Native Vegetation Clearance

VS2020/038 Eyre Highway Shoulder Sealing – WA border to Nundroo (MM0-MM324.80)

Data Report

Clearance under the *Native Vegetation Regulations 2017*

9th August 2021

Prepared by Alice Si – EBS Ecology (NVC BAM Accredited Consultant) and Travis How - EBS Ecology (NVC RAM Accredited Consultant)

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Version 4

Prepared by for Department of Infrastructure and Transport

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Cover photograph: Nundroo Mallee (*Eucalyptus calcareana*) on section of Eyre Highway. Photo taken by Alice Si.

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Glossary and abbreviations

AW	Alinytjara Wilurara Land Management Region
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)
DIT	Department for Infrastructure and Transport
EBS	Environment and Biodiversity Services Pty Ltd (trading as EBS Ecology)
EP	Eyre Peninsula Land Management Region
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999*
ha	Hectare(s)
IBRA	Interim Biogeographical Regionalisation of Australia
km	Kilometre(s)
LMR	Land Management Region
MM	DIT Road Maintenance Marker – physical markers along road corridor to assist with navigation. MM 0.00 begins and WA/SA border.
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	Clearing of potential borrow pits and bore drill sites for shoulder sealing of the Eyre Highway between the Western Australia (WA) border and Nundroo
Project Area	Eyre Highway corridor between the WA border and Nundroo, and associated proposed borrow pits and bore drill sites
RAM	Rangelands Assessment Method
SA	South Australia(n)
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)
ssp.	Sub-species
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:	Catherine Gray T: 8402 1874 M: 0419 851 548 E: catherine.gray@sa.gov.au		
Landowner:	Department of Infrastructure and Transport (DIT)		
Site Address:	Eyre Highway Maintenance Marker (MM) 0 to MM 324.80, and a pit adjacent Laura Bay Road, 4.5 km south of MM500.5 on the Eyre Highway		
Local Government Area:	Pastoral Unincorporated Area Ceduna	**Hundred:**	Bice Lucy Miller Wandana
Title ID:	CR5754/429 CR5754/426 CR5754/424 CR5754/427 CR5754/418 CR5754/432 CT5834/851 CT5834/851 CT6183/577 CT5395/44 Road reserve, Eyre Highway.	**Parcel ID**	H834100S748 H834100S513 H834100S511 H834100S516 H834100S505 H834100S502 H834200S728 H834200S726 H620500S16 H661300S22 Road reserve, Eyre Highway.

Table 2. Summary of the proposed clearance.

Purpose of clearance:	Clearance required for road upgrade works along the Eyre highway including shoulder sealing, stacking sites, borrow pits and water bore drilling sites.
Native Vegetation Regulation:	*Regulation 12(32) Works on behalf of the Commissioner of Highways.*
Description of the vegetation under application:	3.31 ha of Mallee woodland, 18.56 ha of *Melaleuca sp. +/- Acacia sp. +/- Cratystylis conocephala +/- Nitraria billardierei +/- Tecticornia sp. +/-* chenopod shrubland and 2.6 ha of *Austrostipa sp.* grassland varying in condition from poor to excellent.
Total proposed clearance – area (ha) and/or number of trees:	A maximum of 24.47 ha of vegetation is proposed to be cleared (likely to be significantly less)
Level of clearance:	Level 4 (Level 3 for the two BAM sites only if these are to be considered separately).
Overlay (Planning and Design Code):	N/A

Map of proposed clearance area:	
Mitigation Hierarchy:	**Avoidance** DIT is constrained by the location of the road corridor, existing sites and land ownership and is therefore limited in its ability to avoid clearance for road upgrades. Due to the remoteness of the location all material and water for the construction will be sourced locally. **Minimisation** The Project minimises the clearance of vegetation by the following design elements: • Following the initial impact assessment and provision of a heritage assessment, DIT has removed 10 of the initial 12 proposed bore holes. • Most borrow pits have been placed over existing borrow pits and/or stack sites. These have existing access tracks and have been previously cleared of native vegetation and are in degraded condition. • Multiple pit sites have been assessed in the event that material is not suitable or available at preferred pits (Pit 928, pit 918, Pit 915, Old Pit MM 256.6), however it is likely that there will only be impacts to half of the pits assessed. • Existing stack sites will be used as laydown areas, site office areas, parking for vehicles and machinery and vehicle turn around areas. • 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* (Department of Planning, Transport and infrastructure,

	2015). This policy requires all vegetation clearing to be undertaken in accordance with the DIT Environmental Management System. **Rehabilitation or restoration** It is most likely that DIT will look to keep all clearances open as assets, depending on future need for road maintenance, therefore there are no plans to rehabilitate the Project Area at this stage. However, there is potential for some borrow pits to be rehabilitated in the future. **Offset** DIT intend to provide the SEB via payment into the Native Vegetation Fund based on actual clearance impacts, which will be recorded and reconciled at the conclusion of clearance with SEB payment as per the actual clearance undertaken.
SEB Offset proposal	Payment of $225,629.31 including Admin fee of $11,083.48

2. Purpose of clearance

2.1. Description

The Department for Infrastructure and Transport (DIT) is proposing to undertake road upgrade works along the Eyre Highway including shoulder sealing, stack sites, borrow pits, water bore drilling sites, and potential guard fence installation at road junctions and property accesses between the Western Australian (WA) border (MM 0.00) and Nundroo (MM 324.80) (the Project).

Proposed road works will occur within the existing road corridor and are limited to existing cleared road shoulders and stack sites. The majority of proposed borrow pits and water bore drilling sites are at previously cleared sites that have regenerating vegetation; however, a few are in previously uncleared patches of native vegetation. The Project involves the clearance of up to 24.47 hectares (ha) of native vegetation, however this is a 'worst case scenario' figure, and clearance is likely to be significantly less depending on results of soil testing surveys.

2.1.1. Objectives

The objectives of the native vegetation clearance assessment were to:

- Undertake a desktop assessment of the likelihood of occurrence and status of threatened flora, fauna and ecological communities protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and State *National Parks and Wildlife Act 1972* (NPW Act).

- Assess native vegetation within the Project Area for clearance using the Native Vegetation Council (NVC) endorsed Scattered Tree Assessment Method (STAM), Bushland Assessment Method (BAM) and Rangelands Assessment Method (RAM).
- Record the presence of threatened flora and fauna species and habitat encountered within the Project Area; and
- Calculate the Significant Environmental Benefit (SEB) offset requirements based on the impact footprint.

Additional objectives of the assessment to meet DIT requirements included:

- Identify and map amenity vegetation.
- Identify and map significant weeds, such as declared weeds under the *Landscape South Australia Act 2019* (LSA Act) and plants on the DIT list of environmental weeds.
- Survey stack sites for the presence of threatened flora and fauna and significant weeds.

The results of the DIT survey requirements are presented in *Attachment 1 –Eyre Highway Shoulder Sealing MM0 to MM240.80 DIT Amenity Vegetation and Weed Assessment*.

2.2. Background

2.2.1. Administrative boundaries

The Project Area falls within the Pastoral Unincorporated Area, within the Alinytjara Wilurara (AW) and Eyre Peninsula (EP) Landscape Management Regions (LMR).

2.2.2. Current and surrounding land use

The majority of the Project Area is currently used as a road corridor, including sealed highway carriageway and cleared, gravel shoulders. Most of the proposed borrow pits and bore sites have previously been cleared for construction purposes. Some proposed pit and bore sites lay in pastoral land and is used for grazing purposes.

The majority of surrounding land use is for Conservation and Natural Environments. Production from Dryland Agriculture and Plantations also occurs towards the eastern end of the Project Area.

2.2.3. Bioregions

The Interim Biogeographical Regionalisation of Australia (IBRA) identifies geographically distinct bioregions based on common climate, geology, landform, native vegetation and species information. The bioregions are further refined into subregions and environmental associations. The Project Area is in the Hampton, Nullarbor and Eyre Yorke Block IBRA Bioregions and includes the IBRA Subregions and Environmental Associations listed in Table 3.

Table 3. IBRA regions associated with the Project Area, indicating areas of remnant and reserved vegetation.

IBRA Bioregion	IBRA Subregion	IBRA Environmental Association	Remnant Vegetation		Area Reserved	
			Percent	Area (ha)	Percent	Area (ha)
Hampton	Hampton	Bunda	99	44 408	99	44 265
Nullarbor	Nullabor Plain	Nullabor	100	4 094 883	68	2 773 897
	Yalata	Yalata	100	130 786	99	129 511
		Kroonilla	99	810 971	72	584 976
		Chintumba	98	157 755	89	139 734
Eyre Yorke Block	Eyre Mallee	Bookabie	54	72 897	43	36 262

2.3. General location map

The Project Area (Figure 1) includes ten proposed borrow pit sites, two potential bore drill sites and 23 stack sites, along or within a proximity of 5 km to the Eyre Highway, between Maintenance Marker (MM) 0.00 and MM 324.80, from west to east (Figure 1). This is a total distance of 324.80 kilometres (km). One extra proposed borrow pit lies outside this area and is located adjacent to Laura Bay Road, approximately 4.5 km south of MM 500.5 on the Eyre Highway.

Figure 1. Location map of the Project Area

2.4. Details of the proposal

The proposal includes shoulder sealing, stacking sites, borrow pits, water bore drilling sites, and potential guard fence installation along the Eyre Highway between the Western Australian (WA) border (MM0) and Nundroo (MM 324.80) and one borrow pit located adjacent Laura Bay Road, 4.5 km south of MM 500.5 on the Eyre Highway. All features surveyed in the field, in order from MM 0 to MM 324.80 are presented in Table 4. Subsequent to initial design phase, all guardrail fence installation has been declared to be outside of the scope of the project and no longer requires clearance, and a heritage assessment has minimised the selection of bore hole sites from twelve to two.

DIT provided the following project specifications and details:

- All shoulder sealing works will be confined within the existing width of formation (pavement and unsealed shoulders). At this stage, the final configuration will be same as other works along the Eyre Highway (top up/wet mix to 150mm deep, 3.5m lanes with 1.5m sealed shoulder (10m overall seal) with 0.8-1m unsealed shoulder). All works are on existing formation and/or within MAZ therefore no general vegetation survey of shoulder sealing works is required.
- There are no culvert extensions required between MM0 – MM324.8
- The shoulder construction process is to tyne/excavate/top-up using PM2/20QG and mix method with a bomag or similar, generally to a depth of 150mm, reshape, add required rubble, compact and seal.
- Construction Activity Zone width is proposed as 6.5m maximum from road centreline, except where restricted by Roadside Significant Sites (RSS).
- 23 stack sites proposed to be used for this contract are listed in the attached Scoping document (Attachment 2: RN2000 Eyre Highway clearances - WA Border to Nundroo)
- Eleven borrow pit and twelve bore sites proposed for use in this contract are listed in the attached Scoping document (Attachment 2: RN2000 Eyre Highway clearances - WA Border to Nundroo). Ten of the bore hole sites have been subsequently removed from the project scope due to results of a heritage survey.

Table 4. Attribute list for potential clearance areas surveyed, in road running order from MM 0 to MM 500.5 (those with strikethrough have subsequently been removed from clearance application based on results of additional surveys)

Attribute	MM	Side	Offset	Lat	Long	Length	Width
Stack site	0	LHS		-31.637570	129.003177		
Stack site	2	LHS		-31.633381	129.021908	90	30
Stack site	25	RHS		-31.649311	129.254774	200	40
Pit 928 - Yangoonabie	25.4	LHS	1200m	-31.637543	129.256851		
~~Bore Site 1.1~~	~~25.5~~	~~LHS~~	~~930m~~	~~-31.638246~~	~~129.257110~~		
~~Bore Site 1.2~~	~~25.5~~	~~RHS~~	~~0m~~	~~-31.650030~~	~~129.255781~~		
~~Bore Site 1.3~~	~~26.5~~	~~RHS~~	~~260m~~	~~-31.639567~~	~~129.270234~~		
Stack site	37.9	RHS		-31.638374	129.388725	100	40
Pit 925	51.4	LHS	700m	-31.620116	129.526089		

Stack site	51.5	RHS		-31.620485	129.529386	90	40
Stack site	70	RHS		-31.611610	129.721479	100	40
~~Bore Site 2.1~~	~~75.1~~	~~LHS~~	~~0m~~	~~-31.598978~~	~~129.772670~~		
Pit 922	77.4	RHS	275m	-31.598700	129.795727		
~~Bore Site 2.2~~	~~77.4~~	~~RHS~~	~~250m~~	~~-31.599375~~	~~129.796364~~		
Pit 921 - Koonalda	88	LHS	450m	-31.572520	129.907044		
Stack site	88.2	LHS		-31.572459	129.906041	120	90
Stack site	103.7	RHS		-31.570148	130.072109	100	30
Stack site	119.4	LHS		-31.563941	130.233812	200	30
Pit 918	119.5	LHS	300m	-31.562226	130.235438		
~~Bore Site 3.1~~	~~119.5~~	~~LHS~~	~~120m~~	~~-31.564181~~	~~130.234805~~		
~~Bore Site 3.2~~	~~123.7~~	~~RHS~~	~~120m~~	~~-31.572557~~	~~130.277589~~		
~~Bore Site 3.3~~	~~127.05~~	~~RHS~~	~~250m~~	~~-31.576977~~	~~130.311346~~		
Stack site	133.95	LHS		-31.574722	130.386410	110	20
Stack site	146.75	RHS		-31.556447	130.517008	0	0
Stack site	154.4	RHS		-31.550522	130.598393	130	130
Pit 915	154.5	LHS	700m	-31.545138	130.598967		
Stack site	168.7	LHS		-31.520589	130.742391	100	20
Stack site	183.08	LHS		-31.452369	130.877962	290	110
Stack site	183.08	LHS		-31.452369	130.877962	170	170
~~Bore Site 4.1~~	~~183.8~~	~~LHS~~	~~800m~~	~~-31.448739~~	~~130.872985~~		
~~Bore Site 4.2~~	~~185.1~~	~~LHS~~	~~800m~~	~~-31.446124~~	~~130.887319~~		
Stack site	188	RHS		-31.446880	130.921880	110	30
Stack site	201.7	LHS		-31.400530	131.057666	100	30
Bore Site 5.1	224	LHS	200m	-31.363250	131.281600		
~~Pit - Old quarry~~	~~227~~	~~LHS~~	~~4000m~~	~~-31.323765~~	~~131.303374~~		
Stack site	227	LHS		-31.360829	131.314282	100	50
Bore Site 5.2	227	LHS	100m	-31.360476	131.615215		
Stack site	242	LHS		-31.374746	131.468619	80	30
Pit, not DIT	256.6	LHS	450m	-31.406281	131.616299		
Stack site	256.7	LHS		-31.409255	131.614488	89	40
Stack site	270.2	LHS		-31.466976	131.735533	70	28
Stack site	286.2	RHS		-31.529080	131.893451	220	30
Stack site	302.6	LHS		-31.605791	132.090599	70	25
Pit - Iluka Road	304.69	LHS	100m	-31.593312	132.159653		
Pit - west of Nundroo	320	LHS	500m	-31.720180	132.159653		
Pit - Laura Bay Road	500.5	RHS	4500m	-32.172710	133.848144		

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

Environmental legislative approvals required or potentially required:

- Approval is required under *Schedule 1, Division 5* of the *Native Vegetation Regulations 2017* of the *Native Vegetation Act, 1991* to clear native vegetation for the Shoulder sealing. The current report has been prepared

for submission to the Native Vegetation Council (NVC) (Level 3 and 4 clearance) to obtain approval under the Regulations for the clearance area between the WA border and Nundroo.

- Declared Weeds must be transported in line with the *Landscapes South Australia Act 2019* (LSA Act) policies and approval processes.
- The *Aboriginal Heritage Act*, *1998* may be triggered and an approval required if any sites, objects or remains are uncovered during the works.
- EBS Ecology have been issued a Flora Collection Permit under the *National Parks and Wildlife Act 1972* (NPW Act) for collection of plant specimens required when undertaking flora surveys across South Australia.

