BERYL SOLAR FARM

LANDSCAPING PLAN

PREPARED FOR:

DOWNER

PREPARED BY:

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Revision History

Version	Date	Reason	Approved
Draft (V1)	25 June 2018	DPE Review	Downer
Draft (V2)	25 July 2018	Inclusion of contingency watering plan as requested by OEH	Downer
Draft (V3)	6 August 18	Address DPE comments	Downer
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TABLE OF CONTENTS

INTRODUCTION 5

1.1 APPROVED PROJECT 5
1.2 APPLICANT 5
1.3 EPC CONTRACTOR 5
1.4 PLAN OBJECTIVE 6
1.5 PLAN SCOPE 6
1.6 PLAN STRATEGY 7
1.7 CONSULTATION 7
1.7.1 OFFICE OF ENVIRONMENT AND HERITAGE 7
1.7.2 MID-WESTERN REGIONAL COUNCIL 7

PLANTING COMPOSITION 8

2.1 SPECIES CRITERIA 8
2.2 SPECIES SELECTION 8

PLANTING LOCATIONS 10

3.1 SCREEN PLANTING LOCATIONS 10
3.2 SPACING DENSITY 10
3.3 ADDITIONAL PLANTING ROWS 10

PREPARATION AND PLANTING 12

4.1 INITIAL WEED SPRAY 12
4.2 BED PREPARATION 12
4.3 PLANTING 12

MAINTENANCE 13

5.1 OVERVIEW 13
5.2 INITIAL THREE YEARS 13
5.2.1 SCHEDULED INSPECTIONS 13
5.2.2 MORTALITY REPLACEMENT 13
5.2.3 SOIL TESTING 13
5.2.4 SUB SURFACE MOISTURE 14
5.2.5 WEED TREATMENT 14
5.2.6 PLANT GROWTH AND HEALTH 14
5.3 CONTINGENCY PLAN 14
5.4 ONGOING 14

MONITORING 15

6.1 REQUIREMENT 15
6.2 REPORTING 15
6.2.1 INTERNAL REPORTING 15
6.2.2 EXTERNAL REPORTING 15
6.3 AS-BUILT VERIFICATION 16

RESPONSIBILITIES 17

7.1 REQUIREMENT 17
7.2 RESPONSIBILITIES 17
7.2.1 DELINEATION 17
7.2.2 ROLES 17

TIMEFRAMES 18

8.1 REQUIREMENT 18
8.2 CONSIDERATIONS 18
8.2.1 THREE YEAR PERFORMANCE TARGET 18
8.2.2 LIFE OF THE PROJECT 18
8.3 MILESTONES/SCHEDULING 18

REFERENCES 19

TABLES

Table 2.1 – Landscape Species 9
Table 3.1 – Planting Locations 10
Table 4.1 – Responsibilities 17
Table 8.1 – Milestone Timeframes 18

FIGURES

Figure 1: Approved Layout 5
Figure 2: Indicative Planting Configuration 11

APPENDICES

APPENDIX A
Farm Layout and Landscaping

Abbreviations

APZ	Asset Protection Zone
BAR	Biodiversity Assessment Report
BOS	Biodiversity Offset Strategy
BSF	Beryl Solar Farm
CoA	Condition of Approval
DPE	Department of Planning and Environment
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
EPC	Engineering, Procurement and Construction
FSPL	First Solar Pty Ltd
MM	Mitigation Measure
MWRC	Mid Western Regional Council
OEH	Office of Environment and Heritage
OEMP	Operational Environmental Management Plan
PCT	Plant Community Type

Introduction

1.1 APPROVED PROJECT

The Beryl Solar Farm (BSF) was granted development consent on 5 December 2017 (SSD 8183).

The approved General Layout is shown below.

