:** Benjamin Cushnie <[BCushnie@pcl.com](mailto:BCushnie@pcl.com)>

**Subject:** Re: Gunnedah Solar Farm - Landscaping Plan - Council Consultation

Hi Wade,

I thought it would be useful to provide some context ahead of speaking to you on the phone or perhaps you can just respond to this email if that's more convenient.

With regard to comment a) below I note that we are not proposing to plant any landscape screening in Orange Grove Road, just screening along the northern boundary as per my previous email.

With regard to comment b) I have spoken to the Armidale Tree Group who advised that the best solution to ensure the screening is established and serving its function would be to implement a monitoring program to ensure that seedlings that are inspected and lost ones replaced on a regular basis. The following wording has been added to the Monitoring and Inspection Section of the Landscaping Plan/

*“Trees should be monitored for mortality every 3 months during establishment. Any mortalities greater than 10%, or gaps greater than 2m should be replaced at each inspection to ensure the screening is fully established and serving its intended function.”*

*“A monitoring report on the progress of the landscaping establishment shall be provided to Gunnedah Shire Council in conjunction with a site visit from a representative from Council every 6 months during the first 3 years“*

We believe these additions to the wording will provide the necessary safeguard for Council that the landscape screening will be fully established during the first 3 years and provide Council with updates about its progress to ensure appropriate measures.

Im happy to discuss anytime.

Best Regards,

Shane

---

**From:** Hudson - Wade <[wadehudson@infogunnedah.com.au](mailto:wadehudson@infogunnedah.com.au)>

**Date:** Friday, 27 March 2020 at 12:46 pm

**To:** Shane Melotte <[shane.melotte@energyforms.com.au](mailto:shane.melotte@energyforms.com.au)>

**Subject:** RE: Gunnedah Solar Farm - Landscaping Plan - Council Consultation

Hi Shane,

Thank you for providing the amended landscaping site plan. This plan was much clearer and easy to identify the locations that landscaping will be conducted.

In response to the provided plan Council makes the following comments.

1. Schedule 3, Condition 10(b), requires that a vegetation buffer be contained in Lot 2 of the Site. Currently the plans indicate use of vegetation along Orange Grove Road road corridor. Council suggest that all required vegetation barriers be contained within the site, wherever it is determined to be necessary to position vegetation to reduce visual impacts to comply with this condition, including around substation infrastructure.
2. Schedule 3, Condition 11(b) requires that monitor and reporting programs be prepared to ensure that the landscaping in Condition 10 be achieved.  
As landscaping barriers should be established and effective by 3 years, Council has suggested, in previous correspondence dated 16 March 2020 (attached), that this plan include what measures will be implemented after 3 years if it is determined that the screening is ineffective. This will ensure that the obligations of landscaping screens are satisfactory after a 3 year period. The planting of more non-mature vegetation to fill gaps in screening at the 3 year period will not satisfy Condition 10, as this planting would not be immediately established and would take longer to establish.  
It is recommended by Council that other measures be recorded in this plan, to measures effectiveness, in the event the screen is not suitably established by year 3. Alternate temporary screen will give any other form of screening to establish to ensure that landscaping screens are effective from 3 years of construction. Satisfying Schedule 3, Condition 10.

If you have any questions regarding he contents of this email or the matters of this correspondence please call me on 67402100

Kind Regards



**Wade Hudson Senior Development Officer**

**Gunnedah Shire Council**

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I acknowledge the Kamilaroi Aboriginal Nation as the traditional custodians of the land on which I live, work and play. I pay my respect to Elders past and present.

---

**From:** Shane Melotte [<mailto:shane.melotte@energyforms.com.au>]  
**Sent:** Monday, 23 March 2020 2:01 PM  
**To:** Hudson - Wade  
**Subject:** Re: Gunnedah Solar Farm - Landscaping Plan - Council Consultation

Hi Wade,

Please find attached an updated Landscaping Plan which addresses your comments in the document and I have also updated the plan to make the location of the planting clearer.

As discussed the location of the landscaping was considered to be adequate by the Independent Planning Commission (after careful consideration of all sensitive receivers and site visits by the commissioners). On this basis we believe the location of the screening adequately protects the amenity of the sensitive receivers in the area and meets the requirements of the Development Consent. In addition I note that we have nominated 6 rows of plantings for the screening which will provide a robust level of screening once

fully established.

Hopefully the updated location plan makes things much clearer. If you could confirm Councils position on the updated Plan at your nearest convenience that would be greatly appreciated.

Please contact me anytime if you have any questions.

Best Regards,

Shane

Shane Melotte

Director

M: +61 429 778 080

E: [shane.melotte@energyforms.com.au](mailto:shane.melotte@energyforms.com.au)

W: *\*Suspicious\**

A: 8/91 William Street, Melbourne VIC 3000

---

**From:** Hudson - Wade <[wadehudson@infogunnedah.com.au](mailto:wadehudson@infogunnedah.com.au)>

**Date:** Monday, 16 March 2020 at 12:49 pm

**To:** Shane Melotte <[shane.melotte@energyforms.com.au](mailto:shane.melotte@energyforms.com.au)>

**Subject:** RE: Gunnedah Solar Farm - Landscaping Plan - Council Consultation

Hi Shane,

Please find attached comments on the landscaping plan submitted to Council for review for the Solar Farm at Orange Grove Road.

I do note that the submitted plan is quite hard to discern the location of existing vegetation and proposed vegetation. I note that there does not appear to be adequate landscaping along the East and West property boundaries. Landscaping is only identified on the Northern side of the site, which does not offer any screening of the infrastructure (substation) or solar arrays and would not adequately screen the development from the nearby receptors. It is suggested that a more detailed and legible landscaping plan be prepared that illustrates the location of infrastructure and the location of all landscaping barriers.

**Kind Regards**



**Wade Hudson Senior Development Officer**

**Gunnedah Shire Council**

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---

**From:** Shane Melotte [<mailto:shane.melotte@energyforms.com.au>]  
**Sent:** Thursday, 12 March 2020 3:30 PM  
**To:** Hudson - Wade  
**Cc:** Benjamin Cushnie  
**Subject:** Gunnedah Solar Farm - Landscaping Plan - Council Consultation

Hi Wade,

I hope this email finds you well.