Environment approvals that are not required are as follows (but may not represent complete list):

- An approval under the Planning, Development and Infrastructure Act 2016 is not required.
- Water affecting activity permit under the Landscapes SA Act is not required as determined in DIT's Environment and Heritage Impact Assessment process.
- A referral and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is not required as the proposal is deemed not to have a Significant Impact on any Matter of National Environmental Significance (MNES).

2.6. Native Vegetation Regulation

The Project is considered exempt under *Regulation 12(32) Works on behalf of the Commissioner of Highways* in Schedule 1 in Division 5 of the *Native Vegetation Regulations, 2017* (the Regulations) of the *Native Vegetation Act, 1991* (NV Act).

Regulation 12(32) allows clearance of vegetation incidental to new work being undertaken by or on behalf of the Commissioner of Highways including roads and ports infrastructure (other than repair or maintenance). Development Application information (if applicable). Shoulder widening and associated clearances is classified as new works in the DIT Removal Policy (DPTI 2020), therefore clearance associated with it is subject to assessment and achievement of an offset and does not form part of normal road maintenance.

To fulfil this requirement, the proponent must indicate how the mitigation hierarchy has been addressed to minimise impact and any resulting clearance must be offset through establishing a Significant Benefit via an on-ground offset or payment into the Native Vegetation Fund.

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 using a 5 km for BAMs and 50 km for RAMs buffer of the respective Project Areas (Search Areas).

3.1.1. PMST report

A Protected Matters Search Tool (PMST) report was generated on 22 March 2021 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

A data extract from the Biological Database of South Australia (BDBSA) was obtained from DEW to identify flora and fauna species that have been recorded within 5 km of the Project Area (data extracted 28 April 2021; 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 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 5.

Table 5. 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.

Unlikely	Recorded within the previous 20 years, but the area provide 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 Alice Si and Paul Drummond on 29 to 31 March 2021 in accordance with the Bushland, Rangelands and Scattered Tree Assessment Methods (BAM/RAM/STAM) (NVC 2020a, 2020b, 2020c). Guidance was provided by NVC Accredited Consultant Dr Travis How on the implementation of methods, collection of data, completion of datasheets and report review.

The Project Area occurs across two Land Management Regions (LMRs) – Alinytjara Wilurara (AW) and Eyre Peninsula (EP), each of which are subject to different native vegetation assessment methods, with RAM used for AW, and BAM for EP. In total, two sites to the east of the Project Area occurred within the EP LMR and were assessed using BAM, while 30 sites were assessed using RAM within the AW LMR to the west.

Each BAM survey site and proposed stack site was surveyed for the presence of threatened flora species identified by the desktop assessment. This was carried out using an area search method of the entire vegetation patch likely to be impacted.

Flora species within the wider road corridor not likely to be impacted were recorded on an opportunistic records list to provide landscape context for the report.

Amenity vegetation and declared and environmental weeds were also surveyed and mapped (presented in Attachment 1).

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 (verified) 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.

3.2.3. Scattered Tree Assessment Method

The STAM is derived from the *Scattered Tree Clearance Assessment in South Australia: Streamlining, Guidelines for Assessment and Rural Industry Extension* report (Cutten and Hodder 2002). The STAM is suitable for assessing scattered trees in the following instances:

- Individual scattered trees (i.e. canopy does not overlap). The spatial distribution of trees may vary from approaching what would be considered their original distribution (pre-European) through to single isolated trees in the middle of a paddock; or
- Dead trees (when a dead tree is considered native vegetation); or
- Clumps of trees (contiguous overlapping canopies) if the clump is small (approximately <0.1 ha); and
- For both scattered trees and clumps:
    - The ground layer comprises wholly or largely of introduced species;
    - Some scattered colonising native species may be present, but represent <5% of the ground cover; and
    - The area around the trees consists of introduced pasture or crops.

Details of the scattered tree Point Scoring System are outlined in the *Scattered Tree Assessment Manual* (NVC 2020c).

The numbers of uncommon and threatened scattered tree using fauna species entered into the Scattered Tree Scoresheet were calculated by cross-referring the BDBSA data extract (see Section 3.1.2) and the lists of scattered tree using fauna in the *Scattered Tree Assessment Manual* (NVC 2020). The resource use of each species identified was

considered when determining each tree's suitability for threatened fauna species (e.g. species that only use hollows in scattered trees were only assigned to scattered trees containing hollows).

3.3. Fauna assessment

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.

Database searches for threatened fauna species are described in Section 3.1 above.

4. Assessment outcomes

4.1. Vegetation assessment

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

The Project Area spans both the Nullabor Plain and Yalata IBRA subregions. Soils range from powdery red calcareous loams, reddish calcareous earths, and reddish earthy sands, to brown calcareous earths. Landform includes both level plains towards the west, and undulating plains towards the eastern extents of the Project Area. There are no watercourses or wetlands. Vegetation in the Project Area consists of low to mid Mallee woodland to the east, and low *Melaleuca sp., Nitraria billardierii* and *Acacia sp.* shrublands to the west. There is significant variation between sites. The majority of stack sites and previously cleared borrow pits have very little native regeneration and contain varying extents of exotic vegetation.

An eastern portion of the Project Area (borrow pits MM 227, MM 256.6, and MM 304.69 and bore holes 5.1 and 5.2) lie within the Yalata Indigenous Protected Area.

No sections of the Project Area lie within a heritage agreement. The closest heritage agreement to the Project Area is HA 232, approximately 1.6 km WSW of the Nundroo Borrow Pit (MM 320).

Following provision of the Heritage Survey Report of the proposed impact areas, DIT has removed 10 of the 12 initially proposed bore hole sites from the impact area. DIT has requested advice on which of the bore-hole options would be favourable in each case. Based on the condition of the vegetation in the two remaining bore-hole options, EBS recommends the following:

- For bore 5 (RAM block K), both sites contain the same Vegetation Association in very similar condition, hence option 5.1 is recommended as it has less total area, and therefore will result in less clearance overall.

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

During the Project Area survey 30 RAM and 2 BAM sites were assessed – one at each of the potential borrow pit, bore hole and guardrail installation sites.

Ninety-four (94) Scattered Trees were assessed in and around the guardrail installation sites, including 74 trees which were marked for removal, 13 which required minor pruning (<20%) and seven which were deemed unlikely to require removal unless design plans changed (assessment summaries of trees surveyed are included Appendix 3, Appendix 4 (attachments), Appendix 7, and Appendix 8). Guardrails have subsequently been removed from the scope of the project, and as such, scattered tree impacts and associated hazard reduction vegetation clearance has been removed from this report, in total 94 scattered trees and 10 sites (totalling 0.985 hectares). Additionally, 10 of the 12 bore hole sites initially surveyed are no longer being considered for clearance following the results of a heritage assessment and have been removed from the report.

The following tables contain summaries of each of the remaining eleven RAM (Blocks B to N; Table 6) and BAM (Blocks O and P; Table 7).

All BAM, RAM and STAM scoresheets can be found in Appendix 1, Appendix 2 and Appendix 3. Photos of assessed Scattered Trees which are no longer under application can be found in Appendix 4 and 5.

Table 6. Summary of all RAM sites.

Vegetation Association	B1-PL; *Melaleuca pauperiflora* over *Tecticornia sp.* (samphire) shrubland
 Photo facing west, Location: GDA 1994 MGA Zone 52, Easting: 524441 Northing: 6499754	
General description	*Melaleuca pauperiflora* over *Tecticornia sp*. (samphire) shrubland plains, surrounding an old pit.
Threatened species or community	None recorded on site. **Likely/possible to occur:** Slender-billed Thornbill (western; *Acanthiza iredalei iredalei*) Australian Bustard (*Ardeotis australis*) Chestnut Quailthrush (eastern; *Cinclosoma castanotus castanotus*) (unlikely but ssp. *C. clarum* likely)

	White-bellied Sea Eagle (*Haliaeetus leucogaster*) Little Eagle (*Hieraaetus morphnoides*) Eastern Osprey (*Pandion haliaetus cristatus*) Grey Currawong (*Strepera versicolor ssp. plumbea*) Shy Heathwren (*Hylacola cauta cauta*) Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) McKenzie's Dragon (*Ctenophorus mckenziei*) Speckled Slider (*Lerista baynesi*) Heath Goanna (*Varanus rosenbergi*)				
Landscape context score	1.02	**Vegetation Condition Score**	55.69	**Conservation significance score**	1.3
Unit biodiversity Score	73.85	**Area (ha)**	2.16	**Total biodiversity Score**	159.51

Vegetation Association	D1-PL; *Eremophila weldii, Melaleuca pauperiflora, Atriplex nummularia* shrubland over *Westringia rigida*
	   Left photo facing W, centre photo facing E, right photo facing W. Location: GDA 1994 MGA Zone 52, Easting: 573442 Northing: 6503727
General description	*Eremophila weldii, Melaleuca pauperiflora, Atriplex nummulara shrubland* over Westringia rigida on a previously used pit. An EoS Factor of 0.5 for Agricultural Zone was applied to the calculations for this VA based on the mapping information available on NatureMaps, with EoS 0.5 extending along the coastal section of the Nullarbor.
Threatened species or community	None recorded on site. **Likely/possible to occur:** Slender-billed Thornbill (western; *Acanthiza iredalei iredalei*) Australian Bustard (*Ardeotis australis*) Chestnut Quailthrush (eastern; *Cinclosoma castanotus castanotus*) (unlikely but ssp. *C. clarum* likely) White-bellied Sea Eagle (*Haliaeetus leucogaster*) Little Eagle (*Hieraaetus morphnoides*) Eastern Osprey (*Pandion haliaetus cristatus*) Grey Currawong (*Strepera versicolor ssp. plumbea*) Shy Heathwren (*Hylacola cauta cauta*) Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) McKenzie's Dragon (*Ctenophorus mckenziei*) Speckled Slider (*Lerista baynesi*) Heath Goanna (*Varanus rosenbergi*)

Landscape context score	1.02	**Vegetation Condition Score**	53.61	**Conservation significance score**	1.3
Unit biodiversity Score	71.09	**Area (ha)**	2.79	**Total biodiversity Score**	198.35

Vegetation Association	E2-PL; *Nitraria billardierei*, *Geijera linearifolia* and *Cratystylis conocephala* shrubland over *Tecticornia sp.* understorey				
 Photo facing S, Location: GDA 1994 MGA Zone 52, Easting: 575455 Northing: 6503871					
General description	*Nitraria billardierei*, *Geijera linearifolia* and *Cratystylis conocephala* shrubland over *Tecticornia sp.* understorey over a previously cleared area. An EoS Factor of 0.5 for Agricultural Zone was applied to the calculations for this VA based on the mapping information available on NatureMaps, with EoS 0.5 extending along the coastal section of the Nullarbor.				
Threatened species or community	None recorded on site. **Likely/possible to occur:** Slender-billed Thornbill (western; *Acanthiza iredalei iredalei*) Australian Bustard (*Ardeotis australis*) Chestnut Quailthrush (eastern; *Cinclosoma castanotus castanotus*) (unlikely but ssp. *C. clarum* likely) White-bellied Sea Eagle (*Haliaeetus leucogaster*) Little Eagle (*Hieraaetus morphnoides*) Eastern Osprey (*Pandion haliaetus cristatus*) Grey Currawong (*Strepera versicolor ssp. plumbea*) Shy Heathwren (*Hylacola cauta cauta*) Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) McKenzie's Dragon (*Ctenophorus mckenziei*) Speckled Slider (*Lerista baynesi*) Heath Goanna (*Varanus rosenbergi*)				
Landscape context score	1.02	**Vegetation Condition Score**	54.5	**Conservation significance score**	1.3

Unit biodiversity Score	72.27	**Area (ha)**	1.73	**Total biodiversity Score**	125.02

Vegetation Association	F1-PL; *Acacia oswaldii* and *Atriplex nummlaria* over *Scavolea spinescens* shrubland and *Olearia sp.*				
  Left photo facing N, Right photo facing S, Location: GDA 1994 MGA Zone 52, Easting: 584493 Northing: 6510799					
General description	*Acacia oswaldii* and *Atriplex nummlaria* over *Scavolea spinescens* shrubland and *Olearia sp.* over a previously used pit.				
Threatened species or community	None recorded on site. **Likely/possible to occur:** Slender-billed Thornbill (western; *Acanthiza iredalei iredalei*) Australian Bustard (*Ardeotis australis*) Chestnut Quailthrush (eastern; *Cinclosoma castanotus castanotus*) (unlikely but ssp. *C. clarum* likely) White-bellied Sea Eagle (*Haliaeetus leucogaster*) Little Eagle (*Hieraaetus morphnoides*) Eastern Osprey (*Pandion haliaetus cristatus*) Grey Currawong (*Strepera versicolor ssp. plumbea*) Shy Heathwren (*Hylacola cauta cauta*) Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) McKenzie's Dragon (*Ctenophorus mckenziei*) Speckled Slider (*Lerista baynesi*) Heath Goanna (*Varanus rosenbergi*)				
Landscape context score	1.02	**Vegetation Condition Score**	56.77	**Conservation significance score**	1.3
Unit biodiversity Score	75.27	**Area (ha)**	0.58	**Total biodiversity Score**	43.66

Vegetation Association	G1-PL; *Nitraria billardierei* and *Geijera linearifolia* shrubland over chenopod shrubland

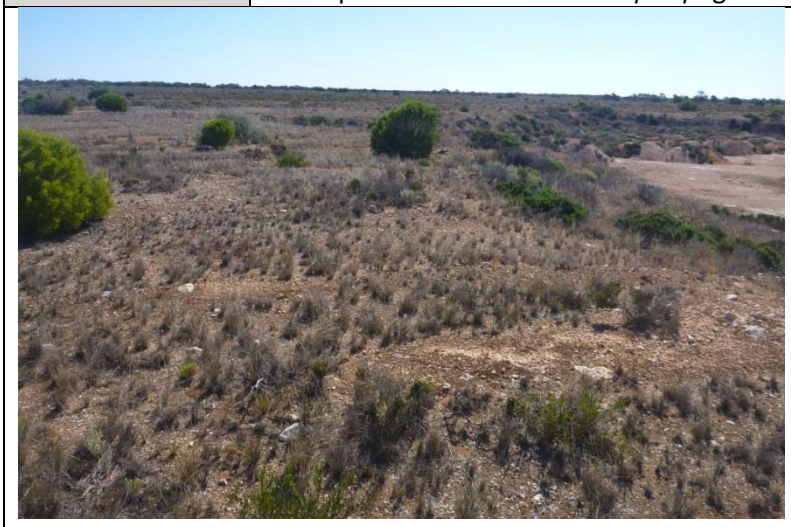
Photo facing E, Location: GDA 1994 MGA Zone 52, Easting: 617082 Northing: 6507412

Evidence of degraded site with rabbit warrens (left) and dumped rubbish (right) at site G1-PL (above)

General description	*Nitraria billardierei* and *Geijera linearifolia* shrubland over chenopod shrubland over a previously disturbed pit area.
Threatened species or community	None recorded on site. **Likely/possible to occur:** Slender-billed Thornbill (western; *Acanthiza iredalei iredalei*) Australian Bustard (*Ardeotis australis*) Chestnut Quailthrush (eastern; *Cinclosoma castanotus castanotus*) (unlikely but ssp. *C. clarum* likely) White-bellied Sea Eagle (*Haliaeetus leucogaster*) Little Eagle (*Hieraaetus morphnoides*) Eastern Osprey (*Pandion haliaetus cristatus*) Grey Currawong (*Strepera versicolor ssp. plumbea*) Shy Heathwren (*Hylacola cauta cauta*) Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) McKenzie's Dragon (*Ctenophorus mckenziei*) Speckled Slider (*Lerista baynesi*) Heath Goanna (*Varanus rosenbergi*)

Landscape context score	1.05	**Vegetation Condition Score**	52.69	**Conservation significance score**	1.3

Unit biodiversity Score	69.86	**Area (ha)**	5.24	**Total biodiversity Score**	366.09