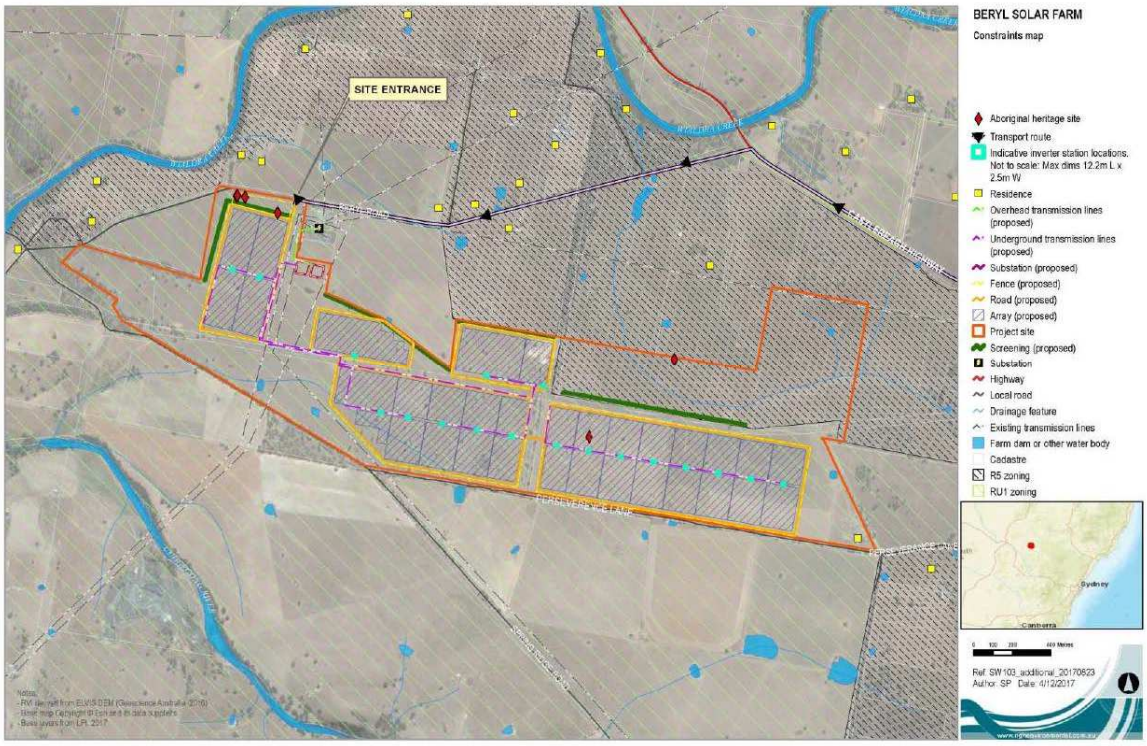

Figure 1: Approved Layout
Source: Development Consent SSD 8183

1.2 APPLICANT

First Solar Pty Ltd (FSPL) is the BSF Applicant.

1.3 EPC CONTRACTOR

Downer is the Engineering Procurement and Construction (EPC) contractor engaged by FSPL to build the BSF.

1.4 PLAN OBJECTIVE

The objective of this Landscaping Plan (LP) is to provide visual impact mitigation.

Schedule 3 Condition of Approval (CoA) 10 of the Minister's development consent states:

> ***Visual Impact Mitigation Measures***
>
> *10. The Applicant must establish and maintain a mature vegetation buffer around the site at the locations outlined in Appendix 1 [Note 1], to the satisfaction of the Secretary. These measures must:*
>
> *(a) be planted prior to commencement of operations [Note 2];*
>
> *(b) consist of vegetation species that facilitate the best possible outcome in terms of visual screening;*
>
> *(c) be effective at screening views of the solar panels and ancillary infrastructure on site from surrounding residences within 3 years of the commencement of construction [Note 3]; and*
>
> *(d) be properly maintained and kept free of weeds.*
>
> *Following the Secretary's approval, the Applicant must implement the Landscaping Plan.*

Note 1: Appendix 1 is the approved Development Layout, which is shown above in **Figure 1**.

Note 2: The definition of operation in the Minister's consent is: *The operation of the development, but does not include commissioning, trials of equipment or the use of temporary facilities.* The operation of the development in this LP is taken to mean when the BSF is generating electricity into the grid.

Note 3: The definition of construction in the Minister's consent is: *The construction of the development, including but not limited to the carrying out of any earthworks on site and the construction of solar panels and any ancillary infrastructure (but excludes any upgrades to the public road network and site entry required under this consent, installation of fencing, artefact survey, overhead line safety marking, geotechnical drilling and/or surveying.*

1.5 PLAN SCOPE

The scope of this LP is detailed in Schedule 3 CoA 11 of the Minister's consent.

