

Swan Reach Water Filtration Plant

Solar panel project

Data Report

Clearance under the *Native Vegetation Regulations 2017*

June 2019

Murraylands Road, Swan Reach

Prepared by T&M Ecologists

Table of contents

1. Application information
2. Background
3. Method
 - 3.1 Flora assessment
 - 3.2 Fauna assessment
4. Assessment outcomes
 1. Vegetation assessment
 2. Requirements of the regulation
 3. Mitigation hierarchy
5. Significant environmental benefit

Appendices

1. Bushland and Scattered Tree Vegetation Assessment Scoresheets (to be submitted in Excel format).
2. Representative photographs
3. Threatened ecological communities, flora and fauna species potentially occurring in the project area.

1. Application information

Applicant:	Aurecon Group		
Key contact:	Lauren Nicholson Phone: 0478 550 440		
Landowner:	SA Water		
Site Address:	Murraylands Road, Swan Reach		
Local Government Area:	Mid Murray Council	Hundred:	Fisher
Certificate of Title:	CT 5526/308 CR/5421/423 CT 6053/327 CR 5362/713 CR 5362/714	Section/Allotment:	Section 3 Allotment 3 DP 6634 Allotment 4 DP 46634 Allotment 10 DP 29703 Allotment 11 DP 29703
Summary of Application			
Proposed clearance area:	<p>11.06 hectares for solar panels and associated infrastructure (including 10m setback distances from arrays to security fences).</p> <p>A proposed clearance area of approximately 0.0258 hectares is required to allow for the underground power route (electrical connections) to the south of the WTP (based on an impact area for trenching width of 2 metres, with a 0.5 loading for immediate site rehabilitation).</p> <p>A proposed clearance area of approximately 0.002 hectares is required to allow for the installation of power poles for the above ground powerline which is planned to the north of the WTP.</p>		
Applicable regulation and purpose of the clearance	Regulation 12(34) – Infrastructure		
Level of risk	4		
Proposed SEB offset:	<p>As this project is part of a comprehensive program of works that involves sites across South Australia, SA Water proposes to pursue a suite of regionally based on-ground offsets, through the establishment, regeneration or maintenance of native vegetation so as to generate a net environmental gain to compensate for the residual impact of the infrastructure. This program of offsets will be developed in consultation with the Native Vegetation Unit of the Department of Environment and Water, and will aim to tailor the offset activity on a regional basis so as to address the affected matter associated with local clearances and/or address a regional conservation priority, if relevant.</p> <p>Where residual impacts cannot be fully addressed by direct offsets, SA Water will apply for payment into the Native Vegetation Fund, as required. A draft plan is currently being developed by SA Water, and will be informed by the types of vegetation removed and the amount of offset required.</p>		

2. Background

2.1 Location and landuse

This project involves the proposed installation of solar panels and associated infrastructure at the Swan Reach Water Filtration Plant on Murraylands Road at Swan Reach. See Figure 1 for location.

The existing SA Water infrastructure associated with the proposed development comprises the Swan Reach Water Treatment Plant (WTP) and the first of the major pumping stations along the Swan Reach to Stockwell Pipeline. The pipeline spans 54km from the Swan Reach Water Treatment Plant (WTP) where raw water is drawn directly from the River Murray and is treated prior to it being pumped into the pipeline. The pipeline was built to supply the Barossa Valley, Lower North and Yorke Peninsula areas and was first used in the 1960s, designed to supplement existing water supply. The pipeline (and associated pump stations) serves townships and farm land along its route, from Swan Reach on the Murray to Stockwell in the Barossa Valley, and also connects into the Yorke Peninsula supply.

The Swan Reach Water Treatment Plant, an advanced water treatment plant built in 1998 for SA Water and operated by Trility, is located just north of the township of Swan Reach on the Eastern Bank of the River Murray and filters and treats the river water prior to it being pumped into the pipeline. The plant produces around 90ML/day and supplies approximately 32,000 customers. The Swan Reach PPS.1 pump station is one of four major pump stations located on the River Murray below Lock 1 and pumps raw water from the river to the water treatment plant.

Surrounding landuse is largely dryland agriculture. The River Murray is immediately adjacent to the east of the proposed clearance area. Brookfield Conservation Park is located approximately 14km to the north-west and Swan Reach Conservation Park is approximately 10km to the south-west.

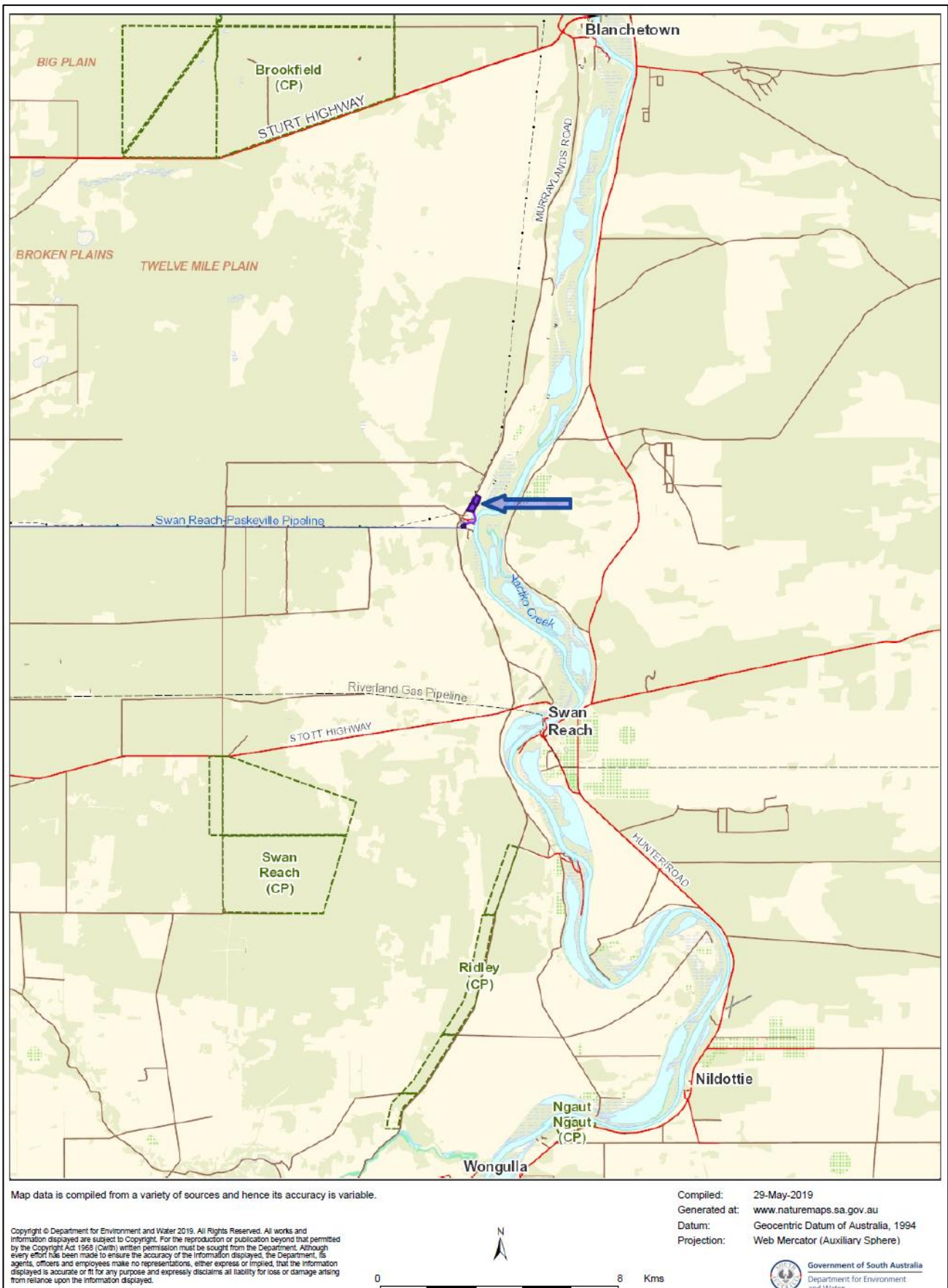


Figure 1: Location of proposed solar panel installation, Swan Reach Wastewater Treatment Plant

A total area of approximately 10.8 hectares to the north of the wastewater treatment plant was assessed in January 2019. Additional locations (8.778 hectares in total) were assessed in April 2019 to encompass the required electrical cabling route, as well as an additional solar PV installation area south of the treatment lagoons.

A broad area was surveyed for the electrical cabling route as the exact path this would take (for both the northern and southern array connections) is not yet confirmed, pending information on geotechnical constraints. However there is indicative agreement that the southern power route will require underground trenching, while the northern route will likely comprise an overhead line (see Figure 2).

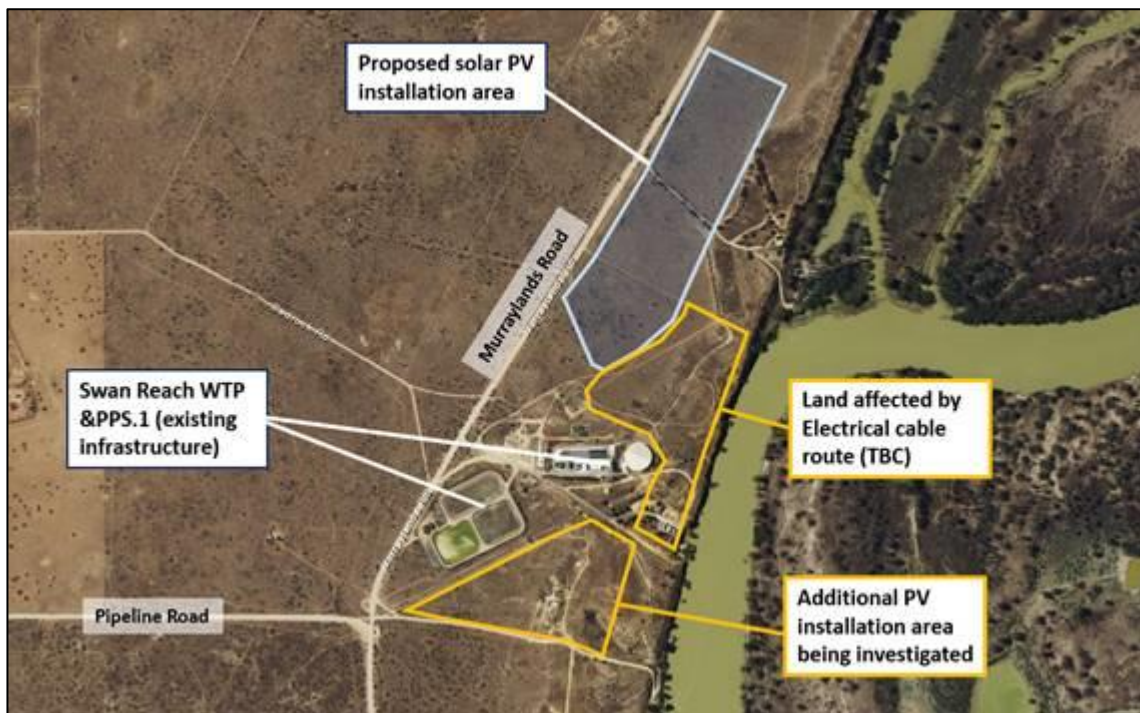


Figure 2: Areas assessed in January 2019 are highlighted in blue. Additional areas assessed in April 2019 are shown with yellow outline.

Figure 3 shows the solar array areas and associated electrical cable routes. The northern power route (approx. 375 metres long) will likely be an above-ground cable, where the main clearance is limited to the associated power pole bases, though a 10m wide easement will also be applied to this route, however it is unlikely that any clearance/vegetation management will be required to ensure the electrical route is accessible for maintenance purposes due to the low-lying nature of the vegetation. The southern cable route (approx. 350 metres long) will be an underground easement, with a trenching width of 1-2 metres required. After the underground cable is laid, vegetation will be able to regenerate within the route.



Figure 3: Shows the solar array areas (blue outline) and associated electrical cable routes (dashed black line). Note that the cable route is proposed to be above ground (overhead) in the northern half and underground in the southern half.

2.2 Approvals required or obtained under other legislation (including past clearance approvals)

The proposed installation of solar PV arrays and associated infrastructure is presently under assessment by the State Commission Assessment Panel (SCAP) as a Crown Development and Public Infrastructure application, in accordance with Section 49 of the *Development Act 1993*.

As part of the assessment process, the application was referred for comment to the Mid Murray Council, Native Vegetation Council, Minister for the River Murray and the SA Murray-Darling Basin NRM Board with no objections or requests for further information having been received.

3. Method

3.1 Flora assessment

Vegetation data was gathered using DEW's Bushland Assessment methodology and Scattered Tree Assessment methodology¹.

¹ Native Vegetation Management Unit, Department of Environment and Water, 2017.

3.2 Fauna assessment

3.2.1 Database searches for flora and fauna

Results from the on-site assessment were supplemented with searches within a 5-10 kilometre buffer of the boundaries of the survey area using the following resources:

- South Australian Department of Environment and Water (DEW) Biological Database of South Australia (BDBSA) search² within a 10km radius;
- Nature Maps³ (5km radius); and
- Department of Environment and Energy (DoEE) Protected Matters Search Tool (PMST)⁴ (5km radius).

3.2.2 Southern Hairy-nosed Wombat

As a number of active and disused Southern Hairy-Nosed Wombat (*Lasiorchinus latifrons*) burrows and warrens have been identified within the proposed solar PV installation area, SA Water's construction partner has engaged the services of Shimmin Environmental Consultants to undertake a survey of the burrows and provide mapping to determine the full extent of these burrows and therefore what exclusionary areas should be factored into final designs to minimise impact upon the wombat population, as well as to ensure the structural adequacy of the solar PV arrays. It is expected that this survey will be undertaken within the next month and results will then be used to finalise the layout of the solar PV array. The findings will also be provided to the Native Vegetation Unit.

As part of this field assessment, undertaken in January and April 2019, active and disused warrens and burrows were recorded and mapped (see Figure 2 for locations). However, this was not a comprehensive survey.

4. Assessment Outcomes

4.1 Vegetation Assessment

The assessment area directly to the north of the Swan Reach Water Filtration Plant (WTP) occurs on Crown Reserve land within Allotment 3 D6634, Hundred of Fisher. This northern site has been divided into 'Area 1' (north) and 'Area 2' (south) which are separated by a track/roadway that provides access from Murraylands Road to a property on the adjacent floodplain.

Assessment areas to the south and east of the WTP are within Allotment 4 D46634, Allotment 10 D29703 and Allotment 11 D29703, Hundred of Fisher.

