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Amended Biodiversity Development Assessment Report

0617753



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CONTENTS

1. ASSESSMENT OVERVIEW 10
1.1 RELEVANT LEGISLATION AND POLICIES 10
1.1.1 Assessment Framework 10
1.1.2 Requirement for a BDAR 11
1.1.3 Application of the BAM 11
1.1.4 Matters of National Environmental Significance 12
1.2 BIODIVERSITY CREDITS AND CLASSES 13
1.3 ACCREDITED PERSON 14
1.4 DATA AND INFORMATION USED 14
1.5 BIODIVERSITY VALUES NOT ASSESSED 15
1.6 CATEGORY 1 - EXEMPT LAND 16
1.7 STRUCTURE OF THE BDAR 16
1.8 BDAR VERSION HISTORY 17
1.9 RESPONSE TO SUBMISSIONS 17
2. INTRODUCTION 25
2.1 PROPOSED DEVELOPMENT 25
2.1.1 Location 25
2.1.2 Subject Land 25
2.1.3 Development Footprint 25
2.1.4 Assessment Area 26
2.1.5 Properties 26
2.1.6 Development Description 30
2.2 METHODOLOGY 33
2.2.1 Site Context 33
2.2.2 Native Vegetation, Threatened Ecological Communities and Vegetation Integrity 33
2.2.3 Threatened Flora Survey Methods 41
2.2.4 Threatened Fauna Survey Methods 46
2.2.5 Targeted Bird Surveys 57
2.2.6 Targeted Bat Surveys 57
2.2.7 Bird and Bat Utilisation Surveys 57
2.2.8 Weather Conditions 58
2.2.9 Predicted Flyway mapping Methods 62
2.2.10 Mathematical Collision Risk Modelling 63
2.2.11 Assumptions, Limitations and Disclaimers 64
2.2.12 Licencing 66
3. SITE CONTEXT 67
3.1 LANDSCAPE FEATURES 67
3.1.1 Aquatic Habitat 69
3.2 NATIVE VEGETATION COVER AND PATCH SIZE 72
3.2.1 Native Vegetation Cover of the Assessment Area 72
3.2.2 Patch Size 73
3.3 BIRD COMMUNITY COMPOSITION 76
3.3.1 Habitat 76
3.3.2 Protected Bird Species 77
3.4 PREDICTED FLYWAY MAPPING 79
3.4.1 Plains-wanderer 80

3.4.2 Blue-winged parrot 82
3.4.3 Pink Cockatoo 84
3.4.4 Migratory Shorebirds 86
3.4.5 Raptors 88
3.5 BAT COMMUNITY COMPOSITION 90
3.5.1 Habitat 90
3.5.2 Survey Results 90
3.5.3 Bat Community 92
4. NATIVE VEGETATION, THREATENED ECOLOGICAL COMMUNITIES AND VEGETATION INTEGRITY 94
4.1 NATIVE VEGETATION EXTENT 94
4.1.1 Mapped Native Vegetation 94
4.1.2 Areas That are Not Native vegetation 94
4.2 IDENTIFY AND MAP PCTS 94
4.2.1 Native Vegetation of the Region 94
4.2.2 Agricultural History 95
4.2.3 State Vegetation Type Map 95
4.2.4 Vegetation Classification 98
4.2.5 Floristic Composition 102
4.2.6 Plant Community Types 104
4.2.7 Threatened Ecological Communities 124
4.2.8 Vegetation Zones 126
5. HABITAT SUITABILITY FOR THREATENED SPECIES 141
5.1 HABITAT SUITABILITY 141
5.1.1 Ecosystem Credit Species 141
5.1.2 Candidate Species 145
5.2 HABITAT SURVEYS: CANDIDATE SPECIES CREDIT SPECIES 146
5.2.1 Identify Threatened Species For Assessment 146
5.2.2 Assess The Habitat Constraints and Vagrant Species on the Subject Land 148
5.2.3 Further Assessment Of Candidate Species Credit Species 150
5.2.4 Determine the Presence of a Candidate Species Credit Species 150
5.2.5 Determine the Area or Count, and Location of Suitable Habitat for a Species Credit Species (a Species Polygon) 153
5.3 SUPPLEMENTARY SEARS REQUIREMENTS 160
6. IDENTIFYING PRESCRIBED IMPACTS 163
6.1 TURBINE RISK ASSSESSMENT 165
6.1.1 Distance from Transmission Line 165
6.1.2 Distance from Woody Vegetation 165
6.1.3 Distance from Water Sources 165
6.1.4 Distance from Major Sealed Roads 166
6.1.5 Turbine Risk Matrix 166
6.1.6 Assumptions 167
6.1.7 Results 167
6.2 BIRD AND BAT RISK ASSESSMENT 178
6.2.1 Assumptions 180
6.2.2 Collision and/or Barotrauma Risk Assessment 180
6.3 COLLISION RISK MODELLING 218
6.3.1 Windfarm and WTG Parameters 218
6.3.2 Bird Species Parameters 219