Vegetation Association	H1-PL; *Melaleuca pauperiflora*, *Acacia oswaldii* and *Geijera linearifolia* shrubland over chenopod shrubs and *Austrostipa sp*. grassland				
 Photo facing W, Location: GDA 1994 MGA Zone 52, Easting: 651814 Northing: 6508819					
General description	*Melaleuca pauperiflora*, *Acacia oswaldii* and *Geijera linearifolia* shrubland over chenopod shrubs and *Austrostipa sp*. grasslands on a stony, level plain.				
Threatened species or community	None recorded on site. **Likely/possible to occur:** Slender-billed Thornbill (western; *Acanthiza iredalei iredalei*) Australian Bustard (*Ardeotis australis*) Chestnut Quailthrush (eastern; *Cinclosoma castanotus castanotus*) (unlikely but ssp. *C. clarum* likely) White-bellied Sea Eagle (*Haliaeetus leucogaster*) Little Eagle (*Hieraaetus morphnoides*) Eastern Osprey (*Pandion haliaetus cristatus*) Grey Currawong (*Strepera versicolor ssp. plumbea*) Shy Heathwren (*Hylacola cauta cauta*) Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) McKenzie's Dragon (*Ctenophorus mckenziei*) Speckled Slider (*Lerista baynesi*) Heath Goanna (*Varanus rosenbergi*)				
Landscape context score	1.02	**Vegetation Condition Score**	53.5	**Conservation significance score**	1.3
Unit biodiversity Score	70.94	**Area (ha)**	1.06	**Total biodiversity Score**	75.2

Vegetation Association	K1-PU; *Melaleuca pauperiflora*, *Nitraria billardierei* and *Scaveola spinescens* shrubland over sparse chenopod and *Austrostipa sp*. understorey

Photos facing W, Location: GDA 1994 MGA Zone 52, Easting: 717048 Northing: 6527906

General description	*Melaleuca pauperiflora, Nitraria billardierei* and *Scaveola spinescens* shrubland over sparse chenopod and *Austrostipa sp.* understorey on an undulating plain.
Threatened species or community	Two Major Mitchell's Cockatoos (*Lophochroa leadbeateri mollis*) recorded on site. **Likely/possible to occur:** Slender-billed Thornbill (western; *Acanthiza iredalei iredalei*) Australian Bustard (*Ardeotis australis*) Shy Heathwren (*Hylacola cauta cauta*) Chestnut Quailthrush (eastern; *Cinclosoma castanotus castanotus*) (unlikely but ssp. *C. clarum* likely) White-winged Chough (*Corcorax melanorhamphos*) Black Falcon (*Falco subniger*) Shy Heathwren (*Hylacola cauta cauta*) Malleefowl (*Leipoa ocellata*) Purple-gaped Honeyeater (*Lichenostomus cratitius occidentalis*) Brown Honeyeater (*Lichmera indistincta indistincta*) Square-tailed Kite (*Lophoictinia isura*) Restless Flycatcher (*Myiagra inquieta*) Scarlet-chested Parrot (*Neophema splendida*) Naretha Bluebonnet (*Northiella narethae*) Gilbert's Whistler (*Pachycephala inornata*) White-bellied Sea Eagle (*Haliaeetus leucogaster*) Little Eagle (*Hieraaetus morphnoides*) Eastern Osprey (*Pandion haliaetus cristatus*) Grey Currawong (*Strepera versicolor ssp. plumbea*) Speckled Slider (*Lerista baynesi*) Carpet Python (*Morelia spilota*) Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) McKenzie's Dragon (*Ctenophorus mckenziei*) Heath Goanna (*Varanus rosenbergi*) Speckled Slider (*Lerista baynesi*)

Landscape context score	1.04	**Vegetation Condition Score**	54.04	**Conservation significance score**	1.3
Unit biodiversity Score	73.06	**Area (ha)**	0.46	**Total biodiversity Score**	33.61

Vegetation Association	K2-PL; *Cratystylis conocephala* and *Scaevola spinescens* shrubland over *Austrostipa sp.* and chenopod understorey
 Photo facing S, Location: GDA 1994 MGA Zone 52, Easting: 720068 Northing: 6528184	
General description	*Cratystylis conocephala* and *Scaevola spinescens* shrubland over *Austrostipa sp.* and chenopod understorey on a stony, level plain.
Threatened species or community	None recorded on site. **Likely/possible to occur:** Slender-billed Thornbill (western; *Acanthiza iredalei iredalei*) Australian Bustard (*Ardeotis australis*) Shy Heathwren (*Hylacola cauta cauta*) Chestnut Quailthrush (eastern; *Cinclosoma castanotus castanotus*) (unlikely but ssp. *C. clarum* likely) White-winged Chough (*Corcorax melanorhamphos*) Black Falcon (*Falco subniger*) Shy Heathwren (*Hylacola cauta cauta*) Malleefowl (*Leipoa ocellata*) Purple-gaped Honeyeater (*Lichenostomus cratitius occidentalis*) Brown Honeyeater (*Lichmera indistincta indistincta*) Major Mitchell's Cockatoo (*Lophochroa leadbeateri mollis*) Square-tailed Kite (*Lophoictinia isura*) Restless Flycatcher (*Myiagra inquieta*) Scarlet-chested Parrot (*Neophema splendida*) Naretha Bluebonnet (*Northiella narethae*) Gilbert's Whistler (*Pachycephala inornata*) White-bellied Sea Eagle (*Haliaeetus leucogaster*) Little Eagle (*Hieraaetus morphnoides*) Eastern Osprey (*Pandion haliaetus cristatus*) Grey Currawong (*Strepera versicolor ssp. plumbea*) Speckled Slider (*Lerista baynesi*) Carpet Python (*Morelia spilota*) Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) McKenzie's Dragon (*Ctenophorus mckenziei*) Heath Goanna (*Varanus rosenbergi*) Speckled Slider (*Lerista baynesi*)

Landscape context score	1.04	**Vegetation Condition Score**	54.07	**Conservation significance score**	1.3
Unit biodiversity Score	73.1	**Area (ha)**	0.75	**Total biodiversity Score**	54.82

Vegetation Association	M1-PL; *Acacia papyrocarpa* open woodland over *Westringia rigida* and chenopod shrubland
 Photo facing E, Location: GDA 1994 MGA Zone 52, Easting: 748830 Northing: 6522346	
General description	*Acacia papyrocarpa* open woodland over *Westringia rigida* and chenopod shrubland on a level plain.
Threatened species or community	2x Major Mitchell's cockatoos (*Cacatua leadbeateri)* observed on site. **Likely/possible to occur:** Slender-billed Thornbill (western; *Acanthiza iredalei iredalei*) Australian Bustard (*Ardeotis australis*) Shy Heathwren (*Hylacola cauta cauta*) Chestnut Quailthrush (eastern; *Cinclosoma castanotus castanotus*) (unlikely but ssp. *C. clarum* likely) White-winged Chough (*Corcorax melanorhamphos*) Black Falcon (*Falco subniger*) Shy Heathwren (*Hylacola cauta cauta*) Malleefowl (*Leipoa ocellata*) Purple-gaped Honeyeater (*Lichenostomus cratitius occidentalis*) Brown Honeyeater (*Lichmera indistincta indistincta*) Square-tailed Kite (*Lophoictinia isura*) Restless Flycatcher (*Myiagra inquieta*) Scarlet-chested Parrot (*Neophema splendida*) Naretha Bluebonnet (*Northiella narethae*) Gilbert's Whistler (*Pachycephala inornata*) White-bellied Sea Eagle (*Haliaeetus leucogaster*) Little Eagle (*Hieraaetus morphnoides*) Eastern Osprey (*Pandion haliaetus cristatus*) Grey Currawong (*Strepera versicolor ssp. plumbea*) Speckled Slider (*Lerista baynesi*) Carpet Python (*Morelia spilota*) Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) McKenzie's Dragon (*Ctenophorus mckenziei*) Heath Goanna (*Varanus rosenbergi*) Speckled Slider (*Lerista baynesi*)

Landscape context score	1.02	**Vegetation Condition Score**	68.43	**Conservation significance score**	1.3
Unit biodiversity Score	90.74	**Area (ha)**	0.75	**Total biodiversity Score**	68.05

Vegetation Association	M2-PL; Very open *Acacia papyrocarpa* and *Eucalyptus sp.* woodland over chenopod understorey				
 Photo facing E, Location: GDA 1994 MGA Zone 52, Easting: 748774 Northing: 6522345					
General description	Very open *Acacia papyrocarpa* and *Eucalyptus sp.* woodland over chenopod understorey on a stony plain.				
Threatened species or community	None recorded on site. **Likely/possible to occur:** Australian Bustard (*Ardeotis australis*) White-winged Chough (*Corcorax melanorhamphos*) Black Falcon (*Falco subniger*) Purple-gaped Honeyeater (*Lichenostomus cratitius occidentalis*) Brown Honeyeater (*Lichmera indistincta indistincta*) Major Mitchell's Cockatoo (*Lophochroa leadbeateri mollis*) Square-tailed Kite (*Lophoictinia isura*) Restless Flycatcher (*Myiagra inquieta*) Scarlet-chested Parrot (*Neophema splendida*) Naretha Bluebonnet (*Northiella narethae*) Gilbert's Whistler (*Pachycephala inornata*) White-bellied Sea Eagle (*Haliaeetus leucogaster*) Little Eagle (*Hieraaetus morphnoides*) Eastern Osprey (*Pandion haliaetus cristatus*) Grey Currawong (*Strepera versicolor ssp. plumbea*) Speckled Slider (*Lerista baynesi*) Carpet Python (*Morelia spilota*) Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) McKenzie's Dragon (*Ctenophorus mckenziei*) Heath Goanna (*Varanus rosenbergi*) Speckled Slider (*Lerista baynesi*)				
Landscape context score	1.02	**Vegetation Condition Score**	53.09	**Conservation significance score**	1.3
Unit biodiversity Score	70.4	**Area (ha)**	0.25	**Total biodiversity Score**	17.6

Vegetation Association	N1-PL; *Scaevola spinescens* low open shrubland over *Vittadinia gracilis, Vittadinia cuneata* and *Roepera ovata* understorey				
 Photo facing S, Location: GDA 1994 MGA Zone 53, Easting: 224042 Northing: 6500837					
General description	*Scaevola spinescens* low open shrubland over *Vittadinia gracilis, Vittadinia cuneata* and *Roepera ovata* understorey on a stony plain.				
Threatened species or community	None recorded on site. **Likely/possible to occur:** Australian Bustard (*Ardeotis australis*) Chestnut Quailthrush (eastern; *Cinclosoma castanotus castanotus*) White-bellied Sea Eagle (*Haliaeetus leucogaster*) Little Eagle (*Hieraaetus morphnoides*) Eastern Osprey (*Pandion haliaetus cristatus*) Grey Currawong (*Strepera versicolor ssp. plumbea*) Shy Heathwren (*Hylacola cauta cauta*) Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) McKenzie's Dragon (*Ctenophorus mckenziei*) Speckled Slider (*Lerista baynesi*) Heath Goanna (*Varanus rosenbergi*)				
Landscape context score	1.02	**Vegetation Condition Score**	28.27	**Conservation significance score**	1.3
Unit biodiversity Score	37.49	**Area (ha)**	3.04	**Total biodiversity Score**	113.95

Table 7. Summary of VAs assessed using the BAM

Vegetation Association	O1; *Eucalyptus calcareana* and *Eucalyptus gracilis* Mallee over *Acacia nyssophylla* and *Acacia oswaldii* shrubland, over *Lomandra effusa* and *Lomandra glauca* understorey				
 Photo facing W, Location: GDA 1994 MGA Zone 53, Easting: 231011 Northing: 6487038					
General description	*Eucalyptus calcareana* and *Eucalyptus gracilis* Mallee over *Acacia nyssophylla* and *Acacia oswaldii* shrubland, over *Lomandra effusa* and *Lomandra glauca* understorey on an undulating plain.				
Threatened species or community	None recorded or assessed as likely to occur at this site based on Bushland Assessment Methods for including species with records within 5 km of site since 1995 with less than 1km reliability.				
Landscape context score	1.06	**Vegetation Condition Score**	17.11	**Conservation significance score**	1
Unit biodiversity Score	18.13	**Area (ha)**	3.06	**Total biodiversity Score**	55.49

Vegetation Association	P1; *Austrostipa sp*. Grassland
 Photo facing N, Location: GDA 1994 MGA Zone 52, Easting: 957266 Northing: 6429874	
General description	*Austrostipa sp.* Grassland on a level plain.

Threatened species or community	None recorded or assessed as likely to occur at this site based on Bushland Assessment Methods for including species with records within 5 km of site since 1995 with less than 1km reliability. Potentially suitable habitat, and within area listed in National Recovery Plan as '*may occur*' for Plains-wanderer (*Pedionomus torquatus).* No records within 5km of BAM site.				
Landscape context score	1.13	**Vegetation Condition Score**	18.32	**Conservation significance score**	1
Unit biodiversity Score	20.7	**Area (ha)**	2.6	**Total biodiversity Score**	53.82

4.1.3. Site maps showing areas of proposed impact

A separate RAM assessment was completed for each of the proposed borrow pits and bore sites (Table 8)

Site maps for each of the proposed borrow pits are shown in Figure 2 to Figure 11, with bore sites in Figure 12 and Figure 13. RAM survey points and showing the Vegetation Associations are also shown in the Figures.

Table 8. RAM assessment correlating to each site

Site type	MM number(s)	Survey Type	VA	Comment
Pit 928	25.4	RAM	B1-PL	Preferred
Pit 925	51.4	RAM	D1-PL	
Pit 922	77.4	RAM	E2-PL	
Koonalda Pit 921	88	RAM	F1-PL	
Pit 918	119.5	RAM	G1-PL	Preferred
Pit 915	154.5	RAM	H1-PL	Preferred
Bore 5.1	224	RAM	K1-PU	
Bore 5.2	227	RAM	K2-PL	
Alt Pit 2	256.6	RAM	M1-PL	Preferred
Alt Pit 2	256.6	RAM	M2-PL	Preferred
Iluka Road Pit	304.69	RAM	N1-PL	
Nundroo Pit	320	BAM	O1	
Laura Bay Pit	500.5	BAM	P1	

