Native Vegetation Clearance

Eyre and Lincoln Highways Overtaking Lanes

Data Report

Clearance under the *Native Vegetation Regulations 2017*

16 March 2021

Prepared by EBS Ecology

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Final V3

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Cover photograph: Site A1 along the Eyre Highway Project Area.

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Glossary and abbreviations

BAM	Bushland Assessment Method
BDBSA	Biological Database of South Australia (maintained by DEW)
DAWE	Department of Agriculture, Water and the Environment (Commonwealth)
DEW	Department for Environment and Water (South Australia)
EBS	Environment and Biodiversity Services Pty Ltd (trading as EBS Ecology)
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
ha	Hectare(s)
IBRA	Interim Biogeographical Regionalisation of Australia
km	Kilometre(s)
NatureMaps	Initiative of DEW that provides a common access point to maps and geographic information about South Australia's natural resources in an interactive online mapping format
NPW Act	*National Parks and Wildlife Act 1972*
NV Act	*Native Vegetation Act 1991*
NVC	Native Vegetation Council
PMST	Protected Matters Search Tool (under the EPBC Act; maintained by DAWE)
Project	Eyre and Lincoln Highways overtaking lanes
Project Area	The four immediate impact footprints provided by Greenhill for the proposed overtaking lanes
RAM	Rangelands Assessment Method
SA	South Australia/South Australian
Search Area	5 km buffer of the Project Area considered in the desktop assessment database searches
SEB	Significant Environmental Benefit
sp.	Species
spp.	Species (plural)
STAM	Scattered Tree Assessment Method
TEC	Threatened Ecological Community
var.	Variety (a taxonomic rank below that of species and subspecies, but above that of form)

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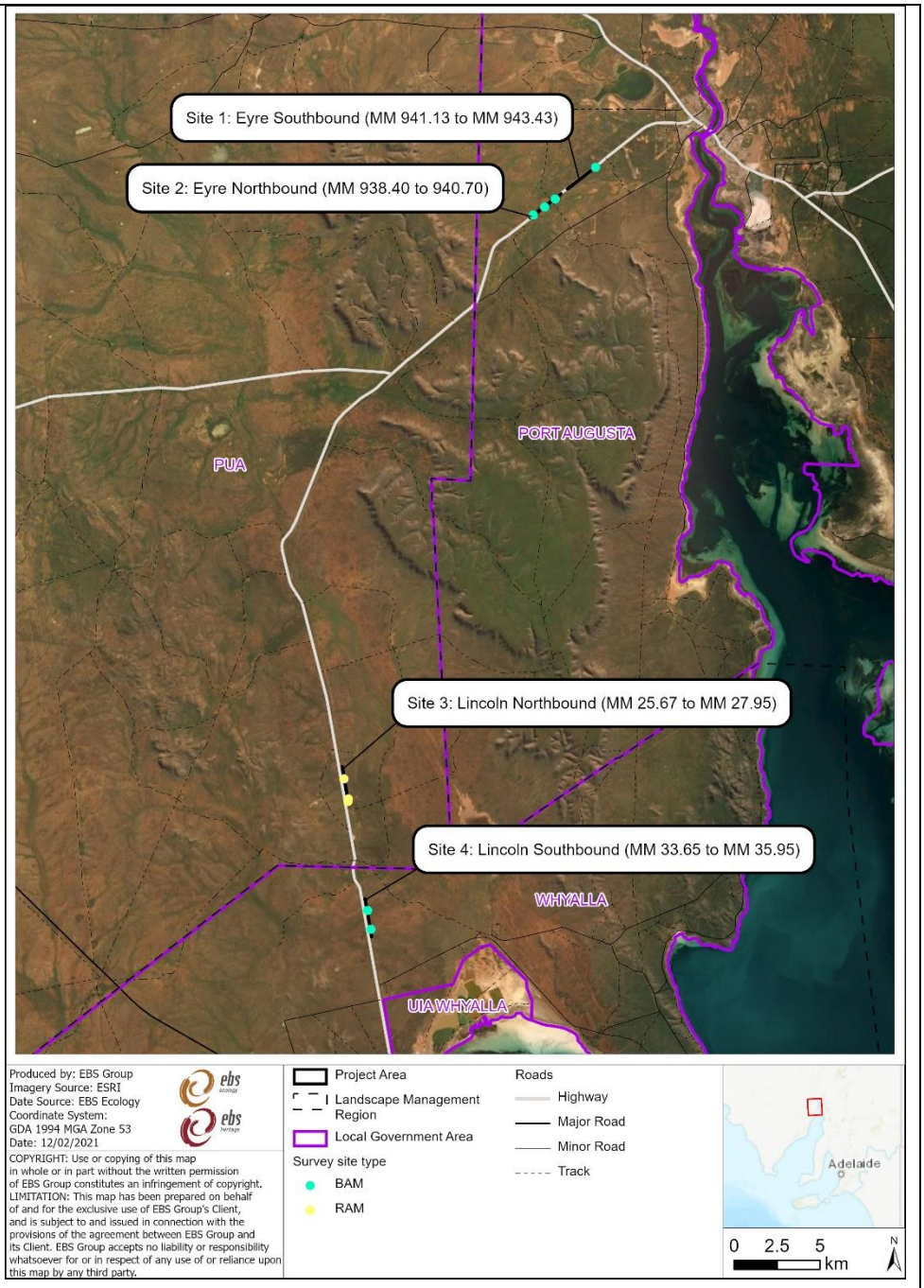
1. Application information

Table 1. Application details.

Applicant:	Department for Infrastructure and Transport (DIT)		
Key contact:	Ross Papillo Senior Project Manager M: 0438340544 E: ross.papillo@sa.gov.au		
Landowner:	Department for Infrastructure and Transport		
Site Address:	Eyre Highway (Maintenance Markers (MM) 938.40 - 940.70, and MM 941.13 – 943.43) and Lincoln Highway (MM 25.67 – 27.95, and MM 33.65 – 35.95).		
Local Government Area:	Port Augusta, Whyalla and PUA	**Hundred:**	Copley, Gillen and Cultana
Title ID:	n/a – road reserve.	**Parcel ID**	n/a – road reserve.

Table 2. Summary of the proposed clearance.

Purpose of clearance:	Clearance required for the construction of four overtaking lanes on Eyre and Lincoln Highways.
Native Vegetation Regulation:	Regulation 12, Schedule 1; clause 32, Works on behalf of Commissioner of Highways
Description of the vegetation under application:	8.77 ha of *Maireana pyramidata/Atriplex vesicaria* shrublands in good condition, 4.65 ha of *Acacia papyrocarpa* woodlands in good condition, and 1.04 ha of *Maireana astrotricha/Atriplex vesicaria* shrubland in good condition.
Total proposed clearance – area (ha) and/or number of trees:	Up to 14.47 ha of native vegetation is proposed to be cleared.
Level of clearance:	The overall level of clearance associated with this application is Level 4. The RAM component of the Project (site 3) is classified as clearance Level 3, while the BAM component (sites 1, 2 and 4) is classified as Clearance level 4, in accordance with the *Guide to the Native Vegetation Regulations 2017*. Refer to section 3 Method for more information on RAM and BAM and section 4.6 Risk assessment for more information on the level of clearance associated with each of the four overtaking lanes.
Overlay (Planning and Design Code):	N/A (Native Vegetation Overlay)

Map of proposed clearance area:	 **Figure 1. Indicating the locations of the proposed overtaking lanes. Not reflective of clearance area (see Figure 27, Figure 28, Figure 29 and Figure 30) and covers approximately 3 ha of native vegetation per site.**
Mitigation Hierarchy:	**Avoidance** The Project must occur in the existing road corridor adjacent to the existing transport infrastructure. It is unlikely that the clearance associated with the proposal can be avoided or located elsewhere. **Minimisation** Where vegetation clearing is required, it will occur in accordance with the DIT Vegetation Removal Policy – Standard Operating Procedures under the Native Vegetation Act 1991 (DPTI 2020). This policy requires all vegetation clearing to be undertaken in accordance with the DIT Environmental Management System. **Rehabilitation or restoration** Clearing associated with the Project is permanent. Rehabilitation will not be undertaken.

	Offset DIT intend to provide the SEB via payment into the Native Vegetation Fund.
SEB Offset proposal	Payment of $92,202.54 into the Native Vegetation Fund

2. Purpose of clearance

2.1. Description

The Department for Infrastructure and Transport (DIT) has announced its commitment to creating a safe and efficient road network. To achieve this, funding has been provided to create a north and south bound overtaking lane on both the Lincoln (RN 2600) and Eyre Highways (RN 2000) (the Project). Project co-funding is being made available by the Australian Government and South Australian (SA) State Government from the Roads of Strategic Importance initiative (Port Augusta to Perth Corridor) and from the Safety Package under the South Australian Rural Roads Package (Greenhill, 2020).

Greenhill Engineers Pty Ltd (Greenhill) have been contracted by DIT to undertake planning investigations to select the appropriate locations for the four overtaking lanes and to undertake a full detailed design based on DIT approved options and locations. EBS Ecology (EBS) has been contracted by Greenhill to provide a Native Vegetation Clearance Data Report, following the desktop ecological (flora and fauna) assessment for the Project.

2.1.1. Scope and Objectives

EBS were engaged to undertake an ecological assessment to determine potential key risks to significant flora, fauna and/or communities associated with the Project and to provide detail on the requirements to avoid and minimise the Project's impact. The scope of works was undertaken in two phases including:

(1) Desktop assessment (February 2020) for four sites along the Eyre Highway and two sites along the Lincoln Highway; and

(2) Field assessment (September 2020) of four preferred locations approved by DIT:

- Site 1. Eyre Highway Southbound MM941 to MM943;
- Site 2. Eyre Highway Northbound MM938 to MM940;
- Site 3. Lincoln Highway Northbound MM25 to MM28; and
- Site 4. Lincoln Highway Southbound MM33 to MM36.

During the design process, the locations of sites have changed. The following locations are the confirmed locations according to the 100% design provided by Greenhill to EBS on 05/02/2021 (Figure 2, Figure 3 and Figure 4):

- Site 1. Eyre Highway Southbound MM941.13 to MM943.43;
- Site 2. Eyre Highway Northbound MM938.40 to MM940.70;
- Site 3. Lincoln Highway Northbound MM25.67 to MM27.95; and
- Site 4. Lincoln Highway Southbound MM33.65 to MM35.95.

Although 430 m of Site 1 and 700 m of Site 2 have not been surveyed in the field, desktop assessment has determined that the vegetation associations are likely to be the same as already surveyed, as described in Section 3.2 below.

The desktop assessment included:

- Identification of relevant local, State and Commonwealth legislative and compliance requirements;
- Desktop research, including database searches, to enable:
  - A summary of flora and fauna species known or likely to occur in the area, including weeds and pest species;
  - Descriptions of species and areas of environmental significance (e.g., Threatened Ecological Communities) potentially impacted by the Project;
  - An assessment of the potential impacts to native vegetation as a result of the Project.
- Broad recommendations on flora and fauna management issues and possible strategies to minimise potential impacts associated with the Project.

The field component included:

- Assess the DIT approved areas using the BAM (Site 1, Site 2, Site 4); and using the RAM (Site 3) as guided by the Landscape Management Regions (LMR) and Local Government Area (LGA), specifically the Port Augusta Council (Figure 2);
- Undertake the field survey with consideration of the ecological constraints identified in the desktop assessment, including classification of vegetation communities and habitat features for threatened species.

2.2. Background

2.2.1. Administrative boundaries

The administrative boundaries that the Project Area falls within are presented in Table 3, and Figure 2 to Figure 4.

Table 3. Administrative boundaries of the Project Area.

Site	Location (MM)	LMR	LGA	Hundred
Site 1: Eyre Southbound	MM 941.13 to MM 943.43	SAAL	Port Augusta	Copley
Site 2: Eyre Northbound	MM 938.40 to 940.70	SAAL	Port Augusta	Copley and Gillen
Site 3 Lincoln Northbound	MM 25.69 to MM 27.95	SAAL	Pastoral unincorporated	Not applicable
Site 4 Lincoln Southbound	MM 33.65 to MM 35.95	Eyre Peninsula	Whyalla	Cultana

**SAAL: South Australian Arid Lands Landscape Management region*

2.2.2. Current and surrounding land use

The site of the clearance is directly adjacent to the existing Highway, within the existing road reserve.

The Eyre Highway sites are surrounded by land largely used for grazing livestock.

The land surrounding Lincoln Highway sites are within the Cultana Training Expansion Area (CUTA) under the Miscellaneous Lease for Defence Purposes No. 53500 (MLDP), which is a Crown Lease issued and granted by South Australia to the Commonwealth through the Department of Defence. This land is largely used for grazing livestock. DIT

has advised of the Department of Defence's plans for a new intersection and underpass to service the redevelopment of the Cultana training facility between MM 29.4 and MM 31.9, which lies between the two proposed overtaking lanes. Outside of this, Whyalla National Park is located 2 km south of the proposed Lincoln Highway Southbound overtaking lane.

2.2.3. Bioregions

The Eyre Project Area falls in the Gawler IBRA Region and the Gawler Lakes IBRA Sub-region in an area where IBRA Associations are not updated for IBRA Version 7. However, based on IBRA Version 6, the Eyre Southbound and the majority of the Eyre Northbound overtaking lanes fall within the Arden IBRA Association. Approximately 600 metres of the western end of Eyre Northbound falls within the Simmens Version 6 IBRA Association. These associations have been used in the BAM scoresheets.

Within the Arden Version 6 IBRA Association, approximately 95% (127522 ha) of the association is mapped as remnant native vegetation, of which 2% (2726ha) is formally conserved.

The Lincoln Project Area is located in the Gawler Bioregion, according to the Interim Bioregionalisation of Australia (IBRA) Version 7.0. This bioregion is further divided into five subregions of similar landscape and environmental characteristics with the Lincoln Project Area falling within the Myall Plains subregion which was used in the Lincoln Northbound RAM Scoresheet. The IBRA Associations were not updated for IBRA Version 7, but based on IBRA Version 6, both of the Lincoln overtaking lanes fall within the Tregolana IBRA Association which has been used for entry into the Lincoln Southbound BAM Scoresheet.

Approximately 97% (1050684 ha) of the Myall Plains subregion is mapped as remnant native vegetation, of which 8% (86146 ha) is formally conserved.

2.3. General location map

The locations provided by Greenhill in January 2021 for the overtaking lanes project area based on the 100% design were:

- Lincoln Highway - Northbound from Maintenance Marker (MM) 25.67 – 27.95 and southbound from MM 33.65 – 35.95
- Eyre Highway - Northbound between MM 938.40 – 940.70 and southbound between MM 941.13 – 943.43.

The locations of the Project areas are displayed in Figure 2, Figure 3 and Figure 4.

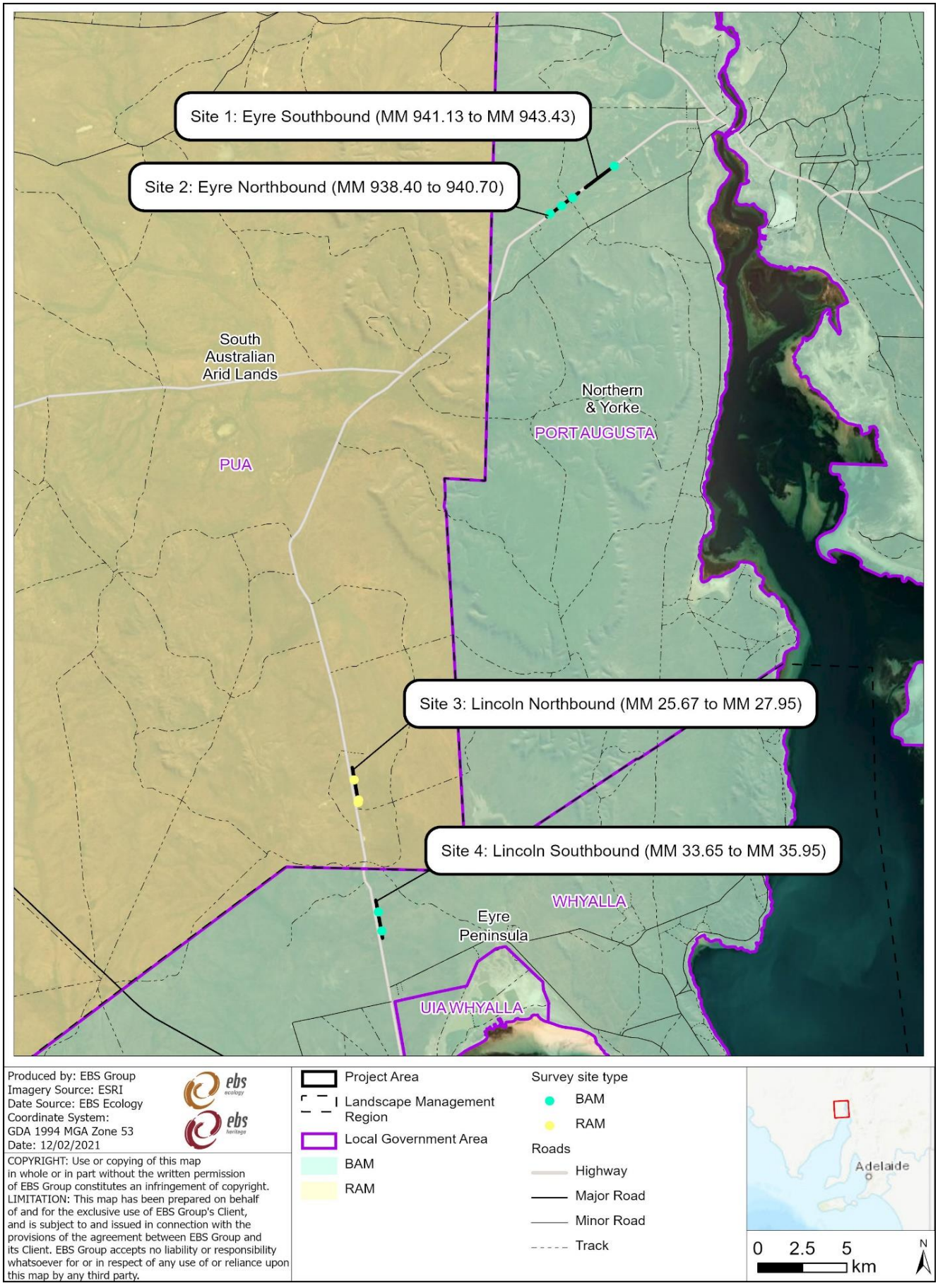


Figure 2. Overview location map of DIT approved overtaking lanes indicating where the BAM and RAM methodology applies based on the Landscape Management Regions (LMR) and Local Government Areas (LGA).