A total of 8 separate native vegetation communities were assessed and the Bushland Assessment Summary Scoresheets are included in Appendix 1 and representative photographs in Appendix 2. There is also an area of **Pinus halepensis* (Community 9) which is shown on Figure 4 but was not assessed as a native vegetation community.

These communities are shown on Figure 4 and are described as follows:

1. False Sandalwood (*Myoporum platycarpum*) Low open woodland

A small patch (0.3626ha) of woodland occurs towards the south-eastern end of Area 2. The understorey is dominated by Bitter Saltbush (*Atriplex stipitata*) and Spine Bush (*Acacia nyssophylla*). There is evidence of heavy grazing throughout with widespread signs of wombats (diggings and scats). Rabbits and kangaroos are also present and impacting on native vegetation.

Fifteen native plant species were observed in this vegetation type. Native:exotic understorey biomass was estimated to be 81-90%, however trees are in poor health overall and no hollows were noted. Fallen timber was sparse and bare ground was estimated to be 5-10%.

² Department of Environment and Natural Resources, Biological Databases of SA (BDSA). This data has been sourced from the South Australian Department of Environment, Water and Natural Resources Biological Database of SA. Recordset number

³ <http://spatialwebapps.environment.sa.gov.au/naturemaps>

⁴ Australian Government (2018). <http://www.environment.gov.au/epbc/protected-matters-search-tool> accessed 21/11/2018.

2. *Senna* spp. +/- Spine Bush (*Acacia nyssophylla*) Shrubland over Bitter Saltbush (*Atriplex stipitata*) with widely scattered emergent False Sandalwood (*Myoporum platycarpum*).

This community occurs across both Area 1 and Area 2 and covers approximately 4.0168ha. There is evidence of heavy grazing throughout with widespread signs of wombats, including diggings and scats.

Thirteen native plant species were observed in this vegetation type. Native:exotic understorey biomass was estimated to be 81-90% and bare ground was estimated to be 5-10%.

A row of planted Southern Cypress Pine (*Callitris gracilis*) occur adjacent to Murraylands Road on the northern half of the north-west boundary of Area 2. Also, a row of planted Aleppo Pine (**Pinus halepensis*) occur adjacent to Murraylands Road towards the more southern half of Area 1.

3. Bitter Saltbush (*Atriplex stipitata*) Low open shrubland with emergent *Senna* spp. and Spine Bush (*Acacia nyssophylla*).

This community is the most widespread (approximately 5.6727ha) and occurs in more degraded parts across both Area 1 and Area 2. There is evidence of heavy grazing throughout with widespread signs of wombats, including diggings, scats and both active and disused warrens (see Figure 2 for locations). Weed cover in this community is also higher due to its more open and disturbed nature.

Eight native plant species were observed in this vegetation type. Native:exotic understorey biomass was estimated to be 61-70%, and bare ground was estimated to be 11-20%.

A row of planted and irrigated trees (**Schinus* sp.?) occur along the north-eastern boundary of Area 1.

4. Bitter Saltbush (*Atriplex stipitata*) Low open shrubland with emergent Spine Bush (*Acacia nyssophylla*) and Sticky Hop-bush (*Dodonaea viscosa* ssp.)

This community occurs across large tracts of the more northern block and is approximately 4.977 hectares in area. There is evidence of heavy grazing throughout with widespread signs of wombats (diggings, scats, grazing, active burrows and warrens). A total of 12 native plant species was observed in this vegetation type.

The impact on this community is likely to be negligible because the only infrastructure proposed in this location is an overhead powerline. There will be up to 10 power poles installed, each of requires the clearance of a 2.4m wide x 1.02m long (2.45 metres²) footing 'pad'. A total clearance area of approximately 0.00245 hectares has therefore been estimated to allow for the installation of power poles. A reduction has been applied to allow for rehabilitation of the site post-construction. It is unlikely that any ongoing maintenance trimming will be required beneath the powerline due to the low-lying nature of the vegetation.

5. Sticky Hop-bush (*Dodonaea viscosa* ssp.) +/- Spine Bush (*Acacia nyssophylla*) Shrubland with widely scattered emergent False Sandalwood (*Myoporum platycarpum*) and Umbrella Wattle (*Acacia oswaldii*).

Two small patches of this community occur in the more northern block, covering a total area of approximately 0.2418 hectares. There is evidence of heavy grazing throughout with widespread signs of wombats, including diggings and scats. Thirteen native plant species were observed in this vegetation type.

The impact on this community is likely to be negligible because the only infrastructure proposed in this location is an overhead powerline. It is unlikely that any ongoing maintenance trimming will be required beneath the powerline due to the low-lying nature of the vegetation.

6. Broad-leaf Desert Senna (*Senna artemisioides x coriacea*) +/- Spine Bush (*Acacia nyssophylla*) Shrubland with emergent False Sandalwood (*Myoporum platycarpum*).

This community occurs in the western third and covers approximately 1.0406 hectares in total area, with an area of impact of 0.483 hectares. A total of 15 native plant species was observed in this vegetation type. No wombat warrens or burrows were observed in this area and the vegetation is in better condition than other parts of the assessment area.

7. Bitter Saltbush (*Atriplex stipitata*), Ruby Saltbush (*Enchylaena tomentosa*) Low open shrubland

Occurs across a total assessed area of approximately 1.599 hectares of the southern block. Areas of impact are 0.3447 hectares for solar panels and 0.0177 hectares for below ground powerline (this is based on an impact area for trenching width of 2 metres, with a 0.5 loading for immediate site rehabilitation).

A total of 3 native plant species was recorded in this vegetation type which has evidence of wombat grazing/damage. Bare ground was estimated to be 21-30%.

8. Spine Bush (*Acacia nyssophylla*) Open shrubland with emergent False Sandalwood (*Myoporum platycarpum*)

Occurs across a total assessed area of approximately 0.9197 hectares at the north-eastern end of the southern block, with an area of impact of 0.1881 hectares for solar panels and 0.0081 hectares for below ground powerline (based on an impact area for trenching width of 2 metres, with a 0.5 loading for immediate site rehabilitation).

A total of 5 native plant species was recorded in this vegetation type which has evidence of wombat grazing/damage. Bare ground was estimated to be 21-30%.

Three (3) scattered River Red Gums (*Eucalyptus camaldulensis* ssp. *camaldulensis*) were also assessed as they are situated within the boundary of the proposed clearance envelope (Figure 2). While the River Red Gums were included in the broader survey area, it has since been confirmed by SA Water's construction partner that the associated power easement which is to connect the northern array to the pump station connection point will follow a route further up the bank to avoid these trees and the steeper terrain.

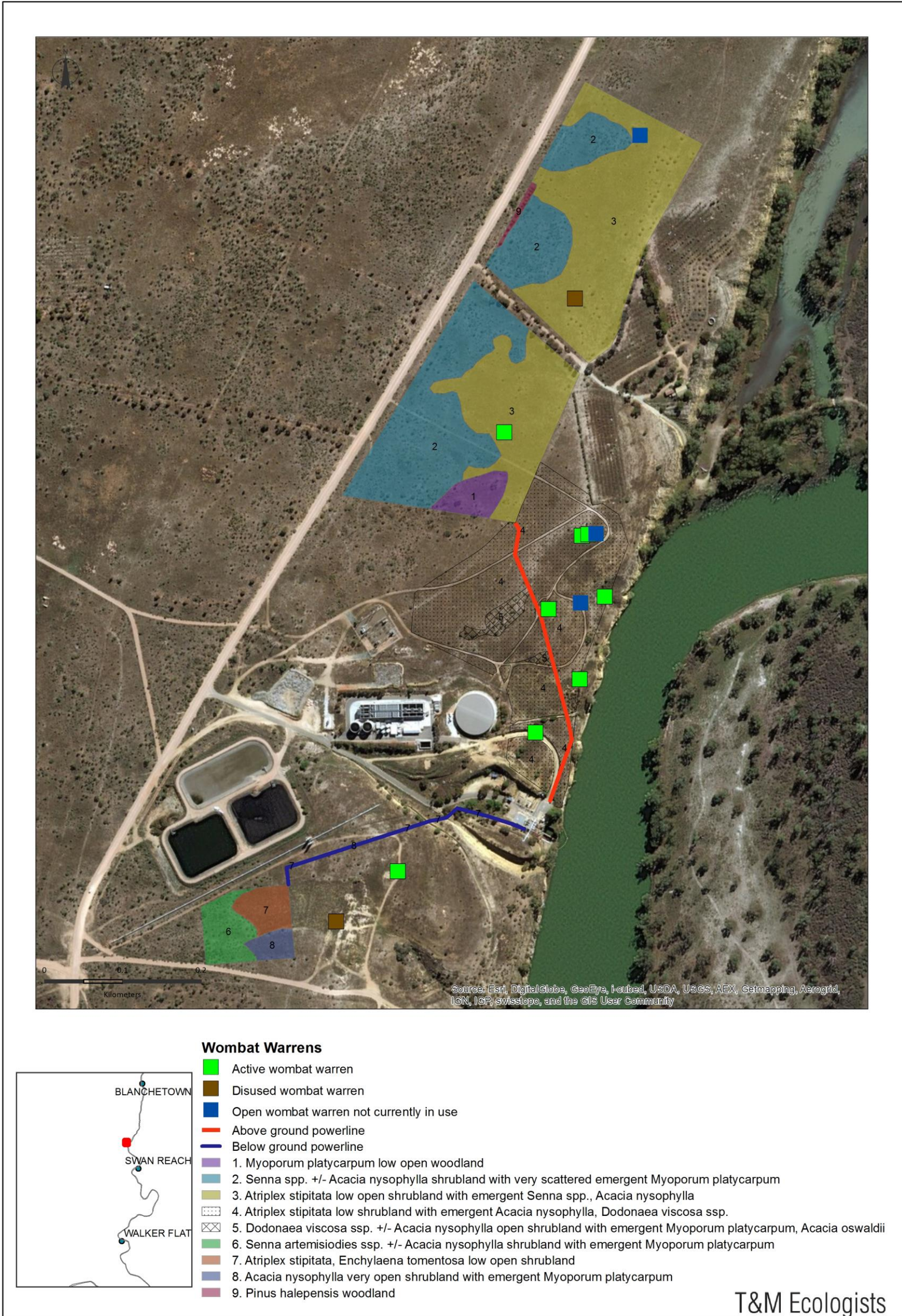


Figure 4: Vegetation communities and wombat warrens/burrows mapped as part of this assessment.

4.2 Database search results

A search of various databases and other sources (Section 3.2.1) was undertaken and threatened vegetation communities and threatened flora and fauna species which have been recorded within a 5-10km radius of the site are listed in Appendix 3 which includes comments on the likelihood that these communities/species would occur within the project area.

4.3 Requirements of the Regulation

Provide information on how the proposed clearance meets the requirements of the regulation.

i. Identify the regulation under which the proposed clearance is applicable and demonstrate that it meets all the criteria of the regulation contained in Division 5 and Schedule 1

The proposed clearance is being undertaken under *Regulation 12(34) – Infrastructure*. This Regulation is to allow clearance of vegetation incidental to the construction or expansion of a building or infrastructure (and associated services) where the Minister has declared that the clearance is in the public interest.

ii. Risk Assessment - determine the level of risk and provide information to support the risk assessment– see [Guide for Applications to Clear Native Vegetation](#)

Under the risk assessment pathway, as part of the Native Vegetation Regulations, two considerations will be applied to assess the risk to biodiversity conservation of a proposed clearance:

1. the size of the clearance (area of clearance or number of trees to be cleared); and
2. the presence of threatened species or communities (representing principles b,c and d of the 'Principles of Clearance', *Native Vegetation Act 1991*).

In this instance, the level of risk has been identified as **Level 4** because the proposed areas of clearance have a Total Biodiversity Score of greater than 250. The relevant **Principles** are addressed below, with reference to data gathered within the proposed clearance area.

b. the vegetation has significance as habitat for wildlife

The **Protected Matters Search Tool (PMST)** search (5km radius) listed 7 fauna species with a Type of Presence of “Species or species habitat known to occur within area”⁵. These are:

- Southern Bell Frog (*Litoria raniformis*)
- Greater Bilby (*Macrotis lagotis*)
- Common Sandpiper (*Actites hypoleucos*)
- Great Egret (*Ardea alba*)
- Sharp-tailed Sandpiper (*Calidris acuminata*)
- Pectoral Sandpiper (*Calidris melanotos*)
- White-bellied Sea Eagle (*Haliaeetus leucogaster*)

It is considered that the project area is not providing significant habitat for any of these species (see Appendix 3 for details).

A search of **NatureMaps** within a 5km radius listed 3 threatened fauna species:

- Southern Bell Frog (*Litoria raniformis*)
- Broadshelled Turtle (*Chelodina expansa*)

⁵ As per guideline provided in the “Native Vegetation Council (NVC) Bushland Assessment Manual”.

- Macquarie River Turtle (*Emydura macquarii*)

It is considered that the project area is not providing significant habitat for any of these species (see Appendix 3 for details).

A search of the **Biological Database of South Australia (BDBSA)** listed one bird species of State conservation significance which has been recorded in similar habitat within a 10km radius of the site - Gilbert's Whistler, *Pachycephala inornata*, rated Rare in South Australia. This species may possibly utilize Community 1 – *Myoporum platycarpum* Low woodland.

Using the Bushland Assessment scoring, the "Guide for applications to clear native vegetation"⁶ provides the following criteria for assessment against this Principle:

Threatened Fauna Score	At Variance with the Principles
0	Not at variance
<0.05	At variance
>0.05	Seriously at variance
Or	
A vegetation association with a Unit Biodiversity Score of >60	Seriously at variance

Table 2 assesses the vegetation present across the proposed clearance site against this Principle, using the above criteria.

Table 2: Assessment of vegetation communities as a habitat for wildlife using NVC criteria

Site/Vegetation Community	Threatened fauna present or may be present	Threatened fauna score	Unit Biodiversity Score	Assessment against Principle b
1. <i>Myoporum platycarpum</i> Low open woodland	1 State Rare species	0.02	59.65	At variance
2. <i>Senna</i> spp. +/- <i>Acacia nyssophylla</i> Shrubland over <i>Atriplex stipitata</i> with very scattered emergent <i>Myoporum platycarpum</i>	Nil	0	62.61	Seriously at variance
3. <i>Atriplex stipitata</i> Low open shrubland with scattered emergent <i>Acacia nyssophylla</i> and <i>Senna</i> spp.	Nil	0	29.45	Not at variance
4. Bitter Saltbush (<i>Atriplex stipitata</i>) Low open shrubland with emergent Spine Bush (<i>Acacia nyssophylla</i>) and Sticky Hop-bush (<i>Dodonaea viscosa</i> ssp.)	Nil	0	28.75	Not at variance
5. Sticky Hop-bush (<i>Dodonaea viscosa</i> ssp.) +/- Spine Bush (<i>Acacia nyssophylla</i>) Shrubland with widely scattered emergent False Sandalwood (<i>Myoporum platycarpum</i>) and Umbrella Wattle (<i>Acacia oswaldii</i>).	Nil	0	-	Not at variance
6. Broad-leaf Desert Senna (<i>Senna artemisioides</i> X <i>coriacea</i>) +/- Spine Bush (<i>Acacia nyssophylla</i>) Shrubland with emergent False Sandalwood (<i>Myoporum platycarpum</i>).	Nil	0	56.94	Not at variance
7. Bitter Saltbush (<i>Atriplex stipitata</i>), Ruby Saltbush Low open shrubland	Nil	0	17.18	Not at variance

⁶ Native Vegetation Council (2017). *Guide for applications to clear native vegetation under the Native Vegetation Act 1991 and Native Vegetation Regulations 2017*. Department for Environment, Water and Natural Resources, Adelaide.