> ***Landscaping Plan***
>
> *11. Prior to the commencement of construction, the Applicant must prepare a detailed Landscaping Plan for the planting within the vegetation buffer in consultation with OEH and Council, to the satisfaction of the Secretary. The plan must:*
>
> *(a) include a description of measures that would be implemented to ensure that the vegetated buffer achieves the objectives of Schedule 3 condition 10 (b) – (d) of this consent:*
>
> *(b) include a program to monitor and report on the effectiveness of these measures; and*
>
> *(c) include details of who would be responsible for monitoring, reviewing and implementing the plan, and timeframes for completion of actions.*
>
> *Following the Secretary's approval, the Applicant must implement the Landscaping Plan.*

1.6 PLAN STRATEGY

The strategy inherent in preparing this LP is that suitable species selection, optimal planting technique and timing, and appropriate maintenance, are the best measures to establish a vegetated buffer that will be effective at screening views of the solar panels and ancillary infrastructure on site from surrounding residences within 3 years of the commencement of construction.

1.7 CONSULTATION

CoA 11 states the LP must be prepared in consultation with Office of Environment and Heritage (OEH) and Mid Western Regional Council (MWRC), and to the satisfaction of the Secretary of the Department of Planning and Environment (DPE) (or nominee).

1.7.1 OFFICE OF ENVIRONMENT AND HERITAGE

OEH recommended a contingency plan be in place in the event that drought conditions persist during the plantings' establishment period.

1.7.2 MID-WESTERN REGIONAL COUNCIL

Mid-Western Regional Council noted the following as considerations relevant to this Landscaping Plan.

- Part of the landscaping area is located on land for which a sub-division was approved. MWRC noted that should individual titles be created, it would be considered necessary that an easement be created over this proposed lot for continued landscaping maintenance and that details of the same should be submitted with any Subdivision Certificate Application.
- MWRC encourages the continued community consultation with regard to visual impact mitigation measures.

Planting Composition

2.1 SPECIES CRITERIA

The composition of species to be planted to establish the vegetative buffer have been determined through several criteria. These include requirements within the development consent, being both specific Conditions of Approval (CoA) and commitments (Mitigation Measures) made by the Applicant in the *Environmental Impact Statement* (ngh, April 2017) and *Submissions Report* (ngh, July 2017) assessment documentation.

Consent Condition

The vegetative buffer must:

- consist of vegetation species that will facilitate the best possible outcome in terms of visual screening (CoA 10b); and
- be effective at screening views of the solar panels and ancillary infrastructure on site from surrounding residences within 3 years of the commencement of construction (CoA10c).

Mitigation Measure

As specified in the *Submissions Report*:

> *The aim of the screening is to soften the visual impact of the solar farm. A continuous, dense 'hedge' effect that blocks all views is not considered sympathetic with the existing landscape character. Native species, planted 1 - 2 rows deep in specific locations are intended to provide a resilient landscape treatment that would be maintained for the life of the project; all dead trees would be replaced.*

Further, the *Submission Report* notes:

> *Where possible, landscape plantings will be comprised of local indigenous species with the objective of increasing the diversity of the existing vegetation.*

2.2 SPECIES SELECTION

Table 2.1 provides a list of tree and shrub species that will be used to establish the vegetative screen.

These species are part of the Plant Community Type (PCT 281) *Rough-Barked Apple Red Gum Yellow Box woodland on alluvial clay to loam soils on valley flats in the NSW South Western Slopes and Brigalow Belt South Bioregions* identified in the locality.

The species selected are relatively fast growing and thus likely to provide screening within 3 years.

In using a selection of these species:

- the shrubs will provide screening (the *Acacia* should reach 3m within 3 years);
- the vegetative screening will be comprised of species representative of the communities endemic to locality; and
- the screening will comprise species that offer a diversity of growth characteristics (such as density and height at maturity) to avoid a continuous dense 'hedge' effect.