I am getting in contact regarding the Landscaping Plan for the Gunnedah Sola Farm.

Schedule 2, Condition 11 of the Development Consent for the project (SSD 8658) requires the preparation of landscaping plan for the project in consultation with Council and to the satisfactory of the Secretary.

To this end please find attached a draft copy of the plan for your reference. Appendix A to this plan is a copy of the Development Consent for reference.

If you would like to discuss any aspect of this plan please do not hesitate to contact me on 0429778080 anytime.

If it is possible to provide councils response on this matter at your nearest convenience that would be greatly appreciated.

Best Regards,

Shane

Shane Melotte  
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## Appendix D Landscape Management Plan (Pitt & Sherry)

# Land Management Plan Gunnedah Solar Farm



**Prepared for:**

Gunnedah Solar Farm Pty Ltd.

**Client representative:**

Robert Ibrahim


**Date:**


9 April 2018

Rev 01

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Prepared by: .....   
 David Pritchard Date: 9 April 2018

Reviewed by: .....   
 Jessica Berry Date: 9 April 2018

Authorised by: .....   
 Malinda Facey Date: 9 April 2018

Revision History					
Rev No.	Description	Prepared by	Reviewed by	Authorised by	Date
00	Draft to client	D. Pritchard	J. Berry	M. Facey	22/03/2018
01	Final to client	D. Pritchard	J. Berry	M. Facey	03/04/2018
01	Minor amendments to Final	D. Pritchard	J. Berry	M. Facey	09/04/2018

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## 1. Cover Note

*This Draft Land Management Plan (LMP) is a supporting document to the Gunnedah Solar Farm Environmental Impact Statement (EIS), 2018 and should be read in conjunction with the EIS and specialist reports provided as part of the EIS. The following EIS chapters and associated specialist reports have informed the preparation of this LMP to determine what constitutes appropriate environmental practices:*

- *Biodiversity (including Flora Impact Assessment Report and Fauna Impact Assessment)*
- *Bushfire Risk (including Bushfire Management Plan)*
- *Heritage (including Archaeological report)*
- *Soils, Geology and Contamination*
- *Surface water, Hydrology and Groundwater (Including Flood Impact Assessment).*

*This Draft LMP provides a framework for the preparation of a Final LMP for the Gunnedah Solar Farm pending approval of the Proposal and receipt of conditions of consent. The Draft LMP contains an indication of the minimum management measures proposed and the overarching methodology for management of land during operation as a Solar Farm. Additional information, management measures and standard reports/forms for monitoring are still to be included.*

*The Final LMP will form part of the Operational Environmental Management Plan (OEMP) prepared for the Gunnedah Solar Farm.*

*Further detail including site specific management measures, monitoring programs and reporting will be included in conjunction with development of the OEMP for the Gunnedah Solar Farm. It should be noted this plan only covers the operations of the Solar Farm.*

*Land management techniques during construction will be developed through the Construction Environmental Management Plan (CEMP).*

## 2. Introduction

### 2.1 Purpose

The primary function of the Gunnedah Solar Farm LMP is to develop a framework for the ongoing management of land, water and vegetation on the property. This requires documenting the existing conditions and use of the property, and providing a methodology for key land management activities such as the maintenance of groundcover vegetation and soil health.

Pursuant to the Minister's approval, this LMP must be submitted for the approval of the Director-General prior to the commencement of Operation of the project, or within such period as otherwise agreed by the Director General.

Operation of the Gunnedah Solar Farm, as defined under the Minister's Conditions of Approval (CoA) will be written in the conditions of approval, if the application is successful.

It should be noted the LMP will be revised if / after the Conditions of Approval from Department of Planning and Environment are obtained. The LMP will be appended to the Operational Environmental Management Plan (OEMP). All environmental management activities specified in this LMP (refer Section 5.2) must be undertaken in a manner that is fully compliant with the OEMP (to be developed following approval of the Proposal) and Health and Safety Management Plan for the Gunnedah Solar Farm.

### 2.2 The Proposal

The Gunnedah Solar Farm ("the Proposal") would comprise of the construction and operation of a solar farm with an upper capacity of 150 MW supplied to the National Electricity Market (NEM). The power generated would be transmitted via TransGrid overhead powerline to the existing Gunnedah substation.

The Proposed site is located at 765 Orange Grove Road, Gunnedah and the solar farm footprint is contained within parts of Lot 1 DP 1202625, Lot 153 DP 754954, Lot 264 DP 754954, Lot 2 DP 801762, Lot 151 DP 754954 and Lot 1 DP 186590 (the "Subject Land"). The Proposal is located within the Gunnedah Local Government Area (LGA) and is approximately 9km north-east from the Gunnedah town centre (Figure 1).

Construction of the Proposal is detailed within the EIS and subsequent Construction Environmental Management Plan (CEMP) to be prepared following approval of the Proposal.

Once operational, activities would include daily operations and maintenance for a period of 25 years including:

- Remote 24/7 on-line monitoring
- Scheduled visual inspections and general maintenance
- Repair and cleaning operations of the PV arrays (as required)
- Replacement of equipment and infrastructure (as required)
- Land management monitoring and activities including
  - Management of sheep
  - Maintenance of groundcover vegetation
  - Weed control
  - Erosion and Sediment control
  - Pest and vermin control.

The site will be monitored for site security including 24hr response should a security event occur.

Daily operations and maintenance by site staff would be undertaken during standard working hours of:

- Monday – Friday 7am to 6pm
- Saturday 8am to 1pm.

Emergency response, inspections and maintenance activities may be required to be undertaken out of hours or at night however these would be minimised where practicable.

During the operational phase of the proposal, it is anticipated there would be six to ten staff located onsite and in Sydney. Minimal operational plant and equipment will be required for operation of the facility including ad hoc maintenance vehicles (Utility Vehicle Mazda BT-50 or similar) and other equipment associated with the activities outlined above.