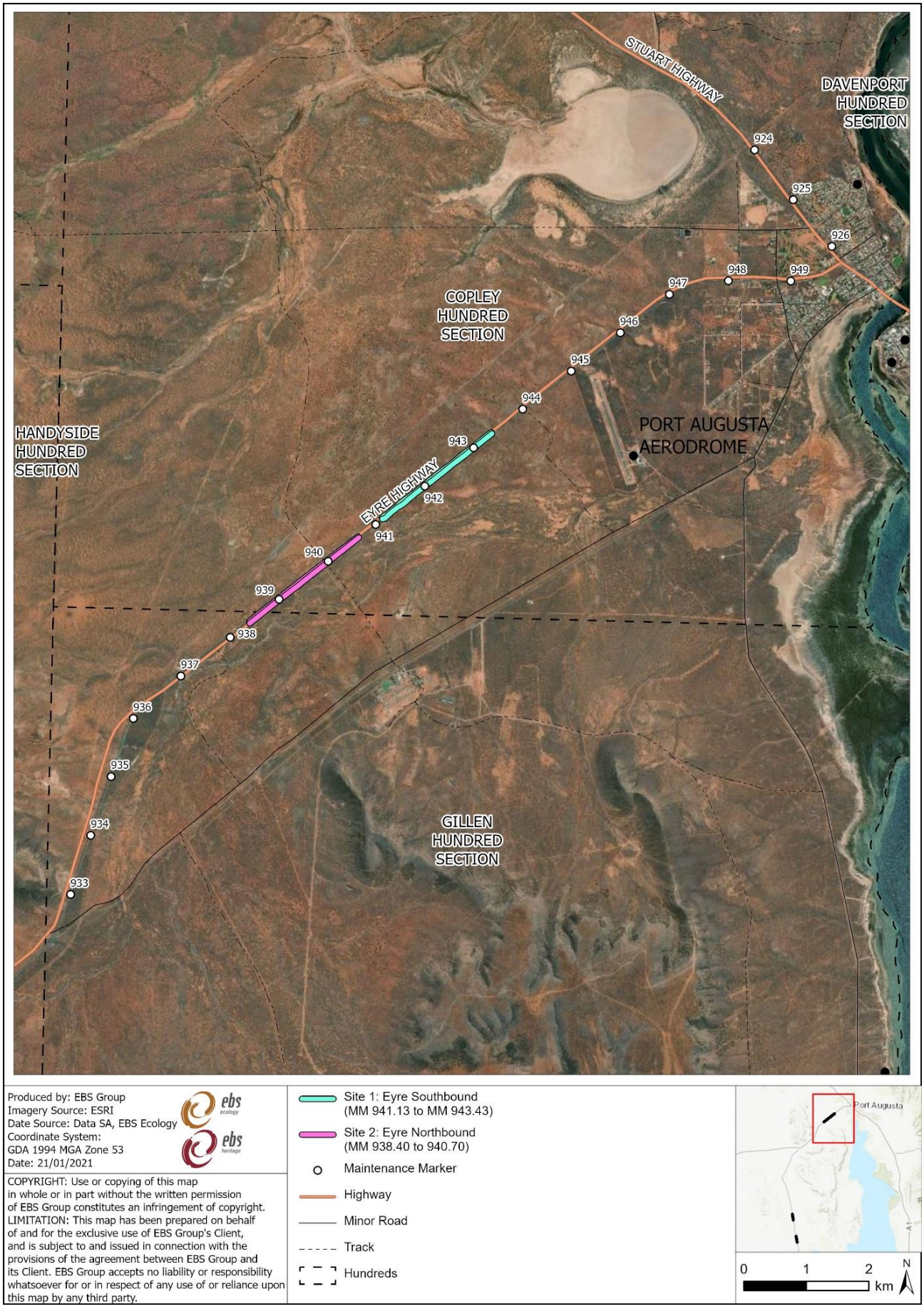


Figure 3. Eyre Highway: proposed locations of north and south bound overtaking lanes on the Eyre Highway (Eyre Project Area).

Figure 4. Lincoln Highway: proposed locations of north and south bound overtaking lanes on the Lincoln Highway (Lincoln Project Area).

2.4. Details of the proposal

The proposed overtaking lanes will impact both sides of the highway. The typical cross sections can be seen in Figure 5 and Figure 6.

All works will be contained within the existing road reserve.

Design plans of the Eyre Highway and Lincoln Highway Overtaking Lanes can be found attached in PDF format as Appendix 1.

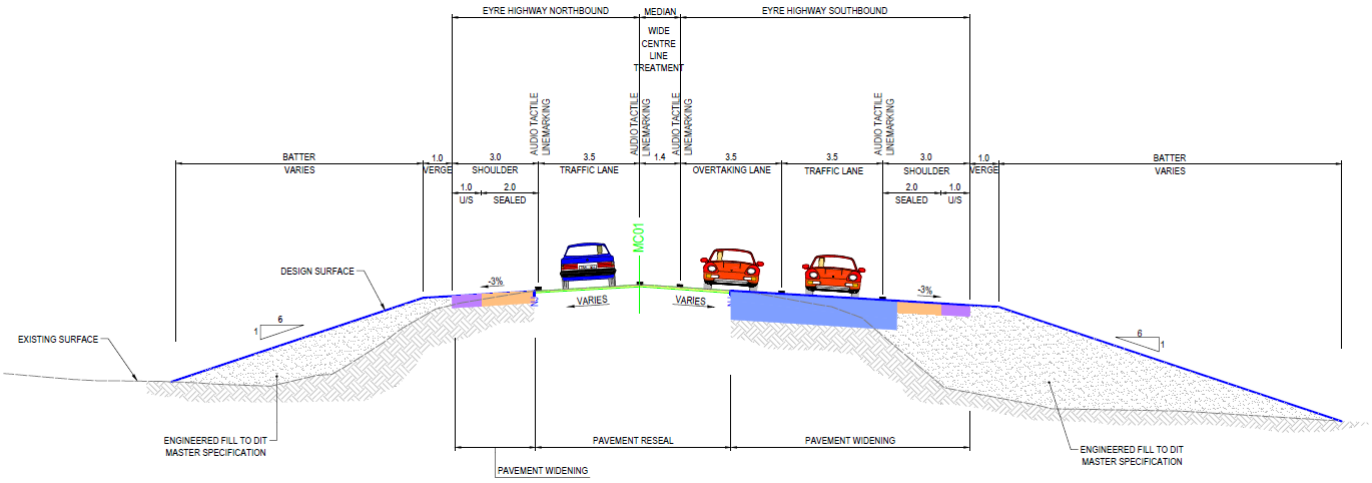


Figure 5. Typical cross section, section taken at MC01 CH 420 (looking north).

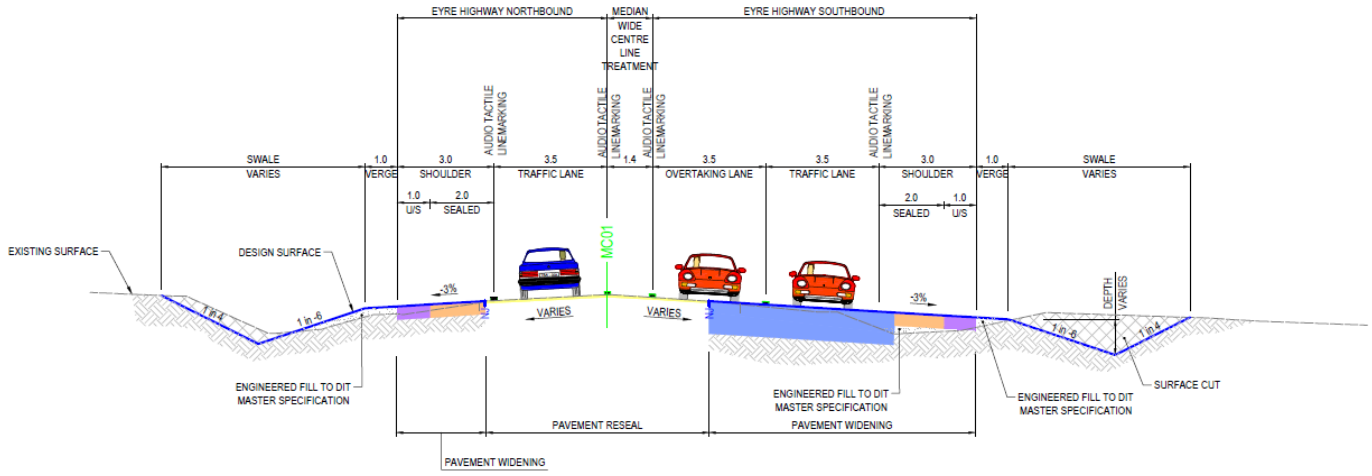


Figure 6. Typical cross section, section taken at MC01 CH 700 (looking north).

2.5. Approvals <u>required</u> *or* <u>obtained</u>

DIT is undertaking an Environment and Heritage Impact Assessment (EHIAR) process for the Project. Examples of other potential approvals include:

- transport of declared weeds under the new Landscapes South Australia Act, and
- Aboriginal heritage Act if any sites, objects or remains are uncovered during the works.

Other legislative approvals may be required.

2.6. Native Vegetation Regulation

The regulations under which the proposed clearance is suggested to be assessed is Regulation 12, Schedule 1; clause 32 – Works on behalf of Commissioner of Highways of the *Native Vegetation Regulations 2017*.

2.7. Development Application information (if applicable)

There is no development plan Zone or Subzone named for the Project Area.

The Eyre Project Area falls within the category of Primary Production – Mining (Code: PTAU), and lies within an area of native vegetation greater than 50 ha.

Site 3 (Lincoln Northbound) lies within a Remote Area. Site 4 (Lincoln Southbound) falls within the category of Industrial (Code: WH), and lies within Acacia and Casuarina woodlands, in area of native vegetation greater than 50 ha.

3. Method

3.1. Desktop assessment

A desktop assessment was undertaken to determine the potential for any threatened flora and fauna species, and Threatened Ecological Communities (TECs) (both Commonwealth and State listed) to occur within the Project Area. This was achieved by undertaking database searches. A 5 km buffer (for BAM) was given to the three Project areas (Sites 1, 2 and 4) located in the agricultural region of SA and/or located within the Port Augusta City Council. A 50km buffer (for RAM) was given to the one Project area (Site 3) located in the South Australian Arid Lands (SAAL) and Alinytjara Wilurara Landscape Management Regions (LMR), excluding the Port Augusta City Council and the Flinders Ranges Council.

3.1.1. PMST report

Two Protected Matters Search Tool (PMST) reports were generated on 20 March 2020 and 17 September 2020 for the BAM and RAM areas respectively to identify nationally threatened flora and fauna, migratory fauna and TECs under the EPBC Act relevant to the Project Area (DAWE 2020). Only species and TECs identified in the PMST report that are likely or known to occur within the Search Area were assessed for their likelihood of occurrence within the Project Area.

3.1.2. BDBSA data extract

Data extracts from the Biological Database of South Australia (BDBSA) was obtained from NatureMaps to identify flora and fauna species that have been recorded within 5 km and 50 km of the Project Areas as required (data extracted 6 April 2020; DEW 2020). The BDBSA is comprised of an integrated collection of species records from the South Australian Museum, conservation organisations, private consultancies, Birds SA, Birdlife Australia and the Australasian Wader Study Group, which meet the Department for Environment and Water's (DEW) standards for data quality, integrity and maintenance. Only species with records since 1995 and a spatial reliability of less than 1 km were assessed for their likelihood of occurrence.

3.1.3. Likelihood of occurrence

The criteria for the likelihood of occurrence of threatened species within the Project Area are described in Table 4.

Table 4. Criteria for the likelihood of occurrence of threatened species within the Project Area.

Likelihood	Criteria
Highly Likely/Known	Recorded in the last 10 years, the species does not have highly specific niche requirements, the habitat is present and falls within the known range of the species distribution or; The species was recorded as part of field surveys.
Likely	Recorded within the previous 20 years, the area falls within the known distribution of the species and the area provides habitat or feeding resources for the species.
Possible	Recorded within the previous 20 years, the area falls inside the known distribution of the species, but the area provides limited habitat or feeding resources for the species. Recorded within 20 -40 years, survey effort is considered adequate, habitat and feeding resources present, and species of similar habitat needs have been recorded in the area.

Likelihood	Criteria
Unlikely	Recorded within the previous 20 years, but the area provides no habitat or feeding resources for the species, including perching, roosting or nesting opportunities, corridor for movement or shelter. Recorded within 20 -40 years; however, suitable habitat does not occur, and species of similar habitat requirements have not been recorded in the area. No records despite adequate survey effort.

3.2. Flora assessment

The flora assessment was undertaken by NVC Accredited Consultant Emma Eichler and Brad Bianco on 09-10 September 2020 in accordance with the Bushland Assessment Method (BAM) and Rangelands Assessment Method (RAM) (NVC 2020a, NVC 2020b).

The following four preferred locations approved by DIT were surveyed:

- Site 1. Eyre Highway Southbound MM941 to MM943;
- Site 2. Eyre Highway Northbound MM938 to MM940;
- Site 3. Lincoln Highway Northbound MM25 to MM28; and
- Site 4. Lincoln Highway Southbound MM33 to MM36.

The location of these sites subsequently changed, and the latest 100% design provided by Greenhill to EBS on 05/02/2021 are as follows:

- Site 1. Eyre Highway Southbound MM941.13 to MM943.43;
- Site 2. Eyre Highway Northbound MM938.40 to MM940.70;
- Site 3. Lincoln Highway Northbound MM25.67 to MM27.95; and
- Site 4. Lincoln Highway Southbound MM33.65 to MM35.95.

Whilst the Lincoln Highway sites remained within the surveyed boundaries, 430m of Site 1 and 700m of Site 2 was not surveyed in the field.

Desktop assessment of these extra lengths of roadside vegetation was done using satellite imagery (Google Earth Pro V 7.3.3.7786., 2021) and the Street View function on Google Maps (Google Maps, 2020), to determine that the unsurveyed vegetation is likely the same as the adjacent mapped areas.

3.2.1. Bushland Assessment Method

The BAM is derived from the Nature Conservation Society of South Australia's Bushland Condition Monitoring methodology (Croft et al. 2007, 2008a, 2008b, 2009; Milne and Croft 2012; Milne and McCallum 2012). The BAM used to assess areas of native vegetation requiring clearance and calculate the SEB requirements.

Details of site selection/stratification and assessment protocols, and the biodiversity value components assessed and the factors that influence these components are outlined in the Bushland Assessment Manual (NVC 2020a).

The Conservation Significance Scores were calculated from direct observations of flora and direct and historical observations of fauna species of conservation significance. All fauna identified as known to occur in the PMST, and fauna with BDBSA records since 1995 and with a spatial reliability of less than 1 km, within 5 km of the Project Area,

were included in the BAM scoresheets. Species determined as unlikely to occur within the Project Area will be removed by the Native Vegetation Branch if the finding is supported. Marine and/or wetland species were omitted from the scoresheets given the Project Area is terrestrial.

3.2.2. Rangelands Assessment Method

The RAM aligns the assessment of vegetation (and land) condition with the method developed by Natural Resources South Australian Arid Lands for the rapid assessment of pastoral properties in sheep and cattle country, but is adapted for native vegetation assessments in arid rangelands throughout South Australia.

Details of site selection/stratification and assessment protocols, and the biodiversity value components assessed and the factors that influence these components are outlined in the *Rangelands Assessment Manual* (NVC 2020b).