Figure 2. Pit 928 – MM 25.4 site map

Figure 3. Pit 925 – MM 51.4 site map

Figure 4. Pit 922 – MM 77.4 site map

Figure 5. Koonalda Pit 921 – MM 921 site map

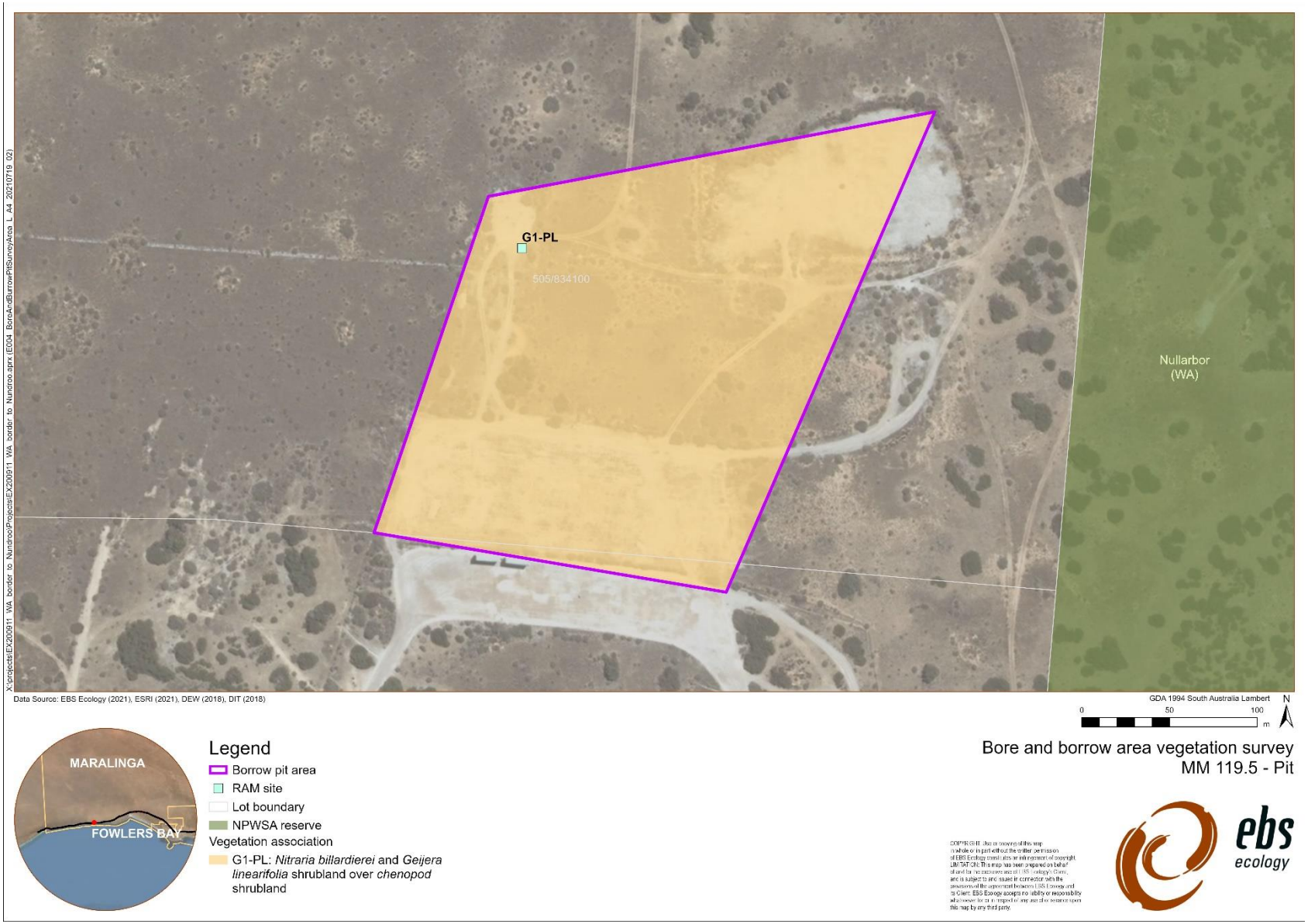


Figure 6. Pit 918 – MM 119.5 site map

Figure 7. Pit 915 – MM 154.5 site map

Figure 8. Pit MM 256.6 site map

Figure 9. Iluka Pit MM 304.69 site map

Figure 10. Nundroo Pit MM 320 site map

Figure 11. Laura Bay Rd Pit – MM 500.5 site map

Figure 12. Bore hole 5.1 site map

Figure 13. Bore hole 5.2 site map

4.1.4. Photo log

A photo was also taken at approximately every 10 km MM (i.e. MM 10, MM 20, MM 30 and so on) along the Eyre Highway. Photographs are shown in Figure 16 to Figure 46 in Appendix 5. Each photo was taken facing east.

4.2. Threatened species assessment

4.2.1. Threatened flora

No species listed as threatened under the EPBC Act or NPW Act were recorded during the survey. Twenty-four (24) species have been previously recorded from within 50 km of the Project Area since 1995, of which 11 have been assessed as likely or possible to occur based on desktop assessment results and habitat present in the Project Area (Table 9). Two of these species, *Microlepidium alatum* and *Tecticornia flabelliformis* are EPBC listed (vulnerable) species and may have been undetectable or unidentifiable (due to lack of fruiting bodies) at the time of survey.

The remaining species, assessed as unlikely to occur, were primarily long-lived conspicuous species (trees and shrubs) which may be present in the general area, but would have been easily observed on field survey if present within Project Area. Other species have been discounted based on niche habitat requirements which were not present within the Project Area. A full list of species assessed is included in Appendix 9.

Species observed on site, or recorded within 50km of the application area since 1995, or the vegetation is considered to provide suitable habitat

Table 9. Likelihood of occurrence of threatened flora species identified in the desktop assessment as being likely or possible. The data source and threat levels are described in the table footer.

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Brachyscome tatei	Nullarbor Daisy	R		1	2012	In scrub on top of limestone sea cliffs. Restricted to cliffs along the Great Australian Bight (eFloraSA, 2007)	Possible – recent records nearby however minimal suitable Nullarbor clifftop habitat ispresent in Project Area.
Leiocarpa pluriseta		R		1	2005	Principally found on calcareous sands of low coastal cliffs and adjacent dunes (eFloraSA, 2007). Little known species with few scattered records.	Possible - may be suitable habitat present, recent records nearby.
Maireana rohrlachii	Rohrlach's Bluebush	R		1	2015	Preferred habitat includes heavy soils (eFlora SA, 2007). In Victoria it is found on saline or sandy loam soils rich in gypsum, often fringing lakes and in seasonally wet	Possible-potentially suitable habitat at Pit 922, recent records nearby, but not observed during field survey.

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
						areas (Royal Botanic Gardens Victoria 2020)	
Microlepidium alatum		VU	V	2, 1	Species or species habitat likely to occur within area / 2008	Occurs along the Nullarbor, growing in sheltered sites in *Melaleuca lanceolata* open woodland over sheet limestone in moss beds (Botanic Gardens of SA, 2020a)	Possible – No preferred habitat (*M. lanceolata* moss beds) identified in Project Area, despite recent, nearby records. Not observed on survey, though small, annual and inconspicuous.
Microlepidium pilosulum	Hairy Shepherd's-purse	R		1	2009	Grows in coastal dunes and salt lake margins (Botanic Gardens of SA, 2020b)	Possible - No salt lake identified in Project Area, minimal dune habitat. Recent, nearby records. Not observed on survey, though small and inconspicuous.
Phlegmatospermum eremaeum	Spreading Cress	R		1	2011	Annual herb grows in semi-arid regions. Known from the Lake Eyre, Nullabor, Eyre Peninsula, Northern Lofty, Murraylands and Yorke Peninsula herbarium regions of SA (eFlora SA, 2007)	Likely - may be suitable habitat present, limited scattered records nearby. Not observed on survey, though small, annual and inconspicuous.
Phlegmatospermum richardsii	Nullarbor Cress	V		1	2009	Grows in run-off areas around calcrete. Associated with *Carrichtera annua*, *Atriplex vesicaria, Oxalis sp., Tetragonia sp., Sisymbrium sp.* Also found in *Eucalyptus calcareana* Open scrub over scattered *Eremophila glabra*, *Rhagodia crassifolia, E. weldii* and	Likely - may be suitable habitat present, limited scattered records nearby. Not observed on survey, though small, annual and inconspicuous.

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
						extensive leaf litter, with patches of *Atriplex vesicaria, Westringia rigida* and *Geijera linearifolia* open areas.	
Poa drummondiana	Knotted Poa	R		1	2009	Across southern mainland Australia Dunes and margins of clay-pans in Mallee-scrub and low woodland (AusGrass2, 2010).	Likely – potentially suitable habitat present, limited scattered records nearby. Not observed on survey, though small, annual and inconspicuous.
Podolepis jaceoides	Showy Copper-wire Daisy	R		1	2005	Occurs in grassland, woodland and Mallee, typically on heavy clay floodplains or sandhills (PlantNet, 2021)	Likely - suitable habitat present, recent records nearby. Not observed on survey, though small, annual and inconspicuous.
Pomaderris forrestiana		R		1	2012	Recorded growing on a cliff and on shallow loam on limestone. SA: NU. Also from WA. (eFloraSA)	Possible- suitable habitat present, recent records nearby WA border. Small shrub, not observed on field survey in Project Area.
Ptilotus symonii		R		1	2001	In WA, found in sandy soils on limestone plains, floodplains and low rocky rises (Western Australian Herbarium, 1998-)	Likely - suitable habitat present, recent records in western extent of Project Area. Not observed during survey, but small and inconspicuous species.
Tecticornia flabelliformis	Bead Samphire	VU	V	1,2	Species or species habitat may	Often grows in low lying areas on the margins of salt lakes and coastal salt marshes over gypsum	Possible - potentially suitable associated habitat present

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
					occur within area / 2005	deposits and is associated with other Tecticornia species and salt tolerant vegetation communities. In SA there is little information on habitat associations but has been reported to occur in samphire shrubland and low lying, irregularly inundated areas (Carter, 2010).	However, there are known previous known records so far west in SA, with the closest record at Fowlers Bay, and further east.
Source; 1- BDBSA, 2 - Protected matters search tool (PMST), 3 – others NP&W Act; E= Endangered, V = Vulnerable, R= Rare EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable							

Microlepidium alatum is a small (<20cm) annual herb which is recognised as Vulnerable at Regional, State and National Levels. On the Eyre Peninsula, the species extent of occurrence is approximately 73000km^2 growing between the Nullarbor Regional Reserve and Wudinna. The little-known species is also known to be present in WA and possibly Victoria, with records from known from herbarium collections. Its habitat requirements are poorly known but has been found to grow in association with moss beds, and in semi-arid habitats in *Melaleuca lanceolata* open woodland with mixed *Chenopod* and *Eremophila* shrubland. In proximity to the Project Area, the nearest known population is at Fowlers Bay Conservation Park, with scattered historical records to the east and west (Pobke, 2007). As a small and inconspicuous species, it is vulnerable to unintended disturbance including by vegetation clearance and roadside management. Given all areas proposed for clearance are within previously disturbed sites, and no preferred moss-bed habitat was identified within the Project Area, it is considered unlikely that this species would occur.

Tecticornia flabelliformis (Bead Glasswort) is a small woody perennial samphire species, which is recognised as Vulnerable at the Regional, State and National levels. It is known from WA, SA, and Victoria, with the majority of known sub-populations in South Australia, and an extent of occurrence over 22000km^2. The most westerly known population in SA is at Fowlers Bay, which is in the far eastern extent of the Project Area, and not within proximity of the road (Pobke, 2007). Though listed as possible due to the likelihood assessment criteria, it is considered unlikely that this species occurs within the Project Area due to the exiting known information about its range and extent. Two Pits (928 and 922) recorded samphire species which were unable to be identified at the time due to lack of fruiting bodies (generally present January to May), however these were in the western extent of the Project Area near the WA border.

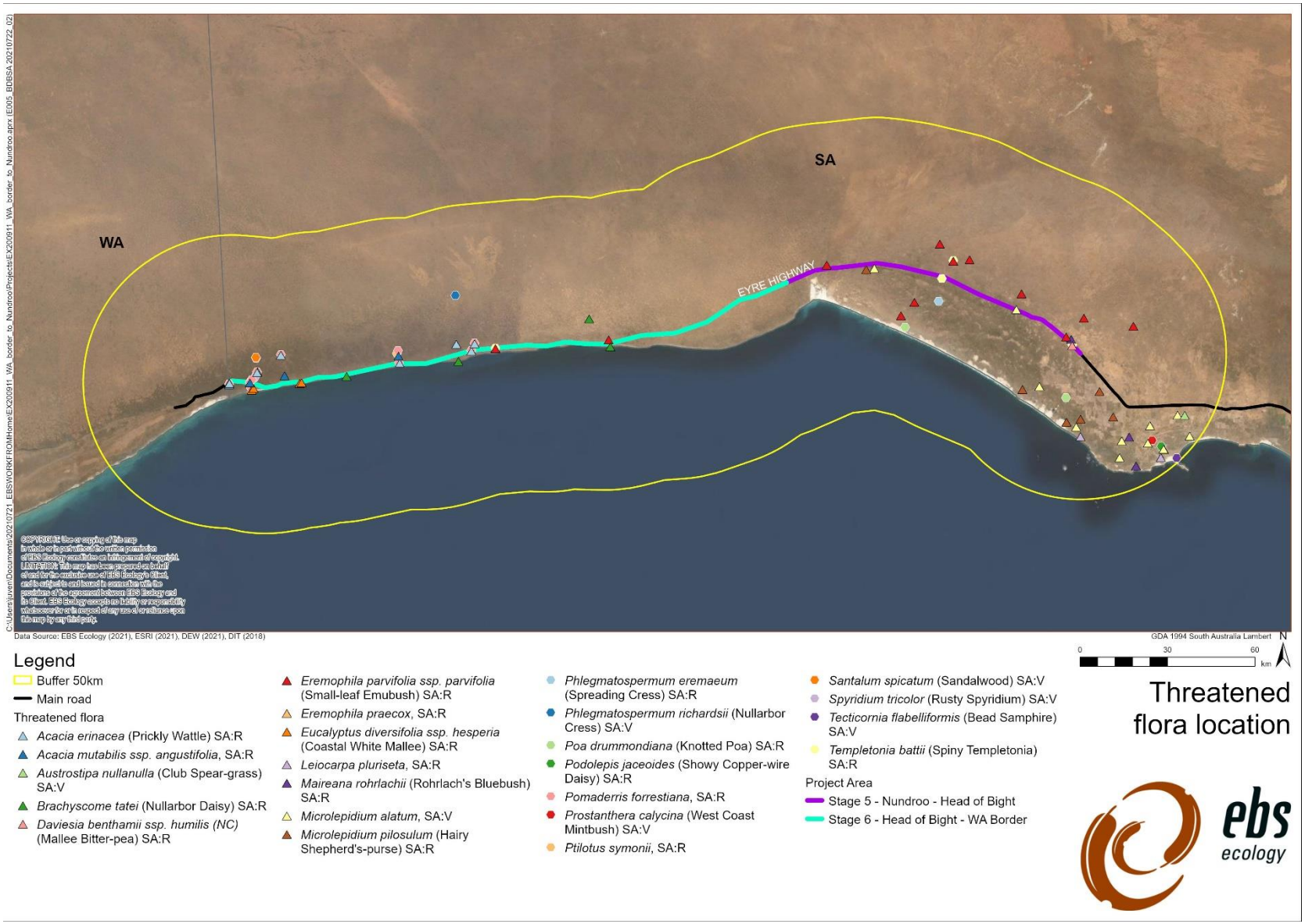


Figure 14. Threatened flora records <20 years old within 50 km of Project Area, <1km reliability.

4.2.2. Threatened fauna

No fauna species listed as threatened under the EPBC Act were recorded during this survey. One fauna species listed as Rare under the NPW Act was recorded during the survey: two individual Major Mitchells Cockatoos (*Lophochroa leadbeateri*) were recorded flying over RAM K1-PU (Bore-hole site 5.1), and two other individual Major Mitchells Cockatoos were recorded resting on a tree, and then flying off just outside RAM M1-PL (Pit MM 256.6). All fauna species recorded during the survey are listed in Appendix 6, and consisted of seventeen bird species, one mammal (the introduced European Rabbit), and two reptiles.

Forty-four (44) fauna species listed as threatened under the NPW Act or EPBC Act have been recorded within 50 km of the Project Area since 1995, excluding marine species such as whales and albatrosses, as the Project Area is strictly terrestrial. This consists of 38 birds, one mammal and five reptiles. Of these, 21 birds and five reptiles have been assessed as likely or possible to occur in the Project Area based on available habitat, and survey results (Table 10).

Two EPBC listed species were determined to be possibly occurring within the Project Area - The Malleefowl (*Leipoa ocellata;* Vulnerable) and Plains-wanderer (*Pedionomus torquatus*; Critically Endangered). The Project Area spans a significant distance within which the vegetation associations vary greatly, and as such not all of the Project Area is likely to be considered suitable habitat for these species. These species and the possible impacts are discussed in detail following the likelihood assessment table. A full likelihood assessment table, including species listed as unlikely, is presented in Appendix 9.

Table 10. Likelihood of occurrence of threatened fauna species identified as likely or possible in the desktop assessment. The data source and threat levels are described in the table footer.

