

Appendix H. Vegetation Assessment



Tailem Bend Solar Project - Stage 2

Equis Energy (Australia) Pty Ltd

Ecological Assessment Report

IW133300-0000-NE-EAR Rev 4

19/12/2017

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Tailem Bend Solar Project - Stage 2

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Acronyms and Abbreviations

AC	Alternating Current
BCM	Bushland Condition Monitoring
BDBSA	Biological Database of South Australia
DEWNR	Department of Environment, Water and Natural Resources
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
Equis	Equis Energy (Australia)
MNES	Matters of National Environmental Significance
MDBSA	Murray Darling Basin South Australia
MW	Megawatt
MWAC	Megawatts Alternating Current
NPW Act	<i>National Parks and Wildlife Act 1972</i>
NRM Act	<i>Natural Resources Management Act 2004</i>
NV Act	<i>Native Vegetation Act 1991</i>
NVC	Native Vegetation Council
NVMU	Native Vegetation Management Unit
TB2SP	Taillem Bend Solar Project Stage 2
TEC	Threatened Ecological Communities
TSSC	Threatened Species Scientific Committee

Important note about your report

The sole purpose of this report and the associated services performed by Jacobs was to provide details regarding vegetation present and clearance required for the proposed solar project at Tailem Bend, South Australia, in accordance with the scope of services set out in the contract between Jacobs and the client, Equis Energy (Australia) Pty Ltd (Equis). That scope of services, as described in this report, was developed by Jacobs.

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1. Introduction

Stage 2 of the Taillem Bend Solar Project (TB2SP) is proposed to be developed by Equis Energy (Australia) Pty Ltd (Equis) with a generation capacity of up to 90 MWAC at Taillem Bend, South Australia. This site is private land and directly north of the Stage 1 site. The TB2SP is designed to be battery ready, creating a combined generation and storage facility project that prepares for the future electricity needs of South Australians.

Jacobs has undertaken the following tasks:

- Desktop Study including:
 - Review of *Environment Protection and Biodiversity and Conservation Act 1999* Protected Matters database search results and high level assessment of likelihood of occurrence for listed and threatened flora and fauna species and Threatened Ecological Communities (TECs);
 - Review of the Biological Database of South Australia (BDBSA) search extract within 5 km of the site for threatened flora, fauna and ecological community results;
- Field Survey to map and describe native and exotic vegetation present on or adjacent to the proposed construction footprint; and
- Collation of findings into an Ecological Assessment Report.

The purpose of this report is to support a Development Application and Native Vegetation Clearance Application and to inform the design process (e.g. location of solar arrays and other infrastructure). The report also provides a description and maps vegetation, assessment of habitat value and discussion of the potential vegetation clearance with respect to approval required under:

- *Native Vegetation Act 1991* and *Native Vegetation Act Regulations 2017*; and
- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The project site is located 2 km south-east of Taillem Bend and 90 km south-east of Adelaide, in the Hundred of Seymour.

The project area site overview is shown on Figure 1-1 below.

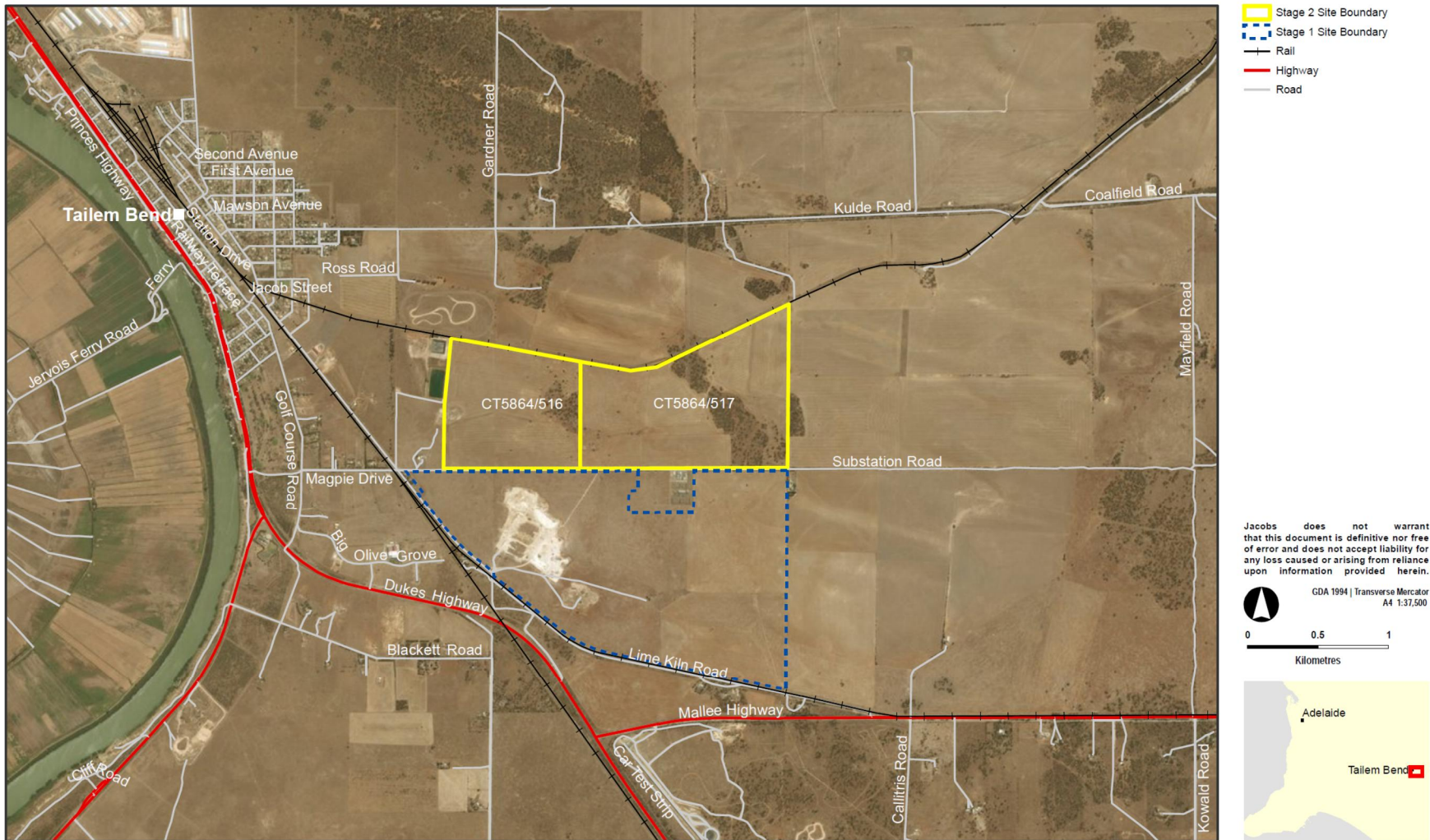


Figure 1-1 TB2SP: Project Site Overview

2. Legislation

An overview of the key legislation and policy relevant to the assessment of potential terrestrial ecology impacts associated with the proposed development is provided below.