The Conservation Significance Scores were calculated from direct and historical observations of flora and fauna species of conservation significance. All flora and fauna identified as known to occur in the PMST, and flora and fauna with BDBSA records since 1995 and with a spatial reliability of less than 1 km, within 50 km of the Project Area, were included in the RAM scoresheets. Species determined as unlikely to occur within the Project Area will be removed by the Native Vegetation Branch if the finding is supported. Marine and/or wetland species were omitted from the scoresheets given the Project Area is terrestrial.

3.3. Fauna assessment

As mentioned above in Section 3.1.2, data extracts from the Biological Database of South Australia (BDBSA) was obtained from NatureMaps to identify fauna species that have been recorded within 5 km and 50 km of the Project Areas as required (data extracted 6 April 2020; DEW 2020).

Very limited time was available for fauna observations in-field, but an assessment was made for threatened species based on vegetation and habitat features. All native and exotic fauna species opportunistically encountered (directly observed, or tracks, scats, burrows, nests and other signs of presence) during the native vegetation clearance assessment were recorded. Potential fauna refuge sites, such as hollows, were noted as an indication of availability of suitable habitat. Particular attention was paid to identifying habitat for threatened species. For each opportunistic fauna observation, the species, number of individuals, GPS location, detection methodology (sight, sound or sign) and habitat were recorded.

4. Assessment outcomes

4.1. Vegetation assessment

4.1.1. General description of the vegetation, the site and matters of significance

Eyre Highway Sites:

Vegetation in surveyed areas comprised chenopod shrublands of *Maireana* and *Atriplex* with densely regenerating *Acacia papyrocarpa* directly adjacent the road on a level plain. All vegetation was dominated by *Maireana pyramidata*, but transitioned to tableland with *Maireana astrotricha* toward the western end of the Eyre Northbound overtaking lane. Vegetation varied in density which was the basis on the separation of BAM Sites. The vegetation was generally in good condition dominated by native species with grazing largely absent, areas of high diversity and regeneration of multiple palatable species including grasses. Plants were larger directly adjacent the roadside, including large *Maireana pyramidata* specimens which may provide habitat opportunities for Western Grasswren. This area also had increased regeneration of *A. papyrocarpa* and *Senna* spp.

Vegetation was mapped into four vegetation associations (Sites) as indicated in Table 5. BAM Site B2 was added based on survey results for B3. The details of each Site are provided in Table 7 to Table 9, whilst the BAM Scoresheets are provided as an attachment to this report.

Due to design changes after field survey, 430 m of Site 1 and 700m of Site 2 were unsurveyed. Through desktop assessment, it was determined that these extra areas of vegetation were visually similar and therefore are likely to also be the same vegetation associations as the adjacent surveyed areas. The vegetation mapping and all calculations reflects this assumption.

Table 5. Summary of vegetation for the Eyre Highway Project Area.

Overtaking Lane	Block	Site	Method	Vegetation Description	IBRA	Area (ha)*	UBS**
Site 1: Eyre Southbound	A	A1	BAM	*Maireana pyramidata (*Black Bluebush*)/Atriplex vesicaria (*Bladder Saltbush*)* Low Shrubland +/- *Senna* spp. (Senna) with emergent *Acacia papyrocarpa (*Western Myall*)*	Arden	3.90	86.26
Site 2: Eyre Northbound	B	B1	BAM	*Maireana pyramidata (*Black Bluebush*)/Atriplex vesicaria (*Bladder Saltbush) Low Very Open Shrubland over *Sclerolaena* spp. (Bindyii) with emergent *Acacia papyrocarpa* (Western Myall)	Arden	1.20	85.74
	B	B2	BAM	*Maireana pyramidata* (Black Bluebush)/*Atriplex vesicaria* (Bladder Saltbush) Low Shrubland +/- *Maireana astrotricha* with emergent *Acacia papyrocarpa* (Western Myall)	Arden	1.45	85.74
	B	B3	BAM	*Maireana pyramidata* (Black Bluebush)/*Atriplex vesicaria* (Bladder Saltbush) Low Shrubland +/- *Maireana astrotricha* with emergent *Acacia papyrocarpa (*Western Myall)	Simmens	0.84	85.74

**This area is inclusive of a 0.5 m buffered area adjacent the outer edge of the provided construction zone footprint, as this vegetation may be impacted during construction works.*

***UBS = Unit Biodiversity Score*

Lincoln Highway Sites:

Vegetation in the Lincoln Project Area comprised Very Low Open Woodlands of *Acacia papyrocarpa* +/- *Myoporum platycarpum* (False Sandalwood) and *Eremophila* spp. *(longifolia, scoparia)* over chenopod shrubland in the Lincoln Southbound overtaking lane transitioning to chenopod shrublands of *Maireana* spp. *(pyramidata, astrotricha, sedifolia)* surrounded by *Casuarina pauper* (Blackoak) woodlands in the Lincoln northbound overtaking lane. Vegetation was in good condition with limited grazing observed except on highly palatable *Exocarpos aphyllus* (Leafless Cherry) and it was noted that a number of highly palatable specimens of *Alectryon oleifolius* (Bullock Bush) were largely un-grazed. Plants were larger directly adjacent the roadside, including large *Maireana pyramidata* specimens which may provide habitat opportunities for Western Grasswren. This area also had increased regeneration of *A. papyrocarpa*, *Senna* spp. and *Eremophila* spp.

The Site 4 Lincoln southbound overtaking lane was assessed using the BAM and was divided into one Block (Block C) and two BAM Sites based on a change in species composition (Figure 30). The Site 3: Lincoln Northbound overtaking lane was assessed using the RAM (as required) and was stratified into three sites based on changes in species composition, but not necessarily changes in condition (Figure 29). It should be noted that the northern section of Lincoln Northbound was assessed over a very short timeframe and the eastern side of the road was assessed only from the vehicle. The details of each BAM and RAM Site are provided in Table 10 to Table 14, whilst the BAM and RAM Scoresheets are provided as an attachment to this report.

Table 6. Summary of vegetation for the Lincoln Highway Project Area.

Overtaking Lane	Block	Site	Method	Vegetation Description	IBRA	Area (ha)*	UBS**
Site 4: Lincoln Southbound	C	C1	BAM	*Acacia papyrocarpa (*Western Myall*)/Myoporum platycarpum (*False Sandalwood) Very Low Open Woodland over *Maireana sedifolia* (Pearl Bluebush)/*Atriplex vesicaria* (Bladder saltbush)	Tregolana	2.79	70.34
	C	C2		*Acacia papyrocarpa* (Western Myall) Very Open Low Woodland over *Maireana sedifolia* (Pearl Bluebush)/*Atriplex vesicaria* (Bladder saltbush) +/- *Eremophila longifolia* (Weeping Emubush) +/- *Casuarina pauper* (Black Oak)		0.69	64.42
Site 3: Lincoln Northbound	D	D1-PL	RAM	*Acacia papyrocarpa* (Western Myall) Very Low Woodland over *Maireana pyramidata* (Black Bluebush)/*Atriplex vesicaria* (Bladder Saltbush*)*	Tregolana (Sub-region: Myall Plains)	1.17	77.30
	D	D2-PL		*Maireana pyramidata (*Black Bluebush*)/Atriplex vesicaria (*Bladder Saltbush) Low Shrubland +/- *Maireana georgei* (Satiny Bluebush) +/- emergent *Acacia papyrocarpa* (Western Myall)		1.39	72.16
	D	D3-PL		*Maireana astrotricha* (Low Bluebush*) / Atriplex vesicaria (*Bladder Saltbush) Low Shrubland over *Sclerolaena* spp. *(*Bindyi) +/- *Acacia papyrocarpa (*Western Myall)		1.04	66.14

**This area is inclusive of a 0.5 m buffered area adjacent the outer edge of the provided construction zone footprint, as this vegetation may be impacted during construction works.*

***UBS = Unit Biodiversity Score*

4.1.2. Details of the vegetation associates/scattered trees proposed to be impacted

Table 7. Summary of BAM Site A1 (Site 1: Eyre Southbound).

Block	Block A - Arden
Vegetation Association	*Maireana pyramidata* (Black Bluebush)/*Atriplex vesicaria* (Bladder Saltbush) Low Shrubland +/- *Senna spp.* (Senna) with emergent *Acacia papyrocarpa* (Western Myall)

Figure 7. Site A1 – BAM Site image – southern side of the road.

Figure 8. Site A1 – southern side of the road indicating larger plants and regenerating shrubs / trees adjacent the roadside.

Figure 9. Site A1 – north side of the road.

General description	Good condition with high diversity of species and mixed age *A. papyrocarpa*, including some older specimens. Large bluebushes, regeneration of shrubs and trees and weed invasion adjacent the road which receives increased water runoff. Limited grazing and multiple species regenerating. Buffel Grass (*Cenchrus ciliaris*) scattered along roadside.				
Threatened species or community	No threatened species or communities were observed. All threatened flora species are considered unlikely to occur. Vegetation may provide habitat for threatened fauna including the Western Grasswren and Slender-billed Thornbill. Refer to the desktop assessment sections for likelihood of occurrence for each fauna species identified in data base searches.				
Landscape context score	1.06	**Vegetation Condition Score**	73.98	**Conservation significance score**	1.10
Unit biodiversity Score	86.26	**Area (ha)**	3.90	**Total biodiversity Score**	336.42

Table 8. Summary of BAM Site B1 (Site 2: Eyre Northbound).

Block	Block B – Arden
Vegetation Association	*Maireana pyramidata* (Black Bluebush)/*Atriplex vesicaria* (Bladder Saltbush) Low Very Open Shrubland over *Sclerolaena spp.* (Bindyi) with emergent *Acacia papyrocarpa* (Western Myall)

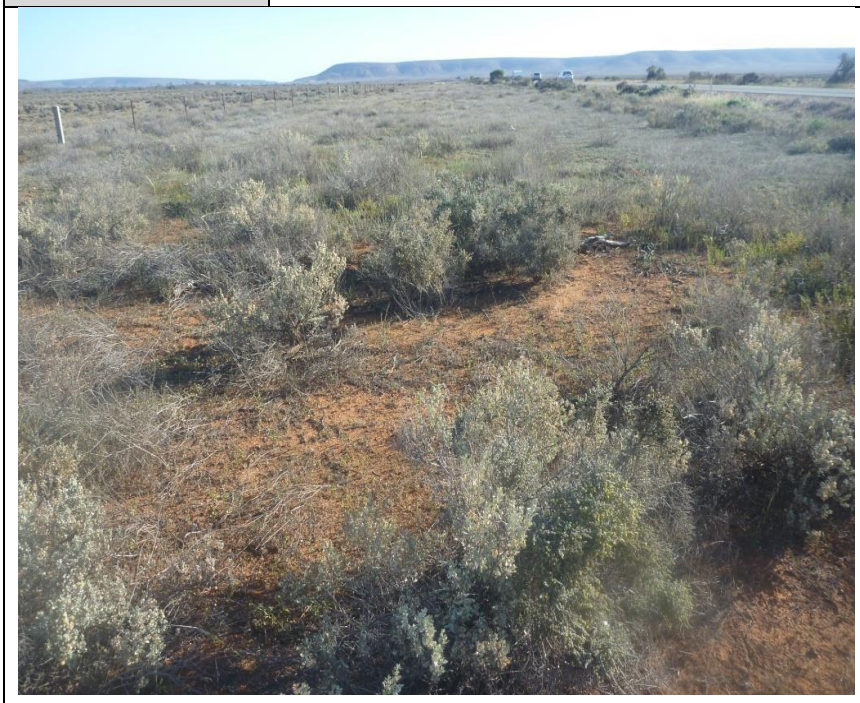


Figure 10. Site B1 – BAM Site image – southern side of the road.

Figure 11. Stockpile in B1 just northeast of the BAM site.

Figure 12. Open patch of *Sclerolaena brachyptera* on northern side of the road (not representative of the entire Site.

General description	More open and poorer condition than site A1, B2 or B3. Fair condition and dominated by *Sclerolaena brachyptera* in some patches likely due to historical grazing pressure. Stockpile and track on southern side of the road with Salvation Jane. However, *Atriplex* and *Maireana* shrubs are mixed age and un-grazed with a moderate to high diversity of plants for this vegetation community. Mixed age *A. papyrocarpa,* including some older specimens. Regeneration, trees and weed invasion higher adjacent the road which receives increased water runoff. Declared weeds Buffel Grass and Salvation Jane were scattered along roadside.
Threatened species or community	No threatened species or communities were observed. All threatened flora species are considered unlikely to occur. Vegetation may provide habitat for threatened fauna. Refer to the desktop assessment for each Project Area; in addition to Appendix 2 for the likelihood of occurrence of each fauna species identified in data base searches.

Landscape context score	1.06	**Vegetation Condition Score**	73.53	**Conservation significance score**	1.10
Unit biodiversity Score	85.74	**Survey Area (ha)**	1.20	**Total biodiversity Score**	102.88

Table 9. Summary of BAM Site B2 (Block B Arden) and B3 (Block B Simmens) (Site 2: Eyre Northbound)

Block	Block B Arden: Site B2 and Block B Simmens: Site B3
Vegetation Association	*Maireana pyramidata* (Black Bluebush)/*Atriplex vesicaria* (Bladder Saltbush) Low Shrubland +/- *Maireana astrotricha* with emergent *Acacia papyrocarpa (*Western Myall)

Figure 13. Representative photo of Site B2 looking northeast on northern side of road. Note - there is no specific photo for BAM Site B2 as data was based on sample point B3.

Figure 14. Photo of Bam Site B3 looking northeast along the road.

Figure 15. Photo of Site B3 looking northeast along southern side of road.

General description	B2 and B3 represent the same community but were separated into two BAM Sites as they cross the IBRA Associations Arden and Simmens. B1 and B2 represents a transition between *Maireana pyramidata/Atriplex vesicaria* Plains and *Maireana astrotricha /Atriplex vesicaria / Tecticornia* tableland country. One BAM Site was assessed (B3) with the same data used to score Site B2. It should be noted that Sites B2 and B3 were in better condition than Site B1, but they scored the same UBS. Sites B2 transitioned into Low Shrublands in improved condition than Site B1, but with Senna spp. And emergent *Acacia papyrocarpa* dropping out which is typical of Maireana astrotricha tableland country. *Maireana* specimens generally smaller overall which is likely to provide reduced habitat opportunities for species such as Western Grasswren. Highly palatable species *M. astrotricha* was ungrazed; in addition to palatable species *Atriplex* being ungrazed and mixed age. Declared weed Buffel Grass was scattered along roadside.
Threatened species or community	No threatened species or communities were observed. All threatened flora species are considered unlikely to occur. Vegetation may provide habitat for threatened fauna. Refer to the desktop assessment for each Project Area; in addition to Appendix 2 for the likelihood of occurrence of each fauna species identified in data base searches.

Landscape context score	1.06	**Vegetation Condition Score**	73.53		**Conservation significance score**	1.10	
Unit biodiversity Score	85.74	**Survey Area (ha)**	B2	1.45	**Total biodiversity Score**	B2	124.32
			B3	0.84		B3	72.02

Table 10. Summary of BAM Site C1 (Site 4: Lincoln Southbound).

Block	Block C
Vegetation Association	*Acacia papyrocarpa* (Western Myall)/*Myoporum platycarpum* (False Sandalwood) Very Low Open Woodland over *Maireana sedifolia* (Pearl Bluebush)/*Atriplex vesicaria (*Bladder saltbush).

Figure 16. BAM Site C1 – looking north along eastern side of the road.

Figure 17. BAM Site C1 – looking south along pipeline (eastern side of the road).

Figure 18. BAM Site C1 – looking south along western side of the road.

General description	Good condition with high diversity of species and regeneration of multiple species including shrubs and trees, the latter regenerating mainly directly adjacent the roadside but mature trees were not present. Excellent cryptogam cover and soil surface appears highly intact. Wards Weed abundant and a range of other weeds increase adjacent the track near the pipeline. Limited grazing and multiple species regenerating.				
Threatened species or community	No threatened species or communities were observed. All threatened flora species are considered unlikely to occur. Vegetation may provide habitat for threatened fauna including Western Grasswren and Slender-billed Thornbill. Refer to the desktop assessment sections for likelihood of occurrence for each fauna species identified in data base searches.				
Landscape context score	1.06	**Vegetation Condition Score**	60.33	**Conservation significance score**	1.10
Unit biodiversity Score	70.34	**Survey Area (ha)**	2.79	**Total biodiversity Score**	196.26

Table 11. Summary of BAM Site C2 (Site 4: Lincoln Southbound).

Block	Block C
Vegetation Association	*Acacia papyrocarpa* (Western Myall) Very Open Low Woodland over Senna (Pearl Bluebush)/*Atriplex vesicaria* (Bladder saltbush) +/- *Eremophila longifolia* (Weeping Emubush) +/- *Casuarina pauper* (Black Oak)

Figure 19. BAM Site C2 – looking south along eastern side of the road.

Figure 20. BAM Site C2 – looking north along eastern side of road.

Figure 21. BAM Site C2 – looking north along western side of the road.