6.3.3 Collision Risk Modelling Results 221

7. AVOID AND MINIMISE IMPACTS 223

7.1 PROJECT LOCATION AND DESIGN 224
7.1.1 Strategic Development Context 224
7.1.2 Project Design and Iteration 224
7.1.3 Further Measures to Avoid and Minimise Impacts 228

8. IMPACT ASSESSMENT 232

8.1 DIRECT IMPACTS 232
8.1.1 Change in Vegetation Integrity Score 232
8.2 INDIRECT IMPACTS 234
8.2.1 Increased Risk of Predators 244
8.3 PRESCRIBED IMPACTS 244
8.4 MITIGATING RESIDUAL IMPACTS – MANAGEMENT MEASURES AND IMPLEMENTATION 249
8.4.1 BMP Framework 253
8.5 ADAPTIVE MANAGEMENT FOR UNCERTAIN IMPACTS 254
8.6 USE OF BIODIVERSITY CREDITS TO MITIGATE OR OFFSET INDIRECT OR PRESCRIBED IMPACTS 254
8.7 IMPACTS ON MNES 254
8.7.1 TECs and threatened Species 254
8.7.2 Migratory Species 267
8.7.3 Description of the Offsets Proposed 270
8.7.4 Details of how the BAM has been applied in accordance with the objects of the EPBC Act 270
8.8 CUMULATIVE IMPACTS 271
8.8.1 Bioregional Context 271
8.8.2 Local Government Area Context 273
8.8.3 Other Infrastructure Projects 274
8.8.4 Summary 285

9. THRESHOLDS FOR ASSESSING AND OFFSETTING IMPACTS 286

9.1 SERIOUS AND IRREVERSIBLE IMPACTS 286
9.1.2 ASSESSMENT FOR SERIOUS AND IRREVERSIBLE IMPACTS ON BIODIVERSITY VALUES 286
9.2 IMPACT SUMMARY 291
9.2.1 Impacts that Require an Offset 291
9.2.2 Impacts that Do Not Require Further Assessment 292
9.2.3 Impacts on Matters of National Environmental Significance 292

10. APPLYING THE NO NET LOSS STANDARD 298

10.1 OFFSET REQUIREMENTS FOR DIRECT IMPACTS 298
10.1.1 Ecosystem Credits 298
10.1.2 Species Credits 299
10.2 OFFSET STRATEGY 299
10.2.1 'Like for like' credits 300
10.2.2 Funding a Biodiversity Conservation Action 300
10.2.3 SODA 301
10.2.4 Biodiversity Conservation trust Fund 301

11. CONCLUSION 302

11.1 BIODIVERSITY MATTERS REQUIRING ASSESSMENT 302
11.2 AVOID, MINIMISE AND MITIGATE 302

11.3 DIRECT IMPACTS ON ASSESSABLE BIODIVERSITY MATTERS 303
11.4 INDIRECT IMPACTS ON ASSESSABLE BIODIVERSITY MATTERS 303
11.5 SUMMARY 303