Table 2.1 – Landscape Species

Scientific Name	Common Name	Maximum Height (m)	Minimum Spacing (m)
Overstorey Species			
Eucalyptus floribunda	Rough-barked apple	30	6
Eucalyptus blakelyi	Blakely's Red Gum	20	6
Eucalyptus melliodora	Yellow Box	30	6
Callitris endlicheri	Black Cypress Pine	20	2-3
Callitris glaucophylla	White Cypress Pine	20	2-3
Midstorey Species			
Acacia decora	Western Silver Wattle	4	1
Acacia gladiiformis	Sword Wattle	3	1-2
Acacia implexa	Hickory Wattle	12	2-3
Acacia leiocalyx	Black Wattle	6	1-2
Acacia pennivervis var. pennivervis	Mountain Hickory	8	2-3
Acacia sertiformis	Curvy Leaved Wattle	2	1
Acacia ulicifolia	Prickly Moses	2	1
Acacia uncinata	Round-leaved wattle	2.5	1
Bursaria spinosa subsp. spinosa	Blackthorn	10	2-3
Cassinia quinquefaria	Wild Rosemary	3	1-2
Exocarpos cupressiformis	Cherry Ballart	8	2-3
Geijera parviflora	Wilga	10	2-3
Grevillea floribunda	Seven Dwarfs Grevillea	2	1-2
Notalaea macrocarpa var. microcarpa	Native Olive	10	2-3

Where possible tube stock of local provenance that is genetically adapted to the local environment will be sourced. If a particular species is not available at the time of planting a close approximate species will be chosen in replacement.

Planting Locations

3.1 SCREEN PLANTING LOCATIONS

The Minister's development consent specifies the location and extent of the landscape plantings to be undertaken. The location of these are identified in the Approved Layout (refer **Figure 1**).

Appendix A provides the Solar Farm Layout with the location of these screenings on a scaled drawing for clear identification.

The screen plantings are proposed in four areas and collectively will provide for 3.035 km of .vegetative screening.

Table 3.1 – Planting Locations

Screen Planting Area	Screen Planting Length (m)	Location
1	825	Inside the solar farm security fence, around the north west corner of the solar farm.
2	735	Inside the solar farm security fence, along the northern side of the solar farm
3	505	Inside the solar farm security fence, along the northern side of the solar farm
4	970	Outside the solar farm security fence, along the northern side of the solar farm at the eastern end.

3.2 SPACING DENSITY

The screening will comprise two (2) rows of plantings with variable densities designed, over time, to break up the view of the BSF infrastructure rather than hide it totally behind a 'hedge' screening. During the planning approvals process it was determined that a 'hedge' effect was not desirable in terms of landscape amenity values and that relatively sparse plantings designed to break up views of infrastructure is the desired outcome.

The rows will be a minimum of 2 m between centres and 1.5 m from any fence. A mix of trees and shrubs will spaced to accommodate for the requisite individual specie spacing to permit healthy growth and avoid a planting density that would, over time, establish a hedge effect.

An indicative layout demonstrating this planting layout is provided below.

3.3 ADDITIONAL PLANTING ROWS

As detailed in **Section 6.3** additional rows (1 to 3) of plantings will be considered as one of the mitigation measures if the 'as built' verification report establishes the need for additional plantings to mitigate visual impacts.