General description	Good condition with high diversity of species and regeneration of multiple species including shrubs and trees, the latter regenerating mainly directly adjacent the roadside but mature trees were not present except occasional *C. pauper*. Separated from C2 as the vegetation became more open and *Eremophila* became co-dominant in the over storey instead of *M. platycarpum*. Excellent cryptogam cover and soil surface appears highly intact. Wards Weed abundant and a range of other weeds increase adjacent the track near the pipeline. Limited grazing and multiple species regenerating.				
Threatened species or community	No threatened species or communities were observed. All threatened flora species are considered unlikely to occur. Vegetation may provide habitat for threatened fauna including Western Grasswren and Slender-billed Thornbill. Refer to the desktop assessment sections for likelihood of occurrence for each fauna species identified in data base searches.				
Landscape context score	1.06	**Vegetation Condition Score**	55.25	**Conservation significance score**	1.10
Unit biodiversity Score	64.42	**Survey Area (ha)**	0.69	**Total biodiversity Score**	44.45

Table 12. Summary of RAM Site D1-PL (Site 3: Lincoln Northbound).

Block	Block D				
Vegetation Association	*Acacia papyrocarpa (Western Myall) Very Low Woodland over Maireana pyramidata (Black Bluebush)/Atriplex vesicaria (Bladder Saltbush)*				
 **Figure 22. RAM Site D1-PL – looking north along western side of the road.**					
General description	Site D1-PL occurs between the Lincoln highway and the fenceline. Site in fair to good condition with limited weed invasion and regeneration of *A. papyrocarpa* in patches along the road. Some large chenopods adjacent the road in narrow strip. Many species are mixed age and the significant majority of species exhibit limited to no grazing pressure. Grazing observed on grasses likely to be Kangaroo.				
Threatened species or community	No threatened species or communities were observed. All threatened flora species are considered unlikely to occur. Vegetation may provide habitat for threatened fauna including Western Grasswren, Slender-billed Thornbill, Gilberts Whistler and Elegant Parrot. Refer to the RAM Scoresheet for terrestrial species that occur within 50km (excluding Flinders Ranges Species) and refer to the desktop assessment sections for likelihood of occurrence for each fauna species identified in the 5km database searches.				
Landscape context score	1.04	**Vegetation Condition Score**	67.57	**Conservation significance score**	1.10
Unit biodiversity Score	77.30	**Survey Area (ha)**	1.17	**Total biodiversity Score**	90.44

Table 13. Summary of RAM Site D2-PL (Site 3: Lincoln Northbound).

Block	Block D
Vegetation Association	*Maireana pyramidata (*Black Bluebush)/*Atriplex vesicaria (*Bladder Saltbush) Low Shrubland +/- *Maireana georgei (*Satiny Bluebush) +/- emergent *Acacia papyrocarpa (*Western Myall)

Figure 23. BAM Site D2-PL – looking north along eastern side of the road.

Figure 24. RAM Site D2-PL – in centre of track on private property west of the highway (looking north).

General description	Site D2-PL occurs on the eastern side of the Lincoln Highway from the road to the pipeline and in a narrow 1.5m strip on private property west of the fence line west of the highway. Site D2-PL was separated as the overstorey largely dropped out and the Site was dominated by chenopods. Site in good condition with many mixed age species and the significant majority of species exhibiting limited to no grazing pressure. Weed invasion increased near pipeline east

	of the road. The 1.5m strip of D2-PL was assessed over the fence and was surrounded on either side by a 3m track (Figure 24).				
Threatened species or community	No threatened species or communities were observed. All threatened flora species are considered unlikely to occur. Vegetation may provide habitat for threatened fauna including Western Grasswren, Slender-billed Thornbill, Gilberts Whistler and Elegant Parrot. Refer to the RAM Scoresheet for terrestrial species that occur within 50km (except Flinders Ranges Species) and Refer to the desktop assessment sections for likelihood of occurrence for each fauna species identified in the 5km data base searches.				
Landscape context score	1.04	**Vegetation Condition Score**	63.08	**Conservation significance score**	1.10
Unit biodiversity Score	72.16	**Survey Area (ha)**	1.39	**Total biodiversity Score**	100.30

Table 14. Summary of RAM Site D3-PL (Site 3: Lincoln Northbound).

Block	Block D
Vegetation Association	*Maireana astrotricha* (Low Bluebush) / *Atriplex vesicaria* (Bladder Saltbush) Low Shrubland over *Sclerolaena spp.* (Bindyi) +/- *Acacia papyrocarpa* (Western Myall)

Figure 25. BAM Site D3-PL – looking north along western side of the road.

Figure 26. RAM Site D3-PL – in centre of track on private property west of the highway (looking north). Casuarina pauper Woodland visible in the rear of the photo, but this association did not occur in the Project Area.

General description	Site D3-PL occurs on the both sides of the road in the northern portion of the Lincoln Northbound overtaking lane site. Vegetation transitioned to *Maireana astrotricha* Low Shrubland and was set between patches of Casuarina pauper, but the woodland did not extend to the road reserve. Site in good condition with the significant majority of species including highly palatable *M. astrotricha* largely un-grazed. The change in composition occurred east of the road as well but there was insufficient time to undertake on ground survey in that location.

Threatened species or community	No threatened species or communities were observed. All threatened flora species are considered unlikely to occur. Vegetation may provide habitat for threatened fauna including Western Grasswren, Slender-billed Thornbill, Gilberts Whistler and Elegant Parrot. Refer to the RAM Scoresheet for terrestrial species that occur within 50km (except Flinders Ranges Species) and Refer to the desktop assessment sections for likelihood of occurrence for each fauna species identified in the 5km data base searches.				
Landscape context score	1.04	**Vegetation Condition Score**	57.81	**Conservation significance score**	1.10
Unit biodiversity Score	66.14	**Survey Area (ha)**	1.04	**Total biodiversity Score**	68.78

4.1.3. Site maps showing areas of proposed impact

Figure 27. Vegetation Associations (BAM Sites) occurring at Site 1: Eyre Southbound overtaking lane.

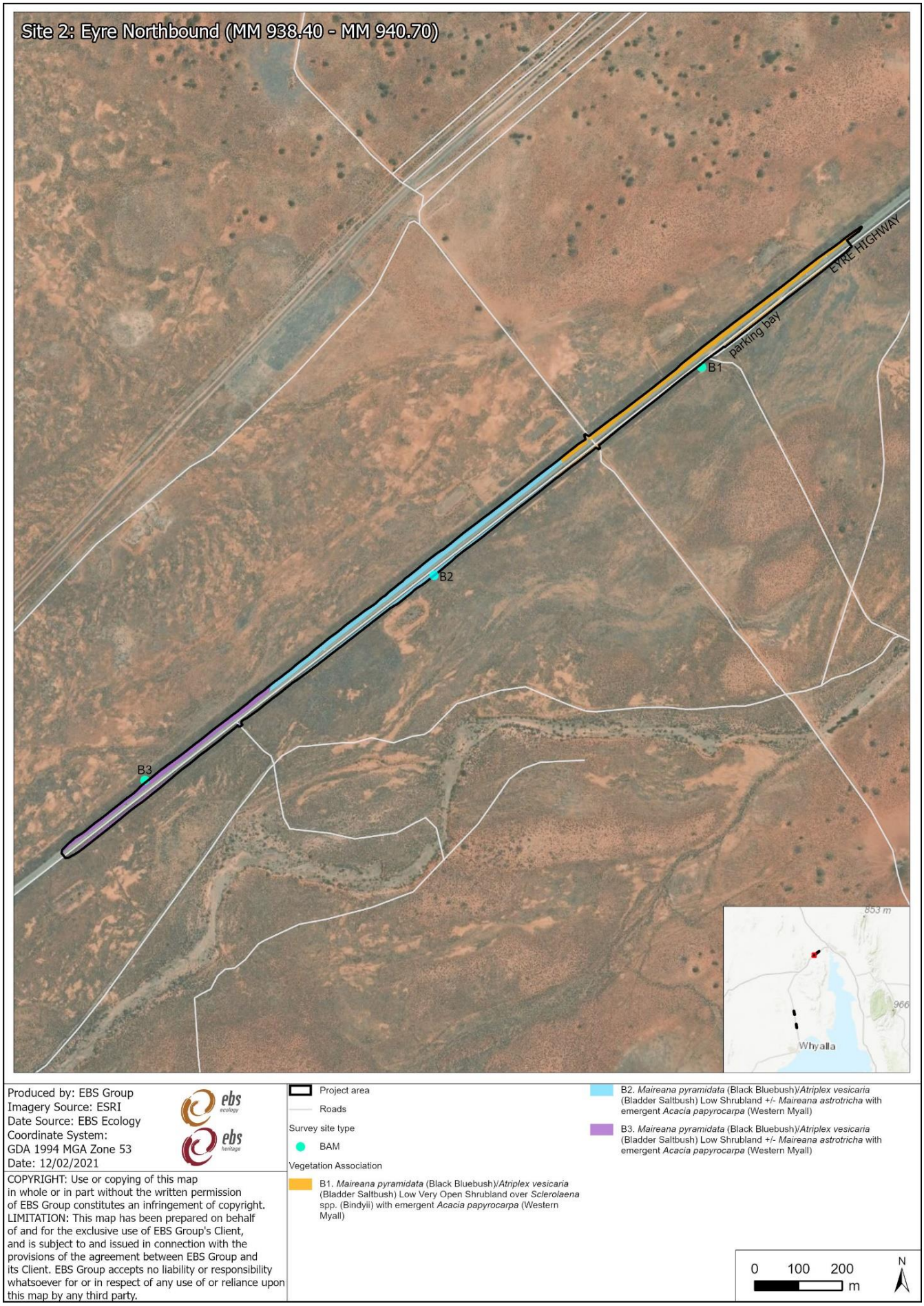


Figure 28. Vegetation Associations (BAM Sites) occurring at the Eyre Northbound overtaking lane.

Figure 29. Vegetation Associations (RAM Sites) mapped for the Site 3: Lincoln Northbound overtaking lane.

Figure 30. Vegetation Associations (BAM Sites) mapped for the Site 4: Lincoln Southbound overtaking lane.

4.1.4. Photo log

Photos of each Site are provided in Table 7 to Table 14. Figure 31 to Figure 33 show habitat features for fauna.

Figure 31. Photo of Site A1 indicating key habitat features such as larger *M. pyramidata* and *L. australe* adjacent road; and with mature *A. papyrocarpa* in the rear.

Figure 32. Overview of Site A1 with large healthy *M. pyramidata* and *A. vesicaria* and *A. papyrocarpa* trees across the landscape.

Figure 33. Larger *M. pyramidata* bushes providing habitat for Western Grasswren in D2-PL.

4.2. Threatened species assessment

From database searches of the BDBSA accessed via NatureMaps and a PMST, it was found that three threatened flora and four threatened fauna listed under the NPW Act have been assessed as possible or likely to occur across the three BAM sites across the two Project Areas, based on a desktop assessment of the type and condition of habitat likely present on the site and historical records (Table 15 and Table 17). Two species listed as threatened under the EPBC Act are likely to or possibly occur and two EPBC Act listed migratory species are also likely. No Threatened Ecological Communities are likely to occur within the Project Areas.

From database searches of the BDBSA accessed via NatureMaps and a PMST, it was found that two threatened flora and seven threatened fauna listed under the NPW Act have been assessed as possible or likely to occur across the one RAM site in the Lincoln Northbound Project Area, based on a desktop assessment of the type and condition of habitat likely present on the site and historical records (Table 16). Three species listed as threatened under the EPBC Act are likely to or possibly occur and two EPBC Act listed migratory species are also likely. No Threatened Ecological Communities are likely to occur within the Project Areas.

Table 15. Ecological constraints for the Project, Lincoln Project Area (Southbound)

Constraint	Comments	Legislative Constraints
Native vegetation	Five Vegetation Associations are likely to be impacted, including shrubland and woodland associations.	*Native Vegetation Act 1991* *Native Vegetation Regulations 2017*
NPW Act threatened species	Two birds and one plant listed as threatened under the NPW Act may be impacted: • Western Grasswren • Slender-billed Thornbill • *Santalum spicatum.*	*National Parks and Wildlife Act 1972*
EPBC Act threatened species	Two species listed as threatened under the EPBC Act are possible or likely to occur and may be impacted: • Western Grasswren • Malleefowl.	*Environment Protection and Biodiversity Conservation Act 1999*
EPBC Act listed migratory species	Two species listed as threatened under the EPBC Act are possible or likely to occur and may be impacted: • Fork-tailed Swift • Oriental Plover.	*Environment Protection and Biodiversity Conservation Act 1999*

Table 16. Ecological constraints for the Project, Lincoln Project Area (Northbound)

Constraint	Comments	Legislative Constraints
Native vegetation	Five Vegetation Associations are likely to be impacted, including shrubland and woodland associations.	*Native Vegetation Act 1991* *Native Vegetation Regulations 2017*
NPW Act threatened species	Six birds, one reptile and two plants listed as threatened under the NPW Act may be impacted: • Western Grasswren • Slender-billed Thornbill • Gilbert's Whistler • Elegant Parrot • Restless Flycatcher • Australian Bustard • Common Bandy Bandy • *Bothriochloa macra* • *Santalum spicatum.*	*National Parks and Wildlife Act 1972*
EPBC Act threatened species	Three species listed as threatened under the EPBC Act are possible or likely to occur and may be impacted: • Western Grasswren • Grey Falcon • Malleefowl.	*Environment Protection and Biodiversity Conservation Act 1999*

EPBC Act listed migratory species	Two species listed as threatened under the EPBC Act are possible or likely to occur and may be impacted: • Fork-tailed Swift • Oriental Plover.	*Environment Protection and Biodiversity Conservation Act 1999*

Table 17. Ecological constraints for the Project, Eyre Project Area

Constraint	Comments	Legislative Constraints
Native vegetation	Three shrubland Vegetation Associations are likely to be impacted.	*Native Vegetation Act 1991* *Native Vegetation Regulations 2017*
NPW Act threatened species	Two bird and two plant species listed as threatened under the NPW Act are likely to occur and may be impacted: • Australian Bustard • Major Mitchell's Cockatoo • *Malacocera gracilis* • *Myoporum parvifolium*	*National Parks and Wildlife Act 1972*
EPBC Act threatened species	One species listed as threatened under the EPBC Act may possibly occur and may be impacted: • Western Grasswren	*Environment Protection and Biodiversity Conservation Act 1999*
EPBC Act listed migratory species	Two species listed as threatened under the EPBC Act are possible or likely to occur and may be impacted: • Fork-tailed Swift • Oriental Plover.	*Environment Protection and Biodiversity Conservation Act 1999*

From the field assessment, it was observed that all vegetation Sites supported chenopod shrublands (including Woodlands) generally dominated by *Maireana pyramidata* and *Atriplex vesicaria* with *Maireana georgei*, but with patches of *Maireana astrotricha* in Site B2, B3 and D3-PL. *Lycium australe* occurred in BAM Site A1. Chenopod shrublands that include larger specimens, particularly of *M. pyramidata* and *L. australe* are known habitat for Nationally threatened species Western Grasswren and State Rare species Slender-billed Thornbill, both of which are known to occur in habitat near both Project Areas. The most suitable habitat appeared to be in larger shrubs directly adjacent the road, and particularly in Sites BAM Sites A1 and C1; and RAM Sites D1-PI and D2-PL. Site BAM Site B1 also contained patches of larger specimens but overall was the most degraded site of all assessed. Multiple records of Western Grasswren occur in the vicinity of the Lincoln Project Area and the species is also known to occur near the Eyre Project Area. It appeared that *A. papyrocarpa*; and large *Maireana* and *Lycium* occurred to a lesser extent toward the west of the Eyre Project Area toward the Simmens Project Area. Vegetation in the proposed overtaking lanes also provides possible habitat for other threatened species including Australian Bustard, Elegant Parrot, Gilberts Whistler and Major Mitchell's Cockatoo.

Table 18. Likelihood of occurrence of threatened flora species identified in the desktop assessment for the Eyre Project Area. The data source and threat levels are described in the table footer.

Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
		AUS	SA				
Acacia pendula	Weeping Myall		V	2		Floodplains in fertile alluvial clay and red-earth soils (Royal Botanic Gardens Victoria, 2020a).	**Unlikely.** The Eyre Project Area is not situated on a floodplain. The sole record from within 5 km is from urban Port Augusta where the species is a commonly planted ornamental tree.
Caladenia tensa	Greencomb Spider-orchid	EN		1	*May occur*	*Callitris* spp. and *Eucalyptus leucoxylon* woodland and *Melaleuca uncinata* mallee.	**Unlikely.** There is no suitable woodland or mallee habitat in the Eyre Project Area. There are no records of the species within 5 km.
Eucalyptus behriana	Broad-leaf Box		R	2		In South Australia, occurs naturally in three small, disjunct areas; lower Eyre Peninsula, northern Mount Lofty Ranges and upper south-east. Occurs in woodland and mallee (Nicolle, 1997).	**Unlikely.** The Eyre Project Area is outside the natural area of occurrence of this species. The record from within 5 km, collected in 1941, may relate to a planted specimen within the township of Port Augusta.
Frankenia plicata		VU	E	1	Likely to occur	Grows in a range of habitats, including small hillside channels that receive the first run off after rain and loamy sands and clays in swales. It occurs north and north-east of Port Augusta (DAWE, 2020).	**Unlikely.** There are no records of the plant within 5 km of the Eyre Project Area. The Project Area is not north or north-east of Port Augusta.
Malacocera gracilis	Slender Soft-horns		V	2		Grows on saline clay soils or gypseous mounds (State Herbarium of South Australia, 2020a).	**Possible.** Although the most recent record of the species within 5 km was collected in 1991, habitat in the Eyre Project Area may be suitable.
Myoporum parvifolium	Creeping Boobialla		R	2		Occurs on clay soils and saline flats (Royal Botanic Gardens Victoria, 2020b).	**Possible.** The recent record from within 5 km of the Eyre Project Area and the possibility of suitable habitat means that it is possible for this species to occur.
Senecio gawlerensis	Gawler Ranges Groundsel		R	2		Rocky outcrops towards the summit of hills and upper slopes (State Herbarium of South Australia, 2020b).	**Unlikely.** The Eyre Project Area is not within the vicinity of rocky outcrops and hill tops. The only record within 5 km is from 1918.

Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
		AUS	SA				
Senecio megaglossus	Large-flowered Groundsel	VU	R	2		Largely confined to rocky creek banks, drainage lines and gorge and valley slopes (Department for Environment and Heritage, 2008).	**Unlikely.** There is no suitable gorge or creek habitat in the Eyre Project Area. The only record within 5 km is from 1913.

Conservation status

AUS: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation Codes: CE/CR: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. M: listed as migratory under the EPBC Act.

Source of Information

1. **EPBC Act Protected Matters Report (Department of Agriculture, Water and the Environment, 2020e) – 5 km buffer applied to Project Area.**
2. **Biological Database of South Australia data extract (Government of South Australia, 2020a) - 5 km buffer applied to Project Area.**

Table 19. Likelihood of occurrence of threatened fauna species identified in the desktop assessment for the Eyre Project Area. The data source and threat levels are described in the table footer.

Scientific Name	Common Name	Status		Source of Record	PMST category /BDBSA Sighting Date	Habitat	Likelihood of occurrence
		Aus.	SA				
Actitis hypoleucos	Common Sandpiper	M	R	1	Known to occur	The species occurs in a wide range of coastal and some inland wetlands (DAWE, 2020).	**Unlikely.** There are no wetland habitats in the Eyre Project Area.
Amytornis textilis myall	Western Grasswren (Gawler Ranges)	VU	V	1, 2	May occur	Chenopod shrublands in the northern Eyre Peninsula and Gawler Ranges. The Western Grasswren is most commonly found in low shrublands comprising *Maireana pyramidata* and *Lycium australe* (Threatened Species Scientific Committee, 2014).	**Possible.** There are no recent records from within 5 km of the Eyre Project Area. However, chenopod shrublands in the project area are possibly suitable habitat for the species.
Apus pacificus	Fork-tailed Swift	M		1	Likely to occur	Aerial, unlikely to utilise terrestrial habitats in Australia. Recorded over open country, forests and cities (Pizzey & Knight, 2007).	**Possible.** Possible as a flyover only. Not likely to utilise terrestrial habitat in the Eyre Project Area.
Ardeotis australis	Australian Bustard		V	2		Grasslands, open shrublands, woodlands, sand hills and pastoral lands (Pizzey & Knight, 2007).	**Likely.** Recent records within 5 km of the Project Area and the likely nature of the habitat indicate that it is likely the species occurs in the Eyre Project Area.
Arenaria interpres	Ruddy Turnstone	M		1	Likely to occur	Tidal reefs and pools, sandy and pebbly	**Unlikely.**

Scientific Name	Common Name	Status Aus.	SA	Source of Record	PMST category /BDBSA Sighting Date	Habitat	Likelihood of occurrence
						shorelines and mudflats (Pizzey & Knight, 2007).	There are no tidal or shoreline habitats in the Eyre Project Area.
Calidris acuminata	Sharp-tailed Sandpiper	M		1	Known to occur	Tidal mudflats, saltmarshes and shallow fresh, brackish or saline inland wetlands (Pizzey & Knight, 2007).	**Unlikely.** There are no wetland habitats in the Eyre Project Area.
Calidris alba	Sanderling	M		1	Likely to occur	Sandy ocean beaches, mudflats and coastal lagoons (Pizzey & Knight, 2007)	**Unlikely.** There are no tidal or shoreline habitats in the Eyre Project Area.
Calidris canutus	Red Knot	EN, M	E	1	Known to occur	The Red Knot inhabits tidal mud flats, sand flats and sandy beaches in estuaries, bays, inlets and lagoons (DAWE, 2020).	**Unlikely.** There are no wetland or tidal habitats in the Eyre Project Area.
Calidris ferruginea	Curlew Sandpiper	CR, M		1	Known to occur	Wetlands. In South Australia, Curlew Sandpipers occur in widespread coastal and subcoastal areas east of Streaky Bay. Important sites include ICI and Price Salt fields, and The Coorong. Occasionally they occur in inland areas south of the Murray River and elsewhere (DAWE, 2020).	**Unlikely.** There are no wetland or tidal habitats in the Eyre Project Area.
Calidris melanotus	Pectoral Sandpiper	M	R	1	May occur	Shallow fresh water wetlands with low grass and other herbage (Pizzey & Knight, 2007)	**Unlikely.** There are no wetland habitats in the Eyre Project Area.
Calidris ruficollis	Red-necked Stint	M		1	Likely to occur	Tidal mudflats and saltmarshes; sandy beaches; saline and fresh water wetlands (Pizzey & Knight, 2007).	**Unlikely.** There are no wetland habitats in the Eyre Project Area.
Caretta caretta	Loggerhead Turtle	EN	E	2	Known to occur	Coral reefs, bays and estuaries in tropical and temperate waters	**Unlikely.** The Eyre Project Area is not within a marine environment.
Charadrius veredus	Oriental Plover	M		1	May occur	Open plains and bare, rolling country. Often far from water. Inland swamps and tidal mudflats (Pizzey & Knight, 2007).	**Possible.** Open shrubland habitat in the Eyre Project Area may be suitable for the species, however there are no records within 5 km.
Gallinago hardwickii	Latham's Snipe	M	R	1	May occur	Shallow water with tussocks and other green or dead growth.	**Unlikely.**

Scientific Name	Common Name	Status		Source of Record	PMST category /BDBSA Sighting Date	Habitat	Likelihood of occurrence
		Aus.	SA				
						Also samphire and saltmarshes, irrigated areas and wet paddocks.	There are no wetland or marshland habitats in the Eyre Project Area.
Larus dominicanus dominicanus	Kelp Gull		R	2		Coasts, including beaches, reefs, bays and offshore islands (Pizzey & Knight, 2007)	**Unlikely.** Although there is a recent record from within 5 km of the Project Area, this species is a marine species that may occasionally fly over the Eyre Project Area, but would not utilise any terrestrial habitat.
Leipoa ocellata	Malleefowl	VU	V	1	May occur	Mallee, Acacia and Casuarina woodlands and other scrubs. Mostly on sandy or gravel soils (Pizzey & Knight, 2007).	**Unlikely.** Low open shrublands that dominate the Eyre Project Area are not suitable habitat for Malleefowl.
Limosa lapponica baueri	Bar-tailed Godwit (bauera)	VU, M	R	1	May occur	The habitat of the Bar-tailed Godwit includes mudflats, estuaries, sewage ponds and salt marshes (Morcombe, 2003).	**Unlikely.** There are no wetland or marshland habitats in the Eyre Project Area.
Limosa lapponica menzbieri	Bar-tailed Godwit (menzbieri)	CR, M	R	1	May occur	As above.	**Unlikely.** There are no wetland or marshland habitats in the Eyre Project Area.
Lophochroa leadbeateri mollis	Major Mitchell's Cockatoo		R	2		Grasslands, gibber, saltbush, mallee and acacia and eucalypt woodlands (Pizzey & Knight, 2007).	**Likely.** Recent records within 5 km of the Project Area and the likely nature of the habitat indicate that it is likely the species occurs in the Eyre Project Area.
Motacilla cinerea	Grey Wagtail	M		1	May occur	Grey Wagtails in Australia are found in habitats near sandy or rocky freshwater streams. Also recorded from sewage ponds (Morcombe, 2003)	**Unlikely.** There are no wetland or marshland habitats in the Eyre Project Area.
Motacilla flava	Yellow Wagtail	M		1	May occur	Open habitats near water such as swamp margins, salt marshes and sewage ponds (Morcombe, 2003).	**Unlikely.** There are no wetland or marshland habitats near water in the Eyre Project Area.
Numenius madagascariensis	Eastern Curlew	CR, M	E	1	Known to occur	Intertidal mudflats (Morcombe, 2003).	**Unlikely.** There are no intertidal habitats in the Eyre Project Area.
Pandion haliaetus	Eastern Osprey	M	E	1	May occur	Eastern Ospreys occur in coastal and terrestrial wetlands, requiring extensive	**Unlikely.** The Eyre Project Area does not have any

Scientific Name	Common Name	Status		Source of Record	PMST category /BDBSA Sighting Date	Habitat	Likelihood of occurrence
		Aus.	SA				
						areas of open water for hunting (DAWE, 2020).	wetland habitats of areas of extensive open waters.
Pezoporus occidentalis	Night Parrot	EN	E	1	Extinct within area	Extinct in the Lincoln Project Area (DAWE, 2020).	**Unlikely.** Extinct in the Project Area.
Pteropus poliocephalus	Grey-headed Flying-fox	VU	R	2		The only known camp in South Australia occurs in metropolitan Adelaide. Foraging bats occur in tree canopies, including introduced trees, where they feed on blossoms, nectar and fruit (DEW, 2020a).	**Unlikely.** The semi-arid chenopod shrubland that occurs in the Eyre Project Area would not provide any foraging habitat for Grey-headed Flying-fox.
Rostratula australis	Australian Painted Snipe	EN	E	1	May occur	Well vegetated margins of wetlands, dams and sewage ponds (Pizzey & Knight, 2007).	**Unlikely.** There are no wetland habitats in the Eyre Project Area.
Thinornis rubricollis rubricollis	Hooded Plover (eastern)	VU	V	1	May occur	Sandy ocean and estuarine beaches (Morcombe, 2003).	**Unlikely.** There are no beach or coastal habitats in the Eyre Project Area.
Tringa nebularia	Common Greenshank	M		1	Likely to occur	Mudflats, estuaries, saltmarshes and the edges of lakes. Including fresh and saline wetlands (Pizzey & Knight, 2007).	**Unlikely.** There are no wetland habitats in the Eyre Project Area.

Conservation status

AUS: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation Codes: CE/CR: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. M: listed as migratory under the EPBC Act.

Source of Information

1. **EPBC Act Protected Matters Report (Department of Agriculture, Water and the Environment, 2020e) – 5 km buffer applied to Project Area.**
2. **Biological Database of South Australia data extract (Government of South Australia, 2020a) - 5 km buffer applied to Project Area.**

Table 20. Likelihood of occurrence of threatened flora species identified in the desktop assessment for Site 4 (BAM) of the Lincoln Southbound Project Area. The data source and threat levels are described in the table footer.

Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
		Aus.	SA				
Frankenia plicata		VU	E	1	May occur	Grows in a range of habitats, including small hillside channels that receive the first run off after rain and loamy sands and clays in swales. It occurs north and north-east of Port Augusta (DAWE, 2020).	**Unlikely.** There are no records of the plant within 5 km of the Lincoln Project Area. The Project Area is not north or

							north-east of Port Augusta.
Santalum spicatum	Sandalwood		V	2		Semi-arid woodlands and shrublands, often on red sandy soils (Department of Biodiversity, Conservation and Attractions, 2020).	**Likely.**

Conservation status

AUS: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation Codes: CE/CR: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. M: listed as migratory under the EPBC Act.

Source of Information

1. **EPBC Act Protected Matters Report (Department of Agriculture, Water and the Environment, 2020e) – 5 km buffer applied to Project Area.**
2. **Cultana Solar Farm: Addendum 3 (version 2) – Native Vegetation Clearance Report (EBS Ecology, 2020).**

Table 21. Likelihood of occurrence of threatened flora species identified for Site 3 (RAM) of the Lincoln Northbound Project Area (50km). The data source and threat levels are described in the table footer.

Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
		AUS	SA				
Acacia pendula	Weeping Myall		V	2	2019	Floodplains in fertile alluvial clay and red-earth soils (Royal Botanic Gardens Victoria, 2020a).	**Unlikely.** The Lincoln Project Area is not situated on a floodplain. The records from within 50 km is from urban Port Augusta, and Whyalla, where the species is a commonly planted ornamental tree.
Austrostipa breviglumis	Cane Spear-grass		R	2	1996	Habitat is rocky gullies to ridge tops, often in seasonally wet areas dominated by woodlands with *Eucalyptus odorata, Xanthorrhoea quadrangulata, Bursaria spinosa* and *Callitris glaucophylla* (Jessop et al., 2006).	**Unlikely.** Unsuitable habitat in Project Area, as it lacks the associated woodlands, as well as the rocky substrate.
Bothriochloa macra	Red-leg Grass		R	2	1998	Grows on a variety of soil types in humid areas but in drier areas is restricted to run-on areas on clay or loamy soils. Occurs on most soil types but often dominant on poor, lower fertility soils and frequently invades degraded areas. Mainly found in open grassy woodland communities and is often found in disturbed sites.	**Possible.** May be suitable habitat in Project Area. Has been recorded within 50 km.
Brachyscome muelleri	Corunna Daisy	EN	E	1	Known to occur	Known from one site on Corunna Station in the upper Eyre Peninsula of SA and has been successfully translocated to western edge of the Baxter Hills. Grows on	**Unlikely.** Project Area not located near Baxter Hills / Iron Knob.

						steep south-facing cliff-foot slopes of the Baxter Hills, approximately 5 km from Iron Knob (DAWE, 2020).	
Caladenia gladiolata	Bayonet Spider-orchid, Clubbed Spider-orchid	EN	R*	1	Likely to occur	Endemic to SA. Emerges in winter and produces a single flower stem in Aug-Sep. Grows in woodland dominated by South Australian Blue Gum (*Eucalyptus leucoxylon*), Sugar Gum (*E. cladocalyx*) or Pink Gum (*E. fasciculosa*). Grows on moderate to steep slopes in sandy loam soils with scattered shale and quartzite.	**Unlikely.** Habitat in Project Area unsuitable for this species. There are no records of the species within 50 km.
Caladenia tensa	Greencomb Spider-orchid, Rigid Spider-orchid	EN	-	1	Likely to occur	Various habitats have been described including Cypress Pine (Family: Cupressaceae) / Yellow Gum Woodland, Pine / Box woodland, mallee-heath sites, healthy woodland and mallee woodland, generally with rock outcrops (DAWE, 2020).	**Unlikely.** There is no suitable woodland or mallee habitat in the Eyre Project Area. There are no records of the species within 50 km.
Caladenia xantholeuca	White Rabbits, Flinders Ranges White Caladenia	EN	E	1	Likely to occur	Endemic to SA. Known to have occurred in three sub-populations in the Southern Flinders Ranges. Two sub-populations were recorded from Mt Remarkable National Park in 1978 and another in Telowie Gorge Conservation Park in 1982. Occurs in Callitris glaucophylla Woodland often on south facing slopes in heavily shaded areas, where it grows on mossy rock ledges and red-brown loam soils.	**Unlikely.** Habitat in Project Area unsuitable for this species. Project Area outside Flinders Ranges and Mt Remarkable NP.
Eucalyptus percostata	Ribbed White Mallee		R	2	1996	Endemic to SA. Found in the southern Flinders Ranges between Quorn and Napperby. Grows on well-drained clay-loams in woodland and mallee on slopes and foot of rocky hills.	**Unlikely.** Habitat in Project Area unsuitable for this species, Project Area not in the southern Flinders Ranges.
Frankenia plicata		VU	E	1	Likely to occur	Grows in a range of habitats, including small hillside channels that receive the first run off after rain and loamy sands and clays in swales. It occurs north and north-east of Port Augusta (DAWE, 2020).	**Unlikely.** There are no records of the plant within 5 km of the Lincoln Project Area. The Project Area is not north or north-east of Port Augusta.
Hibbertia crispula	Ooldea Guinea-flower	VU	V	1	May occur	Known from only two disjunct locations, the Lake Everard region and the Ooldea region of SA.	**Unlikely.** Project Area outside both these disjunct locations.
Malacocera gracilis	Slender Soft-horns		V	2	2016	Grows on saline clay soils or gypseous mounds (State	**Possible.** Although the nearest record of

						Herbarium of South Australia, 2020a).	the species is over 30km away, habitat in the Lincoln Project Area may be suitable.
Myoporum parvifolium	Creeping Boobialla		R	2	2009	Occurs on clay soils and saline flats (Royal Botanic Gardens Victoria, 2020b).	**Possible.** The recent record from within 50 km of the Lincoln Project Area and the possibility of suitable habitat means that it is possible for this species to occur.
Orobanche cernua var. australiana	Australian Broomrape		R	2	2016	Found scattered across the eastern half of South Australia, growing in sand dunes and sandy creek beds, parasitic on native Senecio species (South Australian Seed Conservation Centre, 2018).	**Unlikely.** Project Area lacks sand dune and sandy creek bed habitats.
Prasophyllum pallidum	Pale Leek-orchid	VU	R	1	May occur	Pale Leek-orchid is known singly or in groups in better soils of woodland and grassy open forest (Bates, 2009) from the Flinders Ranges to the Northern and Southern Lofty regions of SA (Jessop & Toelken, 1986). Recorded in woodlands and forests dominated by *Eucalyptus leucoxylon, E. goniocalyx, E. fasciculosa, E. microcarpa, Callitris gracilis/Eucalyptus fasciculosa,* and *Allocasuarina verticillata* over *Lissanthe strigosa, Amphipogon strictus* and *Tricoryne elatior*.	**Unlikely.** Habitat in Project Area unsuitable for this species.
Prasophyllum validum	Sturdy Leek-orchid, Mount Remarkable Leek-orchid	VU	V	1	Likely to occur	Occurs across inland Victoria and restricted to southern Flinders Ranges in SA. Grows in drier woodland habitats, generally with a low sparse understorey.	**Unlikely.** Habitat in Project Area unsuitable for this species. Project Area outside the Flinders Ranges.
Pterostylis xerophila	Desert Greenhood	VU	V	1	Likely to occur	The Desert Greenhood is a small, deciduous, terrestrial orchid endemic to inland South Australia and Victoria. It occurs in generally remote locations in semi-desert environments, growing mostly on rock outcrops under low shrubs (DAWE, 2020).	**Unlikely.** Habitat in Project Area unsuitable for this species – lacking rock outcrop.
Sarcozona bicarinata	Ridged Noon-flower		V	2	2008	Low very open shrubland; Dune bordering saline depression; Saline yellow sands; in sand dunes by road with *Atriplex, Acacia, Olearia, Carpobrotus, Eucalyptus socialis* mixed mallee; Growing in soil in depression in limestone rock. Comes up after fire.	**Unlikely.** Habitat in Project Area unsuitable for this species – lacking sandy habitat.