2.1 Commonwealth Legislation

2.1.1 *Environment Protection and Biodiversity Conservation Act 1999*

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is the Australian Government's central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places — defined in the EPBC Act as matters of national environmental significance (MNES). Under the environmental provisions of the EPBC Act, actions that are likely to have a significant impact on a matter of National Environmental Significance are identified as 'controlled actions' and cannot be undertaken without referral to the Department of the Environment for consideration and approval under the EPBC Act.

The nine matters of national environmental significance identified in the EPBC Act are:

- World heritage properties;
- National heritage places;
- Wetlands of international importance (listed under the Ramsar Convention);
- Threatened species and ecological communities;
- Migratory species as listed under international agreements;
- Commonwealth marine areas;
- The Great Barrier Reef Marine Park;
- Nuclear actions (including uranium mining); and
- A water resource, in relation to coal seam gas development and large coal mining development.

2.2 South Australian Legislation

2.2.1 *National Parks and Wildlife Act 1972*

The *National Parks and Wildlife Act 1972* (NPW Act) allows for the protection of habitat and wildlife through the establishment of parks and reserves (both on land and in State waters) and provides for the use of wildlife through a system of permits allowing certain actions, i.e. keeping, selling, trading, harvesting, farming, hunting and the destruction of native species.

The NPW Act assigns species to state conservation categories; Endangered (Schedule 7), Vulnerable (Schedule 8), and Rare (Schedule 9).

2.2.2 *Native Vegetation Act 1991*

The *Native Vegetation Act 1991* (NV Act) outlines incentives and assistance to land owners relative to the enhancement of native vegetation and acts to control the clearance of native vegetation. The NV Act Regulations, specifically Regulation 5(1)(d) provides for the clearance of native vegetation for public infrastructure subject to approval by the Native Vegetation Council. It is considered that these provisions apply to this project and they area are discussed further in Section 7.

2.2.3 *Natural Resources Management Act 2004*

The *Natural Resources Management Act 2004* (NRM Act) is to assist in the achievement of ecologically sustainable development in the State by establishing an integrated scheme to promote the use and management of natural resources that recognises and protects the intrinsic values of natural resources. The NRM Act combines critical elements of the now repealed Animal and Plant Control (Agricultural Protection and Other Purposes) Act 1986, the Soil Conservation and Land Care Act 1989 and the Water Resources Act 1997.

It further legislates for designated control requirements for a series of 'Declared' plants (as specific to each region or statewide), which effectively:

- Bans the sale of Declared weeds;
- Controls the movement of Declared weeds;
- Requires landowners / managers to destroy or control infestations of Declared weeds; and
- Requires further notification of authorities when an infestation is detected.

2.3 South Australian policies and plans

The South Australian government follows guidelines relating to the conservation of native habitats, communities and species via the implementation of a range of policies including the following:

2.3.1 **No Species Loss - A Nature Conservation Strategy for South Australia 2007-2017 (DEH, 2007)**

The 'No Species Loss' Strategy provides a State wide nature conservation strategy aimed at setting objectives and targets for the conservation and management of State biodiversity assets while also providing guidelines on how targets can be met.

2.3.2 **Guidelines for the Management of Roadside Vegetation**

The guidelines discuss specific issues regarding the management of roadside vegetation. Some issues, such as road construction, will be of direct relevance to local government; while others, such as boundary fencing, may be of concern to adjoining landholders. Another category within the guideline refers to power lines and other services, which relates to government agencies and service providers (Native Vegetation Council, 2012).

The guidelines generally involve three options for assessment:

- Works that may be undertaken without reference to the Native Vegetation Council or Native Vegetation and Biodiversity Management Unit;
- Works requiring at least consultation with and endorsement by the Native Vegetation and Biodiversity Management Unit; and
- Works that require the consent of the Native Vegetation Council (NVC), by means of a clearance application or application to clear under one of the *Native Vegetation Regulations 2017*.

3. EPBC Act Protected Matters Summary

Table 3-1 and Table 3-2 below provide the results of an updated EPBC Protected Matters database search of the study area. The table presents the likelihood of occurrence of Protected Matters identified within the database based on updated Biological Database of South Australia records (within 5 km), knowledge of the site and knowledge of the species. The summary excludes fish species which came up in the search due to proximity of the site to the Murray River.

Table 3-1 Likelihood of occurrence of Matters of National Environmental Significance (MNES)

Type of MNES	Name	Commonwealth Status	Likelihood of occurrence
Wetland of International Importance	The Coorong, and lakes Alexandrina and Albert Wetland	Within 10 km of Ramsar	N/A the site is 12 km from the NE most edge of this wetland.
Listed Threatened Ecological Community (TEC)	Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	This community does not occur at the site or nearby
Listed TEC	Iron-grass Natural Temperate Grassland of South Australia	Critically Endangered	Not present. Whilst BDBSA TEC data suggest the community occurs across the site (see Section 4). The site visit (Section 5) identified only small isolated patches of mallee over Iron-grass (Area A) that did not meet the TEC criteria. All remnant vegetation has been heavily degraded by on-going livestock grazing and weed infestation.
Listed TEC	River Murray and associated wetlands, floodplains and groundwater systems, from the junction with the Darling River to the sea	Approval Disallowed	N/A - the western most boundary of the site is 1.2 km east of the River Murray Protection Area
Other Matter Protected by the EPBC Act	Commonwealth Land - Australian National Railways Commission		A railway corridor adjoins the northern boundary of the survey area. The rail line is not on Commonwealth Land.