Site/Vegetation Community	Threatened fauna present or may be present	Threatened fauna score	Unit Biodiversity Score	Assessment against Principle b
8. Spine Bush (<i>Acacia nyssophylla</i>) Open shrubland with emergent False Sandalwood (<i>Myoporum platycarpum</i>)	Nil	0	30.71	Not at variance

The proposed clearance is therefore **not at variance with Principle b for Communities/Sites 3-8**. Although **Community 1 has been assessed as being ‘At variance’ with Principle b**, it is considered to be a very small and heavily grazed area, therefore its proposed clearance would not be likely to have a significant impact on this species.

Community 2 has been assessed as being **‘Seriously at variance’ with Principle b** because it has a Unit Biodiversity Score of 62.61, however *Acacia nyssophylla* is considered to be an increaser species in this region and, as this spiny species is highly unpalatable, it is not readily grazed and it increases while other more palatable species decrease through grazing⁷. This area, which has been heavily grazed over a long period, is considered to have a decreased structural diversity, with native grasses, herbaceous species and understorey small shrubs greatly reduced in number and cover. Therefore, the proposed clearance of Community 2 has been tempered to “at variance” with Principle b.

c. the site includes plants of a rare, vulnerable or endangered species

The **Protected Matters Search Tool (PMST)** search (5km radius) did not list any flora species with a Type of Presence of “Species or species habitat known to occur within area”⁸. (See Appendix 3 for details.)

A search of **Nature Maps** within a 5km radius listed 9 threatened flora species (see Appendix 3 for details). However, none of these species were recorded during the field assessments and, given the degraded nature of the project area, it is considered that none of these species are likely to occur.

A search of the **Biological Database of South Australia (BDBSA)** listed a further 21 threatened flora species which have been recorded within a 10km radius. Only one of these species, the State Rare Rohrlach’s Bluebush (*Maireana rohrlachii*), was recorded during the field survey. This species was found in Community 1, Community 4 and Community 6.

Using the Bushland Assessment scoring, the “Guide for applications to clear native vegetation”⁹ provides the following criteria for assessment against this Principle:

Threatened Fauna Score	At Variance with the Principles
0	Not at variance
<0.05	At variance
>0.05	Seriously at variance

Table 3 assesses the vegetation present across the proposed clearance site against this Principle.

⁷ Croft, SJ, Pedler, JA & Milne, TI (2009). *Bushland Condition Monitoring Manual: Murray Darling Basin South Australia*, Nature Conservation Society of South Australia Inc., July 2009.

⁸ As per guideline provided in the “Native Vegetation Council (NVC) Bushland Assessment Manual”.

⁹ Native Vegetation Council (2017). *Guide for applications to clear native vegetation under the Native Vegetation Act 1991 and Native Vegetation Regulations 2017*. Department for Environment, Water and Natural Resources, Adelaide.

Table 3: Assessment of vegetation communities as including threatened flora species using NVC criteria

Site/Vegetation Community	Threatened fauna present or may be present	Threatened flora score	Assessment against Principle c
1. <i>Myoporum platycarpum</i> Low open woodland	1 State Rare species	0.02	At variance
2. <i>Senna</i> spp. +/- <i>Acacia nysophylla</i> Shrubland over <i>Atriplex stipitata</i> with very scattered emergent <i>Myoporum platycarpum</i>	Nil	0	Not at variance
3. <i>Atriplex stipitata</i> Low open shrubland with scattered emergent <i>Acacia nysophylla</i> and <i>Senna</i> spp.	Nil	0	Not at variance
4. Bitter Saltbush (<i>Atriplex stipitata</i>) Low open shrubland with emergent Spine Bush (<i>Acacia nysophylla</i>) and Sticky Hop-bush (<i>Dodonaea viscosa</i> ssp.)	1 State Rare species	0.02	At variance
5. Sticky Hop-bush (<i>Dodonaea viscosa</i> ssp.) +/- Spine Bush (<i>Acacia nysophylla</i>) Shrubland with widely scattered emergent False Sandalwood (<i>Myoporum platycarpum</i>) and Umbrella Wattle (<i>Acacia oswaldii</i>).	Nil	0	Not at variance
6. Broad-leaf Desert Senna (<i>Senna artemisioides</i> X <i>coriacea</i>) +/- Spine Bush (<i>Acacia nysophylla</i>) Shrubland with emergent False Sandalwood (<i>Myoporum platycarpum</i>).	1 State Rare species	0.02	At variance
7. Bitter Saltbush (<i>Atriplex stipitata</i>), Ruby Saltbush Low open shrubland	Nil	0	Not at variance
8. Spine Bush (<i>Acacia nysophylla</i>) Open shrubland with emergent False Sandalwood (<i>Myoporum platycarpum</i>)	Nil	0	Not at variance

The clearance which is proposed in **Community 2, Community 3, Community 5, Community 7 and Community 8 is therefore 'Not at variance' with Principle c.**

The clearance which is proposed in **Community 1, Community 4, and Community 6 is 'At variance with Principle c'**. However, given the highly degraded and over-grazed condition of the vegetation, it is unlikely that clearance of a small number of *Maireana rohrlichii* individuals will lead to a long-term decrease in the size of the population overall.

d. the vegetation comprises the whole, or a part, of a plant community that is Rare, Vulnerable or Endangered

No plant communities of State or National conservation significance were recorded during the site assessment. The proposed clearance is therefore **not at variance with Principle d.**

4.4 Address the Mitigation Hierarchy

The NVC will assess the measures taken to avoid and minimize impacts on biodiversity and rare or threatened species or ecological communities within the property or immediate vicinity of the development.

Demonstrate how the clearance proposal addresses the following:

a) Avoidance – outline measures taken to avoid clearance of native vegetation such as making adjustments to the location, design, size or scale of the activity in order to reduce the impact.

Construction works proposed at this site forms part of a larger program involving the installation of solar panels and battery storage at over 70 high energy-use SA Water sites around the state of South Australia. To deliver 'behind-the-meter generation', these installations have to be as close as reasonably practicable to the point of connection. During project development SA Water has taken measures to prioritise sites that are either already cleared of vegetation or have degraded vegetation present, and avoid areas of high quality intact native vegetation. In addition, SA Water has taken measures to maximise installations at sites with high network capacity and low environmental impact aspects (such as native vegetation or heritage), thereby avoiding impacts at other sites.

The solar PV installation proposed at the Swan Reach Water Filtration Plant and Pump Station No.1 is one of three such installations planned along the Swan Reach to Stockwell Pipeline. At the third pump station along this pipeline, approximately 32km to the west in the area of Truro, it was previously proposed that approximately 6 hectares of land within the property at Q97, FP200136 Hundred of Jellicoe (Pipeline Road, Truro) would accommodate solar PV arrays and a native vegetation survey was undertaken here in November 2018. The undertaking of this survey found mature remnant Peppermint Box (*Eucalyptus odorata*) trees containing multiple hollows and observed to be regenerating following previous bushfires.

The mature Peppermint Box trees were noted as likely providing important habitat for several threatened bird species including the White-winged Chough, Diamond Firetail and Hooded Robin (South East ssp.) which have been recorded within similar habitat within a 5km radius of the assessment site. These factors contributed to a high overall Biodiversity Score (290.08) which was not considered an acceptable outcome for the Zero Cost Energy Future project and this site has since been removed from the program, placing even greater importance upon the ability of all remaining sites to generate commensurate power outputs required to achieve net zero energy usage. The proposed location at Swan Reach WFP and PPS.1 is considered appropriate as this location exhibits overall lesser quality vegetation communities which are not considered to provide significant habitat for threatened fauna species

b) Minimization – if clearance cannot be avoided, outline measures taken to minimize the extent, duration and intensity of impacts of the clearance on biodiversity to the fullest possible extent.

In finalising the design of the solar installation, SA Water will seek to minimise the clearance of native vegetation by utilising existing vehicle access tracks where possible, retaining any vegetation present in a 10m buffer around the site boundary and designing solar panel layout to maximise the amount placed in vegetation associations with a lower Unit Biodiversity Score (i.e. place infrastructure in areas of poorer quality vegetation over higher quality vegetation).

Where possible within the site, native grasses and groundcovers will be retained, however once installed, the panel arrays will likely cause a reduction in cover of native groundcovers due to shading. In addition, a 'Site Specific Environmental Control Plan' will be required for the construction phase to manage any native vegetation and ensure only vegetation approved for removal is cleared. Compliance with the plan will be monitored and audited during the works, and a final audit of the remaining native vegetation and its condition will be done at completion of works. Appropriate design and site positioning will be reviewed in the detailed design stage to minimise the overall clearance of vegetation required.

c) Rehabilitation or restoration – outline measures taken to rehabilitate ecosystems that have been degraded, and to restore ecosystems that have been degraded, or destroyed by the impact of clearance that cannot be avoided or further minimized, such as allowing for the re-establishment of the vegetation.

At all sites, perimeter fencing will be installed around the solar array that will exclude grazing by livestock and other herbivores, thereby enabling recovery of any remnant native vegetation within the site. Solar panels will be set back 10 metres from the perimeter providing opportunity for SA Water to undertake, where possible, infill planting of appropriate native species of local provenance to enhance screening functions and support local

biodiversity. SA Water has instructed the appointed construction contractor to utilise slashing or mowing techniques, as opposed to a blanket clearing or grading of the development area (which would leave bare earth) to allow for the vegetation with lower height profiles to regenerate post construction. Vegetation of greater height (trees/ large shrubs) will likely need to be entirely removed from the development area as they pose a risk to the solar arrays if they re-grow to pre-construction heights. The removed vegetation material would be retained on site for potential use as 'habitat stacks'. These methods will be confirmed within final design details and regulated through the Site Specific CEMP.

d) Offset – any adverse impact on native vegetation that cannot be avoided or further minimized should be offset by the achievement of a significant environmental benefit that outweighs that impact.

As this project is part of a comprehensive program of works that involves sites across South Australia, SA Water proposes to pursue a suite of regionally based on-ground offsets, through the establishment, regeneration or maintenance of native vegetation so as to generate a net environmental gain to compensate for the residual impact of the infrastructure on region-by-region basis. This program of offsets will be developed in consultation with the Native Vegetation Unit of the Department of Environment and Water, and will aim to tailor the offset activity on a regional basis so to address the affected matter associated with local clearances and/or address a regional conservation priority if relevant. SA Water intends to pool offset activity into one or more larger sites within each region so as to maximise habitat values and minimise edge effects. Where residual impacts cannot be fully addressed by direct offsets, SA Water will apply for payment into the native Vegetation Fund as required. A draft plan is currently being developed by SA Water, and will be informed by the types of vegetation removed and the amount of offset required in each region.

5. Significant Environmental Benefit

A Significant Environmental Benefit (SEB) is required for approval to clear under Division 5 of the *Native Vegetation Regulations 2017*. The NVC must be satisfied that as a result of the loss of vegetation from the clearance that an SEB will result in a positive impact on the environment that is over and above the negative impact of the clearance.

The Data Report must propose how the SEB will be achieved in accordance with the [SEB Policy and Guide](#), by providing the following information.

DETERMINATION OF THE SEB OBLIGATION

Table 4 summarises the assessment outcomes for the proposed area of impact assessed using the Bushland Assessment Method. See Appendix 1 for the Bushland Assessment Scoresheets.

Table 4: Summary of Bushland Assessments

Vegetation Community	Area (ha) of proposed impact	Unit Biodiversity Score	Total Biodiversity Score	SEB Points required
1	0.3626	59.65	21.63	22.71
2	4.0168	62.61	251.48	264.06
3	5.6727	29.45	167.04	175.39
4	.00245	28.75	0.07	0.05
5	-	-	-	-
6	0.4830	56.94	27.5	28.88
7	0.3624	17.18	6.22	6.54
8	0.1962	30.71	6.02	6.33

ACHIEVING AN SEB

Indicate how the SEB will be achieved by ticking the appropriate box:

- Establish a new SEB Area on land owned by the proponent. **Provide information below.**

- Use SEB Credit that the proponent has established. Provide the SEB Credit Ref. No. _____
- Apply to have SEB Credit assigned from another person or body. The [application form](#) needs to be submitted with this Data Report.
- Apply to have an SEB to be delivered by a Third Party. The [application form](#) needs to be submitted with this Data Report.
- Pay into the Native Vegetation Fund

FOR AN ON-GROUND SEB

As this project is part of a comprehensive program of works that involves sites across South Australia, SA Water proposes to pursue a suite of regionally based on-ground offsets, through the establishment, regeneration or maintenance of native vegetation so as to generate a net environmental gain to compensate for the residual impact of the infrastructure on a region-by-region basis.

This program of offsets will be developed in consultation with the Native Vegetation Unit of the Department of Environment and Water, and will aim to tailor the offset activity on a regional basis so to address the affected matter associated with local clearances and/or address a regional conservation priority if relevant. SA Water intends to pool offset activity into one or more larger sites within each region so as to maximise habitat values and minimise edge effects. Where residual impacts cannot be fully addressed by direct offsets, SA Water will apply for payment into the native Vegetation Fund as required. A draft plan is currently being developed by SA Water, and will be informed by the types of vegetation removed and the amount of offset required in each region.

FOR A PAYMENT SEB

If a proponent is unable to provide an on ground SEB, a proponent may choose, subject to meeting certain requirements as described in the SEB Policy, to make a payment into the Native Vegetation Fund in lieu of providing an on ground SEB¹⁰.

Table 6 provides indicative values for a cash offset for clearance of the different vegetation types within the assessment site.

¹⁰ Native Vegetation Council (2016). Guide for calculating a Significant Environmental Benefit Under the Native Vegetation Act 1991 and Native Vegetation Regulations 2017. Government of South Australia, Adelaide.