12. REFERENCES 304

APPENDIX A DRAFT BIRD AND BAT ADAPTIVE MANAGEMENT PLAN (ERM, 2025)
APPENDIX B BIRD UTILISATION SURVEY DATA
APPENDIX C BAT CALL ANALYSIS REPORTS
APPENDIX D BIODIVERSITY CREDIT REPORTS
APPENDIX E ASSESSMENT OF MNES

LIST OF TABLES

TABLE E-1-1 SUMMARY OF SURVEY EVENTS 4
TABLE E-1-2 PCTS AND VEGETATION ZONES OF THE SUJECT LAND 5
TABLE E-1-3 IMPACTS THAT REQUIRE OFFSETS – ECOSYSTEM CREDITS 8
TABLE E-1-4 IMPACTS THAT REQUIRE OFFSETS – SPECIES CREDITS 9
TABLE 1-1 MNES IDENTIFIED IN THE SUPPLEMENTARY SEARS 13
TABLE 1-2 RESPONSE TO SUBMISSIONS 18
TABLE 2-1 SUBJECT LAND LOT AND DP DETAILS 26
TABLE 2-2 PROJECT COMPONENTS 30
TABLE 2-3 SUBJECT LAND VEGETATION ZONES AND BAM PLOT REQUIREMENTS 37
TABLE 2-4 THREATENED FLORA SURVEY SUMMARY 42
TABLE 2-5 THREATENED FAUNA SURVEY SUMMARY 47
TABLE 2-6 WEATHER CONDITIONS DURING SURVEY PERIODS (SUBJECT LAND) 58
TABLE 3-1 LANDSCAPE FEATURES (SUBJECT LAND) 67
TABLE 3-2 LANDSCAPE FEATURES (HAUL ROUTE) 68
TABLE 3-3 LIKELIHOOD OF OCCURANCE CRITERIA 70
TABLE 3-4 AQUATIC THREATENED SPECIES LIKELIHOOD OF OCCURANCE ASSESSMENT 70
TABLE 3-5 NATIVE VEGETATION COVER IN THE ASSESSMENT AREA (SUBJECT LAND) 72
TABLE 3-6 NATIVE VEGETATION COVER IN THE ASSESSMENT AREA (TRANSPORT ROUTE) 72
TABLE 3-7 RAPTOR HABITAT TYPES 76
TABLE 3-8 THREATENED BIRD SPECIES OBSERVED 77
TABLE 3-9 BAT CALL ANALYSIS RESULTS 90
TABLE 3-10 NUMBER OF TOTAL CALLS PER SPECIES ACROSS THREE HEIGHT TREATMENTS 91
TABLE 4-1 BIONET VEGETATION TYPE DATABASE DESCRIPTION FOR SVTM PCTS MAPPED IN THE SUBJECT LAND 96
TABLE 4-2 SIMPER ANALYSIS OF VEGETATION ZONES 102
TABLE 4-3 PCTS IDENTIFIED WITHIN THE SUBJECT LAND 104
TABLE 4-4 PCT 164 COTTON BUSH OPEN SHRUBLAND OF THE SEMI-ARID (WARM) ZONE 104
TABLE 4-5 PCT 163 DILLON BUSH (NITRE BUSH) SHRUBLAND OF THE SEMI-ARID AND ARID ZONES 109
TABLE 4-6 PCT 159 OLD MAN SALTBUSH SHRUBLAND 112
TABLE 4-7 THREATENED ECOLOGICAL COMMUNITIES INVESTIGATION (SUBJECT LAND) 124
TABLE 4-8 KEY DIAGNOSTIC CHARACTERISTICS FOR THE NATURAL GRASSLANDS OF THE MURRAY VALLEY PLAINS TEC 125
TABLE 4-9 VEGETATION ZONES AND PATCH SIZE WITHIN THE SUBJECT LAND 127
TABLE 4-10 VEGETATION ZONES VEGETATION INTEGRITY SCORES 139
TABLE 5-1 PREDICTED ECOSYSTEM CREDIT SPECIES (SUBJECT LAND) 142
TABLE 5-2 PREDICTED ECOSYSTEM CREDIT SPECIES (TRANSPORT ROUTE) 143