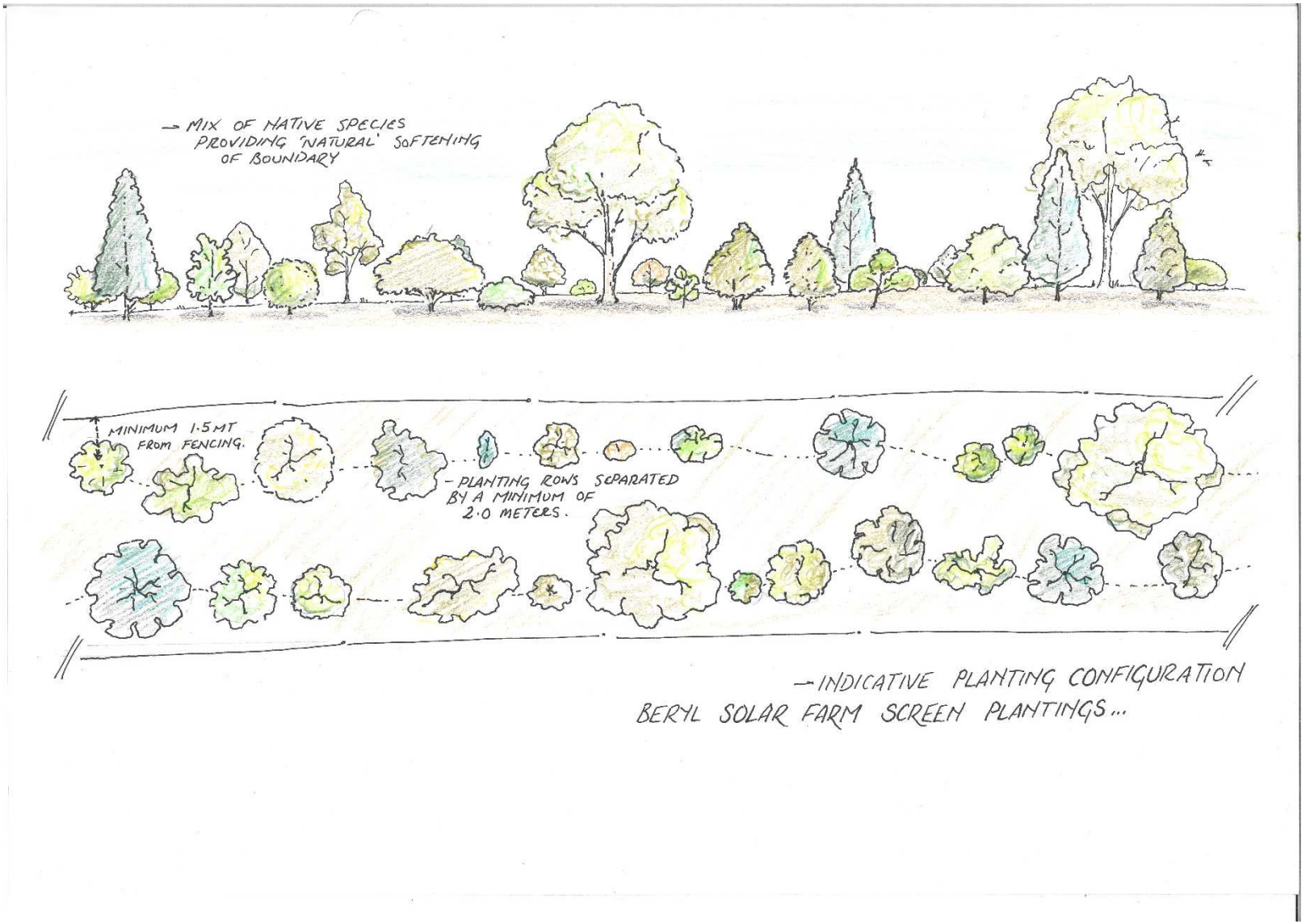

Figure 2: Indicative Planting Configuration

Preparation and Planting

4.1 INITIAL WEED SPRAY

Weeds are to be controlled by spraying with Glyphosate 1.5-2 m wide along each row. This will be completed as early as possible so moisture can start accumulating.

The rows may need to be sprayed several times depending on weed growth.

4.2 BED PREPARATION

Ripping to a minimum depth of 500 mm will be undertaken. This will allow for greater root penetration and reducing the energy output required for root growth. This will increase the seedling growth rate and will enable greater access to water and nutrients.

Following up the deep rip with mounding will concentrate the topsoil, thus increasing the nutrient and soil water holding capacity. The increase in topsoil depth will also contribute to easier establishment of seedling roots in the aerated soil. At the time of ripping, representative soil testing at 8 locations will be carried out. The soil testing results will be used to inform fertiliser selection.

4.3 PLANTING

Tube stock will be planted out as soon as seasonal conditions conducive. Native formulated slow release fertiliser will be applied to each plant at the time of planting. This will provide nutrients for an average of 9 months. All plants will be watered in at the time of planting with at least 2 litres of water per plant.

Plants will be protected with UV stabilised tree guards to create a microclimate around the immature plant, increasing the growth rate. Protection during their first two seasons of growth will be critical to their long-term success rate. Guards will also protect from climatic extremes, browsing pests and potential spray drift from follow up weed control.

If the planting area at the eastern end of the farm (outside the solar farm security fence) has the potential to carry grazing, stock proof fencing will be provided.

Maintenance

5.1 OVERVIEW

While the vegetative screening must be maintained for the life of the BSF, the scope and frequency of maintenance activities should diminish over time. Appropriate species selection, bed preparation, planting technique and suitable early maintenance during the plantings establishment phase will reduce longer term maintenance requirements.