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Aves	**Birds**						
Acanthiza iredalei iredalei	Slender-billed Thornbill (western)	R		1	2012	Usually occurs in sclerophyll heathland and chenopod shrublands that are dominated by samphire, *Maireana* and *Atriplex* (TSSC, 2013)	Likely - suitable habitat present, recent records nearby Project Area.
Ardeotis australis	Australian Bustard	V		1	2012	Bird of open plains usually in grassland, spinifex, arid scrub with saltbush and bluebush, open dry woodland or mulga and mallee heath (Morcombe 2011)	Likely - suitable habitat present, recent records scattered throughout Project Area.
Corcorax melanorhamphos	White-winged Chough	R		1	2007	White-winged Choughs are found in open forests, mallee, mulga,	Possible - suitable habitat present, recent records nearby in eastern

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
						cypress and woodlands, where they forage on the ground in leaf litter (Morecombe 2021). The Eyre Peninsula is the western extent of their range.	extent of Project Area. Most westerly extent of population, more common to the east.
Falco peregrinus macropus	Peregrine Falcon	R		1	2012	This species prefers open habitats such as grasslands, tundra and meadows and nests on cliff faces and in crevices. It has an extremely large range and is found world-wide except for rainforests and cold, dry Arctic regions. This species has increasingly been observed inhabiting urban areas. (White et al., 2020)	Likely - suitable habitat present, recent records nearby.
Falco subniger	Black Falcon	R		1	2012	This species is found along tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas (BirdLife Australia, ND).	Possible - may be suitable habitat present, recent records nearby.

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Haliaeetus leucogaster	White-bellied Sea Eagle	E		1	2012	Found in coastal habitats (especially those close to the sea-shore), around terrestrial wetlands, inland rivers in tropical and temperate regions of mainland Australia and its offshore islands. (DAWE, 2021b) Nests on cliff edge or tall tree close to river or coast (Morcombe 2011)	Possible – two scattered records within 50km of Project Area. Suitable cliff habitat nearby Project Area. May be present as flyover only.
Hieraaetus morphnoides	Little Eagle	V		1	2007	The Little Eagle is widespread over diverse habitats in mainland Australia, central and eastern New Guinea. It is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest (BirdLife Australia, ND).	Likely - suitable habitat present, recent records nearby.
Hylacola cauta cauta	Shy Heathwren (EP, YP, FR, MM, upper SE)	R		1	2012	Prefers dense shrubby or heath understorey in Mallee woodland, Mallee shrubland or Mallee heath in coastal and semi-arid regions, often where spinifex (Triodia) occurs and with dense shrubs such as Banksia, Hakea and Grevillea, also tea-tree (Leptospermum) and cypress pine	Likely - suitable habitat present, recent records nearby.

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
						(Callitris) (Gregory, 2020).	
Leipoa ocellata	Malleefowl	V	VU	2	Known	Occupies shrublands and low woodlands that are dominated by Mallee vegetation in semi-arid regions of South Australia (DAWE, 2021b)	Possible - suitable habitat present, historical records nearby, more recent records further north of Project Area.
Lichenostomus cratitius occidentalis	Purple-gaped Honeyeater (mainland SA)	R		1	2012	Occurs in fragmented areas in Mallee from south and central WA to central Vic (Clements 2007). Mallee, open woodland, heath (Morcombe 2011)	Likely – some suitable habitat present, recent records nearby.
Lichmera indistincta indistincta	Brown Honeyeater	R		1	2012	This species inhabits a wide range of wooded habitats, usually near water. Forest, woodland, heath, mulga, arid scrub, watercourse trees, mangroves and gardens (Morcombe 2011). Considered rare in SA due to its distribution. Common / secure in NSW, NT, QLD, WA.	Possible - suitable habitat, nearby records in western extent of Project Area.
Lophochroa leadbeateri mollis	Major Mitchell's Cockatoo (NW, EP)	Ssp. R		1, 3	2012 / 2021 (seen)	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	Known - suitable habitat present, recent records nearby, seen during field survey.

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
						in (BirdLife Australia, ND).	
Lophoictinia isura	Square-tailed Kite	E		1	2007	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. (NSW Government Environment and Heritage 2014)	Possible - suitable habitat present, scattered records nearby, however Project Area is considered out of typical range for this species (Morcombe 2011).
Myiagra inquieta	Restless Flycatcher	R		1	2012	Found throughout northern and eastern mainland Australia, as well as in south-western Australia. The Restless Flycatcher is found in open forests and woodlands and is frequently seen in farmland (Birds in Backyards, ND).	Likely - suitable habitat present, recent records nearby.
Neophema splendida	Scarlet-chested Parrot	R		1	2007	The species occurs in the Mallee or mulga woodland of southern semi-arid inland Australia (Birdlife Australia, ND).	Likely - suitable habitat present, recent records nearby.
Northiella narethae	Naretha (Western) Bluebonnet	R		1	2012	Open country: lightly timbered grassland, mulga, mallee, sheoak, watercourses and paddock trees (Morcombe 2011).	Likely - suitable habitat present, recent records nearby.

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Pachycephala inornata	Gilbert's Whistler	R		1	2017	Sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, from the western slopes of NSW to the Western Australian wheatbelt (Environment and Heritage 2014). Habitat is shrubby woodland and Mallee (Simpson and Day 1999, p. 227).	Likely - suitable habitat present, recent records nearby.
Pandion haliaetus cristatus	Eastern Osprey	R		1	2005	Eastern Osprey occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands (DAWE, 2021b). Known to follow large rivers far inland including to arid regions. Uses nesting locations with high coastal views including cliffs and rock stacks (Morcombe 2011)	Possible – scattered records nearby Project Area. May be present as flyover only, near coastal cliffs.
Pedionomus torquatus	Plains-wanderer	E	CR	1	2012	The Plains-wanderer occurs at scattered sites in NSW and Victoria and more marginal habitat in QLD and SA. Inhabits sparse, treeless, lowland native grasslands with approximately 50% bare ground, most vegetation less than 5 cm in height, with some	Possible – the Laura Bay Pit (P1) is the only site with suitable habitat and occurs in an area marked in the National Recovery Plan (NRP) (DotE 2016) as an area where species 'may occur'. This site was assessed as BAM and species

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
						widely spaced plants up to 30 cm high (DAWE, 2021b)	not recorded within 5 km. Single record further west, however habitat not suitable in Project Area, and not considered possible or likely habitat in NRP.
Strepera versicolor ssp. plumbea	Grey Currawong	ssp		1	2012	Inhabits a wide range of habitats from the coast to the semi-desert, including forests, woodlands, Mallee, coastal and other heaths. Also found in remnant vegetation on roadsides and farms, in orchards, and in suburban areas (Birds in Backyards ND). NPW Act listed Endangered subspecies is *Strepera versicolor ssp. plumbea plumbea* (western subspecies.	Likely - suitable habitat present, recent records nearby, but not identified to threatened subspecies. Range is likely to be considered threatened ssp.
Turnix varius varius	Painted Buttonquail	R		1	2012	Open forest and woodland, banksia woodland, mulga and brigalow mallee. Prefers stony ridges with abundant leaf litter and sparse grass (Morcombe 2011)	Possible – may be suitable habitat present, single record near WA border, others further east.
Reptilia	**Reptiles**						
Ctenophorus maculatus	Nullarbor Spotted Sand Dragon	R		1	2012	Lives among shrubs and hummock grass (The Reptile Database, ND).	Likely - suitable habitat present, recent records nearby.

Species (scientific name)	Species (common name)	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Ctenophorus mckenziei	McKenzie's Dragon	R		1	2012	Lives among shrubs and hummock grass (The Reptile Database, ND).	Likely - suitable habitat present, recent records nearby.
Lerista baynesi	Speckled Slider	R		1	2012	A fossorial species that has been observed in grassland, shrubland and woodland habitats (Porter, 2019)	Likely - suitable habitat present, recent records nearby.
Morelia spilota	Carpet Python	R		1	2016	Prefers riparian vegetation groups, and dry sclerophyll forest with ground cover and logs. Lives in hollows of large River Red Gums and north-facing cliffs along the Murray River (DAWE, 2021b).	Possible – no preferred habitat in Project Area. Scattered recent records nearby.
Varanus rosenbergi	Heath Goanna	V		1	2012	Open woodlands and heaths on sandy soil from southwest WA to western Victoria. Utilises termite mounts for egg laying and food resource (Wilson and Swan 2013)	Possible - suitable habitat may be present, but unlikely to be preferred. Two isolated records nearby, however majority of records further to east of SA.

Source; 1- BDBSA, 2 - Protected matters search tool, 3 – others
NP&W Act; E= Endangered, V = Vulnerable, R= Rare
EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable

Malleefowl (*Leiopoa ocellata*) are listed as Vulnerable under National and State legislation and within SA, occur throughout the arid and semi-arid mallee scrub regions, dominated by mallee or acacias. A habitat suitability study in the Murray mallee of NSW, SA and Victoria found that sandy habitats containing *Triodia* were among the most preferred habitats, while chenopod mallee (typically on heavy soil) and heath were least preferred. Breeding habitat requires sandy soil and an abundance of leaf litter to build large incubator mounds, and higher rainfall areas are thought to contribute more abundant and varied food resources (Benshemesh 2007). Habitat contained within the Project Area is not considered to be preferred habitat for the Malleefowl. Two sites have acacia / mallee shrubland which may be considered suitable, however neither of these sites is associated with *Triodia*, and both are on non-sandy

substrates with limited litter available for nest building. As such, clearance in these areas is considered unlikely to cause a significant impact on Malleefowl if they were present within the area.

Plains-wanderer (*Pedionomus torquatus)* are listed as Critically Endangered under National legislation and Endangered under the NPW Act. South Australia is considered marginal habitat for Plains-wanderers, and across their range they inhabit sparse, treeless native grasslands on hard red-brown clay soils. The National Recovery Plan (NRP) for the Plains-wanderer specifies that habitat critical to their survival includes *any regions where a species is likely to occur*, and *any newly discovered locations which extend the range of the species* (DotE, 2016). Only one site within the Project Area is considered to have potentially suitable habitat, the Laura Bay Pit (MM500.5). Within the NRP this area is marked as an area where the species '*may occur',* however it is not within the known current distribution of the Plains-wanderer and for this reason, it is considered unlikely that clearance in this location would have a significant impact on this species.

All other NPW Act listed species considered likely or possibly occurring within the Project Area are highly mobile bird or reptile species which are unlikely to be significantly impacted by construction works, particularly given the already degraded, previously disturbed nature of most of these sites. Several listed species with records in the vicinity of the Project Area are considered outside of their typical range and its likely they would only be present following nomadic behaviour in response to atypical seasonal conditions. If possible, it is recommended that any clearance occurs outside of the typical breeding season (spring) of bird species, to minimise likelihood of disturbance to these species should they be utilising an area for nesting.

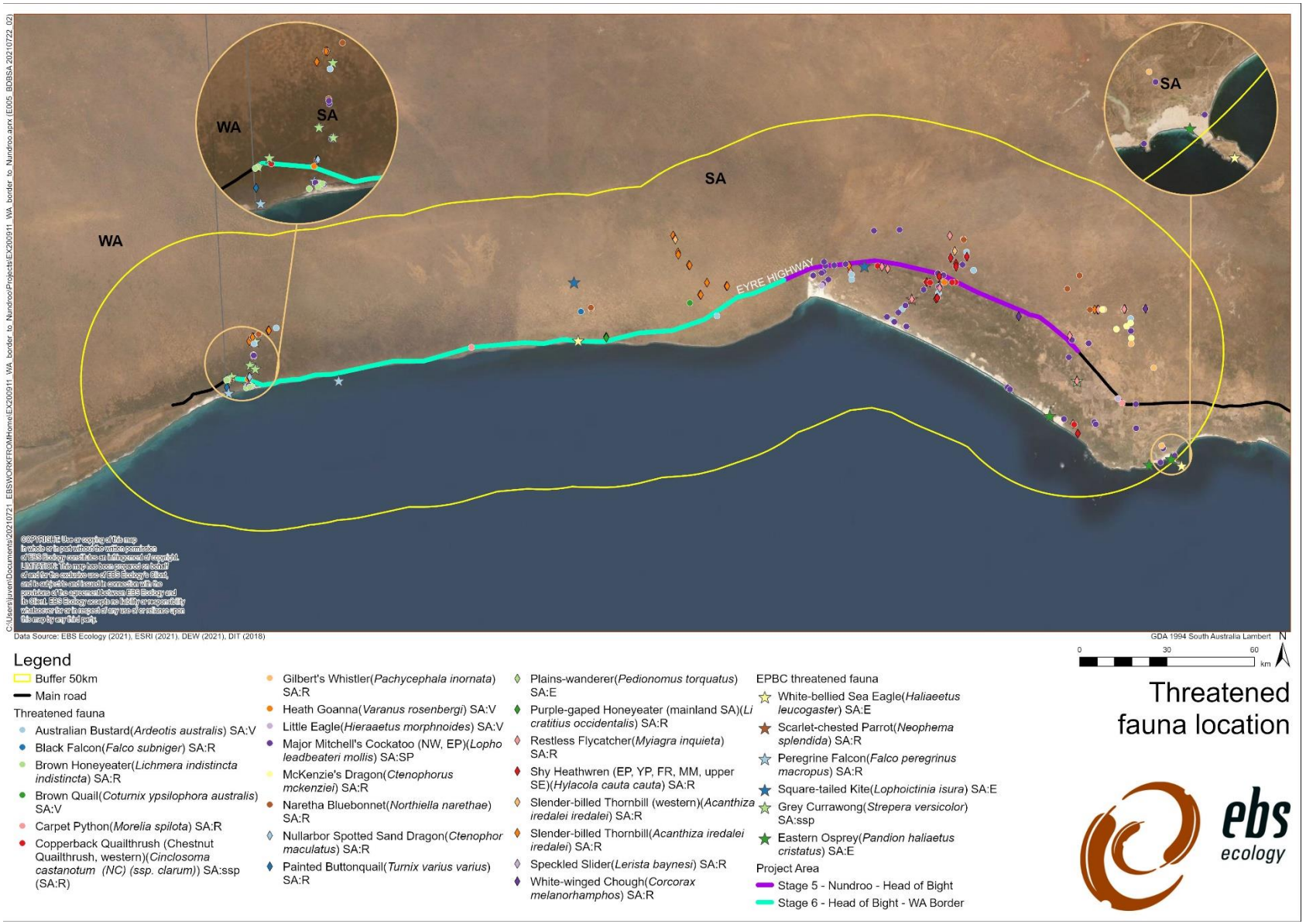


Figure 15. Threatened fauna records <20 years old within 50 km of Project Area, <1km reliability.

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 bulk of direct impact from the Project is clearance of vegetation from eleven proposed borrow pits and two of the twelve proposed bore hole sites. This adds up to a maximum clearance of 24.47 ha of native vegetation.

Up to twenty-three stack sites will also be utilised as part of construction works, however any native vegetation that has regenerated at sites is less than 20 years old and therefore not subject to the NV Act.

Potential indirect and cumulative impacts of the Project include:

- Vegetation trimming of vehicle access tracks to proposed pits and bore sites that are offset from the Eyre Highway;
- Weed spread and infestation during clearance and/or construction, which may impact the condition or health of surrounding vegetation;
- Dust generation during clearance and/or construction, which may impact the condition or health of surrounding vegetation; and
- Noise generation during clearance and/or construction, which may impact fauna species in the area.

Strict hygiene practices should be implemented to avoid weed spread along the road, with particular focus of avoiding weed spread from stack sites which were subject to a high level of invasion; and where specific infestations have been identified.

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

DIT is constrained by the location of the road corridor, existing sites and land ownership and is therefore limited in its ability to avoid clearance for road upgrades. Due to the remoteness of the location all material and water for the construction will be sourced locally.

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:

- There are multiple (either two or three) proposed bore site areas that have been assessed for each eventual bore site, and DIT will make a choice of which site to place the bore holes, considering the vegetation and its condition within each site.
- Impacts assessed as part of this report represent a 'worst case scenario' and only a portion of these impacts are likely to be realised. Actual clearance will be recorded and reconciled following construction.
- Multiple borrow pit sites have been assessed as part of this report to enable testing of material for use in the project, however half are unlikely to be used. Preferred sites are indicated in Table 8.
- Existing stack sites will be used as laydown areas, site office areas, parking for vehicles and machinery and vehicle turn around areas.
- 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* (Department of Planning, Transport and infrastructure, 2015). This policy requires all vegetation clearing to be undertaken in accordance with the DIT Environmental Management System.

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.

It is most likely that DIT will look to keep all clearances open as assets, depending on future need for road maintenance, therefore there are no plans to rehabilitate the Project Area at this stage. However, there is potential for some borrow pits to be rehabilitated in the future.