There would some occasions, such as during a major substation shutdown, that additional maintenance staff may be required on site. During operation of the solar farm, water would be required for stock watering and vegetation management which would be supplied from existing on-site dams and irrigation systems. Emergency firefighting water would be stored in a tank (approx. 50,000L) located adjacent to the maintenance storage containers.

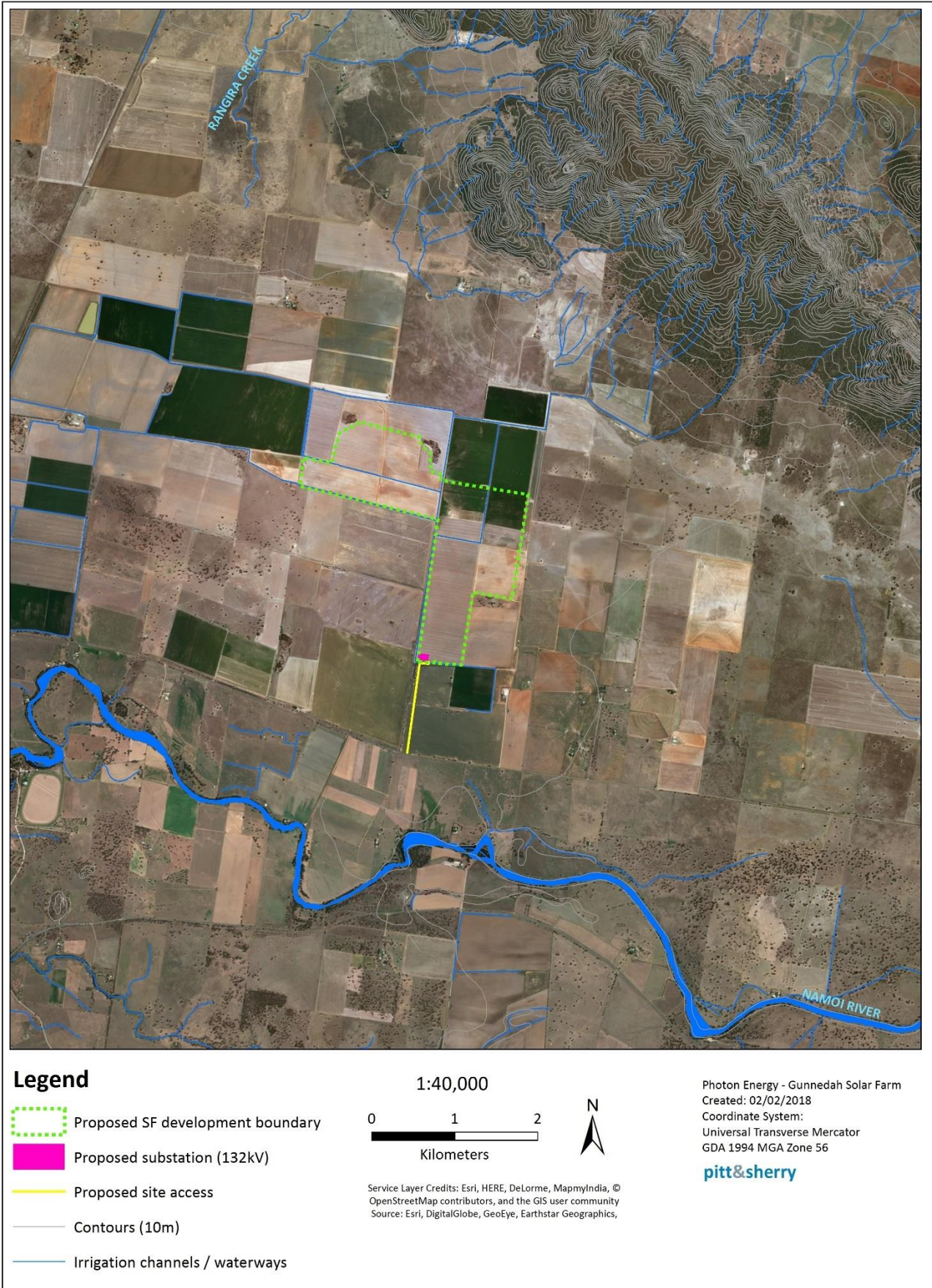


Figure 1 Proposed site layout of Gunnedah Solar farm

### 2.2.1 Existing Operations

The Subject Land is currently used for the production of agricultural crops, utilising both dryland and irrigation techniques. The property has been irrigated for over 10 years with a series of irrigation channels providing water to each paddock, where individual paddocks have been levelled to allow for the flow of water. The property is serviced by a network of access roads which are located along the edges of the irrigation channels and the outer perimeter of each cropping bay.

Dryland wheat and other cereal crops are grown on the property, along with irrigated cotton and chickpeas. Prior to the establishment of the property for irrigation, it was used for beef cattle grazing. To facilitate irrigation of the property bores have been established. Two large off stream water storages totalling 700 megalitres have also been constructed on the northern end of the property.

As stock are not currently located on the property, it is fenced around the external boundary with the only internal fencing being around the sheds and landowner's residence (currently under construction).

### 2.2.2 Existing Site Conditions

The Site and surrounding land is cleared agricultural land which has historically been used for grazing agriculture and is currently used for cropping agriculture. It is located on a floodplain and as such has a very flat topography. Highpoints in the area include the Kelvin Hills located 1.9km to the north of the Site and nearby water courses include the Namoi River which is located approximately 900m south of the Site with no other defined water courses in the general locality.

The vegetation and soils of the Site have been significantly disturbed by construction of roads, farming activities (landform changes), and construction of rural infrastructure including residential dwellings, sheds and silos.