Senecio megaglossus	Superb Groundsel	VU	E	1	Likely to occur	Largely confined to rocky creek banks, drainage lines and gorge and valley slopes (Department for Environment and Heritage, 2008).	**Unlikely.** There is no suitable gorge or creek habitat in the Lincoln Project Area.
Swainsona pyrophila	Yellow Swainson-pea	VU	R	1	Likely to occur	Found in Mallee vegetation communities on a variety of soil types including well-drained sands, sandy loams and heavier clay loams. It is usually found after fire growing in association with *Eucalyptus incrassata* (Ridge-fruited Mallee*), E. socialis* (Beaked Red Mallee*), E. brachycalyx* (Gilja), *E. gracilis* (Yorrell), and *E. oleosa* (Red Mallee) mid mallee woodland over *Melaleuca uncinata* (Broombush) tall shrubland (OEH 2020).	**Unlikely.** Habitat in Project Area unsuitable for this species
Wurmbea stellata	Star Nancy		R	2	2008	Wurmbea stellata is endemic to SA, in arid and semi-arid areas westward from the Flinders Ranges to the Great Victoria Desert and south to the Gawler Ranges, growing in red clay soils on plains or rocky hills, often in exposed sites free of other vegetation (Bates 1995).	**Unlikely.** Soil in Project Area sandy loam, not red clay. Rocky hills also not present.

Conservation status

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Source of Information

1. **EPBC Act Protected Matters Report (Department of Agriculture, Water and the Environment, 2020e) – 50 km buffer applied to Project Area.**
2. **Biological Database of South Australia data extract (Government of South Australia, 2020a) - 50 km buffer applied to Project Area.**

Disclaimer

Flora species confined to the Mt Remarkable National Parklands have been excluded from this Likelihood assessment.

Table 22. Likelihood of occurrence of threatened fauna species identified in the desktop assessment for the Lincoln Project Area. The data source and threat levels are described in the table footer.

RAM	Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
			AUS	SA				
	AVES	**BIRDS**						
	Acanthiza iredalei	Slender-billed Thornbill		R	2	2019*	Semi-arid and arid chenopod shrublands including *Maireana* spp. and *Atriplex* spp.	**Likely.** There are recent records of the species within 5 km and habitat is suitable.
	Actitis hypoleucos	Common Sandpiper	M	R	1, 2*	May occur/ 2019*	The species occurs in a wide range of coastal and some inland wetlands (DAWE, 2020).	**Unlikely.** There are no wetland habitats

RAM	Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
			AUS	SA				
								in the Lincoln Project Area.
*	*Amytornis merrotsyi merrotsyi*	Short-tailed Grasswren	VU	V	1	May occur	Flinders Ranges between Mt Neil in the north and Nelshaby in the south. They inhabit rocky (quarzitic) hillsides and hilltops, steep-sided gullies, stony rises and ridge-crests, in spinifex vegetation (DAWE, 2020).	**Unlikely.** Lack of suitable rocky habitat and spinifex vegetation in Project Area. Project Area not within Flinders Ranges.
	Amytornis textilis myall	Western Grasswren (Gawler Ranges)	VU	V	1, 2	Known to occur/ 2019	Chenopod shrublands in the northern Eyre Peninsula and Gawler Ranges. The Western Grasswren is most commonly found in low shrublands comprising *Maireana pyramidata* and *Lycium australe* (Threatened Species Scientific Committee, 2014).	**Likely.** There are three recent records from within 5 km of the Lincoln Project Area. Chenopod shrublands in the Project area are possibly suitable habitat for the species.
	Apus pacificus	Fork-tailed Swift	M		1	Likely to occur	Aerial, unlikely to utilise terrestrial habitats in Australia. Recorded over open country, forests and cities (Pizzey & Knight, 2007).	**Possible.** Possible as a flyover only. Not likely to utilise terrestrial habitat in the Lincoln Project Area.
*	*Ardea intermedia plumifera*	Plumed Egret		R	2	2001	Occupies a great variety of habitats but is mainly found around shallow inland freshwater areas with abundant emergent aquatic vegetation.	**Unlikely.** Project Area does not contain wetland habitat.
*	*Ardeotis australis*	Australian Bustard		R	2	2019	Grasslands, open shrublands, woodlands, sand hills and pastoral lands (Pizzey & Knight, 2007).	**Possible.** Low shrubland within Project Area may be suitable habitat for this species. Recently recorded within 50 km of Project Area.
*	*Arenaria interpres*	Ruddy Turnstone	M		1, 2	Known to occur/ 1998	It is found in most coastal regions, with occasional records of inland populations. It strongly prefers rocky shores or beaches where there are large deposits of rotting seaweed (DAWE, 2020).	**Unlikely.** Project Area not in close vicinity of coast, lacking rocky shores and beaches.
*	*Biziura lobata menziesi*	Musk Duck		R	2	2019	Occurs in deep freshwater lagoons, with dense reed beds.	**Unlikely.** Habitat unsuitable – lack of freshwater lagoons in Project Area.

RAM	Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
			AUS	SA				
*	*Bubulcus ibis coromandus*	Eastern Cattle Egret		R	2	2019	Tropical and temperate grasslands, wooded lands and terrestrial wetlands. It is commonly associated with the habitats of farm animals, particularly cattle. It uses predominately shallow, open and fresh wetlands including meadows and swamps with low emergent vegetation and abundant aquatic flora.	**Unlikely.** Project Area not in close vicinity of wetlands, road reserve not used for grazing cattle.
	Calidris acuminata	Sharp-tailed Sandpiper	M		1	Known to occur	Tidal mudflats, saltmarshes and shallow fresh, brackish or saline inland wetlands (Pizzey & Knight, 2007).	**Unlikely.** There are no wetland habitats in the Lincoln Project Area.
*	*Calidris alba*	Sanderling	M	R	1	Likely to occur	Almost always found on the coast, mostly on open sandy beaches exposed to open sea-swell, and also on exposed sandbars and spits, and shingle banks, where they forage in the wave-wash zone and amongst rotting seaweed.	**Unlikely.** Project Area not in close vicinity of coast.
	Calidris canutus	Red Knot	EN, M	E	1	May occur	The Red Knot inhabits tidal mud flats, sand flats and sandy beaches in estuaries, bays, inlets and lagoons (DAWE, 2020).	**Unlikely.** There are no wetland or tidal habitats in the Lincoln Project Area.
	Calidris ferruginea	Curlew Sandpiper	CR, M		1, 2*	Known to occur/ 2019*	Wetlands. In South Australia, Curlew Sandpipers occur in widespread coastal and subcoastal areas east of Streaky Bay. Important sites include Imperial Chemical Industries and Price Salt fields, and The Coorong. Occasionally they occur in inland areas south of the Murray River and elsewhere (DAWE, 2020).	**Unlikely.** There are no wetland or tidal habitats in the Lincoln Project Area.
	Calidris melanotus	Pectoral Sandpiper	M	R	1	May occur	Shallow fresh water wetlands with low grass and other herbage (Pizzey & Knight, 2007)	**Unlikely** There are no wetland habitats in the Lincoln Project Area.
*	*Calidris ruficollis*	Red-necked Stint	M		1	Known to occur	The Red-necked Stint is mostly found in coastal areas, including in sheltered inlets, bays, lagoons and estuaries with intertidal mudflats, often near spits, islets and banks and, sometimes, on protected sandy or coralline shores (DAWE, 2020).	**Unlikely.** No coastal habitat in Project Area.

RAM	Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
			AUS	SA				
*	*Calidris tenuirostris*	Great Knot	CR	E	1	Known to occur	Prefers sheltered coastal habitats, with large intertidal mudflats or sandflats. Rarely occurs on inland lakes and swamps.	**Unlikely.** Habitat in Project Area unsuitable for this species.
*	*Charadrius leschenaultii*	Greater Sand Plover, Large Sand Plover	VU	R	1	Known to occur	This species is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons, and inshore reefs, rock platforms, small rocky islands or sand cays on coral reefs.	**Unlikely.** Habitat in Project Area unsuitable for this species – not coastal.
*	*Charadrius mongolus*	Lesser Sand Plover, Mongolian Plover	EN	R	1	Known to occur	This species usually occurs in coastal littoral and estuarine environments. It inhabits large intertidal sandflats or mudflats in sheltered bays, harbours and estuaries, and occasionally sandy ocean beaches, coral reefs, wave-cut rock platforms and rocky outcrops.	**Unlikely.** Habitat in Project Area unsuitable for this species – not coastal.
	Charadrius veredus	Oriental Plover	M		1	May occur	Open plains and bare, rolling country. Often far from water. Inland swamps and tidal mudflats (Pizzey & Knight, 2007).	**Possible.** Open shrubland habitat in the Project Area may be suitable for the species, however there are no records within 5 km.
*	*Cinclosoma castanotum*	Chestnut Quailthrush (Chestnut-backed Quailthrush)		R	2	2018	A wide range of arid and semi-arid habitats; mainly in the low shrubs and undergrowth of mallee scrub, but also in Acacia scrubs, dry sclerophyll woodland, heath, and native pine.	**Unlikely.** Habitat in Project Area unsuitable for this species.
*	*Cladorhynchus leucocephalus*	Banded Stilt		V	2	2019	Endemic to Australia, mainly in the south and inland. Found mainly in saline and hypersaline (very salty) waters of the inland and coast, typically large, open and shallow (Birds in Backyards 2020).	**Unlikely.** There are no saline water habitats within or near the Lincoln Project Area.
*	*Corcorax melanorhamphos*	White-winged Chough		R	2	2018	White-winged Choughs are 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	**Unlikely.** Habitat in Project Area unsuitable for this species.

RAM	Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
			AUS	SA				
							building (BirdLife Australia, 2020).	
*	*Egretta garzetta nigripes*	Little Egret		R	2	2019	Fresh, brackish or saline wetlands. Shows a preference for shallow waters (10-15 cm deep) in open, unvegetated sites.	**Unlikely.** There are no wetland habitats within or near the Lincoln Project Area.
*	*Falco hypoleucos*	Grey Falcon	VU	R	1	Known to occur	The species frequents timbered lowland plains, particularly acacia shrublands that are crossed by tree-lined water courses. The species has been observed hunting in treeless areas and frequents tussock grassland and open woodland, especially in winter (Threatened Species Scientific Committee)	**Possible.** Open shrubland habitat in the Project Area may be suitable for the species, however there are no records within 50 km.
	Gallinago hardwickii	Latham's Snipe	M	R	1	May occur	Shallow water with tussocks and other green or dead growth. Also, samphire and saltmarshes, irrigated areas and wet paddocks.	**Unlikely.** There are no wetland or marshland habitats in the Lincoln Project Area.
*	*Gallinago stenura*	Pin-tailed Snipe	M		1	Known to occur	During non-breeding period the Pin-tailed Snipe occurs most often in or at the edges of shallow freshwater swamps, ponds and lakes with emergent, sparse to dense cover of grass/sedge or other vegetation (DAWE, 2020).	**Unlikely.** There are no wetland or swampland habitats in the Lincoln Project Area.
*	*Grantiella picta*	Painted Honeyeater	VU	R	1	May occur	The species inhabits forests and woodlands containing mistletoes. This includes eucalypt forests/woodlands, riparian woodlands of black box and river red gum, box-ironbark-yellow gum woodlands, acacia-dominated woodlands, paperbarks, casuarinas, callitris, and trees on farmland or gardens (DAWE, 2020).	**Unlikely.** Habitat in Project Area unsuitable for this species.
*	*Haematopus fuliginosus*	Sooty Oystercatcher		R	2	2018	Strictly coastal, usually within 50 m of the ocean (BirdLife Australia, 2020).	**Unlikely.** Project Area not coastal.
*	Haematopus longirostris	Pied Oystercatcher		R	2	2018	Mostly coastal: prefers mudflats, sandbanks and sandy ocean beaches and is less common along rocky or shingle coastlines. Although rarely recorded far from the coast, the Pied Oystercatcher may	**Unlikely.** Project Area not coastal, and does not contain pastures or mudflats.

RAM	Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
			AUS	SA				
							occasionally be found in estuarine mudflats and short pasture (BirdLife Australia, 2020).	
	Leipoa ocellata	Malleefowl	VU	V	1	Likely to occur	Mallee, Acacia and Casuarina woodlands and other scrubs. Mostly on sandy or gravel soils (Pizzey & Knight, 2007).	**Possible.** Woodland habitat in the Lincoln Project Area may be suitable for the species, however there are no records within 5 km.
	Limosa lapponica baueri	Bar-tailed Godwit (bauera)	VU, M	R	1	May occur	The habitat of the Bar-tailed Godwit includes mudflats, estuaries, sewage ponds and salt marshes (Morcombe, 2003).	**Unlikely.** There are no wetland or marshland habitats in the Lincoln Project Area.
	Limosa lapponica menzbieri	Bar-tailed Godwit (menzbieri)	CR, M	R	1	May occur	As above.	**Unlikely.** There are no wetland or marshland habitats in the Lincoln Project Area.
*	*Limosa limosa*	Black-tailed Godwit	M	R	1	Known to occur	Inhabits primarily coastal habitat. The species is commonly found in sheltered bays, estuaries and lagoons with large intertidal mudflats or sandflats, or spits and banks of mud, sand or shell-grit; occasionally recorded on rocky coasts or coral islets (DOE 2014).	**Unlikely.** Habitat in Project Area unsuitable for this species – not coastal.
*	*Lophochroa leadbeateri mollis*	Major Mitchell's Cockatoo (NW, EP)		R	2	2013	Major Mitchell's Cockatoos usually inhabit dry woodlands in arid and semi-arid areas, usually where eucalypts or acacias dominate the vegetation. They require old trees which support hollows that are large enough to be suitable for nesting in (BirdLife Australia, 2020).	**Unlikely.** Lack of woodland habitat with substantial old/hollow trees within Project Area.
	Motacilla cinerea	Grey Wagtail	M		1	May occur	Grey Wagtails in Australia are found in habitats near sandy or rocky freshwater streams. Also recorded from sewage ponds (Morcombe, 2003)	**Unlikely.** There are no wetland or marshland habitats in the Lincoln Project Area.
	Motacilla flava	Yellow Wagtail	M		1	May occur	Open habitats near water such as swamp margins, salt marshes and sewage ponds (Morcombe, 2003).	**Unlikely.** There are no wetland or marshland