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.

The proposed offset for impact to vegetation as a result 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*.

Table 11. 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	One NPW Act listed species was recorded during the field survey (Major Mitchells Cockatoo; *Lophochroa leadbeateri mollis*). No EPBC Act listed threatened species were recorded. Additional threatened species that may occur throughout the Mallee, shrublands and grasslands within the Project Area are (based on previous records within 50 km of RAM sites and 5 km of BAM sites): • Slender-billed Thornbill (western; *Acanthiza iredalei iredalei*) • Australian Bustard (*Ardeotis australis*) • Chestnut Quailthrush (eastern; *Cinclosoma castanotus castanotus*) (Likely reclassified to *Cinclosoma clarum)* • Shy Heathwren (*Hylacola cauta cauta*) • Malleefowl (*Leipoa ocellata*) • Nullarbor Spotted Sand Dragon (*Ctenophorus maculatus*) • McKenzie's Dragon (*Ctenophorus mckenziei*) • White-winged Chough (*Corcorax melanorhamphos*) • Black Falcon (*Falco subniger*) • Shy Heathwren (*Hylacola cauta cauta*) • Malleefowl (*Leipoa ocellata*) • Purple-gaped Honeyeater (*Lichenostomus cratitius occidentalis*) • Brown Honeyeater (*Lichmera indistincta indistincta*)	<u>Seriously at Variance</u> All RAM Vegetation Associations are Seriously at Variance with Principle 1(b).	As per the Rangelands Assessment Manual, all species recorded within 50 km of the Project Area in the past 20 years, with a location reliability of <1km have been included in the scoresheets. Many of these species are considered marine, wetland or aquatic species, or otherwise unlikely to occur due to lack of suitable habitat and therefore should be considered for removal from the scoresheet, using the likelihood assessment (Appendix 9) as a guide. Several moderating factors may be considered by the NVC: <u>*Impact significance*</u> Most areas proposed for clearance are placed over previously cleared / degraded areas of land, and therefore the reduction in habitat for the species are likely to be minimal. Most threatened species that may utilise habitat within the Project Area (including the one species that was observed) are highly mobile (birds and reptiles) and, if present when construction works begin, will likely readily move into habitat adjacent to the proposed clearance areas.

	• Square-tailed Kite (*Lophoictinia isura*) • Restless Flycatcher (*Myiagra inquieta*) • Scarlet-chested Parrot (*Neophema splendida*) • Naretha Bluebonnet (*Northiella narethae*) • Gilbert's Whistler (*Pachycephala inornata*) • Painted Buttonquail (*Turnix varius varius*) • Carpet Python (*Morelia spilota*) • Brown Quail (*Coturnix ypsilophora australis*) • Peregrine Falcon (*Falco peregrinus macropus*) • Plains-wanderer (*Pedionomus torquatus*) • White-bellied Sea Eagle (*Haliaeetus leucogaster*) • Little Eagle (*Hieraaetus morphnoides*) • Eastern Osprey (*Pandion haliaetus cristatus*) • Grey Currawong (*Strepera versicolor ssp. plumbea*) • Speckled Slider (*Lerista baynesi*) • Heath Goanna (*Varanus rosenbergi*) Patches; Threatened Fauna Score = 0.1 Unit biodiversity Score varies between 34.8 and 90.7 for RAM assessments. Unit biodiversity Score for the two BAM assessments are 18.13 and 20.7.		<u>*Non-essential habitat*</u> No known strongholds or listed critical habitat of EPBC listed species are within the Project Area. Likewise, all NPW Act listed species are likely to casually utilise some of the Project Area, but do not necessarily rely on it for breeding.

Principle 1(c) – plants of a rare, vulnerable or endangered species	No listed threatened species were recorded within the Project Area. Threatened species that may be present but undetectable at the time of assessment include: • *Austrostipa nullanulla* (no *Austrostipa sp.* plants were in seed and able to be identified to species level, however due to habitat requirements it is considered unlikely that this species occurs within the Project Area despite records within 50 km) • *Microlepidium alatum* (small annual species which would be easily missed even if present) • *Tecticornia flabelliformis* (no seeds were able to be collected from *Tecticornia* specimens to identify to species level) Threatened Flora Score(s): 0 for BAMs 0.2 for RAMs	<u>Seriously at Variance</u> All RAMs <u>At Variance</u> – None	All threatened plant species identified by the BDBSA database search to have been recorded within 50 km of the Project Area since 1995 with <1km reliability, and all "known" species identified by the PMST within 50 km of the Project Area have been included on the RAM datasheets as per Rangelands Assessment Manual (July 2017). The inclusion of these species should be reviewed, taking into consideration the likelihood assessment in Appendix 9. No threatened species were recorded within the Project Area itself, however at least three species (listed left) were likely to be undetectable at the time of assessment. These species, though listed as possible, are considered unlikely to occur within the Project Area due to the previously disturbed nature of the sites and known information about their niche and / or distribution.
Principle 1(d) – the vegetation comprises the whole or part of a plant community that is Rare, Vulnerable or endangered	No threatened communities under the EPBC Act or threatened ecosystems under the DEW Provisional list of threatened ecosystems are present within the Project Area. Threatened Community Score = 1 for all sites	<u>Seriously at Variance</u> None.	

4.6. Risk assessment

The level of risk associated with the application

Table 12. Summary of the level of risk associated with the application.

Total clearance	No. of trees	0
	Area (ha)	24.47 ha
	Total biodiversity Score	Total: 1365.17

		Comprised of: RAM: 1192.80 BAM: 109.31
Seriously at variance with principle 1(b), 1(c) or 1 (d)		B – Wildlife habitat C – Rare plant species
Risk assessment outcome		**Level 4** (BAM assessments, if considered separately, come in at **Level 3**)

5. Clearance summary

Clearance Area(s) Summary table (No loadings or reductions applicable)

Block	Site	Species diversity score	Threatened Ecological community Score	Threatened plant score	Threatened fauna score	UBS	Area (ha)	Total Biodiversity score	Loss factor	Economies of Scale	Mean annual rainfall	SEB Points required	SEB payment	Admin Fee
B	1	N/A	1	0.2	0.1	73.9	2.2	159.51	1	0.11	279	167.48	$13,559.36	$745.76
D	1	N/A	1	0.2	0.1	71.1	2.8	198.35	1	0.5	275	208.26	$75,542.23	$4,154.82
E	2	N/A	1	0.2	0.1	72.3	1.7	125.02	1	0.5	271	131.27	$46,923.40	$2,580.79
F	1	N/A	1	0.2	0.1	75.3	0.6	43.66	1	0.11	263	45.84	$3,498.40	$192.41
G	1	N/A	1	0.2	0.1	69.9	5.2	366.09	1	0.11	261	384.39	$29,112.51	$1,601.19
H	1	N/A	1	0.2	0.1	70.9	1.1	75.2	1	0.11	257	78.96	$5,888.34	$323.86
K	1	N/A	1	0.2	0.1	73.1	0.5	33.61	1	0.11	237	35.29	$2,426.72	$133.47
K	2	N/A	1	0.2	0.1	73.1	0.8	54.82	1	0.11	241	57.56	$4,025.70	$221.41
M	1	N/A	1	0.2	0.1	90.7	0.8	68.05	1	0.11	254	71.45	$5,266.63	$289.66
M	2	N/A	1	0.2	0.1	70.4	0.3	17.6	1	0.11	254	18.48	$1,361.98	$74.91
N	1	N/A	1	0.2	0.1	37.5	3.0	113.95	1	0.11	278	119.65	$9,652.34	$530.88
O	1	12	1	0	0	18.1	3.1	55.49	1	0.11	295	58.26	$4,987.25	$274.30
P	1	12	1	0	0	20.7	2.6	53.82	1	0.29	286	56.51	$12,363.97	$680.02
						Total	**18.81**	**1365.17**				**1433.4**	**$214,608.83**	**$11,083.48**

Totals summary table

	Total Biodiversity score	Total SEB points required	SEB Payment	Admin Fee (RAM & BAM)	Total Payment
Application	1365.17	1433.4	$214,608.83	$11,083.48	$225,629.31

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

If a proponent proposes to achieve the SEB by paying into the Native Vegetation Fund, summary information must be provided on the amount required to be paid and the manner of payment:

DIT has proposed to pay the total SEB amount shown in Table 28 and Table 29 of $225,692.31 into the Native Vegetation Fund. This is made up of $17,351.22 plus admin fee of $954.32 for native vegetation assessed under BAM; and $197,257.61, plus admin fee of $10,849.16 for clearance of native vegetation assessed under RAM. Vegetation clearance is likely to equate to only a portion of the impacts under application. Actual clearance impacts will be recorded and reconciled at the conclusion of clearance, with SEB payment to be as per the actual clearance undertaken.

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8. Appendices

Appendix 1. Bushland Assessment Scoresheets associated with the proposed clearance and SEB Area (attached in Excel format)

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

Appendix 3. Scattered Tree Vegetation Assessment Scoresheets associated with the proposed clearance and SEB Area (attached in Excel format) (no longer required as guardrail installation no longer within the scope of the project).

Appendix 4. Scattered Tree Photofile (Attached in word format) (no longer required as guardrail installation no longer within the scope of the project).

Appendix 5: Photos taken approximately every 10 km along the Eyre Highway

Figure 16. MM10

Figure 17. MM20

Figure 18. MM30

Figure 19. MM40

Figure 20. MM50

Figure 21. MM60

Figure 22. MM70

Figure 23. MM80

Figure 24. MM90

Figure 25. MM100

Figure 26. MM110

Figure 27. MM120

Figure 28. MM130

Figure 29. MM140

Figure 30. MM150

Figure 31. MM160

Figure 32. MM170

Figure 33. MM180

Figure 34. MM190

Figure 35. MM200

Figure 36. MM214

Figure 37. MM220

Figure 38. MM230

Figure 39. MM240

Figure 40. MM250

Figure 41. MM260

Figure 42. MM270

Figure 43. MM280

Figure 44. MM290

Figure 45. MM300

Figure 46. MM323

Appendix 6: All fauna species recorded during the field survey.

*	Scientific name	Common name	Conservation status	
			Aus	SA
	Aves	**Birds**		
	Acanthagenys rufogularis	Spiny-cheeked Honeyeater		
	Anthochaera carunculata	Red Wattlebird		
	Anthus australis	Australian Pipit		
	Barnardius zonarius	Australian Ringneck		
	Colluricincla harmonica	Grey Shrikethrush		
	Coracina novaehollandiae	Black-faced Cuckooshrike		
	Corvus mellori	Little Raven		
	Cracticus torquatus leucopterus	Grey Butcherbird		
	Eolophus roseicapilla	Galah		
	Gavicalis virescens	Singing Honeyeater		
	Gymnorhina tibicen	Australian Magpie		
	Lophochroa leadbeateri mollis	Major Mitchell's Cockatoo (NW, EP)		R
	Manorina flavigula	Yellow-throated Miner		
	Ocyphaps lophotes	Crested Pigeon		
	Pardalotus striatus	Striated Pardalote		
	Ptilotula plumula	Grey-fronted Honeyeater		
	Rhipidura leucophrys leucophrys	Willie Wagtail		
	Mammalia	**Mammals**		
*	*Oryctolagus cuniculus*	Rabbit (European Rabbit)		
	Reptilia	**Retptiles**		
	Ctenophorus cristatus	Crested Dragon		
	Tiliqua rugosa	Sleepy Lizard		

Aus: Australia (*Environment Protection and Biodiversity Conservation Act 1999*). SA: South Australia (*National Parks and Wildlife Act 1972*). Conservation codes: CE: Critically Endangered. EN/E: Endangered. VU/V: Vulnerable. R: Rare. *: Introduced.

Appendix 7: Scattered Tree Vegetation Assessment Summary (removal no longer required as guardrail installation no longer within scope of project)

Tree #	Tree spp.	No. of trees	Height (m)	Hollows	Diameter (cm)	Canopy dieback (%)	Biodiversity Score	General comments
1	*Eucalyptus gracilis*	1	5.5	0	27	10	0.51	A short, sprawling Mallee in good health with some branches growing horizontally into the Project Area. Will likely require pruning.
2	*Eucalyptus gracilis*	1	6.0	0	33	20	0.59	A multi-stemmed Mallee in good health, with some branches growing horizontally into the Project Area. Will likely require pruning.
3	*Eucalyptus gracilis*	1	6.0	0	25	10	0.53	This tree is outside the Project Area and will not be impacted.
4	*Eucalyptus gracilis*	1	8.0	1 small, 3 medium, 1 large	75	5	4.61	An older multi-stemmed Mallee in good health, with some branches overhanging into the Project Area. This tree contains five hollows of varying sizes and has high habitat value. Will likely require pruning, and its root zone may be impacted by works.
5	*Eucalyptus gracilis*	1	3.0	0	8	5	0.16	A young multi-stemmed Mallee within 8.5 m of road centre and therefore within the Project footprint – may require removal.
6	*Eucalyptus gracilis*	1	6.0	0	30	10	0.60	A multi-stemmed Mallee in good health, with some branches overhanging into the Project Area. Will likely require pruning, and its root zone may be impacted by works.
7	*Eucalyptus gracilis*	1	6.0	0	42	5	1.20	A mid-sized Mallee in good health, with some branches overhanging into the Project Area. Will likely require pruning, and its root zone may be impacted by works.
8	*Eucalyptus gracilis*	1	5.0	0	32	5	0.56	A multi-stemmed Mallee in good health, with some branches overhanging into the Project Area. Will likely require pruning, and its root

Tree #	Tree spp.	No. of trees	Height (m)	Hollows	Diameter (cm)	Canopy dieback (%)	Biodiversity Score	General comments
								zone may be impacted by works.
9	*Eucalyptus gracilis*	1	4.0	0	20	5	0.34	A multi-stemmed Mallee in good health growing on the batter slope. This tree may require removal. Otherwise, there will likely be impact on its root zone.
10	*Eucalyptus gracilis*	1	4.0	0	18	15	0.29	A multi-stemmed Mallee in good health growing on the batter slope. This tree may require removal. Otherwise, there will likely be impact on its root zone.
11	*Eucalyptus gracilis*	1	4.5	0	18	5	0.35	A multi-stemmed Mallee in good health growing on the batter slope. This tree may require removal. Otherwise, there will likely be impact on its root zone.
12	*Eucalyptus gracilis*	1	2.0	0	3	0	0.11	A young Mallee in good health growing on the batter slope. This tree may require removal. Otherwise, there will likely be impact on its root zone.
13	*Eucalyptus gracilis*	1	3.0	0	12	10	0.17	A young Mallee growing at the base of the batter slope. This tree may require removal. Otherwise, there may be impact on its root zone.
14	*Eucalyptus calcareana*	1	6.0	0	28	0	0.46	A mid-sized Mallee in good health, with some branches overhanging into the Project Area.
15	*Eucalyptus calcareana*	1	5.5	0	27	10	0.38	A Mallee in good health growing on the batter slope. This tree may require removal. Otherwise, there will likely be impact on its root zone.
16	*Eucalyptus gracilis*	1	5.0	0	15	5	0.36	A Mallee in good health growing on the batter slope. This tree may require removal. Otherwise, there will likely be impact on its root zone.
17	*Eucalyptus gracilis*	1	4.5	0	20	5	0.37	A Mallee in good health growing on the batter slope. This tree may require removal.