TABLE 5-3	CANDIDATE SPECIES (SUBJECT LAND)	145
TABLE 5-4	CANDIDATE SPECIES (TRANSPORT ROUTE)	145
TABLE 5-5	IDENTIFY THREATENED SPECIES FOR ASSESSMENT	146
TABLE 5-6	CANDIDATE SPECIES WITH GEOGRAPHIC LIMITATION AND/OR ASSOCIATED PCT	147
TABLE 5-7	ASSESSMENT OF CANDIDATE SPECIES EXCLUSION	148
TABLE 5-8	CANDIDATE SPECIES NORMAL DISTRIBUTION AND HABITAT	149
TABLE 5-9	SUMMARY OF SURVEY EFFORT FOR CANDIDATE SPECIES	151
TABLE 5-10	SUMMARY OF SPECIES' POLYGONS	154
TABLE 5-11	MNES SURVEY METHODS AND RESULTS	160
TABLE 6-1	ASSESSMENT OF PRESCRIBED IMPACTS WITHIN THE SUBJECT LAND	163
TABLE 6-2	TURBINE RISK MATRIX	166
TABLE 6-3	TURBINE STRIKE RISK RATINGS	167
TABLE 6-4	TURBINE RISK ASSESSMENT RESULTS	168
TABLE 6-5	CONSEQUENCES CRITERIA FOR TURBINE STRIKE AND/OR BAROTRAUMA	178
TABLE 6-6	LIKELIHOOD CRITERIA FOR TURBINE STRIKE AND/OR BAROTRAUMA	179
TABLE 6-7	RISK MATRIX FOR TURBINE STRIKE AND/OR BAROTRAUMA	180
TABLE 6-8	BIRD AND BAT RISK ASSESSMENT	182
TABLE 6-9	COLLISION RISK MODEL INCLUSION CRITERIA	218
TABLE 6-10	WTG PARAMETERS FOR THE PROJECT	218
TABLE 6-11	BIRD SPECIES PARAMETERS USED IN THE CRM	220
TABLE 6-12	ESTIMATED COLLISION RISK MORTALITIES	221
TABLE 7-1	EXTENT OF AVOIDED IMAPCTS ON PCTS (EIS VS REVISED LAYOUT)	223
TABLE 7-2	EXTENT OF AVOIDED IMAPCTS ON THREATENED SPECIES (EIS VS REVISED LAYOUT)	223
TABLE 7-3	PROJECT REFINEMENTS SINCE SCOPING PHASE	225
TABLE 8-1	SUMMARY OF DIRECT IMPACTS ON NATIVE VEGETATION	232
TABLE 8-2	SUMMARY OF DIRECT IMPACTS ON THREATENED SPECIES	232
TABLE 8-3	CHANGE IN VEGETATION INTEGRITY SCORE	233
TABLE 8-4	SUMMARY OF INDIRECT IMPACTS	235
TABLE 8-5	SUMMARY OF PRESCRIBED IMPACTS	246
TABLE 8-6	SUMMARY OF PROPOSED MITIGATION AND MANAGEMENT MEASURES FOR RESIDUAL IMPACTS (DIRECT, INDIRECT AND PRESCRIBED)	250
TABLE 8-7	BIODIVERSITY MANAGEMENT PLAN FRAMEWORK	253
TABLE 8-8	WOODY VEGETATION CLEARED PER LANDCOVER CLASS IN THE RIVERINA BIOREGION (2009 – 2023)	271
TABLE 8-9	WOODY VEGETATION CLEARED PER LANDCOVER CLASS IN THE MURRAY RIVER LGA (2009 – 2023)	273
TABLE 8-10	POTENTIAL CUMULATIVE IMPACTS	275
TABLE 9-1	PLAINS-WANDERER (*PEDIONOMUS TORQUATUS*) SAII ASSESSMENT	286
TABLE 9-2	MNES ENTITIES IMPACTED BY THE PROJECT	293
TABLE 10-1	IMPACTS THAT REQUIRE AN OFFSET – ECOSYSTEM CREDITS	298
TABLE 10-2	ECOSYSTEM CREDIT CLASS AND MATCHING CREDIT PROFILE	298
TABLE 10-3	IMPACTS THAT REQUIRE AN OFFSET – SPECIES CREDITS	299