Table 6: Cash offset values for the proposed clearance

Area	Unit Biodiversity Score	Payment Required (GST exclusive)	Administration Fee (GST inclusive)
1	59.65	\$7,523.07	\$413.77
2	62.61	\$87,469.54	\$4,810.82
3	29.45	\$58,098.41	\$3,195.41
4	28.75	\$17.15	\$0.94
5	-	-	-
6	56.94	\$9,565.81	\$526.12
7	17.18	\$2,165.11	\$119.08
8	30.71	\$2,095.55	\$115.26

Appendix 1: Bushland Assessment Scoresheets

Note that only the Site Scoresheets have been included here – the full set of sheets which also includes the 'Block', 'Flora' and 'Fauna' sheets will be uploaded to the NVC portal at the time of application lodgement.

Vegetation Community 1

Vegetation Condition Scores																									
VEGETATION COMMUNITY	1																								
BCM COMMUNITY	MDBSA 1.1 Open Woodland with Open Arid adapted Shrub Understorey on Limestone Plains																								
VEGETATION ASSOCIATION DESCRIPTION	Myoporum platycarpum Low open woodland																								
SIZE OF SITE (Ha)	0.3626																								
Benchmarked attributes (Scores determined by comparing to a Benchmark community)																									
Number of Native Species (Minus herbaceous annuals for spring Surveys)	15																								
Native Plant Species Diversity Score (max 30) from benchmark score <i>weighted by a factor of 2</i>	24.0																								
Number of regenerating native species	2																								
Regeneration Score (max 12) from benchmark community weighted by a factor of 1.5	6																								
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I																						
Carrichtera annua	1	2	2																						
Asphodelus fistulosus	1	2	2																						
Romulea sp.	1	2	2																						
			0																						
			0																						
	Cover x Threat		6																						
Weed Score (max 15) from benchmark community			12																						
Native Plant Life Forms (max 20) from benchmark score <i>weighted by a factor of 2</i>			18.0																						
Native Plant Life Forms																									
Trees > 15m																									
Trees 5 - 15 m			2																						
Trees < 5m			3																						
Mallee > 5m																									
Mallee < 5m																									
Shrubs > 2m			1																						
Shrubs 0.5 - 2m			3																						
Shrubs < 0.5			3																						
Forbs																									
Mat Plants																									
Grasses > 0.2m																									
Grasses < 0.2m			1																						
Sedges > 1m																									
Sedges < 1m																									
Hummock grasses																									
Vines, scramblers																									
Mistletoe			1																						
Ferns																									
Grass-tree																									
Total			14																						
Non-Benchmarked Attributes (Scores determined from direct field observations)																									
<i>Is the community naturally treeless?</i>			<input type="checkbox"/>																						
Tree Health Score (max 5)			3																						
Fallen timber/debris (max 5)			0																						
Hollow-bearing trees Score (max 5)			0																						
Native:exotic Understorey biomass score (max 3)	3																								
Bare Ground Score (max 5)	4																								
Vegetation Condition Score calculation																									
Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms + Native:exotic understorey biomass + Tree health + Fallen timber/debris + Hollow-bearing trees																									
- If the community Score is Not Benchmarked (SNB) for regeneration this score is multiplied 1.18																									
- If the community is naturally treeless this score is multiplied by 1.23																									
			54.00																						
Negative Vegetation Attributes Score = Weeds + Bare ground			16																						
VEGETATION CONDITION SCORE (Positive veg attributes x ((Negative vegetation attributes + 60) / 80))			51.30																						
<table border="1"> <thead> <tr> <th>Attribute</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>Native Plant Species Diversity</td> <td>24.0</td> </tr> <tr> <td>Weed Score</td> <td>12</td> </tr> <tr> <td>Native Plant Life Forms</td> <td>18.0</td> </tr> <tr> <td>Regeneration</td> <td>6</td> </tr> <tr> <td>Native:exotic Understorey Biomass</td> <td>3</td> </tr> <tr> <td>Bare Ground</td> <td>4</td> </tr> <tr> <td>Tree Health</td> <td>3</td> </tr> <tr> <td>Tree Hollows</td> <td>0</td> </tr> <tr> <td>Fallen timber</td> <td>0</td> </tr> <tr> <td>Vegetation Condition Score</td> <td>51.30</td> </tr> </tbody> </table>				Attribute	Score	Native Plant Species Diversity	24.0	Weed Score	12	Native Plant Life Forms	18.0	Regeneration	6	Native:exotic Understorey Biomass	3	Bare Ground	4	Tree Health	3	Tree Hollows	0	Fallen timber	0	Vegetation Condition Score	51.30
Attribute	Score																								
Native Plant Species Diversity	24.0																								
Weed Score	12																								
Native Plant Life Forms	18.0																								
Regeneration	6																								
Native:exotic Understorey Biomass	3																								
Bare Ground	4																								
Tree Health	3																								
Tree Hollows	0																								
Fallen timber	0																								
Vegetation Condition Score	51.30																								

Conservation Significance Score


Is the vegetation association considered a Threatened Ecological community or Ecosystem?	Yes/No
State (Provisional List of Threatened Ecosystems of SA) Rare community (0.05 pt)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Vulnerable community (0.1 pts)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Endangered community (0.15 pts)	<input type="checkbox"/>
Nationally (EPBC Act) Vulnerable community (0.2 pts)	<input type="checkbox"/>
Contains a Nationally (EPBC Act) Endangered or Critically Endangered community (0.3 pts)	<input type="checkbox"/>
<i>Note: all sites will score a minimum Conservation Significance Score of 1</i>	Score 1

Number of Threatened Plant Species recorded for the site (within the site)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species recorded (1 pt each)	0
I	0
State Endangered recorded (5 pts each)	0
Nationally Vulnerable species recorded (10 pts each)	0
Nationally Endangered or Critically endangered species recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 0
	0

Potential habitat for Threatened Animal Species (number observed or previously recorded)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species observed or locally recorded (1 pt each)	1
State Vulnerable species observed or locally recorded (2.5 pt each)	0
State Endangered species observed or locally recorded (5 pt each)	0
Nationally Vulnerable species observed or locally recorded (10 pts each)	0
Nationally Endangered or Critically endangered species observed or locally recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 1
	0.02

CONSERVATION SIGNIFICANCE SCORE **1.02**

Total Scores for the Site		Vegetation Condition x Landscape Context x Conservation Significance =	
LANDSCAPE CONTEXT SCORE	Score 1.14	UNIT BIODIVERSITY SCORE	59.65
VEGETATION CONDITION SCORE	51.30	Total Biodiversity Score	
CONSERVATION SIGNIFICANCE SCORE	1.02	(Biodiversity Score x hectares)	21.63

Photo Point and Vegetation Survey Location	Direction of the Photo
	South
	GPS Reference
	Datum WGS84
	Zone (52, 53 or 54) 54
	Easting (6 digits) 368664
	Northing (7 digits) 6181630
	Description

What is the purpose of Assessment?

Clearance

SEB Area

Other

Assessment for Clearance		SEB Points required	
Loss Factor	1.0	Hectares required	2.84
Loadings for clearance of protected areas		Mean Annual rainfall for the site (mm)	265
Reductions for rehabilitation of impact site		Payment into the fund (GST Exclusive)	\$7,523.07
SEB Points of loss	21.63	Administration fee (GST Inclusive)	\$413.77

Vegetation Community 2

Vegetation Condition Scores																			
VEGETATION COMMUNITY	2																		
BCM COMMUNITY	MDBSA 1.2 Tall Shrubland with Open Arid adapted Understorey on Limestone Plains																		
VEGETATION ASSOCIATION DESCRIPTION	Senna spp. +/- Acacia nysophylla Low shrubland over Atriplex stipitata with very scattered emergent Myoporum platycarpum																		
SIZE OF SITE (Ha)	4.0168																		
Benchmarked attributes (Scores determined by comparing to a Benchmark community)																			
Number of Native Species (Minus herbaceous annuals for spring Surveys)		13																	
Native Plant Species Diversity Score (max 30) from benchmark score <i>weighted by a factor of 2</i>		22.0																	
Number of regenerating native species		2																	
Regeneration Score (max 12) from benchmark community weighted by a factor of 1.5		6																	
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I																
Carrichtera annua	1	2	2																
Asphodelus fistulosus	1	2	2																
Romulea sp.	1	2	2																
			0																
			0																
	Cover x Threat		6																
Weed Score (max 15) from benchmark community	12																		
		Native Plant Life Forms																	
		Trees > 15m																	
		Trees 5 - 15 m																	
		Trees < 5m																	
		Mallee > 5m																	
		Mallee < 5m																	
		Shrubs > 2m	1																
		Shrubs 0.5 - 2m	4																
		Shrubs < 0.5	3																
		Forbs																	
		Mat Plants																	
		Grasses > 0.2m	1																
		Grasses < 0.2m	1																
		Sedges > 1m																	
		Sedges < 1m																	
		Hummock grasses																	
		Vines, scramblers																	
		Mistletoe	1																
		Ferns																	
		Grass-tree																	
		Total	11																
Native Plant Life Forms (max 20) from benchmark score weighted by a factor of 2		16.0																	
Non-Benchmarked Attributes (Scores determined from direct field observations)																			
		<i>Is the community naturally treeless?</i>	<input checked="" type="checkbox"/>																
		<i>Tree attributes not scored for</i>	0																
Native:exotic Understorey biomass score (max 3)	3	<i>treeless community</i>	0																
Bare Ground Score (max 5)	4		0																
Vegetation Condition Score calculation																			
Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms + Native:exotic understorey biomass + Tree health + Fallen timber/debris + Hollow-bearing trees																			
- If the community Score is Not Benchmarked (SNB) for regeneration this score is multiplied 1.18																			
- If the community is naturally treeless this score is multiplied by 1.23																			
			57.81																
Negative Vegetation Attributes Score = Weeds + Bare ground																			
			16																
VEGETATION CONDITION SCORE (Positive veg attributes x ((Negative vegetation attributes + 60) / 80))			54.92																
<table border="1"> <thead> <tr> <th>Attribute</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>Native Plant Species Diversity</td> <td>22.0</td> </tr> <tr> <td>Weed Score</td> <td>12</td> </tr> <tr> <td>Native Plant Life Forms</td> <td>16.0</td> </tr> <tr> <td>Regeneration</td> <td>6</td> </tr> <tr> <td>Native:exotic Understorey Biomass</td> <td>3</td> </tr> <tr> <td>Bare Ground</td> <td>4</td> </tr> <tr> <td>Vegetation Condition Score</td> <td>54.92</td> </tr> </tbody> </table>				Attribute	Score	Native Plant Species Diversity	22.0	Weed Score	12	Native Plant Life Forms	16.0	Regeneration	6	Native:exotic Understorey Biomass	3	Bare Ground	4	Vegetation Condition Score	54.92
Attribute	Score																		
Native Plant Species Diversity	22.0																		
Weed Score	12																		
Native Plant Life Forms	16.0																		
Regeneration	6																		
Native:exotic Understorey Biomass	3																		
Bare Ground	4																		
Vegetation Condition Score	54.92																		

Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	Yes/No
State (Provisional List of Threatened Ecosystems of SA) Rare community (0.05 pt)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Vulnerable community (0.1 pts)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Endangered community (0.15 pts)	<input type="checkbox"/>
Nationally (EPBC Act) Vulnerable community (0.2 pts)	<input type="checkbox"/>
Contains a Nationally (EPBC Act) Endangered or Critically Endangered community (0.3 pts)	<input type="checkbox"/>
<i>Note; all sites will score a minimum Conservation Significance Score of 1</i>	Score 1

Number of Threatened Plant Species recorded for the site (within the site)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species recorded (1 pt each)	0
State Vulnerable species recorded (2.5 pt each)	0
State Endangered recorded (5 pts each)	0
Nationally Vulnerable species recorded (10 pts each)	0
Nationally Endangered or Critically endangered species recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 0
	0

Potential habitat for Threatened Animal Species (number observed or previously recorded)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species observed or locally recorded (1 pt each)	0
State Vulnerable species observed or locally recorded (2.5 pt each)	0
State Endangered species observed or locally recorded (5 pt each)	0
Nationally Vulnerable species observed or locally recorded (10 pts each)	0
Nationally Endangered or Critically endangered species observed or locally recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 0
	0

CONSERVATION SIGNIFICANCE SCORE 1

Total Scores for the Site		Vegetation Condition x Landscape Context x Conservation Significance =	
LANDSCAPE CONTEXT SCORE	Score 1.14	UNIT BIODIVERSITY SCORE	62.61
VEGETATION CONDITION SCORE	54.92	Total Biodiversity Score	
CONSERVATION SIGNIFICANCE SCORE	1.00	(Biodiversity Score x hectares)	251.48

Photo Point and Vegetation Survey Location	Direction of the Photo
	South
	GPS Reference
	Datum WGS84
	Zone (52, 53 or 54) 54
	Easting (6 digits) 368664
	Northing (7 digits) 6181630
	Description

What is the purpose of Assessment?