Tree #	Tree spp.	No. of trees	Height (m)	Hollows	Diameter (cm)	Canopy dieback (%)	Biodiversity Score	General comments
								Otherwise, there will likely be impact on its root zone.
18	*Eucalyptus gracilis*	1	4.0	0	17	5	0.31	A Mallee in good health overhanging Project footprint. This tree may require removal. Otherwise, there will likely be impact on its root zone.
19	*Eucalyptus gracilis*	1	3.0	0	6	0	0.16	A small Mallee in good health overhanging Project footprint. This tree may require removal. Otherwise, there will likely be impact on its root zone.
20	*Eucalyptus gracilis*	7	4.0	0	11	5	1.55	These trees are outside the Project Area and will not be impacted.
21	*Eucalyptus gracilis*	1	5.0	0	23	10	0.42	This tree is outside the Project Area and will not be impacted.
22	*Myoporum platycarpum*	2	4.0	0	18	20	0.56	The root zone of this healthy tree may be impacted by construction works.
23	*Myoporum platycarpum*	1	2.5	0	10	0	0.17	The root zone of this healthy tree may be impacted by construction works.
24	*Eucalyptus gracilis*	1	3.0	0	11	25	0.13	A Mallee in good health growing on the batter slope. May require pruning, and its root zone may be impacted by works.
25	*Eucalyptus gracilis*	1	2.0	0	3	5	0.10	A young Mallee in good health growing on the batter slope. May require pruning, and its root zone may be impacted by works.
26	*Eucalyptus gracilis*	5	5.0	0	20	40	1.41	A Mallee in good health growing on the batter slope. May require pruning, and its root zone may be impacted by works.
27	*Eucalyptus calcareana*	1	5.0	0	22	10	0.31	A Mallee in good health right on the edge of the Project footprint. This tree may require removal. Otherwise, there will likely be impact on its root zone.

Tree #	Tree spp.	No. of trees	Height (m)	Hollows	Diameter (cm)	Canopy dieback (%)	Biodiversity Score	General comments
28	*Eucalyptus calcareana*	1	4.5	0	30	5	0.38	A sprawling Mallee with branches overhanging the Project footprint. This tree will likely require pruning, and its root zone will likely be impacted by works.
29	*Eucalyptus calcareana*	10	6.0	0	30	10	4.42	A group of healthy Mallee's on the edge of the Project footprint that may require removal or pruning. Root zones likely to be impacted by works.
30	*Pittosporum angustifolia*	1	4.0	0	11	20	0.13	A healthy tree on the edge of the Project footprint that may require removal or pruning. Root zone is likely to be impacted by works.
31	*Eucalyptus gracilis*	1	6.0	0	27	10	0.56	This tree is outside the Project Area and will not be impacted.
32	*Eucalyptus calcareana*	6	6.5	0	25	10	2.47	These trees are outside the Project Area and will not be impacted.
33	*Eucalyptus calcareana*	2	6.5	0	30	10	0.94	These trees are outside the Project Area and will not be impacted.
34	*Eucalyptus calcareana*	1	3.0	0	18	0	0.23	A single stem Mallee in very good health right on the edge of the Project footprint. This tree may require removal. Otherwise, there will likely be impact on its root zone.
35	*Eucalyptus calcareana*	1	4.0	0	21	5	0.28	A healthy Mallee with branches overhanging Project footprint. May require prune, possible root zone impact.
36	*Eucalyptus calcareana*	1	6.0	0	30	20	0.40	A healthy Mallee with branches overhanging Project footprint. Will likely require a prune, with possible root zone impact.
37	*Eucalyptus calcareana*	1	7.0	0	30	25	0.43	A healthy multi-stem Mallee with branches overhanging Project footprint. May require prune, possible root zone impact.

Tree #	Tree spp.	No. of trees	Height (m)	Hollows	Diameter (cm)	Canopy dieback (%)	Biodiversity Score	General comments
38	*Eucalyptus gracilis*	1	6.0	0	22	20	0.45	A healthy multi-stem Mallee with branches overhanging Project footprint. May require prune, possible root zone impact.
39	*Eucalyptus gracilis*	1	6.0	0	25	20	0.48	A healthy multi-stem Mallee with branches overhanging Project footprint. May require prune, possible root zone impact.
40	Mixed – *Eucalyptus gracilis* and *Eucalyptus calcareana*	9	6.0	0	30	20	4.91	A group of Mallee's in good health growing at the base of the batter slope. These trees will likely require pruning, and their root zones are likely to be impacted by works. (Biodiversity score assessed as *E. gracilis*)
41	*Eucalyptus gracilis*	1	5.0	0	20	20	0.35	A Mallee in good health growing at the base of the batter slope. This tree will likely require pruning, and its root zone is likely to be impacted by works.
42	*Eucalyptus gracilis*	3	3.0	0	17	5	0.76	A group of Mallee's in good health growing on the batter slope. These trees will likely require pruning, and their root zones are likely to be impacted by works.
43	*Myoporum platycarpum*	1	3.5	0	12	5	0.21	A healthy tree growing on the batter slope with branches overhanging the Project footprint. This tree will likely require pruning, and its root zone is likely to be impacted by works.
44	*Eucalyptus gracilis*	7	5.5	0	27	10	3.58	A group of Mallee's in good health growing on the batter slope. These trees will likely require pruning, and their root zones are likely to be impacted by works.
45	*Eucalyptus gracilis*	2	6.0	0	28	10	1.14	These trees are outside the Project Area and will not be impacted.
46	*Eucalyptus calcareana*	1	5.0	0	23	15	0.30	A Mallee in good health growing on the batter slope.

Tree #	Tree spp.	No. of trees	Height (m)	Hollows	Diameter (cm)	Canopy dieback (%)	Biodiversity Score	General comments
								This tree will likely require pruning, and its root zone is likely to be impacted by works.
47	*Eucalyptus calcareana*	2	6.0	0	24	15	0.71	A Mallee in good health growing at the bottom of the batter slope. This tree will likely require pruning, and its root zone is likely to be impacted by works.
48	*Eucalyptus gracilis*	11	5.0	0	12	10	2.94	A Mallee in good health growing at the bottom of the batter slope. This tree will likely require pruning, and its root zone is likely to be impacted by works.
49	*Eucalyptus gracilis*	1	5.5	0	12	20	0.26	A Mallee in good health growing at the bottom of the batter slope. This tree will likely require pruning, and its root zone is likely to be impacted by works.
50	*Eucalyptus gracilis*	1	5.5	0	16	10	0.38	A Mallee in good health with branches overlooking the Project footprint. This tree will likely require pruning, and its root zone is likely to be impacted by works.

Appendix 8. Trees that may possibly require minor (<20%) pruning, that are external from the Scattered Tree Assessments.

Tree ID - 51 **Tree spp. –** *Eucalyptus gracilis* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 663325.32 Northing: 2064015.38 **Notes:** May require a light prune, root zone unlikely to be impacted.	

Tree ID - 52 **Tree spp. –** *Eucalyptus sp.* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 666457.78 Northing: 2063288.65 **Notes:** May require a light prune, root zone unlikely to be impacted.	

Tree ID - 53 **Tree spp. –** *Eucalyptus gracilis* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 663249.85 Northing: 2064019.61 **Notes:** May require a light prune, root zone unlikely to be impacted.	

Tree ID - 54 **Tree spp. –** *Eucalyptus calcareana* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 670154.65 Northing: 2062386.61 **Notes:** May require a light prune, root zone unlikely to be impacted.	

Tree ID - 55 **Tree spp. –** *Eucalyptus gracilis* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 670012.51 Northing: 2062430.00 **Notes:** May require a light prune, root zone unlikely to be impacted.	

Tree ID - 56 **Tree spp. –** *Eucalyptus sp.* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 681508.49 Northing: 2058825.86 **Notes:** A tree root which has come to surface and is within the Project Area. This root will likely be impacted by construction works if a guardrail is to be installed here.	

Tree ID - 57 **Tree spp. –** *Eucalyptus gracilis* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 681595.06 Northing: 2058782.42 **Notes:** May require a light prune, root zone unlikely to be impacted.	

Tree ID - 58 **Tree spp. –** *Eucalyptus calcareana* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 681622.91 Northing: 2058770.00 **Notes:** May require a light prune, root zone unlikely to be impacted.	

Tree ID - 59 **Tree spp. –** *Eucalyptus gracilis* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 681652.27 Northing: 2058754.53 **Notes:** This tree is outside the Project Area and will not be impacted. If the Project area were to shift slightly east, then this tree may require a light prune. The root zone is unlikely to be impacted.	

Tree ID - 60 **Tree spp. –** *Eucalyptus gracilis* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 703643.91 Northing: 2048862.93 **Notes:** May require a light prune, root zone unlikely to be impacted.	

Tree ID - 61 **Tree spp. –** *Eucalyptus gracilis* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 703779.09 Northing: 2048795.93 **Notes:** This tree is outside the Project Area and will not be impacted. If the Project area were to shift slightly east, then this tree may require a light prune. The root zone is unlikely to be impacted.	

Tree ID - 62 **Tree spp. –** *Eucalyptus gracilis* **Location information:** Datum: GDA 1994 Zone: 52 Easting: 703748.22 Northing: 2048811.12 **Notes:** This tree is outside the Project Area and will not be impacted. If the Project area were to shift slightly east, then this tree may require a light prune. The root zone is unlikely to be impacted.	

Tree ID - 62	
Tree spp. – *Eucalyptus calcareana*	
Location information: Datum: GDA 1994 Zone: 52 Easting: 703483.95 Northing: 2048919.33	
Notes: May require a light prune, root zone unlikely to be impacted.	

Appendix 8: Trees assessed as part of the vegetation survey, but not marked for removal and/or outside of the project footprint.

If proposed footprint changes or it is deemed during construction that they require removal, SEB payment will need to be adjusted accordingly, using the STAM details collected below.

Tree or Cluster ID	Number of trees	Fauna Habitat score	Threatened flora score	Biodiversity score	Loss factor	SEB Points required	Total SEB Payment (inc Admin fee)
3	1	**1.8**	**0**	0.53	0	0	$0.00
20	7	**1.4**	**0**	0.22	0	0	$0.00
21	1	**1.8**	**0**	0.42	0	0	$0.00
31	1	**1.8**	**0**	0.56	0	0	$0.00
32	6	**1.8**	**0**	2.47	0	0	$0.00
33	2	**1.8**	**0**	0.94	0	0	$0.00
45	2	**1.8**	**0**	0.57	0	0	$0.00
Total	20			5.71		0	$0.00

Appendix 9: Likelihood of occurrence assessment

Likelihood assessment of flora within the Project Area

Scientific name	Common name	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Acacia erinacea	Prickly Wattle	R		1	2012	Grows in sandplain scrub vegetation on clay, sandy clay, sand, laterite, gravel and loam. Widespread from south-western WA just into the extreme SW of SA (Maslin B.R. 2018).	Unlikely - suitable habitat present with nearby records near WA border, however not observed during field survey.
Acacia mutabilis ssp. angustifolia		R		1	2009	Calcerous loam or sandy with clay in low open woodlands or open shrub mallee. Scattered distribution from Jerramungup WA, east to far western SA /border near Eucla (Maslin B.R. 2018.	Unlikely - suitable habitat present with nearby records near WA border, however not observed during field survey.
Austrostipa nullanulla	Club Spear-grass	V		1	2008	In South Australia it occurs on gypseous soils around salt lakes associated with chenopod shrubland, and mixed-species grassland. (DAWE, 2021b)	Unlikely – recent records to the east of the Project Area (within 50km), however no suitable salt lake habitat present in Project Area.
Bothriochloa macra	Red-leg Grass	R		1	1997	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 (DPI 2021).	Unlikely – single record near project area >20 years old, with most records much further east.
Brachyscome tatei	Nullarbor Daisy	R		1	2012	In scrub on top of limestone sea cliffs. Restricted to cliffs along the Great Australian Bight (eFloraSA, 2007)	Possible - suitable habitat present, recent records nearby Project Area.
Daviesia benthamii ssp. humilis (NC)	Mallee Bitter-pea	R		1	2005	Scattered through mallee districts of SA, Vic and NSW from EP in the west to Wyalong in east. Grows on a variety of soils including skeletal on mountain slopes, sandy loam over limestone and gravelly clay, typically in mallee dominated by shrubby Eucalyptus sp. (Crisp 1982)	Unlikely – no preferred habitat in Project Area, though recent scattered records nearby, mostly further east. Perennial species not observed on field survey.

Scientific name	Common name	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Eremophila parvifolia ssp. parvifolia	Small-leaf Emubush	R		1	2012	Occurs on skeletal calcareous soils from Fowler Bay westwards usually in *Eucalyptus/Melaleuca* low scrubland (eFloraSA, 2007)	Unlikely- suitable habitat present, recent records nearby but not observed during field survey.
Eremophila praecox		R		1	2008	Compacted red-brown earth in *Eucalyptus* woodland (JSTOR, 2014)	Unlikely - suitable habitat present, scattered recent records nearby, conspicuous shrub not observed during field survey.
Eucalyptus diversifolia ssp. hesperia	Coastal White Mallee	R		1	2008	Restricted to the coastal escarpments of the Nullarbor Plain in the far west of SA extending into WA. Occurs on well drained soils on limestone habitat (Euclid 2019).	Unlikely - recent records nearby, however species is conspicuous and was not observed in Project Area on field survey.
Leiocarpa pluriseta		R		1	2005	Principally found on calcareous sands of low coastal cliffs and adjacent dunes (eFloraSA, 2007). Little known species with few scattered records.	Possible - may be suitable habitat present, recent records nearby.
Maireana rohrlachii	Rohrlach's Bluebush	R		1	2015	Preferred habitat includes heavy soils (eFlora SA, 2007). In Victoria it is found on saline or sandy loam soils rich in gypsum, often fringing lakes and in seasonally wet areas (Royal Botanic Gardens Victoria 2020)	Possible- potentially suitable habitat at Pit 922, recent records nearby, but not observed during field survey.
Microlepidium alatum		VU	V	2, 1	Species or species habitat likely to occur within area / 2008	Occurs along the Nullarbor, growing in sheltered sites in *Melaleuca lanceolata* open woodland over sheet limestone in moss beds (Botanic Gardens of SA, 2020a)	Possible – No preferred habitat (*M. lanceolata* moss beds) identified in Project Area, despite recent, nearby records. Not observed on survey, though small, annual and inconspicuous.
Microlepidium pilosulum	Hairy Shepherd's-purse	R		1	2009	Grows in coastal dunes and salt lake margins (Botanic Gardens of SA, 2020b)	Unlikely - No salt lake / dune habitat identified in Project Area, despite recent, nearby records. Not observed on survey, though small and inconspicuous.

Scientific name	Common name	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Phlegmatospermum eremaeum	Spreading Cress	R		1	2011	Annual herb grows in semi-arid regions. Known from the Lake Eyre, Nullabor, Eyre Peninsula, Northern Lofty, Murraylands and Yorke Peninsula herbarium regions of SA (eFlora SA, 2007)	Likely - may be suitable habitat present, limited scattered records nearby. Not observed on survey, though small, annual and inconspicuous.
Phlegmatospermum richardsii	Nullarbor Cress	V		1	2009	Grows in run-off areas around calcrete. Associated with *Carrichtera annua*, *Atriplex vesicaria, Oxalis sp., Tetragonia sp., Sisymbrium sp.* Also found in *Eucalyptus calcareana* Open scrub over scattered *Eremophila glabra*, *Rhagodia crassifolia, E. weldii* and extensive leaf litter, with patches of *Atriplex vesicaria, Westringia rigida* and *Geijera linearifolia* open areas.	Likely - may be suitable habitat present, limited scattered records nearby. Not observed on survey, though small, annual and inconspicuous.
Poa drummondiana	Knotted Poa	R		1	2009	Across southern mainland Australia Dunes and margins of clay-pans in Mallee-scrub and low woodland (AusGrass2, 2010).	Likely – potentially suitable habitat present, limited scattered records nearby. Not observed on survey, though small, annual and inconspicuous.
Podolepis jaceoides	Showy Copper-wire Daisy	R		1	2005	Occurs in grassland, woodland and Mallee, typically on heavy clay floodplains or sandhills (PlantNet, 2021)	Likely - suitable habitat present, recent records nearby. Not observed on survey, though small, annual and inconspicuous.
Pomaderris forrestiana		R		1	2012	Recorded growing on a cliff and on shallow loam on limestone. SA: NU. Also from WA. (eFloraSA)	Possible- suitable habitat present, recent records nearby WA border. Small shrub, not observed on field survey in Project Area.
Prostanthera calycina	West Coast Mintbush	VU	V	2,1	Species or species habitat likely to occur within area / 2008	Endemic to the EP. Sub-populations are distributed from Buckleboo to Coorabie, concentrated in Streaky Bay area (DAWE, 2008). Occurs on limestone outcrops and in sandy loams of undulating calcreted plains in mallee communities. Associated with *E. incrassate, E. oleosa, E. socialis, Melaleuca, Pittosporum, Santalum* (eFloraSA, 2007)	Unlikely – known population in far west of extent (Coorabie) (near east of Project Area), and further east. Habitat is suitable, however but shrub was not observed in Project Area.
Ptilotus symonii		R		1	2001	In WA, found in sandy soils on limestone plains, floodplains and low rocky rises (Western Australian Herbarium, 1998-)	Likely - suitable habitat present, recent records in western extent of Project Area. Not observed

Scientific name	Common name	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
							during survey, but small and inconspicuous species.
Spyridium tricolor	Rusty Spyridium	V		1	2001	Strongly associated with calcareous soils in Mallee habitats, especially when over limestone (Archer, W, 2013).	Unlikely - suitable habitat present and recent records nearby, however this is a conspicuous and identifiable shrub and was not observed in Project Area during field survey.
Tecticornia flabelliformis	Bead Samphire	VU	V	1,2	Species or species habitat may occur within area / 2005	Often grows in low lying areas on the margins of salt lakes and coastal salt marshes over gypsum deposits and is associated with other *Tecticornia* species and salt tolerant vegetation communities. In SA there is little information on habitat associations, but has been reported wo occur in samphire shrubland and low lying, irregularly inundated areas (Carter, 2010)	Possible - potentially suitable associated habitat present at Pit 928 and Pit 922. Samphire species were unable to be identified to species at time of survey due to lack of fruiting bodies (generally present January to May)
Templetonia battii	Spiny Templetonia	R		1	2012	Occurs in north-western EP and WA. Grows in sandy and loamy soils, usually on limestone in shrubland and woodland, associated with salt lakes (Thompson & Wilson 2011).	Unlikely– some suitable may be habitat present and there are recent records nearby, however this is a conspicuous species and was not detected on field survey within the Project Area.