#### Vegetation

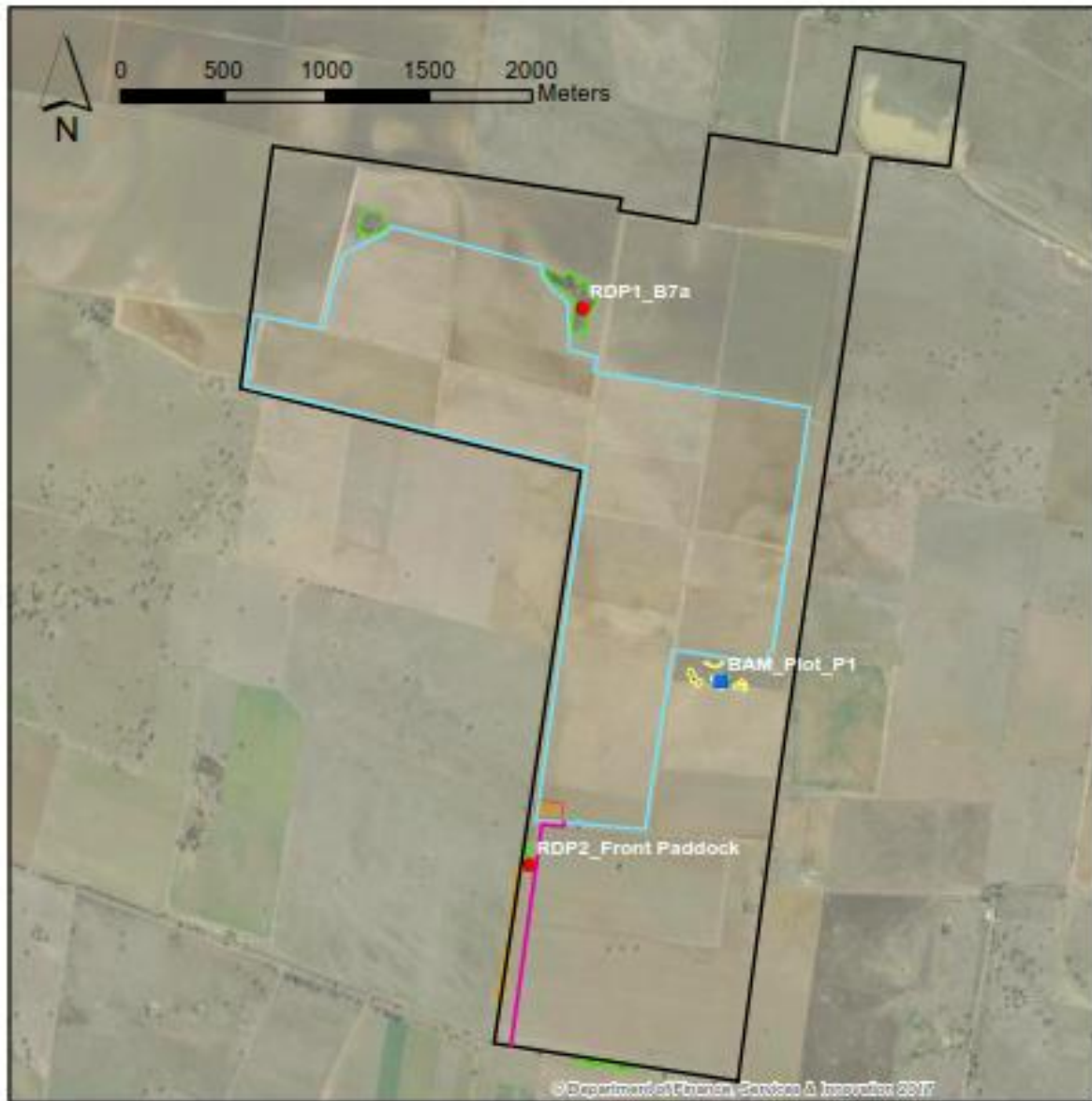
The Site is largely devoid of native vegetation with only small, isolated stands of remnant vegetation recorded as identified in Figure 2.

Target weeds recorded in the vicinity include African Boxthorn (*Lycium ferocissimum*) which has already been identified on the site under current agricultural conditions and is subject to ongoing treatment to remove it from the site.

A total of 2 native vegetation communities were recorded on the Site, these being:

1. River Red Gum (*Eucalyptus camaldulensis*) – Yellow Box (*Eucalyptus melliodora*) Dry Sclerophyll Woodland/Open Woodland; and
2. Bimble Box (*Eucalyptus populnea* subsp. *bimbil*) Dry Sclerophyll Open Woodland.

Further details on the occurrence, condition and structure of these communities is detailed in Appendix E of the EIS.



**Flora Survey Locations**

- BAM\_Plot
- Rapid\_Data\_Point (RDP)
- Site Access
- Solar Farm Boundary
- Gunnedah\_Site\_Boundary
- Substation

**Vegetation Community**

- Bimble Box Open Woodland
- River Red Gum Plantings
- River Red Gum-Yellow Box Woodland/Open Woodland

## Vegetation Map



Gunnedah Solar Farm Vegetation Map  
SY17291/12P/Flora/Gunnedah.gdb

Prepared By: Isaac Mamott  
9 Feb 2018

Figure 2 Vegetation Map - Existing Conditions

## *Soils*

The soils of the area are quite deep and relatively fertile at present, however, baseline testing from six test plots indicate that soil structure is being depleted most likely through the regular cultivation activities currently occurring on site.

Chemical analysis is showing that some of the soils are trending to being slightly acidic as shown by the pH and this can be easily rectified with the application of an ameliorant such as lime. The soil tests also show that the existing soils can be prone to hard setting when left unvegetated and this has implications for managing surface water runoff and reducing the incidence of sheet erosion.

See Appendix L of the EIS for further details including soil sampling results.

## *Weather*

To assist with establishment of improved pastures and management of the site generally, weather data has will be reviewed to determine suitable pasture species.

Generally in Gunnedah, January is the hottest month while July is the coldest. Median rainfall is summer dominant with the highest totals in December, and lowest in April. The long term median annual average rainfall is 620 mm.

The varying temperature and rainfall conditions in the area can have a significant impact on summer growing species. It is therefore very important that any pasture established would have a mix of both summer and winter growing species.