Assessment for Clearance		SEB Points required	
Loss Factor	1.0	Hectares required	264.06
Loadings for clearance of protected areas		Mean Annual rainfall for the site (mm)	33.01
Reductions for rehabilitation of impact site		Payment into the fund (GST Exclusive)	265
SEB Points of loss	251.48	Administration fee (GST Inclusive)	\$87,469.54
			\$4,810.82

Vegetation Community 3

Vegetation Condition Scores																																			
VEGETATION COMMUNITY	3																																		
BCM COMMUNITY	MDBSA 2.2 Chenopod Open Shrublands																																		
VEGETATION ASSOCIATION DESCRIPTION	Atriplex stipitata Low open shrubland with scattered emergent Acacia nysophylla and Senna spp.																																		
SIZE OF SITE (Ha)	5.6727																																		
Benchmarked attributes (Scores determined by comparing to a Benchmark community)																																			
		Native Plant Life Forms	Cover rating																																
		Trees > 15m																																	
		Trees 5 - 15 m																																	
		Trees < 5m																																	
		Mallee > 5m																																	
		Mallee < 5m																																	
		Shrubs > 2m																																	
		Shrubs 0.5 - 2m	1																																
		Shrubs < 0.5	3																																
		Forbs																																	
		Mat Plants																																	
		Grasses > 0.2m																																	
		Grasses < 0.2m	1																																
		Sedges > 1m																																	
		Sedges < 1m																																	
		Hummock grasses																																	
		Vines, scramblers																																	
		Mistletoe																																	
		Ferns																																	
		Grass-tree																																	
		Total	5																																
Native Plant Life Forms (max 20) from benchmark score weighted by a factor of 2			8.0																																
Non-Benchmarked Attributes (Scores determined from direct field observations)																																			
		<i>Is the community naturally treeless?</i>	<input checked="" type="checkbox"/>																																
		<i>Tree attributes not scored for</i>	0																																
Native:exotic Understorey biomass score (max 3)		2	0																																
Bare Ground Score (max 5)		3	0																																
		<i>treeless community</i>	0																																
Vegetation Condition Score calculation																																			
Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms + Native:exotic understorey biomass + Tree health + Fallen timber/debris + Hollow-bearing trees - If the community Score is Not Benchmarked (SNB) for regeneration this score is multiplied 1.18 - If the community is naturally treeless this score is multiplied by 1.23			29.52																																
Negative Vegetation Attributes Score = Weeds + Bare ground			10																																
VEGETATION CONDITION SCORE (Positive veg attributes x ((Negative vegetation attributes + 60) / 80))			25.83																																
<table border="1"> <thead> <tr> <th></th> <th>Low</th> <th>Medium</th> <th>High</th> </tr> </thead> <tbody> <tr> <td>Native Plant Species Diversity</td> <td colspan="3"></td> </tr> <tr> <td>Weed Score</td> <td colspan="3"></td> </tr> <tr> <td>Native Plant Life Forms</td> <td colspan="3"></td> </tr> <tr> <td>Regeneration</td> <td colspan="3"></td> </tr> <tr> <td>Native:exotic Understorey Biomass</td> <td colspan="3"></td> </tr> <tr> <td>Bare Ground</td> <td colspan="3"></td> </tr> <tr> <td>Vegetation Condition Score</td> <td colspan="3"></td> </tr> </tbody> </table>					Low	Medium	High	Native Plant Species Diversity				Weed Score				Native Plant Life Forms				Regeneration				Native:exotic Understorey Biomass				Bare Ground				Vegetation Condition Score			
	Low	Medium	High																																
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Native Plant Life Forms																																			
Regeneration																																			
Native:exotic Understorey Biomass																																			
Bare Ground																																			
Vegetation Condition Score																																			

Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	Yes/No
State (Provisional List of Threatened Ecosystems of SA) Rare community (0.05 pt)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Vulnerable community (0.1 pts)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Endangered community (0.15 pts)	<input type="checkbox"/>
Nationally (EPBC Act) Vulnerable community (0.2 pts)	<input type="checkbox"/>
Contains a Nationally (EPBC Act) Endangered or Critically Endangered community (0.3 pts)	<input type="checkbox"/>
<i>Note; all sites will score a minimum Conservation Significance Score of 1</i>	Score 1

Number of Threatened Plant Species recorded for the site (within the site)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species recorded (1 pt each)	0
State Vulnerable species recorded (2.5 pt each)	0
State Endangered recorded (5 pts each)	0
Nationally Vulnerable species recorded (10 pts each)	0
Nationally Endangered or Critically endangered species recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 0

Potential habitat for Threatened Animal Species (number observed or previously recorded)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species observed or locally recorded (1 pt each)	0
State Vulnerable species observed or locally recorded (2.5 pt each)	0
State Endangered species observed or locally recorded (5 pt each)	0
Nationally Vulnerable species observed or locally recorded (10 pts each)	0
Nationally Endangered or Critically endangered species observed or locally recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 0

CONSERVATION SIGNIFICANCE SCORE	1
--	----------

Total Scores for the Site		Vegetation Condition x Landscape Context x Conservation Significance =	
LANDSCAPE CONTEXT SCORE	Score 1.14	UNIT BIODIVERSITY SCORE	29.45
VEGETATION CONDITION SCORE	25.83	Total Biodiversity Score	
CONSERVATION SIGNIFICANCE SCORE	1.00	(Biodiversity Score x hectares)	167.04

Photo Point and Vegetation Survey Location	Direction of the Photo
	South
	GPS Reference
	Datum WGS84
	Zone (52, 53 or 54) 54
	Easting (6 digits) 368861
	Northing (7 digits) 6182008
Description	

What is the purpose of Assessment?	<input checked="" type="button" value="Clearance"/>	<input type="button" value="SEB Area"/>	<input type="button" value="Other"/>
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Assessment for Clearance		SEB Points required	
Loss Factor	1.0	Hectares required	175.39
Loadings for clearance of protected areas		Mean Annual rainfall for the site (mm)	21.92
Reductions for rehabilitation of impact site		Payment into the fund (GST Exclusive)	265
SEB Points of loss	167.04	Administration fee (GST Inclusive)	\$58,098.41
			\$3,195.41

Vegetation Community 4

Vegetation Condition Scores			
VEGETATION COMMUNITY	4		
BCM COMMUNITY	MDBSA 2.2 Chenopod Open Shrublands		
VEGETATION ASSOCIATION DESCRIPTION	Atriplex stipitata Low open shrubland with emergent Acacia nysophylla, Dodonaea viscosa		
SIZE OF SITE (Ha)	0.00245		
Benchmarked attributes (Scores determined by comparing to a Benchmark community)			
Number of Native Species (Minus herbaceous annuals for spring Surveys)	8		
Native Plant Species Diversity Score (max 30) from benchmark score <i>weighted by a factor of 2</i>	14.0		
Number of regenerating native species	0		
Regeneration Score (max 12) from benchmark community weighted by a factor of 1.5	0		
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I
Carrichtera annua	2	2	4
Asphodelus fistulosus	2	2	4
Romulea sp.	2	2	4
Marrubium vulgare	1	3	3
Schinus molle	1	2	2
	Cover x Threat		17
Weed Score (max 15) from benchmark community			6
Native Plant Life Forms (max 20) from benchmark score weighted by a factor of 2			8.0
Native Plant Life Forms			
Trees > 15m			
Trees 5 - 15 m			
Trees < 5m			
Mallee > 5m			
Mallee < 5m			
Shrubs > 2m			
Shrubs 0.5 - 2m			1
Shrubs < 0.5			3
Forbs			
Mat Plants			
Grasses > 0.2m			
Grasses < 0.2m			1
Sedges > 1m			
Sedges < 1m			
Hummock grasses			
Vines, scramblers			
Mistletoe			
Ferns			
Grass-tree			
Total			5
Non-Benchmarked Attributes (Scores determined from direct field observations)			
		<i>Is the community naturally treeless?</i>	<input checked="" type="checkbox"/>
		<i>Tree attributes not scored for</i>	3
Native:exotic Understorey biomass score (max 3)	2	<i>treeless community</i>	0
Bare Ground Score (max 5)	1		0
Vegetation Condition Score calculation			
Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms + Native:exotic understorey biomass + Tree health + Fallen timber/debris + Hollow-bearing trees - If the community Score is Not Benchmarked (SNB) for regeneration this score is multiplied 1.18 - If the community is naturally treeless this score is multiplied by 1.23			29.52
Negative Vegetation Attributes Score = Weeds + Bare ground			7
VEG	Low	Medium	High
Native Plant Species Diversity			
Weed Score			
Native Plant Life Forms			
Regeneration			
Native:exotic Understorey Biomass			
Bare Ground			
Vegetation Condition Score			

Conservation Significance Score


Is the vegetation association considered a Threatened Ecological community or Ecosystem?	Yes/No
State (Provisional List of Threatened Ecosystems of SA) Rare community (0.05 pt)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Vulnerable community (0.1 pts)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Endangered community (0.15 pts)	<input type="checkbox"/>
Nationally (EPBC Act) Vulnerable community (0.2 pts)	<input type="checkbox"/>
Contains a Nationally (EPBC Act) Endangered or Critically Endangered community (0.3 pts)	<input type="checkbox"/>
<i>Note; all sites will score a minimum Conservation Significance Score of 1</i>	Score 1

Number of Threatened Plant Species recorded for the site (within the site)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species recorded (1 pt each)	1
State Vulnerable species recorded (2.5 pt each)	0
State Endangered recorded (5 pts each)	0
Nationally Vulnerable species recorded (10 pts each)	0
Nationally Endangered or Critically endangered species recorded (20 pts each)	0
<i>0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts</i>	Score 0.02

Potential habitat for Threatened Animal Species (number observed or previously recorded)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species observed or locally recorded (1 pt each)	0
State Vulnerable species observed or locally recorded (2.5 pt each)	0
State Endangered species observed or locally recorded (5 pt each)	0
Nationally Vulnerable species observed or locally recorded (10 pts each)	0
Nationally Endangered or Critically endangered species observed or locally recorded (20 pts each)	0
<i>0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts</i>	Score 0

CONSERVATION SIGNIFICANCE SCORE	1.02
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Total Scores for the Site		Vegetation Condition x Landscape Context x Conservation Significance =	
LANDSCAPE CONTEXT SCORE	Score 1.14	UNIT BIODIVERSITY SCORE	28.75
VEGETATION CONDITION SCORE	24.72	Total Biodiversity Score	0.07
CONSERVATION SIGNIFICANCE SCORE	1.02	(Biodiversity Score x hectares)	0.07

Photo Point and Vegetation Survey Location	Direction of the Photo	
	South	
	GPS Reference	
	Datum	WGS84
	Zone (52, 53 or 54)	54
	Easting (6 digits)	368843
	Northing (7 digits)	6181535
Description		

What is the purpose of Assessment?	<input type="button" value="Clearance"/> <input type="button" value="SEB Area"/> <input type="button" value="Other"/>
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Assessment for Clearance		SEB Points required	
Loss Factor	1.0	SEB Points required	0.05
Loadings for clearance of protected areas		Hectares required	0.01
Reductions for rehabilitation of impact site	0.3	Mean Annual rainfall for the site (mm)	265
SEB Points of loss	0.05	Payment into the fund (GST Exclusive)	\$17.15
		Administration fee (GST Inclusive)	\$0.94

Vegetation Community 5

Vegetation Condition Scores																				
VEGETATION COMMUNITY	5																			
BCM COMMUNITY	MDBSA 1.2 Tall Shrubland with Open Arid adapted Understorey on Limestone Plains																			
VEGETATION ASSOCIATION DESCRIPTION	Sticky Hop-bush (<i>Dodonaea viscosa</i> ssp.) +/- Spine Bush (<i>Acacia nyssophylla</i>) Shrubland with widely scattered emergent False Sandalwood (<i>Myoporum platycarpum</i>) and Umbrella Wattle (<i>Acacia</i>																			
SIZE OF SITE (Ha)	0																			
Benchmarked attributes (Scores determined by comparing to a Benchmark community)																				
Number of Native Species (Minus herbaceous annuals for spring Surveys)	13		Native Plant Life Forms	Cover rating																
Native Plant Species Diversity Score (max 30) from benchmark score weighted by a factor of 2	22.0		Trees > 15m																	
Number of regenerating native species	1		Trees 5 - 15 m																	
Regeneration Score (max 12) from benchmark community weighted by a factor of 1.5	4.5		Trees < 5m																	
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I	Mallee > 5m																
<i>Carrichtera annua</i>	1	2	2	Mallee < 5m																
<i>Asphodelus fistulosus</i>	2	2	4	Shrubs > 2m																
<i>Romulea rosea</i> var. <i>australis</i>	2	2	4	Shrubs 0.5 - 2m																
<i>Medicago</i> spp.	1	2	2	Shrubs < 0.5																
			0	Forbs																
				Mat Plants																
				Grasses > 0.2m																
				Grasses < 0.2m																
				Sedges > 1m																
				Sedges < 1m																
				Hummock grasses																
				Vines, scramblers																
				Mistletoe																
				Ferns																
				Grass-tree																
				Total																
Weed Score (max 15) from benchmark community	8			9																
Native Plant Life Forms (max 20) from benchmark score weighted by a factor of 2				14.0																
Non-Benchmarked Attributes (Scores determined from direct field observations)																				
Native:exotic Understorey biomass score (max 3)	2		<i>Is the community naturally treeless?</i>	<input checked="" type="checkbox"/>																
Bare Ground Score (max 5)	2		<i>Tree attributes not scored for</i>	0																
			<i>treeless community</i>	0																
				0																
Vegetation Condition Score calculation																				
Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms + Native:exotic understorey biomass + Tree health + Fallen timber/debris + Hollow-bearing trees																				
- If the community Score is Not Benchmarked (SNB) for regeneration this score is multiplied 1.18																				
- If the community is naturally treeless this score is multiplied by 1.23																				
				52.28																
Negative Vegetation Attributes Score = Weeds + Bare ground																				
				10																
VEGETATION CONDITION SCORE (Positive veg attributes x ((Negative vegetation attributes + 60) / 80))																				
				45.74																
<table border="1"> <thead> <tr> <th>Attribute</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>Native Plant Species Diversity</td> <td>22.0</td> </tr> <tr> <td>Weed Score</td> <td>8</td> </tr> <tr> <td>Native Plant Life Forms</td> <td>14.0</td> </tr> <tr> <td>Regeneration</td> <td>4.5</td> </tr> <tr> <td>Native:exotic Understorey Biomass</td> <td>2</td> </tr> <tr> <td>Bare Ground</td> <td>2</td> </tr> <tr> <td>Vegetation Condition Score</td> <td>45.74</td> </tr> </tbody> </table>					Attribute	Score	Native Plant Species Diversity	22.0	Weed Score	8	Native Plant Life Forms	14.0	Regeneration	4.5	Native:exotic Understorey Biomass	2	Bare Ground	2	Vegetation Condition Score	45.74
Attribute	Score																			
Native Plant Species Diversity	22.0																			
Weed Score	8																			
Native Plant Life Forms	14.0																			
Regeneration	4.5																			
Native:exotic Understorey Biomass	2																			
Bare Ground	2																			
Vegetation Condition Score	45.74																			

Conservation Significance Score


Is the vegetation association considered a Threatened Ecological community or Ecosystem?	Yes/No
State (Provisional List of Threatened Ecosystems of SA) Rare community (0.05 pt)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Vulnerable community (0.1 pts)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Endangered community (0.15 pts)	<input type="checkbox"/>
Nationally (EPBC Act) Vulnerable community (0.2 pts)	<input type="checkbox"/>
Contains a Nationally (EPBC Act) Endangered or Critically Endangered community (0.3 pts)	<input type="checkbox"/>
<i>Note; all sites will score a minimum Conservation Significance Score of 1</i>	Score 1

Number of Threatened Plant Species recorded for the site (within the site)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species recorded (1 pt each)	0
State Vulnerable species recorded (2.5 pt each)	0
State Endangered recorded (5 pts each)	0
Nationally Vulnerable species recorded (10 pts each)	0
Nationally Endangered or Critically endangered species recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 0

Potential habitat for Threatened Animal Species (number observed or previously recorded)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species observed or locally recorded (1 pt each)	0
State Vulnerable species observed or locally recorded (2.5 pt each)	0
State Endangered species observed or locally recorded (5 pt each)	0
Nationally Vulnerable species observed or locally recorded (10 pts each)	0
Nationally Endangered or Critically endangered species observed or locally recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 0

CONSERVATION SIGNIFICANCE SCORE 1

Total Scores for the Site		Vegetation Condition x Landscape Context x Conservation Significance =	
LANDSCAPE CONTEXT SCORE	Score #DIV/0!	UNIT BIODIVERSITY SCORE	#DIV/0!
VEGETATION CONDITION SCORE	45.74	Total Biodiversity Score	
CONSERVATION SIGNIFICANCE SCORE	1.00	(Biodiversity Score x hectares)	#DIV/0!