Source; 1- BDBSA, 2 - Protected matters search tool (PMST), 3 – others
NP&W Act; E= Endangered, V = Vulnerable, R= Rare
EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable

Likelihood assessment of fauna within the Project Area

Sscientific name	Common name	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Aves	**Birds**						
Acanthiza iredalei iredalei	Slender-billed Thornbill (western)	R		1	2012	Usually occurs in sclerophyll heathland and chenopod shrublands that are dominated by samphire, *Maireana* and *Atriplex* (TSSC, 2013)	Likely - suitable habitat present, recent records nearby Project Area.
Actitis hypoleucos	Common Sandpiper	R		1	2004	Habitat is banks, rocks and sandy beaches near water. Found in coastal or inland wetlands, both saline and fresh (Morecombe 2021).	Unlikely - no suitable wetland or beach habitat in Project Area
Ardenna carneipes	Flesh-footed Shearwater	R		1	1998	Offshore bird: mainly occurs in the subtropics over continental shelves and slopes and occasionally inshore waters (Morcombe 2011).	Unlikely - no suitable marine habitat in Project Area
Ardeotis australis	Australian Bustard	V		1	2012	Bird of open plains usually in grassland, spinifex, arid scrub with saltbush and bluebush, open dry woodland or mulga and mallee heath (Morcombe 2011)	Likely - suitable habitat present, recent records scattered throughout Project Area.
Arenaria interpres interpres	Ruddy Turnstone	R		1	2007	It is found in most coastal regions, with occasional records of inland populations. Prefers rocky shores or beaches where there are large deposits of rotting seaweed. South Australian sites of international importance for this species are Kangaroo Island, Port MacDonnell coast and Carpenter Rocks, Pelican Point. (DAWE 2020b)	Unlikely - no suitable beach habitat in Project Area
Calidris alba alba	Sanderling	R		1	2005	In Australia, the species is almost always found on the coast, mostly on open sandy beaches exposed to open sea-swell, and on exposed sandbars and spits, and shingle banks, where they forage in the wave-wash zone and amongst rotting seaweed.	Unlikely - no suitable beach habitat in Project Area
Calidris canutus	Red Knot, Knot		EN	2	Known	In Australasia the Red Knot mainly inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours (DAWE, 2021b).	Unlikely - no suitable habitat in Project Area, no recent records nearby.

Sscientific name	Common name	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Calidris ferruginea	Curlew Sandpiper	E	CR	2	Known	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms (DAWE, 2021b).	Unlikely - no suitable habitat in Project Area
Cereopsis novaehollandiae (NC)	Cape Barren Goose	R		1	2015	Mostly inhabits small, windswept and generally uninhabited offshore islands, but ventures to adjacent mainland farming areas in search of food in summer.	Unlikely - no suitable onshore grazing habitat in Project Area
Cinclosoma castanotus castanotus (NC)	Chestnut Quail-thrush (eastern)	R		1	2004	Inhabits Mallee, mulga scrub; inland desert heaths, woodlands. Occurs in south-eastern Australia. This species has since been taxonomically reviewed and re-classified as a separate sub-species (2015) and is now known as Copperback Quail-thrush (*Cinclosoma clarum*) (Auerbach, 2015).	– reclassified into separate sub-species, *Cinclosoma clarum* which is not listed under the NPW Act.
Cladorhynchus leucocephalus	Banded Stilt	V		1	1996	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, ND).	Unlikely - no suitable saline lake habitat in Project Area
Corcorax melanorhamphos	White-winged Chough	R		1	2007	White-winged Choughs are found in open forests, mallee, mulga, cypress and woodlands, where they forage on the ground in leaf litter (Morecombe 2021). The Eyre Peninsula is the western extent of their range.	Possible - suitable habitat present, recent records nearby in eastern extent of Project Area. Most westerly extent of population, more common to the east.
Coturnix ypsilophora australis	Brown Quail	V		1	2012	Prefers dense grasslands, often on the edges of open forests, and bracken. Prefers damp rank vegetation (Morcombe 2011)	Unlikely – no preferred habitat in Project Area. Recent scattered records within 50km of Project Area but appears to be outside of known range of species.
Egretta sacra sacra	Pacific Reef Heron	R		1	2005	Lives on beaches, rocky shores, tidal rivers and inlets, mangroves, and exposed coral reefs (Morcombe 2011)	Unlikely - no suitable beach habitat in Project Area

Sscientific name	Common name	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Falco peregrinus macropus	Peregrine Falcon	R		1	2012	This species prefers open habitats such as grasslands, tundra and meadows and nests on cliff faces and in crevices. It has an extremely large range and is found world-wide except for rainforests and cold, dry Arctic regions. This species has increasingly been observed inhabiting urban areas. (White et al., 2020)	Likely - suitable habitat present, recent records nearby.
Falco subniger	Black Falcon	R		1	2012	This species is found along tree-lined watercourses and in isolated woodlands, mainly in arid and semi-arid areas (BirdLife Australia, ND).	Possible - may be suitable habitat present, recent records nearby.
Haematopus fuliginosus fuliginosus	Sooty Oystercatcher	R		1	2014	The Sooty Oystercatcher is strictly coastal, usually within 50 m of the ocean. It prefers rocky shores but will be seen on coral reefs or sandy beaches near mudflats (BirdLife Australia, ND).	Unlikely - no suitable beach habitat in Project Area
Haematopus longirostris	Pied Oystercatcher	R		1	2014	The Pied Oystercatcher prefers mudflats, sandbanks and sandy ocean beaches and is less common along rocky or shingle coastlines (BirdLife Australia, ND).	Unlikely - no suitable beach habitat in Project Area
Haliaeetus leucogaster	White-bellied Sea Eagle	E		1	2012	Found in coastal habitats (especially those close to the sea-shore), around terrestrial wetlands, inland rivers in tropical and temperate regions of mainland Australia and its offshore islands. (DAWE, 2021b) Nests on cliff edge or tall tree close to river or coast (Morcombe 2011)	Possible – two scattered records within 50km of Project Area. Suitable cliff habitat nearby Project Area. May be present as flyover only.
Hieraaetus morphnoides	Little Eagle	V		1	2007	The Little Eagle is widespread over diverse habitats in mainland Australia, central and eastern New Guinea. It is seen over woodland and forested lands and open country, extending into the arid zone. It tends to avoid rainforest and heavy forest (BirdLife Australia, ND).	Likely - suitable habitat present, recent records nearby.

Sscientific name	Common name	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Hylacola cauta cauta	Shy Heathwren (EP, YP, FR, MM, upper SE)	R		1	2012	Prefers dense shrubby or heath understorey in Mallee woodland, Mallee shrubland or Mallee heath in coastal and semi-arid regions, often where spinifex (Triodia) occurs and with dense shrubs such as Banksia, Hakea and Grevillea, also tea-tree (Leptospermum) and cypress pine (Callitris) (Gregory, 2020).	Likely - suitable habitat present, recent records nearby.
Leipoa ocellata	Malleefowl	V	VU	2	Known	Occupies shrublands and low woodlands that are dominated by Mallee vegetation in semi-arid regions of South Australia (DAWE, 2021b)	Possible - suitable habitat present, historical records nearby, more recent records further north of Project Area.
Lichenostomus cratitius occidentalis	Purple-gaped Honeyeater (mainland SA)	R		1	2012	Occurs in fragmented areas in Mallee from south and central WA to central Vic (Clements 2007). Mallee, open woodland, heath (Morcombe 2011)	Likely – some suitable habitat present, recent records nearby.
Lichmera indistincta indistincta	Brown Honeyeater	R		1	2012	This species inhabits a wide range of wooded habitats, usually near water. Forest, woodland, heath, mulga, arid scrub, watercourse trees, mangroves and gardens (Morcombe 2011). Considered rare in SA due to its distribution. Common / secure in NSW, NT, QLD, WA.	Possible - suitable habitat, nearby records in western extent of Project Area.
Lophochroa leadbeateri mollis	Major Mitchell's Cockatoo (NW, EP)	SP		1, 3	2012 / 2021 (seen)	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, ND).	Known - suitable habitat present, recent records nearby, seen during field survey.
Lophoictinia isura	Square-tailed Kite	E		1	2007	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. (NSW Government Environment and Heritage 2014)	Possible - suitable habitat present, scattered records nearby, however Project Area is considered out of typical range for this species (Morcombe 2021).
Myiagra inquieta	Restless Flycatcher	R		1	2012	Found throughout northern and eastern mainland Australia, as well as in south-western Australia. The Restless Flycatcher is found in open forests and woodlands and is frequently seen in farmland (Birds in Backyards, ND).	Likely - suitable habitat present, recent records nearby.

Sscientific name	Common name	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Neophema splendida	Scarlet-chested Parrot	R		1	2007	The species occurs in the Mallee or mulga woodland of southern semi-arid inland Australia (Birdlife Australia, ND).	Likely - suitable habitat present, recent records nearby.
Northiella narethae	Naretha (Western) Bluebonnet	R		1	2012	Open country: lightly timbered grassland, mulga, mallee, sheoak, watercourses and paddock trees (Morcombe 2011).	Likely - suitable habitat present, recent records nearby.
Pachycephala inornata	Gilbert's Whistler	R		1	2017	Sparsely distributed over much of the arid and semi-arid zone of inland southern Australia, from the western slopes of NSW to the Western Australian wheatbelt (Environment and Heritage 2014). Habitat is shrubby woodland and Mallee (Simpson and Day 1999, p. 227).	Likely - suitable habitat present, recent records nearby.
Pandion haliaetus cristatus	Eastern Osprey	R		1	2005	Eastern Osprey occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands (DAWE, 2021b). Known to follow large rivers far inland including to arid regions. Uses nesting locations with high coastal views including cliffs and rock stacks (Morcombe 2011)	Possible – scattered records nearby Project Area. May be present as flyover only, near coastal cliffs.
Pedionomus torquatus	Plains-wanderer	E	CR	1	2012	The Plains-wanderer occurs at scattered sites in NSW and Victoria and more marginal habitat in QLD and SA. 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 (DAWE, 2021b)	Possible – the Laura Bay Pit (P1) is the only site with suitable habitat, and occurs in an area marked in the National Recovery Plan (NRP) (DotE 2016) as an area where species 'may occur'. Single record further west, however habitat not suitable in Project Area, and not considered possible or likely habitat in NRP.
Pluvialis fulva	Pacific Golden Plover	R		1	2004	In South Australia, they are recorded at many sites between the Coorong and Streaky Bay, including the coasts of Gulf St Vincent and Spencer Gulf. In non-breeding grounds in Australia this species usually inhabits coastal habitats, though it rarely occurs around inland wetlands (DAWE, 2021b)	Unlikely – scattered records nearby, however no suitable wetland or coastal habitat occurs in Project Area,
Sternula nereis nereis	Australian Fairy Tern	E	VU	2	Known	Habitat is coasts, estuaries; breeds on sandy beaches and sand spits (Simpson and Day 1999, p. 106).	Unlikely - no suitable coastal or beach habitat in Project Area

Sscientific name	Common name	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Strepera versicolor ssp. plumbea	Grey Currawong	E		1	2012	The Grey Currawong inhabits a wide range of habitats from the coast to the semi-desert, including forests, woodlands, Mallee, coastal and other heaths. Also found in remnant vegetation on roadsides and farms, in orchards, and in suburban areas (Birds in Backyards ND). NPW Act listed Endangered subspecies is *Strepera versicolor ssp. plumbea* (western subspecies.	Likely - suitable habitat present, recent records nearby, but not identified to threatened subspecies. Range is likely to be considered threatened ssp.
Thinornis cucullatus cucullatus	Hooded Plover (eastern), Eastern Hooded Plover	V	VU	2	Known	The hooded plover is found on broad, sandy surf beaches, showing preference for beaches backed by sand dunes, with large amounts of seaweed.	Unlikely - no suitable beach habitat in Project Area
Turnix varius varius	Painted Buttonquail	R		1	2012	Open forest and woodland, banksia woodland, mulga and brigalow mallee. Prefers stony ridges with abundant leaf litter and sparse grass (Morcombe 2011)	Possible – may be suitable habitat present, single record near WA border, others further east.
Mammalia	**Mammals**						
Neophoca cinerea	Australian Sea Lion	V	EN	1	2014	Sea Lions prefer sandy beaches, usually in isolated bays and sheltered areas (Australian Museum, ND).	Unlikely - no suitable marine or beach habitat in Project Area
Reptilia	**Reptiles**						
Ctenophorus maculatus	Nullarbor Spotted Sand Dragon	R		1	2012	Lives among shrubs and hummock grass (The Reptile Database, ND).	Likely - suitable habitat present, recent records nearby.
Ctenophorus mckenziei	McKenzie's Dragon	R		1	2012	Lives among shrubs and hummock grass (The Reptile Database, ND).	Likely - suitable habitat present, recent records nearby.
Lerista baynesi	Speckled Slider	R		1	2012	A fossorial species that has been observed in grassland, shrubland and woodland habitats (Porter, 2019)	Likely - suitable habitat present, recent records nearby.

Sscientific name	Common name	NP&W Act	EPBC Act	Data source	Date of last record	Species known habitat preferences	Likelihood of use for habitat – Comments
Morelia spilota	Carpet Python	R		1	2016	Prefers riparian vegetation groups, and dry sclerophyll forest with ground cover and logs. Lives in hollows of large River Red Gums and north-facing cliffs along the Murray River (DAWE, 2021b).	Possible – no preferred habitat in Project Area. Scattered recent records nearby.
Varanus rosenbergi	Heath Goanna	V		1	2012	Open woodlands and heaths on sandy soil from southwest WA to western Victoria. Utilises termite mounts for egg laying and food resource (Wilson and Swan 2013)	Possible - suitable habitat may be present, but unlikely to be preferred. Two isolated records nearby, however majority of records further to east of SA.
Source; 1- BDBSA, 2 - Protected matters search tool, 3 – others *NP&W Act; E= Endangered, V = Vulnerable, R= Rare* *EPBC Act; Ex = Extinct, CR = Critically endangered, EN = Endangered; VU = Vulnerable*							

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