RAM	Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
			AUS	SA				
								habitats near water in the Lincoln Project Area.
*	*Myiagra inquieta*	Restless Flycatcher		R	2	2015	Open forests and woodlands. Frequently seen in farmland (Birds in Backyards ND).	**Possible.** This species may utilise the *Acacia papyrocarpa* very low woodland in the Project Area.
*	*Neophema chrysogaster*	Orange-bellied Parrot	CR	E	1	May occur	Throughout the year Orange-bellied Parrots are found in salt marshes, coastal dunes, pastures, shrub lands, estuaries, islands, beaches and moorlands within 10 km of the coast. Holes in eucalypts are used for nesting (DOE 2014).	**Unlikely.** Project Area not within 10km of coast, unsuitable habitat, no recent records nearby.
*	*Neophema elegans elegans*	Elegant Parrot		R	2	2008	The Elegant Parrot can be found in a wide variety of open habitats, including shrublands, bluebush plains, woodlands and thickets, grasslands, heathlands, mallee, saltmarsh and farmland (BirdLife Australia, 2020).	**Possible.** There may be suitable habitat (especially shrublands and bluebush plains) within the Project Area.
	Numenius madagascariensis	Eastern Curlew	CR, M	E	1	Likely to occur	Intertidal mudflats (Morcombe, 2003).	**Unlikely.** There are no intertidal habitats in the Lincoln Project Area.
*	*Pachycephala inornata*	Gilbert's Whistler		R	2	2019	Sparsely distributed over much of the arid and semi-arid zone of inland southern Australia (Environment and Heritage 2014). Habitat is shrubby woodland and mallee (Simpson and Day 1999, p. 227).	**Possible.** There may be suitable habitat for this species (shrubby woodland) within the Project Area.
	Pandion haliaetus	Eastern Osprey	M	E	1	May occur	Eastern Ospreys occur in coastal and terrestrial wetlands, requiring extensive areas of open water for hunting (DAWE, 2020).	**Unlikely.** The Lincoln Project Area does not have any wetland habitats of areas of extensive open waters.
*	*Pedionomus torquatus*	Plains-wanderer	CR	E	1	May occur	Inhabits sparse, treeless, lowland native grasslands with approximately 50% bare ground, most vegetation less than 5 cm in height, with some widely-spaced plants up to 30 cm high (DOE 2014).	**Unlikely.** Habitat in Project Area unsuitable for this species – lacking sparse grasslands.
	Pezoporus occidentalis	Night Parrot	EN	E	1	Extinct within area	Extinct in the Lincoln Project Area (DAWE, 2020).	**Unlikely.**

RAM	Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
			AUS	SA				
								Extinct in the Project Area.
*	*Philomachus pugnax*	Ruff	M		1	Known to occur	Generally found on fresh, brackish or saline wetlands with exposed mudflats at the edges (DAWE, 2020).	**Unlikely.** There are no wetland habitats in the Lincoln Project Area.
*	*Plegadis falcinellus*	Glossy Ibis		R	2	2017	Preferred habitat for foraging and breeding are fresh water marshes at the edges of lakes and rivers, lagoons, flood-plains, wet meadows, swamps, reservoirs, sewage ponds, rice-fields and cultivated areas under irrigation (DAWE 2020).	**Unlikely.** The Lincoln Project Area does not have any wetland or marshy habitats.
*	*Podiceps cristatus australis*	Great Crested Grebe		R	2	2019	During breeding season, habitat is freshwater lakes with aquatic and marginal vegetation. During non-breeding season, habitat is fresh or saline waters – lakes, lagoons, estuaries and bays (Simpson and Day 1999, p. 50).	**Unlikely.** There are no aquatic / wetland habitats in the Lincoln Project Area.
	Rostratula australis	Australian Painted Snipe	EN	E	1	May occur	Well vegetated margins of wetlands, dams and sewage ponds (Pizzey & Knight, 2007).	**Unlikely.** There are no wetland habitats in the Lincoln Project Area.
	Sternula nereis	Australian Fairy Tern	VU	E	1, 2*	Known to occur/ 2019*	Coastal inlets and bays and saline or brackish lakes and wetlands (Pizzey & Knight, 2007).	**Unlikely.** There are no wetland or coastal habitats in the Lincoln Project Area.
*	*Stictonetta naevosa*	Freckled Duck		V	2	2017	Typically breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree (Environment and Heritage 2014).	**Unlikely.** Lincoln Project Area not located near the aforementioned water systems. Project area lacks swamp habitat.
*	*Thalasseus bergii*	Crested Tern	M		1	Breeding known to occur within area	In Australia, mostly coastal. Inhabiting ocean beaches, estuaries, bays, harbours, coastal lagoons. Also, may be found inland on major rivers. Occasionally on saline lakes and salt ponds near the coast (Morcombe, 2011).	**Unlikely.** There are no coastal or riverine habitats in the Lincoln Project Area.
	Thinornis rubricollis rubricollis	Hooded Plover (eastern)	VU	V	1	May occur	Sandy ocean and estuarine beaches (Morcombe, 2003).	**Unlikely.** There are no beach or coastal

RAM	Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
			AUS	SA				
								habitats in the Lincoln Project Area.
*	*Tringa brevipes*	Grey-tailed Tattler	M		1	Known to occur	Coastal. Forages in inter-tidal pools, shallows, soft surfaces of mudflats and sand beaches as well as rock ledges and reefs (Morcombe, 2011).	**Unlikely.** There are no coastal habitats in the Lincoln Project Area.
*	*Tringa glareola*	Wood Sandpiper		R	2	2018	Well-vegetated, shallow, freshwater wetlands, such as swamps, billabongs, lakes, pools and waterholes (DAWE, 2020).	**Unlikely.** There are no wetland habitats in the Lincoln Project Area.
	Tringa nebularia	Common Greenshank	M		1	Likely to occur	Mudflats, estuaries, saltmarshes and the edges of lakes. Including fresh and saline wetlands (Pizzey & Knight, 2007).	**Unlikely.** There are no wetland habitats in the Lincoln Project Area.
*	*Tringa stagnatilis*	Marsh Sandpiper, Little Greenshank	M		1	Known to occur	Coastal and inland wetlands, salt or fresh; typically estuarine and mangrove mudflats, beaches, swamp shallows, lakes, billabongs, and temporary flood waters, sewage farms and saltworks ponds (Morcombe, 2011).	**Unlikely.** There are no wetland habitats in the Lincoln Project Area.
*	*Zapornia tabuensis*	Spotless Crake		R	2	2019	Found in well vegetated freshwater wetlands with rushes, reeds and cumbungi. Will also frequent muddy areas, reedbeds or wetlands (DEH 2008).	**Unlikely.** There are no wetland habitats in the Lincoln Project Area.
	MAMMALIA	**MAMMALS**						
*	*Petrogale xanthopus xanthopus*	Yellow-footed Rock-wallaby	VU		1	May occur	In SA, this species inhabits rocky outcrops, cliffs and ridges in semi-arid country. This ranges from sandstones, limestones and conglomerates in the Flinders Ranges, to granites in the Gawler Ranges and Olary Hills.	**Unlikely.** Habitat in Project Area unsuitable for this species, Project Area not within these regions.
*	*Pteropus poliocephalus*	Grey-headed Flying-fox	VU	R	2	2018	The only known camp in South Australia occurs in metropolitan Adelaide. Foraging bats occur in tree canopies, including introduced trees, where they feed on blossoms, nectar and fruit (DEW, 2020a).	**Unlikely.** The semi-arid chenopod shrubland that occurs in the Eyre Project Area would not provide any foraging habitat for Grey-headed Flying-fox.
*	*Sminthopsis psammophila*	Sandhill Dunnart	EN	E	1	Likely to occur	The sandhill dunnart occurs in isolated sandy arid and semi-arid areas in the Great Victoria Desert and the Eyre Peninsula. It occurs in	**Unlikely.** Habitat in Project Area unsuitable for this species,

RAM	Scientific Name	Common Name	Status		Source of Record	PMST category/ BDBSA Sighting Date	Habitat	Likelihood of occurrence
			AUS	SA				
							vegetation dominated by hummock (Triodia) grassland (DAWE, 2020).	no recent records within 50 km of Project Area.
	REPTILIA	**REPTILES**						
*	*Aprasia pseudopulchella*	Flinders Worm-lizard	VU		2	2017	Occurs in open woodland, native tussock grassland, riparian habitats and rocky isolates (Cogger et al. 1993).	**Unlikely.** Habitat in Project Area unsuitable for this species.
*	*Varanus varius*	Lace Monitor		R	2	2019	Lace Monitors occur in well-timbered areas from dry woodlands to cool temperate forests in southern Australia.	**Unlikely.** Habitat in Project Area unsuitable for this species – lack of well-timbered areas.
*	*Vermicella annulata*	Common Bandy Bandy		R	2	2008	Found in a variety of habitats, including wet coastal forests, Acacia, mulga and mallee scrubs, savannah woodland and spinifex desert sandhills (DAWE, 2020).	**Possible.** Habitat in Project Area may be suitable for this species. One recent record within 50 km of Project Area.

Conservation status

AUS: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation Codes: CE/CR: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. M: listed as migratory under the EPBC Act.

Source of Information

1. **EPBC Act Protected Matters Report (Department of Agriculture, Water and the Environment, 2020e) – 5 km buffer applied to Project Area.**
2. **Biological Database of South Australia data extract (Government of South Australia, 2020a) - 5 km buffer applied to Project Area.**

RAM / *: This species only relevant to Lincoln Northern Project Area (Site 3) - 50 km buffer for BDBSA search as required in RAM.

Disclaimer:
Fauna species confined to the Flinders Ranges or Mt Remarkable National Parklands, as well as marine animals have been excluded from this Likelihood assessment.

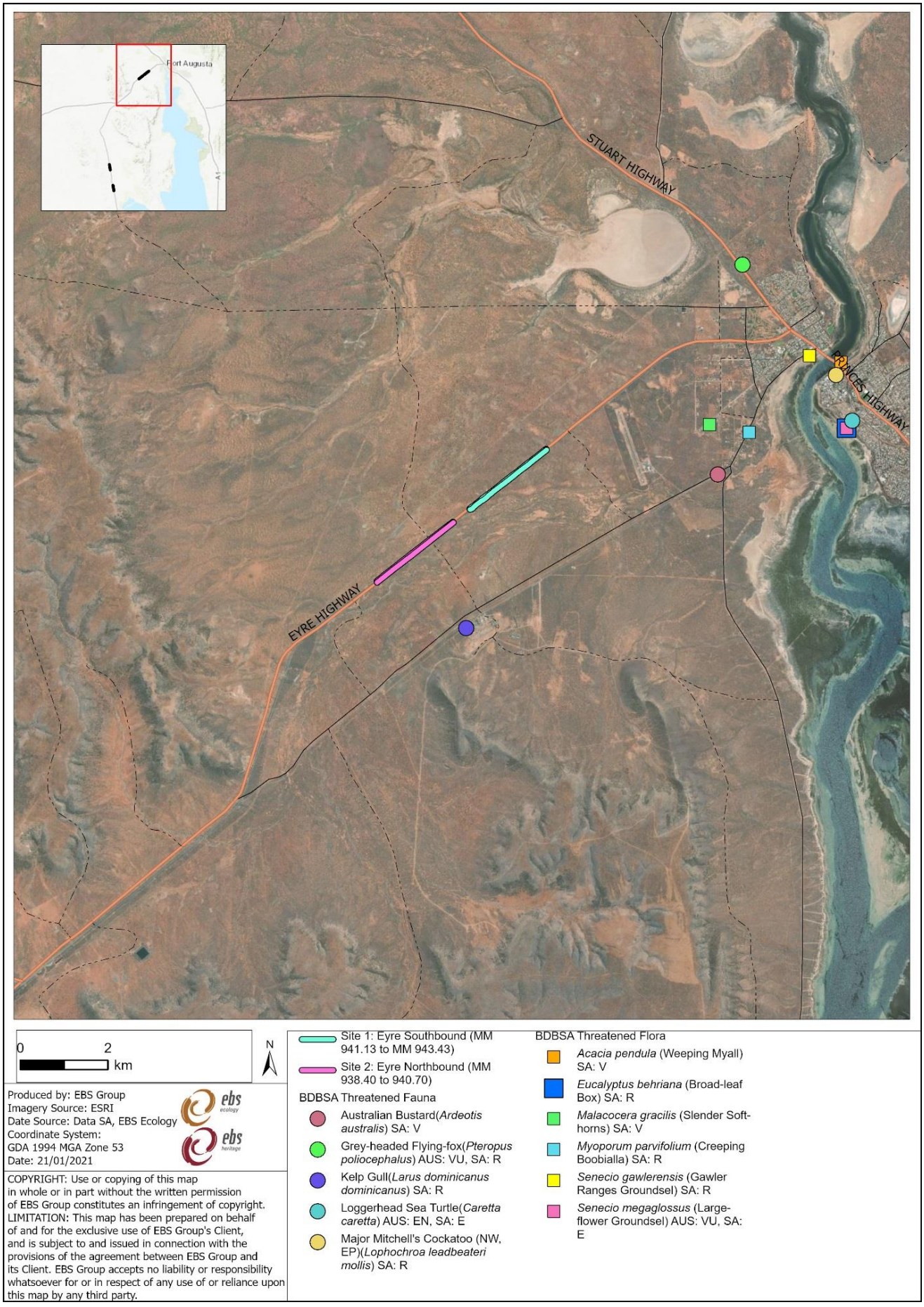

Figure 34. Records of threatened flora and fauna from within 5 km of the Eyre Project Area. Records have been obtained from the BDBSA (Department for Environment and Water, 2020a).

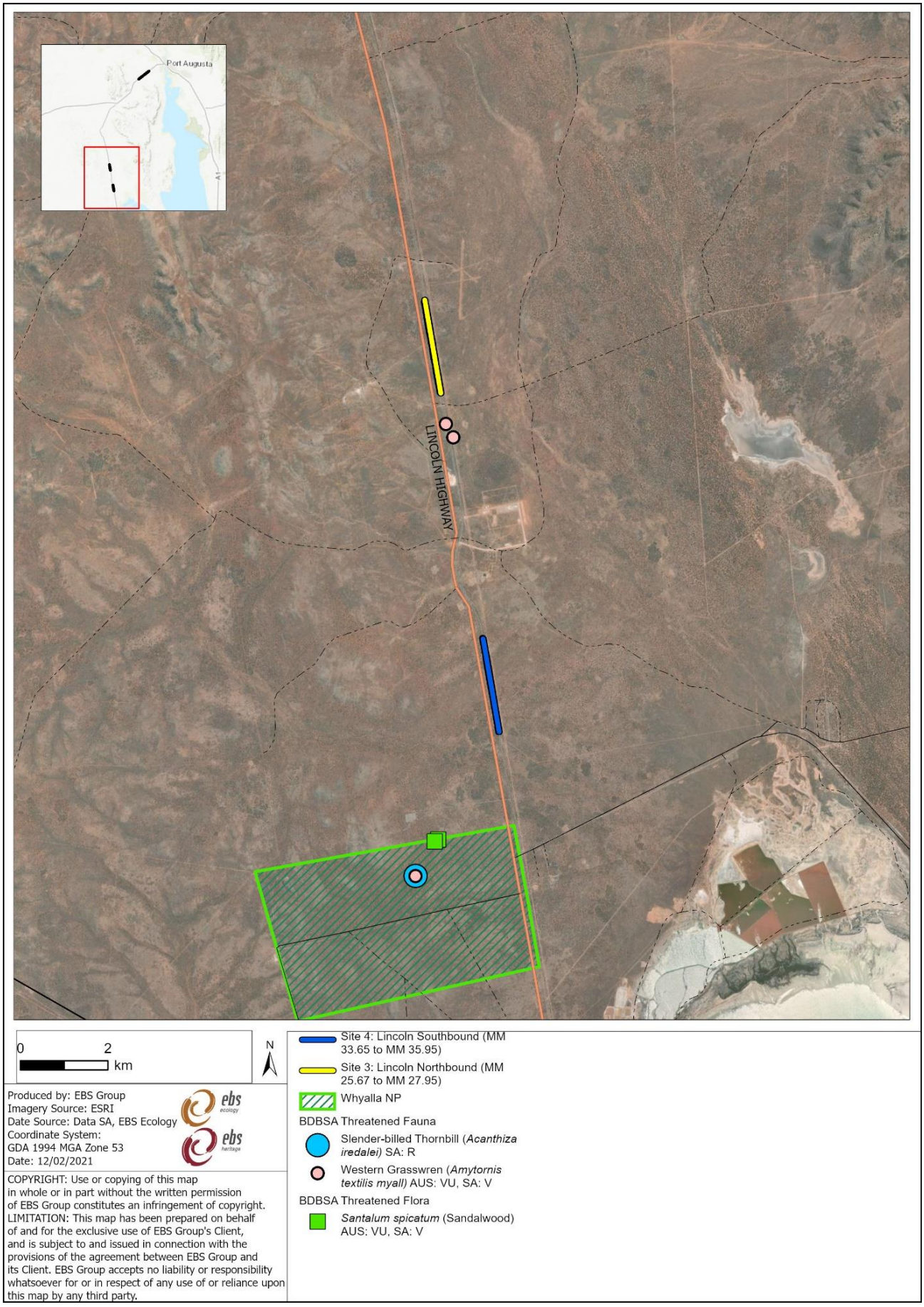

Figure 35. Desktop Assessment: Records of threatened flora and fauna from within 5 km of the Lincoln Project Area for the BAM assessment. Records have been obtained from the BDBSA (Department for Environment and Water, 2020a) and EBS (EBS Ecology, 2020).