Photo Point and Vegetation Survey Location	Direction of the Photo
	South
	GPS Reference
	Datum WGS84
	Zone (52, 53 or 54) 54
	Easting (6 digits) 368720
	Northing (7 digits) 6181477
	Description

What is the purpose of Assessment?

Assessment for Clearance		SEB Points required	#DIV/0!
Loss Factor	1.0	Hectares required	#DIV/0!
Loadings for clearance of protected areas		Mean Annual rainfall for the site (mm)	265
Reductions for rehabilitation of impact site		Payment into the fund (GST Exclusive)	#DIV/0!
SEB Points of loss	#DIV/0!	Administration fee (GST Inclusive)	#DIV/0!

Vegetation Community 6

Vegetation Condition Scores																												
VEGETATION COMMUNITY	6																											
BCM COMMUNITY	MDBSA 1.2 Tall Shrubland with Open Arid adapted Understorey on Limestone Plains																											
VEGETATION ASSOCIATION DESCRIPTION	Senna artemisioides ssp. +/- Acacia nysophylla Open shrubland with emergent Myoporum platycarpum																											
SIZE OF SITE (Ha)	0.483																											
Benchmarked attributes (Scores determined by comparing to a Benchmark community)																												
Number of Native Species (Minus herbaceous annuals for spring Surveys)	12																											
Native Plant Species Diversity Score (max 30) from benchmark score <i>weighted by a factor of 2</i>	20.0																											
Number of regenerating native species	1																											
Regeneration Score (max 12) from benchmark community weighted by a factor of 1.5	4.5																											
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I																									
Carrichtera annua	2	2	4																									
Asphodelus fistulosus	2	2	4																									
Romulea sp.	2	2	4																									
Medicago spp.	1	2	2																									
Dittrichia graveolens	1	2	2																									
	Cover x Threat		16																									
Weed Score (max 15) from benchmark community	6																											
Native Plant Life Forms (max 20) from benchmark score <i>weighted by a factor of 2</i>			18.0																									
Non-Benchmarked Attributes (Scores determined from direct field observations)																												
			<i>Is the community naturally treeless?</i>	<input checked="" type="checkbox"/>																								
			<i>Tree attributes not scored for</i>	0																								
Native:exotic Understorey biomass score (max 3)	3			0																								
Bare Ground Score (max 5)	4			0																								
Vegetation Condition Score calculation																												
Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms + Native:exotic understorey biomass + Tree health + Fallen timber/debris + Hollow-bearing trees																												
- If the community Score is Not Benchmarked (SNB) for regeneration this score is multiplied 1.18																												
- If the community is naturally treeless this score is multiplied by 1.23																												
				55.97																								
Negative Vegetation Attributes Score = Weeds + Bare ground				10																								
VEGETATION CONDITION SCORE (Positive veg attributes x ((Negative vegetation attributes + 60) / 80))				48.97																								
<table border="1"> <thead> <tr> <th>Attribute</th> <th>Score</th> <th>Level</th> </tr> </thead> <tbody> <tr> <td>Native Plant Species Diversity</td> <td>20.0</td> <td>Medium</td> </tr> <tr> <td>Weed Score</td> <td>6</td> <td>Low</td> </tr> <tr> <td>Native Plant Life Forms</td> <td>18.0</td> <td>High</td> </tr> <tr> <td>Regeneration</td> <td>4.5</td> <td>Low</td> </tr> <tr> <td>Native:exotic Understorey Biomass</td> <td>3</td> <td>Low</td> </tr> <tr> <td>Bare Ground</td> <td>4</td> <td>Low</td> </tr> <tr> <td>Vegetation Condition Score</td> <td>48.97</td> <td>Medium</td> </tr> </tbody> </table>					Attribute	Score	Level	Native Plant Species Diversity	20.0	Medium	Weed Score	6	Low	Native Plant Life Forms	18.0	High	Regeneration	4.5	Low	Native:exotic Understorey Biomass	3	Low	Bare Ground	4	Low	Vegetation Condition Score	48.97	Medium
Attribute	Score	Level																										
Native Plant Species Diversity	20.0	Medium																										
Weed Score	6	Low																										
Native Plant Life Forms	18.0	High																										
Regeneration	4.5	Low																										
Native:exotic Understorey Biomass	3	Low																										
Bare Ground	4	Low																										
Vegetation Condition Score	48.97	Medium																										

Conservation Significance Score

Is the vegetation association considered a Threatened Ecological community or Ecosystem?	Yes/No
State (Provisional List of Threatened Ecosystems of SA) Rare community (0.05 pt)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Vulnerable community (0.1 pts)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Endangered community (0.15 pts)	<input type="checkbox"/>
Nationally (EPBC Act) Vulnerable community (0.2 pts)	<input type="checkbox"/>
Contains a Nationally (EPBC Act) Endangered or Critically Endangered community (0.3 pts)	<input type="checkbox"/>
<i>Note: all sites will score a minimum Conservation Significance Score of 1</i>	Score 1

Number of Threatened Plant Species recorded for the site (within the site)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species recorded (1 pt each)	1
State Vulnerable species recorded (2.5 pt each)	0
State Endangered recorded (5 pts each)	0
Nationally Vulnerable species recorded (10 pts each)	0
Nationally Endangered or Critically endangered species recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 0.02

Potential habitat for Threatened Animal Species (number observed or previously recorded)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species observed or locally recorded (1 pt each)	0
State Vulnerable species observed or locally recorded (2.5 pt each)	0
State Endangered species observed or locally recorded (5 pt each)	0
Nationally Vulnerable species observed or locally recorded (10 pts each)	0
Nationally Endangered or Critically endangered species observed or locally recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 0

CONSERVATION SIGNIFICANCE SCORE **1.02**

Total Scores for the Site		Vegetation Condition x Landscape Context x Conservation Significance =	
LANDSCAPE CONTEXT SCORE	Score 1.14	UNIT BIODIVERSITY SCORE	56.94
VEGETATION CONDITION SCORE	48.97	Total Biodiversity Score	
CONSERVATION SIGNIFICANCE SCORE	1.02	(Biodiversity Score x hectares)	27.50

Photo Point and Vegetation Survey Location	Direction of the Photo
	South
	GPS Reference
	Datum WGS84
	Zone (52, 53 or 54) 54
	Easting (6 digits) 368322
	Northing (7 digits) 6181085
Description	

What is the purpose of Assessment? Clearance SEB Area Other

Assessment for Clearance		SEB Points required	
Loss Factor	1.0	Hectares required	28.88
Loadings for clearance of protected areas		Mean Annual rainfall for the site (mm)	3.61
Reductions for rehabilitation of impact site		Payment into the fund (GST Exclusive)	265
SEB Points of loss	27.50	Administration fee (GST Inclusive)	\$9,565.81
			\$526.12

Vegetation Community 7

Vegetation Condition Scores																											
VEGETATION COMMUNITY	7																										
BCM COMMUNITY	MDBSA 2.2 Chenopod Open Shrublands																										
VEGETATION ASSOCIATION DESCRIPTION	Atriplex stipitata, Enchylaena tomentosa Low open shrubland																										
SIZE OF SITE (Ha)	0.3624																										
Benchmarked attributes (Scores determined by comparing to a Benchmark community)																											
Number of Native Species (Minus herbaceous annuals for spring Surveys)		3																									
Native Plant Species Diversity Score (max 30) from benchmark score <i>weighted by a factor of 2</i>		4.0																									
Number of regenerating native species		0																									
Regeneration Score (max 12) from benchmark community weighted by a factor of 1.5		0																									
Weed species (Top 5 Cover x Invasiveness)	Cover (max 6)	Weed Threat Rating (max 5)	C x I																								
Carrichtera annua	2	2	4																								
Salvia verbenaca var.	1	2	2																								
Asphodelus fistulosus	2	2	4																								
Marrubium vulgare	1	3	3																								
			0																								
	Cover x Threat		13																								
Weed Score (max 15) from benchmark community	8																										
Native Plant Life Forms (max 20) from benchmark score weighted by a factor of 2		8.0																									
Non-Benchmarked Attributes (Scores determined from direct field observations)		<i>Is the community naturally treeless?</i> <input checked="" type="checkbox"/>																									
Native:exotic Understorey biomass score (max 3)		2																									
Bare Ground Score (max 5)		2																									
		<i>Tree attributes not scored for treeless community</i>																									
		0																									
		0																									
Vegetation Condition Score calculation																											
Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms + Native:exotic understorey biomass + Tree health + Fallen timber/debris + Hollow-bearing trees - If the community Score is Not Benchmarked (SNB) for regeneration this score is multiplied 1.18 - If the community is naturally treeless this score is multiplied by 1.23																											
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Negative Vegetation Attributes Score = Weeds + Bare ground																											
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<table border="1"> <thead> <tr> <th>Attribute</th> <th>Score</th> <th>Relative Position (Low to High)</th> </tr> </thead> <tbody> <tr> <td>Native Plant Species Diversity</td> <td>4.0</td> <td>~15%</td> </tr> <tr> <td>Weed Score</td> <td>8</td> <td>~30%</td> </tr> <tr> <td>Native Plant Life Forms</td> <td>8.0</td> <td>~30%</td> </tr> <tr> <td>Regeneration</td> <td>0</td> <td>0%</td> </tr> <tr> <td>Native:exotic Understorey Biomass</td> <td>2</td> <td>~10%</td> </tr> <tr> <td>Bare Ground</td> <td>2</td> <td>~10%</td> </tr> <tr> <td>Vegetation Condition Score</td> <td>15.07</td> <td>~40%</td> </tr> </tbody> </table>				Attribute	Score	Relative Position (Low to High)	Native Plant Species Diversity	4.0	~15%	Weed Score	8	~30%	Native Plant Life Forms	8.0	~30%	Regeneration	0	0%	Native:exotic Understorey Biomass	2	~10%	Bare Ground	2	~10%	Vegetation Condition Score	15.07	~40%
Attribute	Score	Relative Position (Low to High)																									
Native Plant Species Diversity	4.0	~15%																									
Weed Score	8	~30%																									
Native Plant Life Forms	8.0	~30%																									
Regeneration	0	0%																									
Native:exotic Understorey Biomass	2	~10%																									
Bare Ground	2	~10%																									
Vegetation Condition Score	15.07	~40%																									

Conservation Significance Score


Is the vegetation association considered a Threatened Ecological community or Ecosystem?	Yes/No
State (Provisional List of Threatened Ecosystems of SA) Rare community (0.05 pt)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Vulnerable community (0.1 pts)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Endangered community (0.15 pts)	<input type="checkbox"/>
Nationally (EPBC Act) Vulnerable community (0.2 pts)	<input type="checkbox"/>
Contains a Nationally (EPBC Act) Endangered or Critically Endangered community (0.3 pts)	<input type="checkbox"/>
<i>Note; all sites will score a minimum Conservation Significance Score of 1</i>	Score 1

Number of Threatened Plant Species recorded for the site (within the site)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species recorded (1 pt each)	0
State Vulnerable species recorded (2.5 pt each)	0
State Endangered recorded (5 pts each)	0
Nationally Vulnerable species recorded (10 pts each)	0
Nationally Endangered or Critically endangered species recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	0
Score	0

Potential habitat for Threatened Animal Species (number observed or previously recorded)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species observed or locally recorded (1 pt each)	0
State Vulnerable species observed or locally recorded (2.5 pt each)	0
State Endangered species observed or locally recorded (5 pt each)	0
Nationally Vulnerable species observed or locally recorded (10 pts each)	0
Nationally Endangered or Critically endangered species observed or locally recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	0
Score	0

CONSERVATION SIGNIFICANCE SCORE	1
--	----------

Total Scores for the Site		Vegetation Condition x Landscape Context x Conservation Significance =	
	Score	UNIT BIODIVERSITY SCORE	17.18
LANDSCAPE CONTEXT SCORE	1.14	Total Biodiversity Score	6.22
VEGETATION CONDITION SCORE	15.07	(Biodiversity Score x hectares)	
CONSERVATION SIGNIFICANCE SCORE	1.00		

Photo Point and Vegetation Survey Location	Direction of the Photo
	South-east
	GPS Reference
	Datum WGS84
	Zone (52, 53 or 54) 54
	Easting (6 digits) 368449
	Northing (7 digits) 6181109
	Description

What is the purpose of Assessment? Clearance SEB Area Other

Assessment for Clearance		SEB Points required	
Loss Factor	1.0	Hectares required	0.82
Loadings for clearance of protected areas		Mean Annual rainfall for the site (mm)	265
Reductions for rehabilitation of impact site		Payment into the fund (GST Exclusive)	\$2,165.11
SEB Points of loss	6.22	Administration fee (GST Inclusive)	\$119.08