5.2 INITIAL THREE YEARS

The development consent requires that the landscaping be effective at screening views of the solar panels and ancillary infrastructure on site from surrounding residences within 3 years of the commencement of construction. To ensure optimum survival and facilitate healthy growth, the plantings will be maintained for the first three (3) years as detailed below.

5.2.1 SCHEDULED INSPECTIONS

5.2.1.1 Frequency

Regular scheduled inspections will be undertaken to assess watering, fertilising and weeding requirements. These inspections will also assess plant losses and tree guard integrity.

Four (4) inspections will be undertaken in the first 12 months of planting, dropping to three (3) inspections each year for the following two years. Seasonal conditions will determine the actual timing of these inspections.

5.2.1.2 Parameters Monitored

Monitoring over the initial three years from planting will include:

- Planting mortality rates
- Tree guard integrity
- Soil fertility
- Soil moisture levels
- Plant health and growth rates

5.2.1.3 Photographic Record

As detailed in Section 6.2, each of these maintenance inspections will be complemented with site photographs that will record growth rates and screening effectiveness.

5.2.2 MORTALITY REPLACEMENT

Mortalities greater than 10% or gaps greater than 5 m will be replaced within the first 3 years.

5.2.3 SOIL TESTING

Soil testing will be recorded and repeated at 12 months and 24 months at the same locations to ensure that if any changes occur to soil makeup over the time, that fertiliser and micro nutrient levels (if required) can be adjusted accordingly.

5.2.4 SUB SURFACE MOISTURE

Sub surface moisture levels will be checked to determine whether additional watering is required.

5.2.5 WEED TREATMENT

Noxious weeds will be spot sprayed or, dependent on the weed and extent of infestation, chipped/pulled.

5.2.6 PLANT GROWTH AND HEALTH

Plant health will be checked for stress indicators (disease and pest problems).

5.3 CONTINGENCY PLAN

The intention is to undertake the plantings as soon as conditions are favourable following the commencement of construction and for four (4) scheduled inspections to be undertaken in the first 12 months from planting.

Should drought conditions persist during the establishment period, the number of scheduled inspections will be increased and supplementary watering and fertilising be undertaken should it be required.

5.4 ONGOING

Following the intense maintenance undertaken during the initial three (3) years after initial planting, monitoring of the vegetative screen would be undertaken annually and be restricted to weed control, mortality and replacement, and general check on vegetation health.

For the life of the BSF all screen planting mortalities would be replaced.

Monitoring

6.1 REQUIREMENT

CoA 11(b) states the LP must include a program to report on the effectiveness of the landscaping measures.

6.2 REPORTING

6.2.1 INTERNAL REPORTING

Each of the maintenance inspections (as detailed in **Section 5**) will be documented and complemented with a photographs taken at the time of inspection.

Documentation will include observations and findings, along with recommendations for any specific maintenance tasks required, including timeframes for when these tasks need to be completed.

These records form a key component of this LP and will be held to ensure (and demonstrate) measures specified in this LP are implemented and that the landscape plantings are effective in meeting their visual mitigation objective.

6.2.2 EXTERNAL REPORTING

Six (6) monthly evaluation reports will be prepared and submitted to DPE throughout the first two (2) years of the screen planting's life.

These evaluation reports will assess the health and growth of the landscape plantings and identify the need for (and detail of) any targeted enhanced landscaping techniques.

In terms of monitoring and reporting on the success of the landscape plantings, these performance evaluation reports will provide an assessment of the health and growth of the plantings and, significantly, assess anticipated compliance against the 3 year performance objective of breaking up views of the BSF infrastructure.

Where non-compliance is identified as a possibility, the evaluation reports will provide a targeted strategy for rectification.