Table 3-2 Likelihood of occurrence of EPBC listed Threatened and / or migratory species

Species	Common Name	Commonwealth Status	Likelihood
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory Marine	Possible as overfly visitor. No historic BDBSA records, but wide ranging aerial species.
<i>Ardea alba</i>	Great Egret, White Egret	Migratory Wetland	Unlikely. 3 BDBSA records (2002, 2005). No preferred habitat within site, but possible if land is inundated.
<i>Ardea ibis</i>	Cattle Egret	Migratory Wetland	Possible. 2 BDBSA records (1982, 1985). Will use pasture habitat, however such habitat is not core habitat or preferred breeding habitat.
<i>Botaurus poiciloptilus</i>	Australasian Bittern	Endangered	Unlikely. One historic record within 5 km. Preferred habitat does not occur with the site.
<i>Caladenia macroclavia</i>	Large-club Spider-orchid	Endangered	Unlikely. No preferred habitat.
<i>Caladenia tensa</i>	Greencomb Spider-orchid, Rigid Spider-orchid	Endangered	Unlikely. No preferred habitat.

Species	Common Name	Commonwealth Status	Likelihood
<i>Gallinago hardwickii</i>	Latham's Snipe, Japanese Snipe	Migratory Wetland	Unlikely. No BDBSA records within 5 km. No preferred habitat within the site.
<i>Grantiella picta</i>	Painted Honeyeater	Vulnerable	Unlikely. No BDBSA records within 5 km. Limited habitat within site. Roadside vegetation may provide habitat for occasional visitor.
<i>Lathamus discolor</i>	Swift Parrot	Endangered	Unlikely. No BDBSA records within 5 km. Limited habitat within site.
<i>Leipoa ocellata</i>	Malleefowl	Vulnerable and Migratory	Unlikely. 3 historic BDBSA records within 5 km. No Mallee habitat within site. Fragmented patches of Mallee occur within the region. May occur as occasional visitor passing through site, however unlikely.
<i>Litoria raniformis</i>	Growling Grass Frog, (also referred to as Southern Bell Frog, Green and Golden Frog, Warty Swamp Frog)	Vulnerable	Unlikely. 5 historic BDBSA records within 5 km. No preferred habitat within the site. SA population along River Murray known to have suffered serious decline.
<i>Merops ornatus</i>	Rainbow Bee-eater	Migratory Terrestrial	Possible as overfly visitor. Regularly recorded, in the region and conspicuous species. Limited preferred nesting habitat within and adjacent site, (i.e. nests in mud banks).
<i>Motacilla cinerea</i>	Grey Wagtail	Migratory Terrestrial	Unlikely. No BDBSA records within 5 km. Has global distribution. No preferred habitat within site.
<i>Motacilla flava</i>	Yellow Wagtail	Migratory Terrestrial	Unlikely. No BDBSA records within 5 km. Has global distribution. No preferred habitat within site.
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Migratory Terrestrial	Unlikely. 1 BDBSA records within 5 km. No preferred habitat within the site.
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat, South-eastern Long-eared Bat	Vulnerable	Unlikely. No BDBSA records within 5 km. Limited habitat within and adjacent site.
<i>Pandion haliaetus</i>	Osprey	Migratory Wetland	Unlikely. No BDBSA records within 5 km. No preferred roosting or feeding habitat within site.
<i>Pedionomus torquatus</i>	Plains-wanderer	Critically Endangered	Unlikely. No BDBSA records within 5 km.
<i>Pterostylis arenicola</i>	Sandhill Greenhood Orchid	Vulnerable	Unlikely. No preferred habitat within the site.
<i>Rostratula australis</i>	Australian Painted Snipe	Endangered	Unlikely. No BDBSA records within 5 km.
<i>Thelymitra epipactoides</i>	Metallic Sun-orchid	Endangered	Unlikely. No preferred habitat within site.
<i>Tringa nebularia</i>	Common Greenshank, Greenshank	Migratory Wetland	Unlikely. 2 records within 5 km, but no preferred wetland habitat within the site.

4. BDBSA summary

Biological Database of South Australia (BDBSA) records were obtained for the site with a 5 km buffer to allow for the paucity of records within the actual site. There are no records for nationally or state threatened flora or fauna within the study area. Several threatened flora and fauna have been recorded within 5 km of the site and these are summarised in Table 4-1. The last column defines whether these species were observed during the site survey or are likely to occur.

Table 4-1 BDBSA summary of threatened species recorded within 5 km of the site

Species	Common Name	EPBC Act	NPW Act	Likelihood of occurrence
Fauna				
<i>Anhinga novaehollandiae</i>	Australasian Darter	-	Rare	Unlikely. Record from River Murray wetlands to west. No suitable habitat on the site.
<i>Corcorax melanorhamphos</i>	White-winged Chough		Rare	Possible. Preferred mallee vegetation present, however remnant patches are small, degraded and fragmented. Not observed or heard during field survey.
<i>Microeca fascinans</i> SA: ssp	Jacky Winter	-	Rare	Possible. Preferred dense mallee vegetation present (Area B), however remnant patches are small, degraded and fragmented. Not observed or heard during field survey.
<i>Northiella haematogaster</i>	Bluebonnet	-	Rare	Possible. Old growth mallee with large tree hollows (Areas C and D and some several large scattered trees) provides potential nesting habitat.
<i>Petroica phoenicea</i>	Flame Robin		Vulnerable	Possible. Preferred mallee woodland present however remnant patches are small, degraded and fragmented. Not observed or heard during field survey.
Flora				
<i>Crassula sieberiana</i>	Sieber's Crassula	-	-	Unlikely. No suitable rocky habitat present. Not observed during survey.
<i>Thelymitra epipactoides</i>	Metallic Sun-orchid	Endangered	Endangered	Unlikely. No suitable habitat present. Not observed during survey.
<i>Juncus prismatocarpus</i>	Branching Rush	-	Vulnerable	Unlikely. No suitable damp run-on habitat present.
<i>Prasophyllum constrictum</i>	Tawny Leek-orchid		Rare	Unlikely. Preferred mallee habitat present. However degraded understorey. Not recorded during field survey.
<i>Lythrum salicaria</i>	Purple Loosestrife		Rare	Unlikely. No suitable damp run-on habitat present.

NPW Act – National Parks and Wildlife Act 1972, State legislation which protects flora and fauna.