Vegetation Community 8

Vegetation Condition Scores																				
VEGETATION COMMUNITY		8																		
BCM COMMUNITY		MDBSA 1.2 Tall Shrubland with Open Arid adapted Understorey on Limestone Plains																		
VEGETATION ASSOCIATION DESCRIPTION		Acacia nysophylla Open shrubland with emergent Myoporum platycarpum																		
SIZE OF SITE (Ha)		0.1962																		
Benchmarked attributes (Scores determined by comparing to a Benchmark community)																				
Number of Native Species (Minus herbaceous annuals for spring Surveys)		5		Native Plant Life Forms																
Native Plant Species Diversity Score (max 30) from benchmark score <i>weighted by a factor of 2</i>		8.0		Cover rating																
Number of regenerating native species		0		Trees > 15m																
Regeneration Score (max 12) from benchmark community weighted by a factor of 1.5		0		Trees 5 - 15 m																
Weed species (Top 5 Cover x Invasiveness)		Cover (max 6)	Weed Threat Rating (max 5)	C x I	Trees < 5m															
Carrichtera annua	1	2	2	Mallee > 5m																
Asphodelus fistulosus	2	2	4	Mallee < 5m																
Medicago spp.	1	2	2	Shrubs > 2m	1															
				Shrubs 0.5 - 2m	3															
				Shrubs < 0.5	3															
				Forbs																
				Mat Plants																
				Grasses > 0.2m																
				Grasses < 0.2m	1															
				Sedges > 1m																
				Sedges < 1m																
				Hummock grasses																
				Vines, scramblers																
				Mistletoe	1															
				Ferns																
				Grass-tree																
				Total	9															
Weed Score (max 15) from benchmark community		11																		
Native Plant Life Forms (max 20) from benchmark score <i>weighted by a factor of 2</i>					14.0															
Non-Benchmarked Attributes (Scores determined from direct field observations)																				
Native:exotic Understorey biomass score (max 3)		2		<i>Is the community naturally treeless?</i>	<input checked="" type="checkbox"/>															
Bare Ground Score (max 5)		2		<i>Tree attributes not scored for</i>	0															
				<i>treeless community</i>	0															
					0															
Vegetation Condition Score calculation																				
Positive Vegetation Attributes Score = Native species diversity + Regeneration + Native Plant Life Forms + Native:exotic understorey biomass + Tree health + Fallen timber/debris + Hollow-bearing trees																				
- If the community Score is Not Benchmarked (SNB) for regeneration this score is multiplied 1.18																				
- If the community is naturally treeless this score is multiplied by 1.23																				
				29.52																
Negative Vegetation Attributes Score = Weeds + Bare ground																				
				13																
VEGETATION CONDITION SCORE (Positive veg attributes x ((Negative vegetation attributes + 60) / 80))																				
				26.94																
<table border="1"> <thead> <tr> <th>Attribute</th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>Native Plant Species Diversity</td> <td>8.0</td> </tr> <tr> <td>Weed Score</td> <td>11</td> </tr> <tr> <td>Native Plant Life Forms</td> <td>14.0</td> </tr> <tr> <td>Regeneration</td> <td>0</td> </tr> <tr> <td>Native:exotic Understorey Biomass</td> <td>2</td> </tr> <tr> <td>Bare Ground</td> <td>2</td> </tr> <tr> <td>Vegetation Condition Score</td> <td>26.94</td> </tr> </tbody> </table>					Attribute	Score	Native Plant Species Diversity	8.0	Weed Score	11	Native Plant Life Forms	14.0	Regeneration	0	Native:exotic Understorey Biomass	2	Bare Ground	2	Vegetation Condition Score	26.94
Attribute	Score																			
Native Plant Species Diversity	8.0																			
Weed Score	11																			
Native Plant Life Forms	14.0																			
Regeneration	0																			
Native:exotic Understorey Biomass	2																			
Bare Ground	2																			
Vegetation Condition Score	26.94																			

Conservation Significance Score


Is the vegetation association considered a Threatened Ecological community or Ecosystem?	Yes/No
State (Provisional List of Threatened Ecosystems of SA) Rare community (0.05 pt)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Vulnerable community (0.1 pts)	<input type="checkbox"/>
State (Provisional List of Threatened Ecosystems of SA) Endangered community (0.15 pts)	<input type="checkbox"/>
Nationally (EPBC Act) Vulnerable community (0.2 pts)	<input type="checkbox"/>
Contains a Nationally (EPBC Act) Endangered or Critically Endangered community (0.3 pts)	<input type="checkbox"/>
<i>Note; all sites will score a minimum Conservation Significance Score of 1</i>	Score 1

Number of Threatened Plant Species recorded for the site (within the site)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species recorded (1 pt each)	0
State Vulnerable species recorded (2.5 pt each)	0
State Endangered recorded (5 pts each)	0
Nationally Vulnerable species recorded (10 pts each)	0
Nationally Endangered or Critically endangered species recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 0

Potential habitat for Threatened Animal Species (number observed or previously recorded)	Number
<i>*If a species has both a State (NP&W Act) and National (EPBC Act) rating, it's only recorded for its National rating.</i>	
State Rare species observed or locally recorded (1 pt each)	0
State Vulnerable species observed or locally recorded (2.5 pt each)	0
State Endangered species observed or locally recorded (5 pt each)	0
Nationally Vulnerable species observed or locally recorded (10 pts each)	0
Nationally Endangered or Critically endangered species observed or locally recorded (20 pts each)	0
0 = 0 pts; <2 = 0.02 pts; 2 - <5 = 0.04 pts; 5 - <10 = 0.06 pts; 10 - <20 = 0.08pts; 20 or > = 0.1 pts	Score 0

CONSERVATION SIGNIFICANCE SCORE 1

Total Scores for the Site		Vegetation Condition x Landscape Context x Conservation Significance =	
LANDSCAPE CONTEXT SCORE	Score 1.14	UNIT BIODIVERSITY SCORE	30.71
VEGETATION CONDITION SCORE	26.94	Total Biodiversity Score	
CONSERVATION SIGNIFICANCE SCORE	1.00	(Biodiversity Score x hectares)	6.02

Photo Point and Vegetation Survey Location	Direction of the Photo
	South
	GPS Reference
	Datum WGS84
	Zone (52, 53 or 54) 54
	Easting (6 digits) 368513
	Northing (7 digits) 6181177
	Description

What is the purpose of Assessment?

Clearance

SEB Area

Other

Assessment for Clearance		SEB Points required	
Loss Factor	1.0	Hectares required	6.33
Loadings for clearance of protected areas		Mean Annual rainfall for the site (mm)	0.79
Reductions for rehabilitation of impact site		Payment into the fund (GST Exclusive)	265
SEB Points of loss	6.02	Administration fee (GST Inclusive)	\$2,095.55
			\$115.26

Appendix 2: Representative photographs



Community/Site 1: False Sandalwood (*Myoporum platycarpum*) Low open woodland. Facing South at 368664/6181630.



Community/Site 2: *Senna* spp. +/- Spine Bush (*Acacia nyssophylla*) Shrubland with widely scattered emergent False Sandalwood (*Myoporum platycarpum*). Facing South at 368595/6181675.



Community/Site 3: Bitter Saltbush (*Atriplex stipitata*) Low open shrubland with emergent *Senna* spp. and Spine Bush (*Acacia nyssophylla*). Facing South at 368861/6182008.



Planted

Aleppo Pines (*Pinus halepensis*) which occur on the south-western boundary of Area 1.



Community/Site 4: *Atriplex stipitata* Low shrubland with emergent *Acacia nysophylla*, *Dodonaea viscosa* ssp.
Facing South at 368843/6181585.



Community/Site 5: *Dodonaea viscosa* ssp. +/- *Acacia nysophylla* Open shrubland with emergent *Myoporum platycarpum*, *Acacia oswaldii*, Facing South at 368720/6181477



Community/Site 6: *Senna artemisioides* ssp. +/- *Acacia nysophylla* Shrubland with emergent *Myoporum platycarpum*. Facing South-east at 368322/6181085.



Community/Site 7: *Atriplex stipitata*, *Enchylaena tomentosa* Low open shrubland. Facing South-east at 368449/6181109.



Community/Site 8: *Acacia nysophylla* Open shrubland with emergent *Myoporum platycarpum*. Facing South at 368513/6181177.



Tree 1: *Eucalyptus camaldulensis* ssp. *camaldulensis*.



Tree 2: *Eucalyptus camaldulensis* ssp. *camaldulensis* (on LHS of Tree 1).

Tree 3: *Eucalyptus camaldulensis* ssp. *camaldulensis* (on RHS of Tree 1).

Appendix 3: Threatened ecological communities, flora and fauna species potentially occurring in the project area.
(Note that fish species have been excluded.)

Species	Common Name	EPBC Rating	NPWS Rating	Source	Likelihood of occurrence
Ecological Community					
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions		Endangered		Protected Matters Search Tool	This community was not recorded during field assessment and habitat is not suitable
Plants					
<i>Adiantum capillus-veneris</i>	Dainty Maiden-hair		Vulnerable	BDBSA	Previously recorded near to the river – the project area does not provide suitable habitat.
<i>Austrostipa pilata</i>	Prickly Spear-grass		Vulnerable	Naturemaps	Grows in mallee ¹¹ – unlikely as habitat is not suitable.
<i>Austrostipa tenuifolia</i>			Rare	BDBSA	Grows in sandy soils in grassland or grassy woodland associated with <i>Callitris</i> or <i>Allocasuarina</i> ¹² . The project area does not provide suitable habitat.
<i>Brachyscome graminea</i>	Grass Daisy		Rare	BDBSA	Grows in moist areas from swamps to saline marshes and along watercourses ¹³ . The project area does not provide suitable habitat.
<i>Brachyscome paludicola</i>	Swamp Daisy		Rare	BDBSA	Found along the Murray River and in the South-east of South Australia, growing on inundated clay soils and common in seasonally wet, red gum dominated flats ¹⁴ . The project area does not provide suitable habitat.
<i>Callistemon brachyandrus</i>	Prickly Bottlebrush		Rare	BDBSA	Found along the Murray River in South Australia mainly between Swan Reach and Waikerie growing in the sandy soils of alluvial flats ¹⁵ . The project area does not provide suitable habitat.
<i>Calotis scapigera</i>	Tufted Burr-daisy		Rare	BDBSA	Found mainly along the River Murray in South Australia with some scattered records further north, growing chiefly in saltbush and river red gum communities, on damp clay soils

¹¹ <https://spapps.environment.sa.gov.au/SeedsOfSA/>

¹² <https://spapps.environment.sa.gov.au/SeedsOfSA/speciesinformation.html?rid=620>

¹³ <https://spapps.environment.sa.gov.au/SeedsOfSA/speciesinformation.html?rid=751>

¹⁴ <https://spapps.environment.sa.gov.au/SeedsOfSA/speciesinformation.html?rid=734>

¹⁵ <https://spapps.environment.sa.gov.au/SeedsOfSA/speciesinformation.html?rid=898>

Species	Common Name	EPBC Rating	NPWS Rating	Source	Likelihood of occurrence
					in flood-prone areas ¹⁶ . The project area does not provide suitable habitat.
<i>Ceratophyllum demersum</i>	Hornwort		Rare	BDBSA	A submerged, free-flowing aquatic plant.
<i>Cristella dentata</i>			Rare	BDBSA	A small fern which forms tussocks along stream banks, on rainforest margins or in open forest ¹⁷ . The project area does not provide suitable habitat.
<i>Dodonaea subglandulifera</i>	Peep Hill Hop-bush	Endangered	Endangered	Protected Matters Search Tool	Grows on low hills on loamy soils associated with rocky outcrops in open woodland, open shrubland and mallee ⁸ . Site is considered too degraded to support this species.
<i>Duma horrida ssp. horrida</i>	Spiny Lignum		Rare	Naturemaps BDBSA	Grows on floodplains and beside dry inland lakes ⁸ , therefore unlikely as habitat is not suitable.
<i>Elatine gratioloides</i>	Waterwort		Rare	Naturemaps BDBSA	Grows in or on the margins of stationary or slow-flowing water ⁸ , therefore unlikely as habitat is not suitable.
<i>Eragrostis lacunaria</i>	Purple Love Grass		Rare	BDBSA	Widespread on clay soils of inland ¹⁸ . Not recorded during field assessment.
<i>Lythrum salicaria</i>	Purple Loosestrife		Rare	Naturemaps BDBSA	Grows in moist places or near water, often in swamps or the edge of streams ⁸ , therefore unlikely as habitat is not suitable.
<i>Maireana pentagona</i>	Slender Fissure-plant		Rare	BDBSA	Widespread, especially on heavier red and brown soils. Often found growing in large numbers on cracking grey clay River Murray floodplains ¹⁹ . The project area does not provide suitable habitat.
<i>Maireana rohrlachii</i>	Rohrlach's Bluebush		Rare	BDBSA	Yes – several plants recorded during this field assessment.
<i>Microlepidium pilosulum</i>	Hairy Shepherd's-purse		Rare	BDBSA	Grows on sand and loam in coastal dunes and salt lake margins ²⁰ . The project area does not provide suitable habitat.
<i>Myriophyllum papillosum</i>	Robust Milfoil		Rare	BDBSA	An aquatic species.

¹⁶ <https://spapps.environment.sa.gov.au/SeedsOfSA/speciesinformation.html?rid=939>

¹⁷ <http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Christella~dentata>

¹⁸ <http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Eragrostis~lacunaria>

¹⁹ <https://spapps.environment.sa.gov.au/SeedsOfSA/speciesinformation.html?rid=2806>

²⁰ <https://spapps.environment.sa.gov.au/SeedsOfSA/speciesinformation.html?rid=2930>

Species	Common Name	EPBC Rating	NPWS Rating	Source	Likelihood of occurrence
<i>Phlegmatospermum eremaeum</i>	Spreading Cress		Rare	BDBSA	Grows in open mallee on calcareous clay or loam ²¹ . The project area does not provide suitable habitat.
<i>Picris squarrosa</i>	Squat Picris		Rare	Naturemaps BDBSA	Occurs on coastal sand-dunes or river banks and floodplains ²² - suitable habitat is not present within the project area.
<i>Sclerolaena muricata var. villosa</i>	Five-spine Bindyi		Rare	Naturemaps BDBSA	Widespread colonizing species, especially common on overgrazed or overstocked areas on heavier soils ²³ - could possibly occur in the project area, although it was not recorded during field assessment.
<i>Scutellaria humilis</i>	Dwarf Skullcap		Rare	Naturemaps BDBSA	Grows in various habitats, often in moist sheltered areas, particularly along creeks or gullies ²⁴ , therefore habitat is not suitable in the project area.
<i>Stellaria palustris var. tenella</i>	Swamp Starwort		Rare	BDBSA	Grows in in moist areas around swamps, rivers, lakes or dams often found growing in muddy or grassy areas after water has receded ²⁵ , therefore habitat is not suitable in the project area.
<i>Swainsona pyrophila</i>	Yellow Swainson-pea	Vulnerable	Rare	Protected Matters Search Tool	A short lived perennial fire-responsive shrub ⁸
Birds					
<i>Actites hypoleucos</i>	Common Sandpiper	Migratory Wetland	Rare	Protected Matters Search Tool	A non-breeding migratory wader from Eurasia. Over-summers in the Southern Hemisphere. In Australia is found on muddy or rocky edges of both saline and fresh water. Most likely to be observed on coastal mudflats ²⁶ , therefore not likely within the project area.
<i>Anas rhynchotis</i>	Australasian Shoveler		Rare	BDBSA	Found in all kinds of wetlands, preferring large undisturbed heavily vegetated freshwater swamps. It is also found on

²¹ <https://spapps.environment.sa.gov.au/SeedsOfSA/speciesinformation.html?rid=3303>

²² <http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Picris~squarrosa>

²³ <http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Sclerolaena~muricata>

²⁴ <http://plantnet.rbgsyd.nsw.gov.au/cgi-bin/NSWfl.pl?page=nswfl&lvl=sp&name=Scutellaria~humilis>

²⁵ <https://spapps.environment.sa.gov.au/SeedsOfSA/speciesinformation.html?rid=4303>