6.3 AS-BUILT VERIFICATION

A Mitigation Measure that forms part of the development consent is to address the 'as-built' visual impacts of the BSF. Specifically:

> *A post construction audit would be undertaken to assess the effectiveness of the screening layout with reference to the final constructed infrastructure and augment the former as required.*
>
> *Involvement of the most affected landowners (relevant to medium impact view locations). This may include increased onsite planting density in specific locations suggested by the landowners (for example, where the proposed solar farm would be visible from outdoor recreational areas).*
>
> *Verification of predicted and actual impacts. This would improve the reliability of the measures and provide a trigger to undertake additional mitigation if required.*

Pursuant to the above an 'as-built' visual impact verification will be undertaken three years after construction commencement (ie. August 2021). This process will include consultation with those four (4) landowners identified in the Environmental Impact Statement (ngh, 2017) as having 'medium impact view locations'.

If and as required, additional plantings will be undertaken within the established vegetation screening buffer, and or as additional rows of plantings at select locations, to provide for increased planting density and/or visual impact mitigation.

The outcomes of this 'as-built' verification will validate the effectiveness of visual mitigation measures achieved through the implementation of this LP.

Responsibilities

7.1 REQUIREMENT

CoA 11(c) states the LP must include details of who would be responsible for monitoring, reviewing and implementing the plan.

7.2 RESPONSIBILITIES

7.2.1 DELINEATION

The Applicant referenced in the CoA is First Solar Pty Ltd. The Applicant has ultimate responsibility to ensure all CoA are complied with.

Downer is the EPC Contractor building the BSF. It is doing so under an EPC Contract within which certain responsibilities for acting on specific CoA and Mitigation Measures are shared between FSFPL and Downer.

As it relates to establishing and maintaining a mature vegetation buffer to mitigate visual impacts as required under CoA 10, the delineation of responsibilities is as follows:

Table 7.1 – Responsibilities

Task	Responsibility
Preparation of this Landscaping Plan.	Downer
Implementation of this Landscaping Plan for the duration of the EPC contract.	Downer
Implementation of this Landscaping Plan post completion of the EPC contract	First Solar

7.2.2 ROLES

7.2.2.1 First Solar

FSPL's Project Manager has responsibility to ensure that Downer execute their contractual obligations in full compliance with the Minister's CoA.

After Downer's obligations under the EPC Contract are met, FSPL as the owner of the BSF will have responsibility for implementing and residual actions required under this LP.

7.2.2.2 Downer

Downer's Environmental Officer is responsible for ensuring that all actions specified in this LP are implemented until such time that Downer's obligations under the EPC Contract are met and FSPL, as the owner of the BSF assumes responsibility for residual actions required under this LP.

Timeframes

8.1 REQUIREMENT

CoA 11(c) states the LP must include timeframes for completion of actions.

8.2 CONSIDERATIONS

8.2.1 THREE YEAR PERFORMANCE TARGET

The Minister's consent requires that the vegetation screening be planted prior to commencement of operations (Schedule 3 CoA 10a). The operation of the development in this LP is taken to mean when the BSF is generating electricity into the grid.

The Minister's consent also requires that the plantings be effective at screening views of the solar panels and ancillary infrastructure on site from surrounding residences within 3 years of the commencement of construction (Schedule 3 CoA 10d).

Construction is scheduled in commence in August 2018.

The ability to meet the three year target requires plantings to be undertaken as soon conditions are favourable: noting that seasonal conditions and the associated windows of opportunity for planting must be acknowledged.

8.2.2 LIFE OF THE PROJECT

The screen would be maintained for the operational life of the solar farm.

8.3 MILESTONES/SCHEDULING

Table 8.1 – Milestone Timeframes

Timeframe	Commitment
August 2018	Construction start
As soon as seasonal conditions permit after August 2018	Undertake plantings
In the first year after planting	Four scheduled inspections (with a contingency plan to increase the number of inspections if drought conditions persist during the establishment period).
For both the 2nd and 3rd year after planting	Three scheduled inspections
For the first two years after planting	Six (6) monthly evaluation reports submitted to DPE
August 2021	Effective screening of BSF infrastructure/'As-built' verification
Ongoing for life of farm	Annual inspections

References

ISO 14001:2015(E) *Environmental management systems – requirements with guidance for use*

DIPNR (2004) *Guidelines for the Preparation of Environmental Management Plans*

Mid Western Regional Council (2014) *Development Control Plan 2013*

nghenvironmental (July 2017) *Beryl Solar Farm – Submissions Report*

nghenvironmental (April 2017) *Beryl Solar Farm – Environmental Impact Statement*

Appendix A

FARM LAYOUT AND LANDSCAPING