## 3. Land Management

### 3.1 Structure and Responsibility

The LMP will form part of the OEMP compiled to ensure ongoing environmental management during operation of the Gunnedah Solar Farm.

The carriage and use of this plan will be the responsibility of Gunnedah Solar Farm Pty Ltd. (GSF) and the onsite management representative, whether it be a GSF employee or contractor.

#### 3.1.1 Property Owner

The land required for the solar farm will be contained within part of: Lot 1 DP 186590; Lot 1 DP 1202625; Lot 153 DP 754954; Lot 264 DP 754954; Lot 2 DP 801762; and Lot 151 DP 754954.

The land is privately owned and would be subject to a lease agreement between Photon Energy AUS (which is a part owner of GSF) and the landowner.

#### 3.1.2 Lessee

The lessee of the proposed solar footprint would be Photon Energy AUS.

#### 3.1.3 Electricity Infrastructure Owner

TransGrid operates and manages a large portion of the major high voltage electricity transmission network in NSW and the ACT, connecting power generators, distributors and major end users.

Their core role is to connect electricity consumers to a safe, secure and reliable network through efficient maintenance and effective operation and management of electricity supply assets.

The Gunnedah Solar Farm will connect into the existing TransGrid 132 kV network which is located in close proximity to the site.

#### 3.1.4 Contractors

*Details of the contractor will be included when they are available.*

## 4. Approvals and Licensing

Compliance with all relevant approvals and licences will be addressed in the OEMP. Table 3 provides a list of the key legal instruments relevant to the requirements of the LMP.

Table 2 Legislation reference for requirements of the LMP

Legal Instrument	Reference to LMP
<i>Environmental Planning and Assessment Act 1979</i>	Compliance with Conditions of Approval
<i>Protection of the Environment Operations Act 1997</i>	No pollution of waters. Reporting environmental harm.
<i>Waste Avoidance and Resource Recovery Act 2001</i>	Appropriate disposal of waste to a lawful facility
<i>Noxious Weeds Act 1993</i>	Treatment of noxious weeds
<i>Rural Fires Act 1997</i>	Compliance with Rural Fire Service directives

### 4.1.1 Conditions of Approval

*Will be furnished once specific conditions have been assigned to project.*

### 4.1.2 Agreements

*Any agreements made with respect to land management will be detailed here.*

## 5. Implementation

### 5.1 Risk Assessment

Potential impacts on the environment from the Gunnedah Solar Farm have been identified through consideration of the operations to be undertaken on site. This includes risks identified in Chapter 6 of the Gunnedah Solar Farm EIS. Risks were identified by environmental specialists and stakeholders (neighbours, local community and government agencies) during the approvals process.

Potential impacts from some of these risks can be managed through the implementation of this LMP.

Potential risks identified from the operation of the Gunnedah Solar farm associated with Land Management practices and addressed by this LMP are outlined below:

- Change in land use from cropping to grazing and non- agricultural use of land. See Section 5.2.1
- Maintenance of adequate and suitable groundcover (e.g. pasture for grazing). See Section 5.2.2
- Management of fuel loads and potential for bushfires. See Section 5.2.3
- Weed and feral animal management. See Section 5.2.4
- Disturbance to soil and generation of dust. See Section 5.2.5.

*Other operational risks identified in the EIS would be addressed in the OEMP including incident response and management.*

### 5.2 Management Activities and Controls

This section of the LMP details the environmental management activities, mitigation and control measures that will be used to prevent or minimise environmental risks and impacts associated with management of the land.

#### 5.2.1 Grazing Management

##### **Objective**

*Grazing objectives to be determined including continuing agricultural use and vegetation management.*

##### **Grazing Management Plan**

*A grazing management plan will be developed in consultation with the landowner and included as part of this LMP prior to commencement of operation. Strategic internal electric fencing and watering points would also need to be established to assist with management of grazing live stock.*

*This would include details of the grazing regime (i.e. when sheep arrived, head numbers and when they were taken off the site) or the date of mechanical slashing and the location of the activity carried out.*

#### 5.2.2 Vegetation Management

##### **Objective**

Establish and maintain a minimum of 80% groundcover with minimal weed incursion over the Solar Farm footprint that does not create or increase a fuel hazard and minimises the potential for erosion and sediment laden runoff.

Management of vegetation on site will be undertaken to maintain groundcover rather than agricultural production. If the seasonal factors lead to a drop in vegetative cover, the need for fuel load reduction would not be needed and stock grazing would be managed accordingly.

A baseline of site conditions will be recorded prior to construction and again prior to operation as well as regularly throughout operation of the Proposal in accordance with Section 6. The following characteristics will be recorded:

- vegetation type
- groundcover type
- percent groundcover
- weed and noxious weed occurrence
- fire hazard
- feral animal presence.

### ***Establish and Maintain Groundcover***

Following disturbance from construction or other activities, improved grasses and legumes are to be established from the list of species outlined in Table 3 List of suitable groundcover species.

Pastures would be established to provide competition to reduce the potential for weed propagation. Well managed pasture is a cost-effective alternative to slashing and using herbicides for weed control management. Apart from the improved grasses suggested below, there would have been some useful native grass and legume species existing prior to them being cultivated out. Over time, some of these may recruit from seedbanks along roadsides and nearby forested areas.

All areas where the cells are to be erected have to be established with an improved perennial grass stand of summer and winter active species with a legume component for nitrogen supply. The native vegetation areas would be managed with grazing to control excessive vegetation growth and weeds. Ideally this would be maintained at a height of 10 to 15 cm high. These areas could also serve as a sacrifice paddock if conditions became dry to ensure the perennial pastures were maintained in the cell areas. If dry conditions persisted, then stock numbers would have to be reduced to ensure groundcover was maintained to prevent water and wind erosion over the site.

A list of pasture species is provided in Table 3, but some suggestions are grasses suited to a 600-mm rainfall zone with a summer dominance. Suitable grasses are cocksfoot, fescue, phalaris and yellow seeded Yanninicum and Brachycalycinum type sub clovers suited to heavier self-mulching soils and white clover. Suitable lucerne species could be sown in the pasture mix.