LIST OF FIGURES

FIGURE 2-1	LOCATION MAP	27
FIGURE 2-2	THE SUBJECT LAND	28
FIGURE 2-3	TRANSPORT ROUTE	29
FIGURE 2-4	PROPOSED DEVELOPMENT LAYOUT	32
FIGURE 2-5	VEGETATION SURVEY LOCATIONS (SUBJECT LAND)	39
FIGURE 2-6	VEGETATION SURVEY LOCATIONS (TRANSPORT ROUTE)	40
FIGURE 2-7	TARGETED THREATENED FLORA SURVEY EFFORT (SUBJECT LAND)	44
FIGURE 2-8	DIURNAL BIRD TARGETED FAUNA SURVEY EFFORT	53
FIGURE 2-9	NOCTURNAL BIRD TARGETED FAUNA SURVEY EFFORT	54
FIGURE 2-10	AMPHIBIAN TARGETED FAUNA SURVEY EFFORT	55
FIGURE 2-11	MICROBAT TARGETED FAUNA SURVEY EFFORT	56
FIGURE 3-1	NATIVE VEGETATION COVER OF THE ASSESSMENT AREA (SUBJECT LAND)	74
FIGURE 3-2	NATIVE VEGETATION COVER OF THE ASSESSMENT AREA (HAUL ROUTE)	75
FIGURE 3-3	STICK NESTS AND PROTECTED BIRD SIGHTINGS WITHIN THE PROJECT AREA	78
FIGURE 3-4	PREDICTED FLYAY MAPPING FOR THE PLAINS-WANDERER	81
FIGURE 3-5	PREDICTED FLIGHTWAYS FOR THE BLUE-WINGED PARROT	83
FIGURE 3-6	PREDICTED FLYWAY MAPPING FOR THE PINK COCKATOO	85
FIGURE 3-7	PREDICTED FLYWAY MAPPING FOR MIGRATORY SHOREBIRDS	87
FIGURE 3-8	PREDICTED FLYWAY MAPPING FOR RAPTORS	89
FIGURE 4-1	PLANT COMMUNITY TYPES (SUBJECT LAND)	114
FIGURE 4-2	PLANT COMMUNITY TYPES (HAUL ROUTE)	123
FIGURE 4-3	VEGETATION ZONES (SUBJECT LAND)	129
FIGURE 4-4	VEGETATION ZONES (HAUL ROUTE)	138
FIGURE 5-1	ECOSYSTEM SPECIES OBSERVATIONS	144
FIGURE 5-2	SPECIES' POLYGON FOR MOSSGIEL DAISY (*BRACHYSCOME PAPILLOSA*)	157
FIGURE 5-3	SPECIES' POLYGON FOR CHARIOT WHEELS (*MAIREANA CHEELII*)	158
FIGURE 7-1	TURBINE RISK RATING	229
FIGURE 7-2	ALTERNATIVE PROJECT DESIGN – SCOPING REPORT	230
FIGURE 7-3	ALTERNATIVE PROJECT DESIGN – EIS	231
FIGURE 8-1	ENVIRONMENTAL SENSITIVE NO-GO ZONES WITHIN THE PROJECT AREA	252
FIGURE 9-1	IMPACTS REQUIRING AN OFFSET	296
FIGURE 9-2	IMPACTS NOT REQUIRING AN OFFSET	297