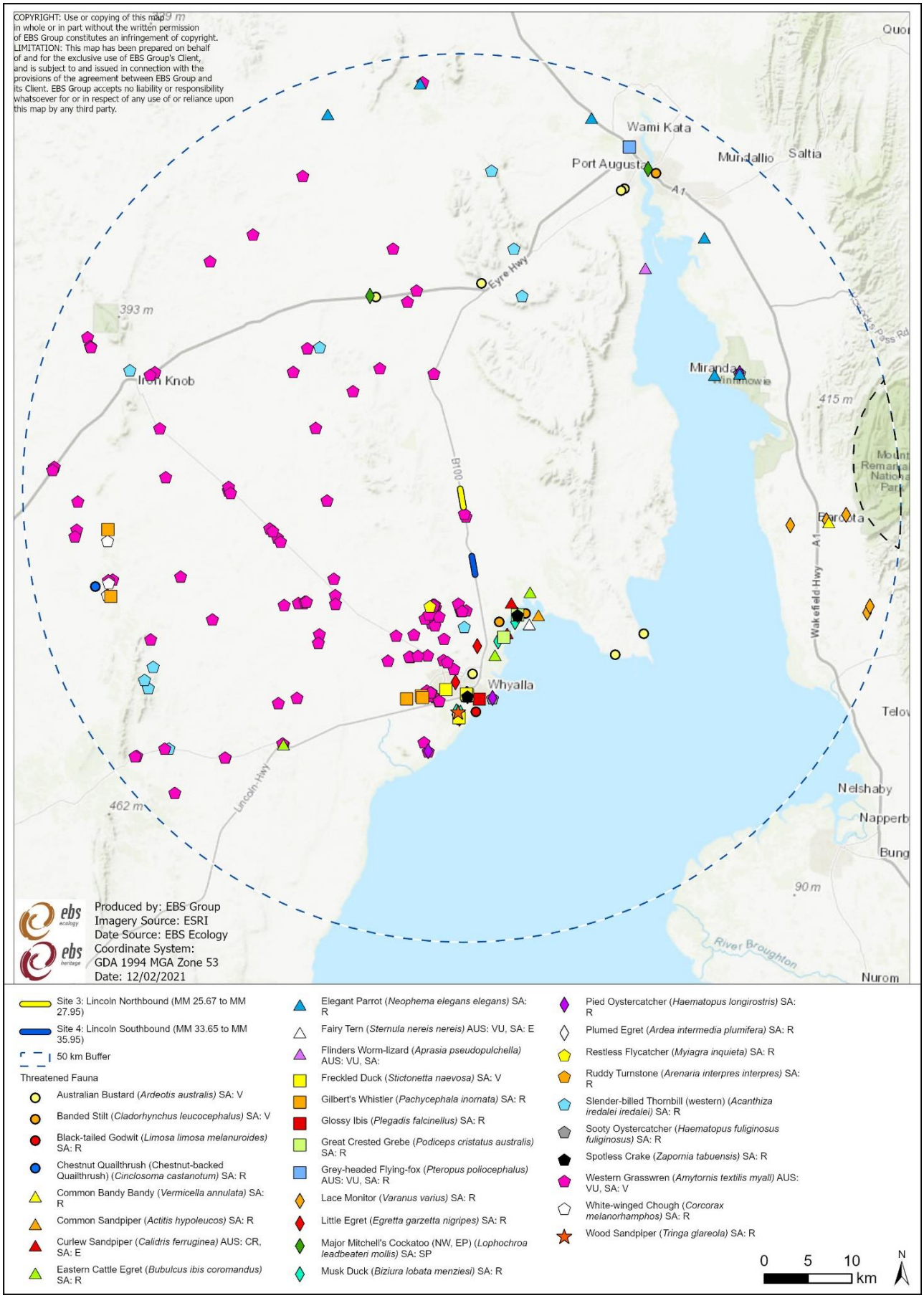

Figure 36. Threatened fauna records within 50 km of the Lincoln Northbound overtaking lane.

4.3. Cumulative impacts

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must consider the potential cumulative impact, both direct and indirect, that is reasonably likely to result from a proposed clearance activity.

- The direct impact of the Project is the proposed clearance of up to 14.47 ha.
  - This is comprised of 13.55 ha of clearance for the construction zone, plus an extra 0.92 ha of vegetation to account for vegetation located on or adjacent to the edge of the construction zone that may be impacted/cleared during construction works. The 0.92 ha has been calculated by adding a 0.5 m buffer around the outside of the construction zone.
- Potential indirect/cumulative impacts of the Project include:
  - Weed spread and infestation during construction, which may impact the condition or health of surrounding vegetation;
  - Dust generation during construction, which may impact the condition or health of surrounding vegetation; and
  - Noise generation during construction, which may impact fauna species in the area.

Given that the construction works are to be confined within the road reserve, it is unlikely that the Project will alter the hydrology (e.g., raised or lowered water table, flooding, impounding water or reduced water supply) of surrounding vegetation. The proposed overtaking lanes would have a small increase in the non-permeable surface area and any stormwater run-off will be managed in accordance with DIT drainage design requirements accordingly.

Cumulative impacts will be reduced by implementing the following measures:

- Access to the impact areas will be from the pre-existing road and therefore access tracks will not be necessary; and
- Side-casting of debris may be required in some areas, however mapped areas of native vegetation can be easily avoided for this section of road, so the impact will be minimal.

4.4. Addressing the Mitigation Hierarchy

When exercising a power or making a decision under Division 5 of the Native Vegetation Regulations 2017, the NVC must have regard to the mitigation hierarchy. The NVC will also consider, with the aim to minimize, impacts on biological diversity, soil, water and other natural resources, threatened species or ecological communities under the EPBC Act or listed species under the NP&W Act.

a) Avoidance – outline measures taken to avoid clearance of native vegetation

It is unlikely that the clearance associated with the proposal of four overtaking lanes can be avoided or located elsewhere. The Project must occur in the existing road corridor adjacent to the existing transport infrastructure. The following factors were taken into consideration when selecting locations for overtaking lanes:

- Provide optimal sight distance to the diverge area and more importantly to the merge area.
- Avoiding significant junctions, driveways (where possible) particularly where right turn movements are conducted from within the overtaking lane.

- Environmental issues, Aboriginal Heritage concerns, Native title and issues relating to flora and fauna.
- Conform to appropriate design standards and guidelines to ensure optimum road safety.
- Minimising any significant impact to services.
- The length of the lanes are approximately 2000m, in order to cater for overtaking of the longer PBS level 3A vehicles.

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 (whether the impact is direct, indirect or cumulative).

The Project minimises the clearance of vegetation by the following design elements:

- Located away from Whyalla National Park, where three threatened species have been recorded previously. The threatened species are:
    - Slender-billed Thornbill (*Acanthiza iredalei*) SA: R
    - Western Grasswren (*Amytornis textilis myall*) AUS: VU, SA: V
    - *Santalum spicatum* (Sandalwood) AUS: VU, SA: V
- All clearing will occur in accordance with the DIT Vegetation Removal Policy – Standard Operating Procedure under the Native Vegetation Act 1991 (DPTI, 2020). This policy requires all vegetation clearing be undertaken in accordance with the DIT Environmental Management System.
- Vegetation and soil-disturbing activities will be restricted to the area needed, and then that area will become part of our maintenance zone into the future (included for general vegetation control in the clearance envelope, including activities such as spraying/slashing).

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.

Clearing associated with the Project is permanent. Rehabilitation will not be undertaken.

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.

The NVC will only consider an offset once avoidance, minimization and restoration have been documented and fulfilled. The SEB Policy explains the biodiversity offsetting principles that must be met.

For this project, a payment into the Fund is the preferred offset method. The proposed offset for impact to vegetation of the Project has been calculated in Section 6.

4.5. Principles of Clearance (Schedule 1, *Native Vegetation Act 1991*)

The Native Vegetation Council will consider Principles 1(b), 1(c) and 1(d) when assigning a level of Risk under Regulation 16 of the Native Vegetation Regulations. The Native Vegetation Council will consider all the Principles of clearance of the Act as relevant, when considering an application referred under the *Planning, Development and Infrastructure Act 2016*. Assessment against the Principles of Clearance is shown in Table 23.

Table 23. Assessment against the Principles of Clearance.

Principle of clearance	Relevant information	Assessment against the principles	Moderating factors that may be considered by the NVC
Principle 1(b) – significance as a habitat for wildlife	All vegetation Sites supported chenopod shrublands (including Woodlands) generally dominated by Maireana pyramidata and Atriplex vesicaria with Maireana georgei, but with patches of Maireana astrotricha in Site B2, B3 and D3-PL. Lycium australe occurred in BAM Site A1. Chenopod shrublands that include larger specimens, particularly of M. pyramidata and L. australe are known habitat for Nationally threatened species Western Grasswren and State Rare species Slender-billed Thornbill, both of which are known to occur in habitat near both Project Areas. The most suitable habitat appeared to be in larger shrubs directly adjacent the road, and particularly in Sites BAM Sites A1 and C1; and RAM Sites D1-PL and D2-PL. Site BAM Site B1 also contained patches of larger specimens but overall was the most degraded site of all assessed. Multiple records of Western Grasswren occur in the vicinity of the Lincoln Project Area and the species is also known to occur near the Eyre Project Area. Vegetation in the proposed overtaking lanes also provides possible habitat for other threatened species including Australian Bustard, Elegant Parrot, Gilberts Whistler and Major Mitchell's Cockatoo.	<u>Seriously at Variance</u> All sites: • *Maireana pyramidata* (Black Bluebush)/*Atriplex vesicaria* (Bladder Saltbush) Low Shrubland +/- *Senna spp*. (Senna) with emergent *Acacia papyrocarpa* (Western Myall) • *Maireana pyramidata* (Black Bluebush)/*Atriplex vesicaria* (Bladder Saltbush) Low Very Open Shrubland over *Sclerolaena spp.* (Bindyii) with emergent *Acacia papyrocarpa* (Western Myall) • *Maireana pyramidata* (Black Bluebush)/*Atriplex vesicaria* (Bladder Saltbush) Low Shrubland +/- *Maireana astrotricha* with emergent *Acacia papyrocarpa* (Western Myall) • *Acacia papyrocarpa* (Western Myall)/*Myoporum platycarpum* (Sugarwood) Very Low Open Woodland over *Maireana sedifolia* (Pearl Bluebush)/*Atriplex vesicaria* (Bladder saltbush) • *Acacia papyrocarpa* (Western Myall) Very Open Low Woodland over *Maireana sedifolia* (Pearl Bluebush)/*Atriplex vesicaria* (Bladder saltbush) +/- *Eremophila longifolia* (Weeping Emubush) +/- *Casuarina pauper* (Black Oak)	Clearance is restricted to a narrow impact footprint on either side of the highways, and therefore will not be causing any further fragmentation of intact native vegetation. Although vegetation has a high habitat value the actual clearance area is small and is expected to have negligible impact on threatened fauna.

	Patches; Threatened Fauna Score was 0.1 for each site. BAM: The Unit biodiversity Score was 86.26 for Block A, 85.74 for Block B, 70.34 for Site C1 and 64.42 for site C2. RAM: The Unit Biodiversity Score was 77.30 for site D1-PL, 72.16 for D2-PL, and 66.14 for D3-PL.	• *Acacia papyrocarpa* (Western Myall) Very Low Woodland over *Maireana pyramidata* (Black Bluebush)*/Atriplex vesicaria* (Bladder Saltbush) • *Maireana pyramidata* (Black Bluebush*)/Atriplex vesicaria* (Bladder Saltbush) Low Shrubland +/- *Maireana georgei* (Satiny Bluebush) +/- emergent *Acacia papyrocarpa* (Western Myall) • *Maireana astrotricha* (Low Bluebush) / *Atriplex vesicaria* (Bladder Saltbush) Low Shrubland over *Sclerolaena spp.* (Bindyi) +/- *Acacia papyrocarpa* (Western Myall)	
Principle 1(c) – plants of a rare, vulnerable or endangered species	The Project Area does not contain any plants of a rare, vulnerable or endangered species). Threatened Flora Score = 0 for all sites.	Clearance of vegetation is not considered at variance to Principal 1(c)	N/A
Principle 1(d) – the vegetation comprises the whole or part of a plant community that is Rare, Vulnerable or endangered	The Project Area does not contain any threatened communities under the EPBC Act or threatened ecosystems under the DEW Provisional list of threatened ecosystems (DEH, in Progress). Threatened Community Score = 1 for all sites.	Clearance of vegetation is not considered at variance to Principal 1(d)	N/A

4.6. Risk assessment

The level of risk associated with the application

The overall level of risk associated with this application is Clearance level 4.

While, the RAM component of the Project (site 3) is classified as clearance Level 3, the BAM component (sites 1, 2 and 4) is classified as Clearance level 4, in accordance with the *Guide to the Native Vegetation Regulations 2017* (Table 24).

The total biodiversity value for the BAM (sites 1, 2 and 4) aligns with clearance Level 4 as the Total Biodiversity Score is greater than 250. The total biodiversity value for the RAM (site 3) aligns with clearance Level 2 (>3 ha to 10 ha) but as the clearance provides habitat for threatened species based on including all species occurring within 50 km in the scoresheets, it is escalated to Level 3. EBS has indicated moderating factors that may apply in Table 23, but these must be considered by the NVMU or delegate.

Table 24. Summary of the level of risk associated with the application.

		BAM (sites 1, 2 and 4)	RAM (site 3)	Total/overall
Total clearance	No. of trees	N/A	N/A	N/A
	Area (ha)	10.87	3.60	14.47
	Total biodiversity Score	841.31	259.52	1,100.83
Seriously at variance with principle 1(b), 1(c) or 1 (d)		Principle 1(b)	Principle 1(b)	Principle 1(b)
Risk assessment outcome		Level 4	Level 3	Level 4

4.7. NVC guidelines

Other information that demonstrates that the clearance complies with any relevant NVC guidelines related to the activity

The clearance will be undertaken in accordance with DIT's *Vegetation Removal Policy – Standard Operating Procedures under the Native Vegetation Act 1991* (DPTI, 2020).

5. Clearance summary

Clearance Area(s) Summary table

The clearance area summary table is provided in Table 25.

Table 25. Summary of vegetation clearance areas.

Block	Site	Species diversity score	Threatened Ecological community Score	Threatened plant score	Threatened fauna score	UBS	Area (ha)	Total Biodiversity score	Loss factor	Loadings	Reductions	SEB Points required	SEB payment	Admin Fee
A	1	30	1	0	0.1	86.26	3.90	301.38	1			353.24	$25,831.14	$1,420.71
B	1	30	1	0	0.1	85.74	1.20	102.88	1			108.03	$7,899.54	$434.47
B	2	30	1	0	0.1	85.74	1.45	124.32	1			130.53	$9,621.03	$529.16
B	3	30	1	0	0.1	85.74	0.84	72.02	1			75.62	$5,573.56	$306.55
C	1	30	1	0	0.1	70.34	2.79	196.26	1			206.07	$15,248.23	$838.65
C	2	30	1	0	0.1	64.42	0.69	44.45	1			46.67	$3,453.64	$189.95
D	1PL	N/A	1	0	0.1	77.30	1.17	90.44	1			94.97	$6,889.25	$378.91
D	2PL	N/A	1	0	0.1	72.16	1.39	100.30	1			105.31	$7,640.03	$420.20
D	3PL	N/A	1	0	0.1	66.14	1.04	68.78	1			72.22	$5,239.36	$288.16
						Total	**14.47**	**1100.83**				**1192.66**	**$87,395.78**	**$4,806.76**

Totals summary table

The totals summary table is provided in Table 26. The Economies of Scale and Rainfall (mm) factors used in the SEB calculations are provided in Table 27.

Table 26. Totals summary table.

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee	Total Payment
Application	1100.83	1192.66	$87,395.78	$4,806.76	$92,202.54

Table 27. Economies of Scale and Rainfall (mm) factors

Block	A	B	C	D
Economies of Scale Factor	0.11	0.11	0.11	0.11
Rainfall (mm)	252	252-254	255	250

6. 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.

ACHIEVING AN SEB

Indicate how the SEB will be achieved by ticking the appropriate box and providing the associated information:

☐ Establish a new SEB Area on land owned by the proponent.

☐ 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.

PAYMENT SEB

DIT intend to provide the SEB via payment into the Native Vegetation Fund. The total SEB payment required is $92,202.54, which includes payment into the fund of $87,395.78, plus an administration fee of $4,806.76 (Table 28).

Table 28. Cost breakdown for payment into the Native Vegetation Fund.

Site	Area	SEB points required	Payment into the fund (GST Exclusive)	Admin fee (GST inclusive)
A1	3.90	353.24	$25,831.14	$1,420.71
B1	1.20	108.03	$7,899.54	$434.47
B2	1.45	130.53	$9,621.03	$529.16
B3	0.84	75.62	$5,573.56	$306.55
C1	2.79	206.07	$15,248.23	$838.65
C2	0.69	46.67	$3,453.64	$189.95
D1PL	1.17	94.97	$6,889.25	$378.91
D2PL	1.39	105.31	$7,640.03	$420.20
D3PL	1.04	72.22	$5,239.36	$288.16
Total:	**14.47**	**1,192.66**	**$87,395.78**	**$4,806.76**

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8. Appendices

Appendix 1. Design plans of the Eyre Highway and Lincoln Highway Overtaking Lanes (attached in PDF format)

Appendix 2. Bushland and Rangeland Vegetation Assessment Scoresheets associated with the proposed clearance and SEB Area (attached in Excel format)

Appendix 3. Shapefiles of the vegetation impacts (attached in Shapefile format)

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