Summer growing species to be considered in the mix would be Bambatsi panic grass, Bluegrass and Rhodes grass. The exact pasture species and sowing rates change periodically so up to date advice could be obtained from the local DPI or local agronomists.

When establishing pasture observe many of the common recommendations such as:

- killing out all existing plants and weeds before sowing,
- application of appropriate fertilisers or ameliorants such as lime determined from the soil tests,
- Sow into a warm soil >12 degrees Celsius,
- Sow seed into a firm seed bed no deeper than 15 mm
- Insects controlled and monitored
- Apply nitrogen fertiliser 2 to 3 times in the first six months

- Weeds are monitored and sprayed early if identified
- No grazing until the plants are firmly rooted and higher than 15 cm.
- Avoid a first grazing in wet paddocks to prevent puffing and destroying young plants.

There are seed treatments available from seed companies such SowEast KickStart which has appropriate legume inoculation with a polymer insecticide which enhances the emergence of pastures.

**Table 3 List of suitable groundcover species**

Temperate Species	Grass	Temperate Species	Legume	Tropical Grass Species	Tropical Legume Species
<ul style="list-style-type: none"> <li>• Phalaris (Phalaris aquatica)</li> <li>• Cocksfoot (Dactylis glomerata)</li> <li>• Fescue (Festuca arundinacea)</li> </ul>		<ul style="list-style-type: none"> <li>• Lucerne (Medicago sativa)</li> <li>• Snail medic (Medicago scutellata)</li> <li>• Barrel medic (Medicago truncatula)</li> <li>• Sub clover (Trifolium subterraneum)</li> <li>• Rose clover (Trifolium hirtum)</li> <li>• Serradella (Ornithopus spp.)</li> <li>• Biserrula (Biserrula pelecinus)</li> <li>• Disc/Strand hybrid medic (Medicago tornata/ littoralis)</li> <li>• Gland clover (Trifolium glanduferum)</li> <li>• Sulla (Hedysarum coronarium)</li> <li>• Purple clover (Trifolium purpureum)</li> </ul>		<ul style="list-style-type: none"> <li>• Panic (Panicum spp.)</li> <li>• Setaria (Setaria incrassata)</li> <li>• Rhodes (Chloris gayana)</li> <li>• Digit (Digitaria eriantha)</li> <li>• Buffel (Cenchrus ciliaris)</li> <li>• Bluegrass (Bothriochloa spp.)</li> </ul>	<ul style="list-style-type: none"> <li>• Annual lablab (Lablab purpureum)</li> <li>• Perennial lablab (Lablab purpureum)</li> <li>• Atro siratro (Macroptilium atropurpureum)</li> <li>• Burgundy bean (Macroptilium bracteatum)</li> <li>• Cowpea (Vigna unguiculata)</li> <li>• Butterfly pea (Clitoria ternata)</li> <li>• Desmanthus (Desmanthus virgatus)</li> </ul>

Management of grazing will focus on ensuring 80% groundcover in accordance with Section 5.2.1 including adapting the frequency, duration and intensity of grazing, and the timing of any mechanical slashing, to suit the prevailing seasonal conditions.

## Monitoring

The following will be regularly monitored by the Site Manager in accordance with a Vegetation Monitoring Form (to be prepared):

- The health and overall percentage of ground cover across the entire site will be monitored regularly and monitoring would be an ongoing activity and duty of personnel working on the Solar Farm
- Regular inspection across the site following intense rainfall events to check that drainage is stable and localised scouring hot-spots are not appearing
- Maintain buffers from existing vegetation surrounding the Site during operational activities.

With good grazing management to maintain 70% groundcover and pasture growth at around 10 cm, the issues of bare ground and hard setting topsoil should not be an issue. The monitoring will be based on assessing ground cover and height within the grazing rotation. The issues of hard setting topsoil will be significantly reduced with groundcover and the return of organic matter for improving soil organic matter. Additionally, there may be some self-mulching at the soil surface over time.

If groundcover gets below 50% in the cell area all stock should be removed and placed on the native grass paddocks as sacrifice areas. In fact, as the native grass areas will need grazing over time to control vegetation height they can be included in the grazing rotation plan. If all areas have groundcover less than 50% then all stock will have to be removed from the solar farm area to another area of the farm or be moved to another property.

## Records

When vegetation management procedures are undertaken the Site Manager would record details of the activity undertaken.

Indicators of groundcover conditions in these inspections would include:

- Percentage ground cover and fuel load
- Presence of noxious weeds
- Vegetation health
- Areas devoid of groundcover
- Signs of localised erosion.

These parameters are listed on a Schedule which will form part of the ongoing monitoring program and record keeping for the operation which are listed in Section 5.5.

## 5.2.3 Bushfire Management

### Objective

Manage and maintain the Gunnedah Solar Farm to reduce the risk of a fire originating from the Site, and/or ensure the Site does not intensify an approaching bushfire due to excessive fuel loads on the Site.

### Management Measures

- A minimum 15m wide mineral earth Asset Protection Zone (APZ), will be constructed and appropriately maintained around the perimeter of the Site as per Figure 3
- A permanent water tank for storing firefighting water is to be located on Site (50,000L) near the entrance to the Solar Farm. An indicative location is identified in Figure 3
- Fuel loads will be managed by grazing, slashing or mowing as detailed in Section 5.2.2

- No operational activities with the risk of grass fire ignitions will be undertaken on site while the Grassland Fire Danger Index (GFDI) is or forecast to be 35 or greater
- An Emergency Response Plan (ERP) will be prepared as part of the OEMP in accordance with the requirements outlined in Appendix K of the EIS
- Consultation with Gunnedah Local Emergency Management Committee shall be undertaken prior to the commencement of operation and ongoing as required
- Regular briefing shall be provided to local volunteer fire fighters and neighbouring farmers at pre-season fire meetings on safety issues and procedures associated with the Gunnedah Solar Farm.