5. Methodology

A Jacobs field team of a senior ecologist and field assistant conducted a foot and vehicle survey of the project site and surrounds on 8 August 2017 in order to:

- Map and describe native vegetation on and adjacent to the project area, including descriptions of disturbance levels and condition;
- Identify any threatened species and/or ecosystems or important wildlife habitat present at the site;
- Review the vegetation communities present in relation to the Principles of Clearance (Schedule 1) and exemption 5(1)(d) of the *Native Vegetation Act 1991*; and
- Review ecological values present at the site in relation to the provisions of the EPBC Act.

The surveyed area included the project area as defined in Figure 1-1 and included adjoining roadside and rail reserve vegetation. The field survey gathered information in order to map and describe native and exotic vegetation communities present within the project footprint.

6. Results

6.1 Overview

The proposed project site consists of cleared land that has been utilised for cropping and pasture with scattered patches of remnant native vegetation comprising approximately 22 hectares and approximately 53 scattered remnant individual trees. Two blocks of remnant vegetation have been classified and mapped into five areas based on features including size and distribution of patches, overstorey species composition, vegetation condition and overstorey age structure. These native vegetation blocks (Block A and Block B) have been labelled as A1, A2, A3 and B1, B2 (based on naming convention for Bushland Assessments (NVMU 2017)) and are shown on Figure 1-1, together with the location of individual scattered native trees and planted vegetation.

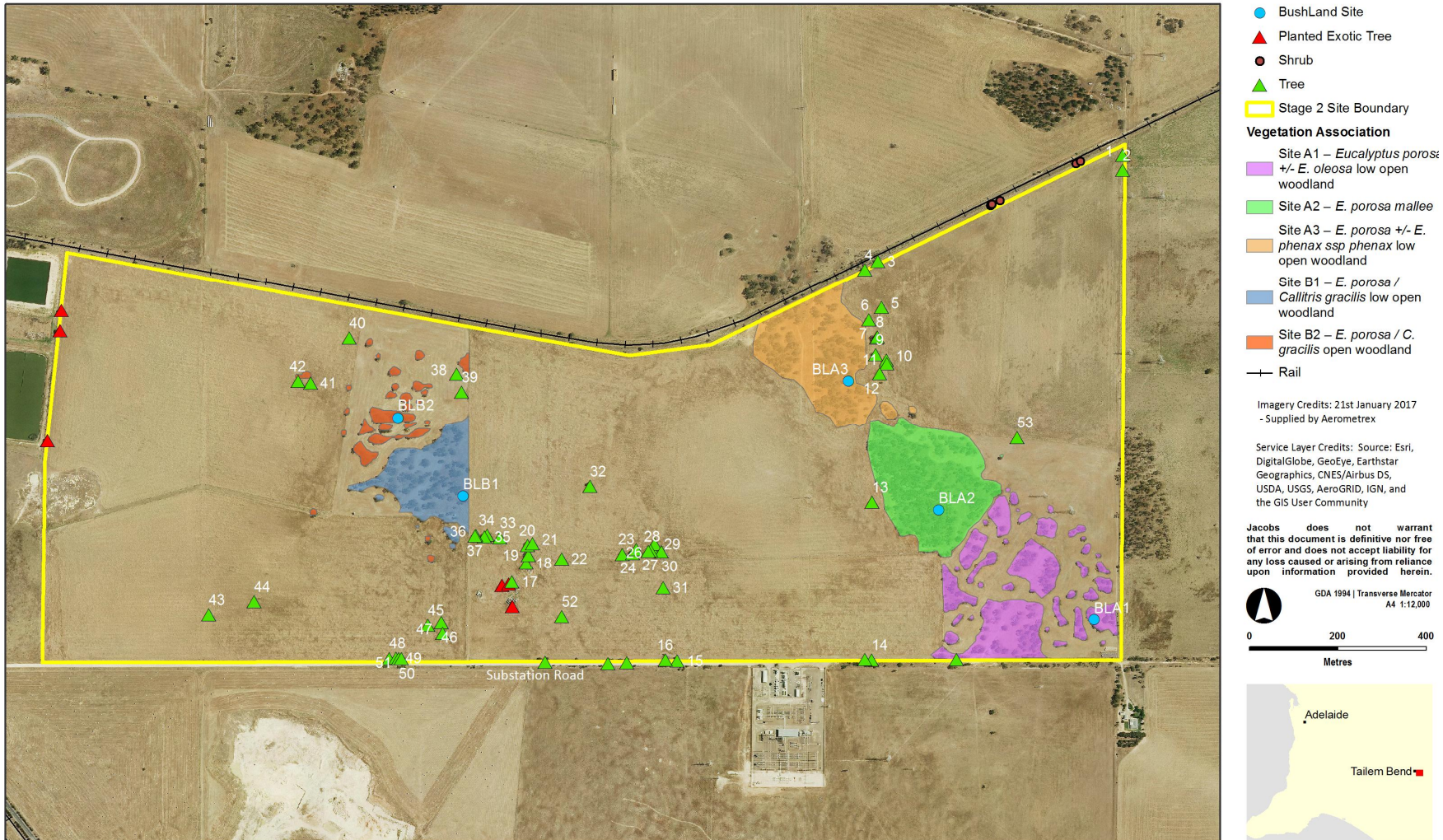


Figure 6-1 TB2SP: Vegetation

6.2 Cleared Land

The project area is dominated by historically cleared land that has been utilised for cropping and pasture, with the majority under crop at the time of the field survey. These areas are comprised of exotic grasses (including crop species) and herbs including common agricultural weed species (Figure 6-3). In addition, a large proportion of the roadside adjoining the project area perimeter, including most of the southern boundary (Substation Road) and the rail reserve adjoining the northern boundary have also been cleared and are dominated by exotic grasses and herbs.



Figure 6-2 View of southern boundary along Substation Road showing cleared paddocks and predominantly cleared roadside.

6.3 Remnant Native Vegetation Patches

6.3.1 Block A (site 1)

Vegetation Association: *Eucalyptus porosa* +/- *E. oleosa* low open woodland over tussock grassland (5.7 ha approx.)

This site is located in the south east corner of the surveyed area and is comprised of small patches of *Eucalyptus porosa* (Mallee Box) tall mallee over a sparse Chenopod shrub understorey. This community is representative of Murray Darling Basin South Australia (MDBSA) Bushland Condition Monitoring (BCM) 9.1: *Woodlands with an open grassy understorey* (Croft, Pedlar and Milne 2009).