²⁶ <http://birdlife.org.au/bird-profile/sharp-tailed-sandpiper>

Species	Common Name	EPBC Rating	NPWS Rating	Source	Likelihood of occurrence
					open waters and occasionally along the coast ²⁷ . More likely to be found on the River Murray.
<i>Anhinga novaehollandiae</i>	Australasian Darter		Rare	BDBSA	Found in wetlands and sheltered coastal waters, mainly in the Tropics and Subtropics. It prefers smooth, open waters, for feeding, with tree trunks, branches, stumps or posts fringing the water, for resting and drying its wings. Most often seen inland, around permanent and temporary water bodies at least half a metre deep ²⁸ . More likely to be found on the River Murray.
<i>Apus pacificus</i>	Fork-tailed Swift	Migratory Marine	-	Protected Matters Search Tool	Possible flying overhead as this species is almost exclusively aerial – in South Australia is widespread from the Victorian border west to the Spencer Gulf ²⁹ .
<i>Ardea alba</i>	Great Egret	Migratory Marine	-	Protected Matters Search Tool	A possible visitor. Site is unlikely to form significant habitat for this species.
<i>Ardea ibis</i>	Cattle Egret	Migratory Marine	-	Protected Matters Search Tool	A possible visitor - found in grasslands, woodlands and wetlands. It also uses pastures and croplands, especially where drainage is poor. Will also forage at garbage dumps, and is often seen with cattle and other stock ³⁰ . However, the site is unlikely to form significant habitat for this species.
<i>Biziura lobata</i>	Musk Duck		Rare	BDBSA	Unlikely – an aquatic species.
<i>Burhinus grallarius</i>	Bush Stonecurlew		Rare	BDBSA	
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Migratory Wetland	-	Protected Matters Search Tool	A summer migrant which prefers the grassy edges of shallow inland freshwater wetlands. It is also found around sewage farms, flooded fields, mudflats, mangroves, rocky shores and beaches. Breeds in Siberia ³¹ .
<i>Calidris ferruginea</i>	Curlew Sandpiper	Critically Endangered	-	Protected Matters Search Tool	Found on intertidal mudflats of estuaries, lagoons, mangroves, as well as beaches, rocky shores and around lakes, dams and floodwaters. Breeds in the Northern

²⁷ <http://www.birdlife.org.au/bird-profile/australasian-shoveler>

²⁸ <https://www.birdlife.org.au/bird-profile/australasian-darter>

²⁹ http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=678

³⁰ <http://www.birdsinbackyards.net/species/Ardea-ibis>

³¹ <http://birdlife.org.au/bird-profile/sharp-tailed-sandpiper>

Species	Common Name	EPBC Rating	NPWS Rating	Source	Likelihood of occurrence
					Hemisphere ³² . Possibly could be an occasional visitor, however the project area does not provide critical habitat.
<i>Calidris melanotos</i>	Pectoral Sandpiper	Migratory Wetland	Rare	Protected Matters Search Tool	In South Australia this species is found mostly in the south-east, from north to the Murray River and west to Yorke Peninsula. Prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands ³³ . Site is unlikely to form significant habitat for this species.
<i>Chrysococcyx osculans</i>	Black-eared Cuckoo	Migratory Marine	-	Protected Matters Search Tool	Not likely – Habitat includes dry open forests, scrublands, mallee, mulga, lignum, saltbush and riverside thickets. ³⁴ .
<i>Cladorhynchus leucocephalus</i>	Banded Stilt		Vulnerable	BDBSA	Found mainly in saline and hypersaline (very salty) waters of the inland and coast, typically large, open and shallow ³⁵ . More likely to be found on the River Murray.
<i>Corcorax melanorhamphos</i>	White-winged Chough		Rare	BDBSA	Found in open forests and woodlands. They tend to prefer the wetter areas, with lots of leaf-litter, for feeding, and available mud for nest building ³⁶ . The project area does not provide suitable habitat for this species.
<i>Egretta garzetta</i>	Little Egret		Rare	BDBSA	Unlikely – an aquatic species.
<i>Falco peregrinus</i>	Peregrine Falcon		Rare	BDBSA	This species requires abundant prey and secure nest sites, and prefers coastal and inland cliffs or open woodlands near water ³⁷ . The project area does not provide critical habitat for this species.
<i>Gallinago hardwickii</i>	Latham's Snipe	Migratory Wetland	Rare	Protected Matters Search Tool	A migratory wetland bird which breeds in Japan. In Australia, found in freshwater wetlands on or near the coast, generally amongst dense cover ³⁰ . Site is unlikely to form significant habitat for this species.

³² Tim Croft, Ornithologist

³³ http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=858

³⁴ https://en.wikipedia.org/wiki/Black-eared_cuckoo

³⁵ <http://www.birdlife.org.au/bird-profile/banded-stilt>

³⁶ <http://www.birdlife.org.au/bird-profile/white-winged-chough>

³⁷ <http://www.birdlife.org.au/bird-profile/peregrine-falcon>

Species	Common Name	EPBC Rating	NPWS Rating	Source	Likelihood of occurrence
<i>Haliaeetus leucogaster</i>	White-bellied Sea-eagle	Migratory Marine	Endangered	Protected Matters Search Tool BDBSA	Possibly recorded perched high in a tree, or soaring over waterways and adjacent land ³⁸ , however the site is unlikely to form significant habitat for this species.
<i>Leipoa ocellata</i>	Malleefowl	Vulnerable	Vulnerable	Protected Matters Search Tool BDBSA	Not likely – habitat is not suitable.
<i>Melanodryas cucullata</i>	Hooded Robin		Rare	BDBSA	Found in lightly timbered woodland, mainly dominated by acacia and/or eucalypts ³⁹ . The project area is quite degraded and probably does not provide critical habitat for this species.
<i>Merops ornatus</i>	Rainbow Bee-eater	Marine Migratory	-	Protected Matters Search Tool	A possible visitor. Most often found in open forests, woodlands and shrublands, and cleared areas, usually near water. It will be found on farmland with remnant vegetation and in orchards and vineyards. It will use disturbed sites such as quarries, cuttings and mines to build its nesting tunnels ⁴⁰ . However, the site is unlikely to form significant habitat for this species.
<i>Motacilla cinerea</i>	Grey Wagtail	Migratory Terrestrial	-	Protected Matters Search Tool	Always associated with running water when breeding – may be a visitor to the site however its unlikely to form significant habitat for this species ³⁰ .
<i>Motacilla flava</i>	Yellow Wagtail	Migratory Terrestrial	-	Protected Matters Search Tool	Possibly an occasional visitor. Breeds in Europe and Asia. Site is unlikely to form significant habitat for this species ³⁰ .
<i>Myiagra cyanoleuca</i>	Satin Flycatcher	Migratory Terrestrial	Endangered	Protected Matters Search Tool	Not likely - found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests ⁴¹ .
<i>Myiagra inquieta</i>	Restless Flycatcher		Rare	BDBSA	Found in open forests and woodlands and is frequently seen in farmland ⁴² , however the project area is not likely to provide critical habitat for this species.
<i>Neophema elegans</i>	Elegant Parrot		Rare	BDBSA	Can be found in a wide variety of habitats, including grasslands, shrublands, mallee, woodlands and thickets,

³⁸ <http://www.birdlife.org.au/bird-profile/white-bellied-sea-eagle>

³⁹ <http://www.birdsinbackyards.net/species/Melanodryas-cucullata>

⁴⁰ <http://birdlife.org.au/bird-profile/rainbow-bee-eater>

⁴¹ <http://www.birdlife.org.au/bird-profile/satin-flycatcher>

⁴² <http://birdlife.org.au/bird-profile/restless-flycatcher>

Species	Common Name	EPBC Rating	NPWS Rating	Source	Likelihood of occurrence
					bluebush plains, heathlands, saltmarsh and farmland ⁴³ . Could possibly utilize the project area, however it is not likely to provide critical habitat.
<i>Numenius madagascariensis</i>	Eastern Curlew	Critically Endangered	Vulnerable	Protected Matters Search Tool	Found on intertidal mudflats and sandflats, often with beds of seagrass, on sheltered coasts, especially estuaries, mangrove swamps, bays, harbours and lagoons ⁴⁴ . The project area is unlikely to form significant habitat for this species.
<i>Oxyura australis</i>	Blue-billed Duck		Rare	BDBSA	Unlikely – an aquatic species.
<i>Pandion haliaetus</i>	Osprey	Migratory Wetland	Endangered	Protected Matters Search Tool	A largely sedentary bird of prey found around the coast and off-shore islands and, at times, terrestrial wetlands and along inland rivers. It builds nests on cliffs or in dead trees ³⁰ .
<i>Pachycephala pectoralis</i>	Golden Whistler		Rare	BDBSA	Can be found in almost any wooded habitat, from rainforest to mallee, but prefers the denser areas ⁴⁵ . Occasionally it visits parks and orchards. Could possibly utilise the <i>Myoporum platycarpum</i> Low Woodland (Community 1) and the scattered Red Gums closer to the River.
<i>Pedionomus torquatus</i>	Plains-wanderer	Critically Endangered	Endangered	Protected Matters Search Tool	A sedentary bird, primarily observed in open sparse grasslands, and unlikely in dense, improved grasslands or in treed areas. Its nest is a hollow on the ground. Due to agricultural development now found in the north east pastoral area and possibly the northern Flinders Ranges ³⁰ . Not likely to utilise the project area.
<i>Pezoporus anthopeplus</i>	Regent Parrot	Endangered	Endangered	Protected Matters Search Tool	Found in River Red Gum, <i>Eucalyptus camaldulensis</i> , floodplain, woodland and mallee ⁴⁶ , therefore the project area would not provide suitable habitat for this species.
<i>Plectorhyncha lanceolata</i>	Striped Honeyeater		Rare	BDBSA	Found in forests and woodlands, often along rivers ⁴⁷ – more likely to have been recorded on the River Murray.

⁴³ <http://birdlife.org.au/bird-profile/elegant-parrot>

⁴⁴ <https://www.birdlife.org.au> – accessed February 2019

⁴⁵ <http://www.birdlife.org.au/bird-profile/golden-whistler>

⁴⁶ <http://www.birdlife.org.au/bird-profile/regent-parrot>

⁴⁷ <http://www.birdsinbackyards.net/species/Plectorhyncha-lanceolata>

Species	Common Name	EPBC Rating	NPWS Rating	Source	Likelihood of occurrence
<i>Plegadis falcinellus</i>	Glossy Ibits		Rare	BDBSA	Requires shallow water and mudflats, so is found in well-vegetated wetlands, floodplains, mangroves and ricefields ⁴⁸ . Therefore not likely to be found in the project area.
<i>Polytelis anthopeplus</i>	Night Parrot	Vulnerable	Vulnerable	Protected Matters Search Tool BDBSA	Usually inhabits arid or semi-arid grasslands that are dominated by spinifex, though they have also been recorded in shrublands dominated by samphire, bluebush and saltbush ⁴⁹ . However, the project area is considered to be quite degraded, therefore this species is unlikely to be present.
<i>Rostratula australis</i>	Australian Painted-snipe	Endangered	Vulnerable	Protected Matters Search Tool	A widespread, mobile, sparsely distributed wetland bird, mostly associated with the Murray Darling Basin. It is found in various shallow, brackish or freshwater, especially temporary wetlands, with muddy margins and small, low-lying islands. In SA it is an erratic spring-autumn breeding visitor along the River Murray, South East and at times the Mount Lofty Ranges ³⁰ . The project does not provide suitable habitat for this species.
<i>Rostratula benghalensis</i>	Painted Snipe	Endangered	Vulnerable	Protected Matters Search Tool	Not likely as habitat is not suitable - generally inhabits shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans. They also use inundated or waterlogged grassland or saltmarsh, dams, rice crops, sewage farms and bore drains ⁵⁰ .
<i>Stictonetta naevosa</i>	Freckled Duck		Vulnerable	BDBSA	Unlikely – an aquatic species.
<i>Tringa nebularia</i>	Common Greenshank	Migratory Wetland	-	Protected Matters Search Tool	Does not breed in Australia. Seen singly or in small to large flocks (sometimes hundreds) in a variety of coastal and inland wetlands ⁵¹ .
Mammals					
<i>Bettongia lesueur</i>	Burrowing Bettong	Extinct	Endangered	BDBSA	Considered to be regionally extinct.

⁴⁸ <http://www.birdlife.org.au/bird-profile/glossy-ibis>

⁴⁹ <http://birdlife.org.au/bird-profile/night-parrot>

⁵⁰ http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=77037

⁵¹ http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=832

Species	Common Name	EPBC Rating	NPWS Rating	Source	Likelihood of occurrence
<i>Bettongia penicillata ogilbyi</i>	Woylie	Endangered	Rare	Protected Matters Search Tool BDBSA	Not likely – protected in the nearby Yookamurra Private Nature Reserve. (Regionally extinct)
<i>Macrotis lagotis</i>	Greater Bilby	Vulnerable	Vulnerable	Protected Matters Search Tool BDBSA	Not likely – protected in the nearby Yookamurra Private Nature Reserve.
<i>Myrmecobius fasciatus</i>	Numbat	Endangered	Endangered	BDBSA	This species is considered to be regionally extinct ⁵² .
<i>Nyctophilus corbeni</i>	Corben's Long-eared Bat	Vulnerable		Protected Matters Search Tool	Found in an array of inland woodland vegetation types, including box, ironbark and cypress pine woodlands; Buloke, Belah, River Red Gum and Black Box woodlands as well as a variety of mallee vegetation ⁵³ . More likely to be found on the River Murray floodplain.
<i>Trichosurus vulpecula</i>	Common Brushtail Possum		Rare	BDBSA	Not likely to be found in the project area as the trees do not possess hollows.
Frogs					
<i>Littoria raniformis</i>	Southern Bell Frog	Vulnerable	Vulnerable	Protected Matters Search Tool Naturemaps BDBSA	This species is found throughout the River Murray and South East in large permanent waterbodies with abundant growth of vegetation near the bank ⁵⁴ . Not likely as habitat is not suitable.
Reptiles					
<i>Chelodina expansa</i>	Broadshelled Turtle		Vulnerable	Naturemaps BDBSA	A riverine species, therefore would not use the project area.
<i>Emydura macquarii</i>	Macquarie River Turtle		Vulnerable	Naturemaps BDBSA	A riverine species, therefore would not use the project area.
<i>Morelia spilota</i>	Carpet Python		Rare	BDBSA	Known from cliffs and Red Gums along the river, however unlikely to utilise the project area.
<i>Varanus varius</i>	Lace Monitor		Rare	BDBSA	Known from cliffs and Red Gums along the river, however unlikely to utilise the project area.

⁵² Gillam, S. and Urban, R. (2010) *Regional Species Conservation Assessment Project, Phase 1 Report: Regional Species Status Assessments, Murraylands Region*. Department of Environment and Natural Resources, South Australia.

⁵³ https://en.wikipedia.org/wiki/Nyctophilus_corbeni

⁵⁴ <https://www.frogwatchsa.com.au/species/view/10>