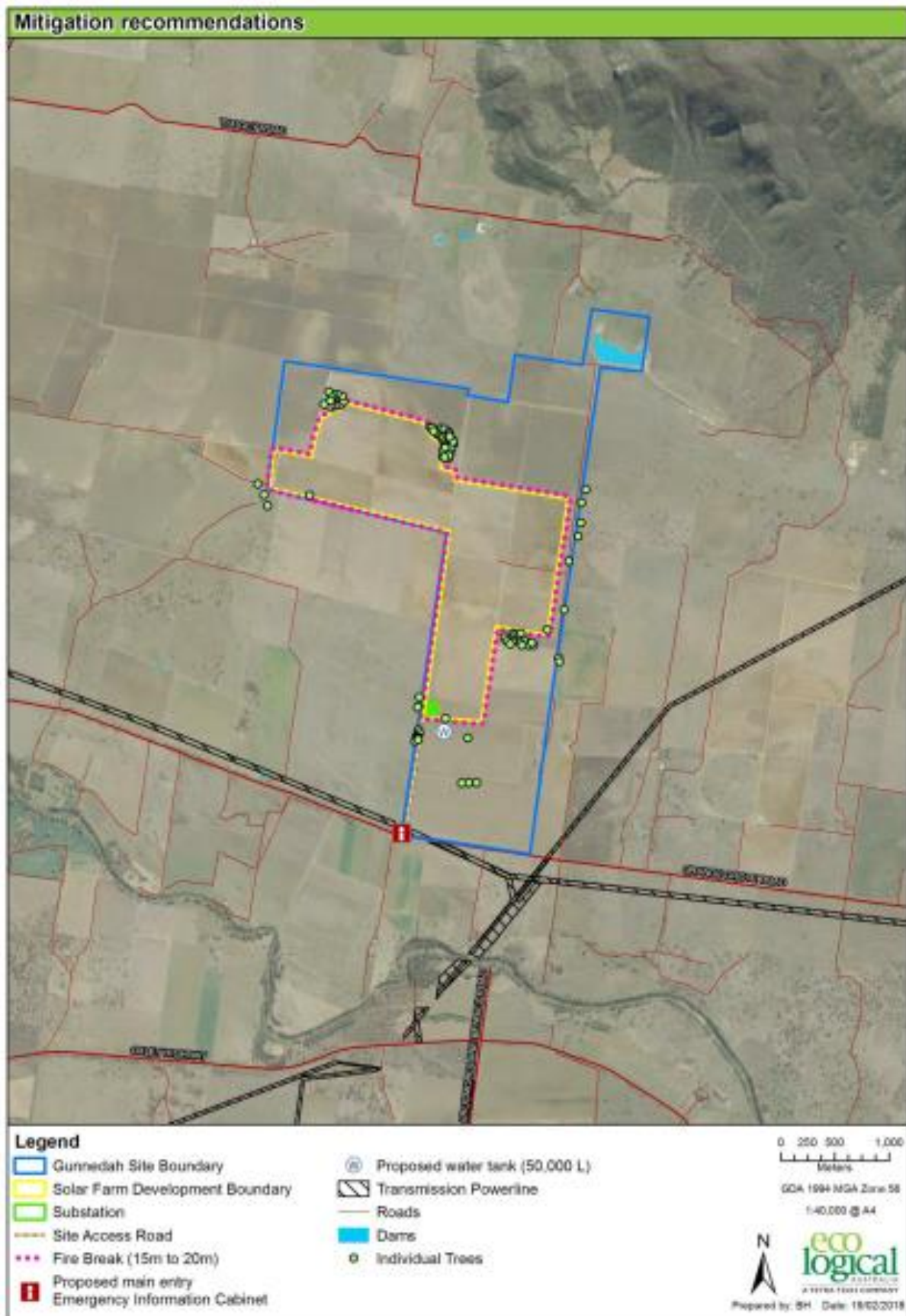


Figure 3 Bushfire Mitigation Measures

## 5.2.4 Weed and Feral Animal Management

### Objective

The objective of weed and feral animal management is to

- prevent the spread of noxious weeds and feral animals
- ensure the operation of the Gunnedah Solar farm complies with the *Noxious Weeds Act 1993*.

### Management Measures

Any noxious weed or feral animals detected on-site will be managed using appropriate methods.

Where this requires the application of pesticides GSF will ensure:

- an appropriately accredited (ChemCert) local contractor is engaged
- a copy of the contractor's application treatment will be retained and filed by GSF
  - this treatment record will detail the date, chemical applied and at what rates, weather conditions and the weed species sprayed.

Noxious weeds as identified by the Noxious Weeds Act 1993 will be notified to the relevant authority as required in accordance with the Act. If weeds are becoming an issue, advice will be sought from DPI or local agronomists of the best strategies. Regular monitoring will be required as proposed, as weeds are more easily controlled when they first germinate.

## 5.2.5 Soils Management

### Objective

*Soil management objectives to be determined following detailed design and receipt of the Conditions of Approval (CoA).*

### Management Measures

The following chemical and physical soil parameters will be recorded prior to construction and again prior to operation as well as regularly throughout operation of the Proposal in accordance with Section 6 including:

- pH
- N, P and S levels
- ECe / salinity
- Surface crusting
- Erosion – surface / rills/ gullies
- Contamination – spills.

The objectives of soil management on the Site is to minimise potential for impacts upon soil health including erosion and soil degradation. The intention to maintain a perennial ground cover suitable for grazing livestock will assist with having a positive impact on the soils at the Site. Possible benefits could include;

- increases in soil moisture
- an increase in soil carbon levels
- improvements to the soils structural integrity, and,
- an improvement in conditions for soil biota.

The proposed soil testing schedule will allow the introduction of required ameliorants prior to the establishment of groundcover, in addition to ongoing monitoring which will assist in maintenance of soil health and condition during the life span of the Solar farm. This program should assist in ensuring no loss of productive potential during the operation of the proposal.