The patches are isolated from each other by areas of cropped land and vary in size ranging from one or two trees to several larger areas including a patch of approximately 1.5 ha adjoining the southern boundary.

Mallee Box dominates the overstorey with scattered individual *E. oleosa* (Red Mallee) and *E. phenax* ssp *phenax* (White Mallee) and is old regrowth with multi-stemmed habit. The patchy open understorey includes *Enchylaena tomentosa* (Ruby Saltbush) the woody forb *Vittadinia cuneata* (Fuzzy New Holland Daisy). Scattered clumps of *Dianella brevicaulis* (Short-stem Flax-lily) and *Lomandra effusa* (Scented Mat-rush) are

present in the larger patches and the herb *Senecio pinnatifolius var pinnatifolius* (Daisy) together with native grass species *Austrostipa spp.* (Speargrass) and *Rytidosperma caespitosum* (Common Wallaby Grass) are common understorey species (Figure 6-3).

African Boxthorn (*Lycium ferocissimum*) bushes are common in the patches while Bridal Creeper (*Asparagus asparagoides*) was recorded in a small number of locations. Galenia (*Galenia sulcata*), a perennial mat plant is widespread in all patches together with agricultural weeds including Indian Hedge Mustard (*Sisymbrium orientale*) and Horehound (*Marrubium vulgare*) (Figure 6-3).

All the patches are accessible to livestock and have been grazed more or less continuously for more than a century. Palatable species including *Einadia nutans* (Climbing Saltbush) and *Austrostipa elegantissima* (Elegant Spear-grass) were present in very low numbers and always growing under protection indicative of on-going grazing pressure.

Bushland Site BLA1 has been installed to represent vegetation in site A1.



Figure 6-3 Site A1: isolated patches of mixed Mallee low open woodland over native grass understorey

6.3.2 Block A (site 2)

Vegetation Association: *Eucalyptus porosa* mallee over Chenopod low open shrubland and tussock grassland (Area 6.2 approx.)

Site A2 is a single patch of *Eucalyptus porosa* low mallee located on a low rise located in the central eastern portion of the survey area. The shallow sandy loam soil over sheet limestone is reflected in the stunted whipstick characteristic of the mallee overstorey and the lack of species diversity in the understorey. The mid-storey is dominated by *Enchylaena tomentosa* with *Senecio pinnatifolius var pinnatifolius* and *Austrostipa spp.* (Speargrass) common in the understorey (Figure 6-4).

This community is representative of MDBSA BCM 6.1: *Open Mallee with mid-dense shrub and tussock understorey on limestone soils.*

Scattered infestations of African Boxthorn and Bridal Creeper were recorded in this patch and no tree hollows were noted.

Bushland Site BLA2 has been installed to represent vegetation in site A2.



Figure 6-4 Site A2: Whipstick *Eucalyptus porosa* (Mallee Box) dominates with *Enchylaena tomentosa* (Ruby Saltbush) dominating the understorey

6.3.3 Block A (site 3)

Vegetation Association: *Eucalyptus porosa* +/- *E. phenax* ssp *phenax* low open woodland over Chenopod low open shrubland and tussock grassland (5.6 ha).

Site A3 is a single large patch located near the northern central boundary of the survey area. This patch is comprised of old growth *Eucalyptus porosa* with scattered individual *E. phenax* ssp *phenax* and *Melaleuca lanceolata* (Dryland Teatree). The understorey is dominated by *Enchylaena tomentosa* with scattered patches of *Pimelea stricta* (Erect Rice Flower) and *Lepidosperma laterale* and *Lomandra micrantha* ssp *micrantha* (Small-flowered Mat-rush) (Figure 6-5). Mallee trees are often single trunk trees indicative of old growth and small and medium tree hollows are present in most trees

This community is representative of MDBSA BCM 9.1: *Woodlands with an open grassy understorey* (Croft, Pedlar and Milne 2009).

Bushland Site BLA3 has been installed to represent vegetation in Site A3.



Figure 6-5 Site A3: Older growth *Eucalyptus porosa* (Mallee Box) with African boxthorn

6.3.4 Block B (site 1)

Vegetation Association: *Eucalyptus porosa* / *Callitris gracilis* low open woodland over Chenopod low open shrubland and tussock grassland.

Site B1 is located on a low sandy rise in the central portion of the survey area and is comprised of a single larger remnant patch (3.4 Ha) of older growth *Eucalyptus porosa* with *Callitris gracilis* (White Cypress Pine) surrounded by cropping land. The understorey is dominated by *Enchylaena tomentosa* and *Austrostipa* spp. (Speargrass) with the introduced perennial mat plant *Galenia* (*Galenia sulcata*) and African Boxthorn common (Figure 6-6). The Mallee trees are comparatively tall (approximately 8m) in this area and often single-trunk with small and medium hollows recorded.

This community is representative of MDBSA (Murray Darling Basin South Australia) BCM 9.1: *Woodlands with an open grassy understorey* (Croft, Pedlar and Milne 2009).

Bushland Site BLB1 has been installed to represent vegetation in Site B1.



Figure 6-6 Site B1: Older growth *Eucalyptus porosa* with *Enchylaena tomentosa* understorey

6.3.5 Block B (site 2)

Vegetation Association: *Eucalyptus porosa* +/- *Callitris gracilis* low open woodland over Chenopod low open shrubland and tussock grassland.

This site consists of numerous small patches of open woodland vegetation separated by cropping land located adjacent to site B1 near the north western boundary of the block. The patches are comprised of older growth *Eucalyptus porosa* with *Callitris gracilis* (White Cypress Pine). The understorey is dominated by *Enchylaena tomentosa* and *Austrostipa* spp. (Speargrass) with the introduced perennial mat plant Galenia (*Galenia sulcata*) and African Boxthorn common (Figure 6-7).

This community is representative of MDBSA (Murray Darling Basin South Australia) BCM 9.1: *Woodlands with an open grassy understorey* (Croft, Pedlar and Milne 2009).

Bushland Site BLA2 has been installed to represent vegetation in Site B2.



Figure 6-7 Site B2: Older growth *Eucalyptus porosa* with *Enchylaena tomentosa* understorey

6.4 Scattered Native Trees

As identified on Figure 6-1, approximately 53 scattered native trees are present within the cropped paddocks, along fence lines with *Eucalyptus porosa* the dominant species together with a small number of *Callitris gracilis* and other mallee species (Figure 6-8). In addition, a small number of native scattered trees have been recorded along roadsides or the rail reserve adjoining the survey area.

A list of scattered trees recorded is provided in Appendix 2 attached.



Figure 6-8 Numerous scattered native trees are found within cropped paddocks

6.5 Planted Exotic and Non-indigenous Native Trees

A small number of planted exotic or self-sown non-indigenous natives are present particularly in the vicinity of a farm house ruin near in the central portion of the survey area. Species include Pepper Tree (*Schinus molle*) and Athel Pine (*Tamarisk microphylla*) and *Acacia saligna* (farmyard wattle) (Figure 6-9).



Figure 6-9 Pepper Tree (*Schinus molle*) one of several planted exotic trees near a farmhouse ruin in the central portion of the survey area

7. Discussion

7.1 Disturbance Levels and Vegetation Condition

In general, disturbance levels within the remnant vegetation within the study area have been high. Past vegetation clearance has reduced vegetation communities to small patches surrounded by land that has been cropped and grazed continuously for many decades. On-going moderate grazing pressure from livestock and, to a lesser extent in recent years, rabbits, has impacted the understorey where less palatable and more resilient species dominate. Less palatable species typically present in mallee box communities are either absent or confined to scattered individuals growing in a protected location.

Infestations of African Boxthorn (Declared under the NRM Act and a Weed of National Significance) are common throughout the remnant vegetation patches and often present under scattered paddock trees and scattered small infestations of Bridal Creeper (Declared) were also recorded.

Bushland assessments representative of each of the five remnant vegetation areas (the location of the sites are identified on Figure 6-1), together with information collected on scattered trees and general observations have been used to assess vegetation condition. Information regarding the condition of each remnant vegetation area is summarised in Table 7-1 below. The flora species list for each site is provided in Appendix A.

The bushland assessments will need to be consolidated in a form required for a Native Vegetation Clearance application (if applicable).

Table 7-1 Native vegetation patch condition

Remnant Block / Site	Bushland Site	Vegetation Community	MDBSA BCM Community	Native Species Richness	Comments	Unit Biodiversity Score ¹	Total Biodiversity Score ¹	Condition
A1	BLA1	<i>Eucalyptus porosa</i> +/- <i>E phenax</i> ssp <i>phenax</i> low open woodland	9.1	23 (recorded across numerous small patches)	<ul style="list-style-type: none"> Aggregation of many small remnant patches Moderate grazing impact Understorey dominated by exotic species and biomass Good mix of native species across all patches Widespread invasive weed infestations Older regrowth mallee with no tree hollows 	55.84	318.30	Moderate
A2	BLA2	<i>Eucalyptus porosa</i> mallee	6.1	8	<ul style="list-style-type: none"> Larger continuous patch Whipstick mallee formation with no tree hollows Good cover of native shrubs and grasses in understorey 	39.97	247.80	Moderate
A3	BLA3	<i>Eucalyptus porosa</i> low +/- <i>E phenax</i> ssp <i>phenax</i> low open woodland	9.1	18	<ul style="list-style-type: none"> Larger continuous patch Moderate grazing impact Understorey dominated by exotic species and biomass Old growth single stem mallee with small and medium-sized hollows 	53.76	301.6	Moderate
B1	BLB1	<i>Eucalyptus porosa</i> / <i>Callitris gracilis</i> low open woodland	9.1	4	<ul style="list-style-type: none"> Single larger patch Understorey dominated by exotic species and biomass Old growth single stem mallee with small and medium-sized hollows 	32.8	111.51	Poor
B2	BLB2	<i>Eucalyptus porosa</i> / <i>Callitris gracilis</i> open woodland	9.1	4	<ul style="list-style-type: none"> Numerous small patches separated by cropping land Understorey dominated by exotic species and biomass Old growth single stem mallee with small and medium-sized hollows 	32.8	42.6	Poor

¹Data outputs from Bushland Assessment Sheets

7.2 Threatened Species and Threatened Ecological Communities (TEC)

The EPBC search indicated that Iron-grass Natural Temperate Grassland, nationally listed as Critically Endangered under the EPBC Act, may be present on the site. *Lomandra effusa* (Scented mat-rush), one of the key species for this TEC is present in the understory in several patches of mixed mallee in the south east of the survey area (Site A1) (Figure 7-1). Patches at this site were assessed to determine whether they met the criteria for the TEC (as per conservation advice (TSSC 2008)), however the patches **did not** meet the TEC criteria, primarily based on the sparse coverage of *Lomandra* clumps and the low species richness of native grasses and broad-leaf herbaceous species. Whilst these patches did not meet Class A and Class B of the listed TEC, they meet criteria for Class C. The conservation advice stipulates that Class C is **not** considered part of the EPBC listed TEC, but is *indicative of patches that are degraded and could be rehabilitated to become the listed ecological community*.

No State or Commonwealth threatened flora or fauna species or plant communities were recorded during the survey and it is considered that they are unlikely to be present given the highly modified and degraded condition of the vegetation communities present within the surveyed area.



Figure 7-1 Site A1: *Lomandra effusa* (scented mat-rush) is present in the understory of some of the larger patches

7.3 Clearance of Native Vegetation

Preliminary design plans for this project indicate that clearance of native vegetation including removal of a number of scattered trees and parts of the remnant patches will be required. The final clearance footprint will depend on the final layout for infrastructure.

The provisions of the NV Act provide for the clearance of native vegetation either by application to the NVC for consent to clear or under exemptions contained in the *Native Vegetation Regulations 2017*.

It is considered that vegetation clearance required for this project falls under the provisions of Section 5 of the NV Act which provide for the clearance of native vegetation under Regulation 12(34) of the *Native Vegetation Regulations 2017* as described below:

7.3.1 Exemption 12 (34) Clearance incidental to the construction of infrastructure in the public interest

Regulation 12 (34) permits clearance of vegetation for the construction or expansion of a building or infrastructure that the Minister for Sustainability, Environment and Conservation considers to be in the public interest.