Current soil conditions on site do not present any major physical or chemical constraints as the soils are:

- quite deep and relatively well drained
- generally, within the acceptable pH range
- non-saline
- moderate to highly erodible (K factors) however the overall erosion hazard is very low due to climate and landform factors.

During operation of the solar farm soil health may be impacted by:

- loss or deterioration of groundcover material
- surface crusting on areas devoid of vegetation
- increased surface runoff / sheet erosion if soils are allowed to become crusted
- compaction of soils along access thoroughfares
- loss of soil through wind erosion
- poor weed control
- poor stock management and overgrazing of pastures / groundcover.

As the Solar panels sit above the ground, vegetation will be maintained beneath and surrounding the panels (excluding internal access tracks). The objective is to maintain the current vegetation (or alternative grass cover sown) which will minimise the erosion hazard.

The site is susceptible to westerly winds which can be problematic for wind erosion and the soils are high in silt with a reasonable clay content (21 - 39%), which would powder very readily if disturbed vehicle use or heavy machinery during operational and maintenance activities thus exposing the soils to wind erosion. Maintenance of ground cover during operation of the Solar Farm will reduce the potential for wind erosion however it may still occur on internal access roads between the solar panels.

If soils are impacted by operational activities and left in a dry powdery condition, the potential risk of strong winds creating dust would be high. However, conventional dust management activities such as watering of soils using a water cart and application of synthetic dust suppressants, can be employed effectively to manage wind erosion and reduce dust as required.

If pH or soil fertility is identified as an issue during operation of the Solar farm the addition of ameliorants such as organic mulches and lime can assist in reducing alkalinity or acidity and fertility can be improved through targeted addition of nutrients and ameliorants.

## 6. Monitoring

To assist with the ongoing management of site conditions, a monitoring program will be implemented. This monitoring will include onsite and visual analysis along with annual laboratory testing for a suite of parameters. With regard to nutrient monitoring analysis of specific paddocks would be required as there is a wide variation within the baseline samples analysed. This would be due mainly to the range of paddocks being irrigated cropping through to native paddocks. Appropriate monitoring will require approximately 10 surface tests to determine precisely the nutrient and acidity levels for individual paddocks. This will provide a basis for fertiliser and ameliorant application if required for the individual cell areas to establish pastures. Once this is established the paddock monitoring could be reduced to once every two years rather than every year.

In the unimproved grass areas fertiliser, and ameliorant application should be much less than the improved areas. Advice on nutrient requirements can be obtained from the DPI or local agronomists once the vegetation composition is determined. The cost of soil testing could be reduced to only monitor pH and major nutrients as EC and organic matter will not significantly change in the short term and would require measurement every 5 years. Table 4 details the proposed regime and will be subject to change depending on ongoing analysis of results. This will be required as part of the OEMP.

Table 4- Frequency of soil testing requirements during the operation of the Gunnedah Solar farm.

Soil Parameter	On site / laboratory	Frequency
Bare patches / scalds	Onsite – visual	Monthly
Hard setting	Onsite - visual	Monthly
N, P, K, S	Laboratory	Annual
pH	Laboratory	Annual
ECe	Laboratory	Annual

To assist with the ongoing management of vegetation on site, a monitoring program will be implemented. This monitoring will include onsite and visual analysis along with laboratory testing should it be required. Table 5 details the proposed regime.

Table 5- Frequency of vegetation monitoring requirements during the operation of the Gunnedah Solar farm.

Vegetation Parameter	On site / laboratory	Frequency
Bare patches / scalds	Onsite – visual	Monthly
Vegetation condition	Onsite - visual	Monthly
% groundcover	Onsite - visual	Monthly
Weed species present	Onsite - visual	Monthly
Species composition	Onsite - visual	Annual

### 6.1 Reporting

A series of schedules will be available to document management actions for the site. These will include:

- Complaints register / record
- Grazing / stock management register
- Noxious Weed Treatment
- Soil testing.

These schedules to be used on-site would be developed and provided in the OEMP.

## 7. Remediation Plan

As has been documented in the Gunnedah Solar Farm EIS, the Solar Farm has a projected life span of 25 years. At this time, the infrastructure will be assessed and a decision will be made as to whether the Site will be refurbished to allow ongoing operation or to close and decommission the Site.

If the decision is made to decommission the Solar Farm, GSF have made a commitment to remove all above and below ground infrastructure and remediate the site to allow it to be returned to its original use and condition as agricultural land. At this time a specific Site Remediation Plan will be compiled to ensure the removal of material from the Site is done in a structured and appropriate manner in accordance with relevant approvals and permits, and in conjunction with all necessary works and processes to return the Site to its pre- development condition.

The specifics of the Remediation Plan will be established prior to decommissioning and in consultation with relevant stakeholders including the Shire of Gunnedah. The following aspects would be address in the plan:

- Remediation goals
- Discussion of the extent of remediation
- Discussion of possible remedial options and risk reduction
- Rationale for the selection of recommended remedial actions
- Proposed testing to validate the site after remediation
- Contingency plan if the selected remedial strategy fails
- Interim site management plan (before remediation), including
  - Fencing
  - erection of warning signs
  - stormwater diversion
- Site management plan (decommissioning phase) including:
  - Site stormwater management
  - Soil management
  - Noise control
  - Dust control
  - Vegetation management
  - Waste and Contaminated material management
  - Occupational health and safety plan
- Remediation schedule
- Hours of operation
- Contingency plans to respond to site incidents, to minimise potential impacts on the surrounding environment and community
- Identification of regulatory compliance requirements such as licences and approvals
- Names and phone numbers of appropriate personnel to contact during remediation
- Community Consultation
- Staged progress reporting, where appropriate

- Long-term site management plan.

## **8. Audit and Quality Management**

### **8.1 Review**

This management plan is to be reviewed at an agreed appropriate interval in conjunction with other relevant plans that are subject to review.

The review will include an assessment of the effectiveness of the established controls and their performance against the LMP's objectives. In addition, progressive amendments / updates will be made to this LMP as / if required.

### **8.2 Records**

All records associated with this LMP are to be retained by GSF.

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