Approval to clear native vegetation under the provisions of exemption 5(1)(d) must be obtained from the NVC prior to construction. The NVC Exemption Guidelines (NVC, 2017) indicate the following broad provisions apply to clearance of native vegetation under exemption 12 (34):

- the clearance is incidental to the construction or expansion of a building or infrastructure and the Minister has, by instrument in writing, declared that he or she is satisfied that the clearance is in the public interest; or
- the clearance is required in connection with the provision of infrastructure or services to a building or proposed building, or to any place; and
- any development authorisation required by or under the *Development Act 1993* has been obtained; and
- the Council is satisfied (on the basis of information provided to the Council by the person seeking the benefit of this paragraph and such other information as the Council thinks fit) that, after taking into account the need to preserve biological diversity and the nature and purposes of any proposed building or infrastructure that is yet to be constructed, the proposed site of the building or infrastructure is the most suitable that is available; and
- the Council is satisfied (on the basis of information provided to the Council by the person seeking the benefit of this paragraph and such other information as the Council thinks fit) that:
 - there is no other practicable alternative that would involve no clearance or the clearance of less vegetation;
 - or the clearance of vegetation that is less significant or (if relevant);
 - the clearance of vegetation that has been degraded to a greater extent than the vegetation proposed to be cleared; and
- an approved Vegetation Management Plan is provided; and
- a Significant Environmental Benefit (SEB) offset applies to vegetation clearance under this exemption.

7.4 Justification for application of Exemption 12 (34)

The provisions of exemption 12 (34) are considered to apply for TB2SP as:

- The project is considered to be in the public interest as it supports the delivery of renewable energy to consumers in South Australia and the broader national electricity market, and provides for additional capacity and competition between generators in the South Australia market. Reflecting the public interest,

the project is likely to be deemed 'public infrastructure' by the Department of Premier and Cabinet pursuant to Section 49 of the *Development Act 1993*;

- The clearance required is in connection with the provision of electricity infrastructure;
- The project is in the early design phase, however infrastructure will be positioned to minimise vegetation clearance and clearance of scattered trees rather than continuous patches of remnant vegetation; and
- A SEB in the form of a land set aside or monetary payment is required.

8. Summary

The desktop study and field survey confirmed the presence of native vegetation within the project area including scattered patches of remnant native vegetation comprising approximately 22 hectares and approximately 53 scattered remnant individual trees.

Remnant vegetation has been highly fragmented from past vegetation clearance and considered to be in moderate to poor condition as a result of on-going high total grazing pressure and weed invasion. Older growth mallee found in Sites A3, B1 and B2 includes trees with small and medium sized tree hollows that provide nesting habitat for a range of bird and bat species. Larger remnant patches in site A1 include *Lomandra effusa* (Scented Mat-rush) in the understorey and while do not fit the criteria for inclusion as Iron-grass Natural Temperate Grassland TEC (Classes A and B), they fit the criteria for Class C (not classified as TEC) indicating they may be amenable to rehabilitation. Clearance of these patches has largely been avoided in the preliminary design. Retention and potentially rehabilitation of these patches could be included in the SEB and vegetation management plan required as part of the vegetation clearance approval process through consultation with the NVC.

The preliminary design for this project has sought to minimise vegetation clearance, by positioning solar arrays and other infrastructure predominantly on cleared land and where clearance of native vegetation is required, it consists largely of scattered individual trees and smaller isolated patches assessed to be in poor condition (reflected in the comparatively low Total Biodiversity Scores, and the vegetation condition presented in the graph). Larger remnant patches (including sites A2, A3 and B1) are proposed to be retained and it is considered that these measures meet the requirements of Exemption 5(1)(d) of the Native Vegetation Act.

The field survey determined that no flora and fauna species or Threatened Ecological Community listed under the EPBC Act is likely to be present or significantly impacted by this project and a referral under the provisions of the act is not required.

9. References

Australian Weeds Committee (2012) Weeds of National Significance, <http://www.weeds.org.au/WoNS/> (Accessed online April 2016).

Croft SJ, Pedler JA & Milne T (2009) Bushland condition monitoring manual: Murray Darling Basin, South Australia. Nature Conservation Society of South Australia.

Government of South Australia (2017a) Native Vegetation Guide for applications to clear under the Act or Regulations, Native Vegetation Council / Natural Resources (DEWNR) Government of South Australia.

Government of South Australia (2017b) Policy for a Significant Environmental Benefit under the Native Vegetation Act 1991 and the Native Vegetation Regulations 2017 (SEB Policy).

Native Vegetation Management Unit (NVMU) (2017) Bushland Assessment Manual, NVMU, Department of Environment, Water and Natural Resources Government of South Australia.

Threatened Species Scientific Committee (TSSC) (2008)
<http://www.environment.gov.au/biodiversity/threatened/communities/pubs/l-effusa.pdf>

Appendix A. Flora species observed during field visit

Species	Common Name	Block A1	Block A2	Block A3	Block B
<i>Acacia pycnantha</i>	Golden Wattle	x			
<i>Asparagus asparagoides f. asparagoides*</i>	Bridal Creeper	x	x	x	
<i>Asphodelus fistulosus*</i>	Onion Weed	x			
<i>Austrostipa elegantissima</i>	Elegant Spear-grass	x	x		
<i>Austrostipa sp.</i>	Spear-grass	x	x	x	x
<i>Billardiera cymosa ssp. cymosa</i>	Sweet Apple-berry	x		x	
<i>Brachyscome ciliaris var. lanuginosa</i>	Woolly Variable Daisy	x			
<i>Brassica tournefortii</i>	Wild Turnip			x	
<i>Bromus sp.</i>	Brome	x			
<i>Callitris gracilis</i>	White Cypress Pine				x
<i>Carrichtera annua</i>	Ward's Weed	x	x	x	
<i>Clematis microphylla</i>	Old Man's Beard	x			
<i>Chrysocephalum sp.</i>	Everlasting			x	
<i>Convolvulus remotus</i>	Grassy Bindweed	x			
<i>Dianella brevicaulis</i>	Short-stem Flax-lily	x			
<i>Einadia nutans ssp.</i>	Climbing Saltbush	x	x		
<i>Enchylaena tomentosa var. tomentosa</i>	Ruby Saltbush	x	x	x	x
<i>Enneapogon nigricans</i>	Black-head Grass			x	
<i>Eucalyptus gracilis</i>	Yorrell	x			
<i>Eucalyptus oleosa ssp. oleosa</i>	Red Mallee	x			
<i>Eucalyptus phenax ssp. phenax</i>	White Mallee	x		x	
<i>Eucalyptus porosa</i>	Mallee Box	x	x	x	
<i>Galenia secunda*</i>	Galenia	x	x	x	x
<i>Gomphocarpus fruticosus</i>	Narrow-leaf Cotton-bush	x			
<i>Goodenia pinnatifida</i>	Cut-leaf Goodenia	x			
<i>Hypochaeris sp.*</i>	Cat's Ear		x		
<i>Lepidosperma laterale</i>	Tall Sword-sedge			x	
<i>Lomandra effusa</i>	Scented Mat-rush	x			
<i>Lomandra micrantha ssp. micrantha</i>	Small-flower Mat-rush			x	
<i>Lycium ferocissimum*</i>	African Boxthorn	x	x	x	x
<i>Maireana brevifolia</i>	Short-leaf Bluebush	x		x	
<i>Marrubium vulgare*</i>	Horehound	x			
<i>Medicago minima var. minima*</i>	Little Medic	x	x	x	
<i>Melaleuca lanceolata</i>	Dryland Tea-tree			x	
<i>Mesembryanthemum crystallinum*</i>	Common Ice-plant	x			x
<i>Parietaria debilis*</i>	Smooth Nettle				
<i>Pimelea stricta</i>	Erect Rice-flower			x	

Species	Common Name	Block A1	Block A2	Block A3	Block B
<i>Ptolotis spathulatus</i>	Pussy Tails			x	
<i>Reichardia tingitana</i> *	False Sow-thistle	x	x		
<i>Rytidosperma caespitosa</i>	Common Wallaby Grass	x	x	x	x
<i>Senecio pinnatifolius</i> var. <i>pinnatifolius</i>	Groundsel	x	x	x	
<i>Sisymbrium</i> sp.*	Wild Mustard	x	x	x	
<i>Sonchus oleraceus</i> *	Common Sow-thistle	x	x		
<i>Vittadinia sulcata</i>	Furrow-leaf New Holland Daisy	x		x	
<i>Wurmbea dioica</i> ssp. <i>dioica</i>	Early Nancy			x	

** = exotic species

Appendix B. Scattered Tree Details

Tree Number	Species	Position	Within Preliminary Design Footprint
1	<i>Eucalyptus incrassata</i>	Inside property fence adjacent railway	No
2	<i>Eucalyptus incrassata</i>	Inside property fence adjacent railway	No
3	<i>Eucalyptus porosa</i>	Inside property fence adjacent railway	No
4	<i>Eucalyptus porosa</i>	Inside property fence adjacent railway	No
5	<i>Eucalyptus porosa</i>	In paddock	Yes
6	<i>Eucalyptus porosa</i>	In paddock	Yes
7	<i>Eucalyptus porosa</i>	In paddock	Yes
8	<i>Eucalyptus porosa</i>	In paddock	Yes
9	<i>Eucalyptus porosa</i>	In paddock	Yes
10	<i>Eucalyptus porosa</i>	In paddock	Yes
11	<i>Eucalyptus porosa</i>	In paddock	Yes
12	<i>Eucalyptus porosa</i>	In paddock	Yes
13	<i>Eucalyptus porosa</i>	In paddock	Yes
14	<i>Eucalyptus porosa</i>	Substation Road roadside vegetation	No
15	<i>Eucalyptus porosa</i>	Substation Road roadside vegetation	No
16	<i>Eucalyptus porosa</i>	Substation Road roadside vegetation	No
17	<i>Eucalyptus porosa</i>	In paddock	Yes
18	<i>Eucalyptus porosa</i>	In paddock	Yes
19	<i>Eucalyptus porosa</i>	In paddock	Yes
20	<i>Eucalyptus porosa</i>	In paddock	Yes
21	<i>Eucalyptus porosa</i>	In paddock	Yes
22	<i>Eucalyptus porosa</i>	In paddock	Yes
23	<i>Eucalyptus porosa</i>	In paddock	Yes
24	<i>Eucalyptus porosa</i>	In paddock	Yes
25	<i>Eucalyptus porosa</i>	In paddock	Yes
26	<i>Eucalyptus porosa</i>	In paddock	Yes
27	<i>Eucalyptus porosa</i>	In paddock	Yes
28	<i>Eucalyptus porosa</i>	In paddock	Yes
29	<i>Eucalyptus porosa</i>	In paddock	Yes
30	<i>Eucalyptus porosa</i>	In paddock	Yes
31	<i>Eucalyptus porosa</i>	In paddock	Yes
32	<i>Eucalyptus porosa</i>	In paddock	Yes
33	<i>Eucalyptus porosa</i>	In paddock	Yes
34	<i>Eucalyptus porosa</i>	In paddock	Yes
35	<i>Eucalyptus porosa</i>	In paddock	Yes
36	<i>Eucalyptus porosa</i>	In paddock	Yes
37	<i>Eucalyptus porosa</i>	In paddock	Yes
38	<i>Eucalyptus porosa</i>	In paddock	Yes
39	<i>Eucalyptus porosa</i>	In paddock	Yes
40	<i>Eucalyptus porosa</i>	In paddock	Yes
41	<i>Eucalyptus porosa</i>	In paddock	Yes
42	<i>Eucalyptus porosa</i>	In paddock	Yes
43	<i>Eucalyptus porosa</i>	In paddock	Yes

Tree Number	Species	Position	Within Preliminary Design Footprint
44	<i>Eucalyptus porosa</i>	In paddock	Yes
45	<i>Eucalyptus porosa</i>	In paddock	Yes
46	<i>Eucalyptus porosa</i>	In paddock	Yes
47	<i>Eucalyptus porosa</i>	In paddock	Yes
48	<i>Eucalyptus porosa</i>	Substation Road roadside vegetation	No
49	<i>Eucalyptus porosa</i>	Substation Road roadside vegetation	No
50	<i>Eucalyptus porosa</i>	Substation Road roadside vegetation	No
51	<i>Eucalyptus porosa</i>	Substation Road roadside vegetation	No
52	<i>Eucalyptus porosa</i>	In paddock	Yes
53	<i>Eucalyptus porosa</i>	In paddock	Yes

Note further details are contained within electronic DEWNR scattered trees assessment sheets, that will be provided when vegetation clearance details are finalised.