ACRONYMS AND ABBREVIATIONS

Acronyms	Description
ANOSIM	Analysis of Similarity
AOO	Area of Occupancy
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BBAMP	Bird and Bat Adaptive Management Plan
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BC Regulation	*Biodiversity Conservation Regulation 2017* (NSW)
BCS	Biodiversity Conservation and Science Directorate
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offset Assessment Management System
BOS	Biodiversity Offsets Scheme
BUS	Bird Utilisation Survey
CAP	Canonical Analysis of Principal Coordinates
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
cm	Centimetres
CRM	Collision Risk Modelling
CTMP	Construction Traffic Management Plan
Cwth	Commonwealth
Cwth DCCEEW	Commonwealth Department of Climate Change, Energy, Environment and Water
DPE	NSW Department of Planning and Environment
DPIE	NSW Department of Planning, Industry and Environment
EOO	Extent of Occurrence
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwth)
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EEC	Endangered Ecological Community
FM Act	*Fisheries Management Act 1994* (NSW)
Ha	Hectare
km	Kilometre
kV	Kilovolt
LCA	Land Categorisation Assessment
LLS Act	*Local Land Services Act 2013* (NSW)
Met mast	Meteorological mast

Acronyms	Description
MNES	Matters of National Environmental Significance
MW	Megawatt
IBRA	Interim Biogeographic Regionalisation for Australia
nMDS	Non-metric Multidimensional Scaling Plot
NVR Map	Native Vegetation Regulatory Map
NSW	New South Wales
NSW BioNet	Atlas of NSW Wildlife and Vegetation Classification
NSW DCCEEW	NSW Department of Climate Change, Energy, Environment and Water
NSW DEC	NSW Department of Environment and Conservation
PCT	Plant Community Type
PMST	Protected Matters Search Tool (Cwth)
REZ	Renewable Energy Zone
RSA	Rotor Swept Area
SAII	Serious and Irreversible Impact
SEARs	Secretary's Environmental Assessment Requirements
SIMPER	Similarity Percentage
SIMPROF	Similarity Profiles
SVTM	State Vegetation Type Map (NSW)
SWMP	Soil and Water Management Plan
TBDC	Threatened Biodiversity Data Collection
TEC	Threatened ecological community
VIS	Vegetation integrity score
VZ	Vegetation Zone
WTG	Wind Turbine Generator

GLOSSARY

Term	Description
Assessable vegetation	The extent of native vegetation cover within the Subject Land that is required to be assessed for direct impacts. This vegetation is to be assigned to a plant community type with broad condition state.
Benchmark (DPIE 2020)	The quantitative measures that represent the 'best attainable' condition for each PCT, which acknowledges that native vegetation within the contemporary landscape has been subject to both natural and human-induced disturbance. Vegetation with relatively little evidence of modification generally has minimal timber harvesting (few stumps, coppicing, cut logs), minimal firewood collection, minimal exotic weed cover, minimal grazing and trampling by introduced or overabundant native herbivores, minimal soil disturbance, minimal canopy dieback, no evidence of recent fire or flood, no high-frequency burning, and evidence of recruitment of native species.
Biodiversity risk weighting	Use in the BAM to evaluate the ecological risks of threatened entities from the Biodiversity Offsets Scheme (BOS)
Biodiversity values	Being vegetation integrity, habitat suitability and biodiversity-related values prescribed by the *Biodiversity Conservation Regulation 2017* (BC Regulation).
BioNet Vegetation Classification	The vegetation community-level classification (i.e., plant community types) for use in vegetation mapping programs and regulatory biodiversity impact assessment frameworks in NSW. This is published by the Department and available at www.environment.nsw.gov.au/research/Visclassification.htm.
Condition attributes	The matters assessed for composition, structure and function to determine vegetation integrity. The condition attributes for composition and structure are assessed according to growth form groups.
Development footprint (DPIE 2020)	The area of land that is directly impacted by a proposed development, including access roads and areas used to store construction materials. The term development footprint is also taken to include clearing footprint.
Development site (DPIE (2020)	An area of land that is subject to a proposed development under the *Environmental Planning and Assessment Act 1979* (EP&A Act)
Direct impacts	Impacts on biodiversity values and threatened species habitat that relate to clearing native vegetation and impacts on biodiversity values prescribed by the BC Regulation. This includes impacts from activities related to the construction or operational phase of the proposal
Habitat suitability (BC Act)	Being the degree to which the habitat needs of threatened species are present at a particular site
Indirect impacts (DPIE 2020)	Impacts that occur when the proposal affects native vegetation and threatened species habitat beyond the development footprint or within retained areas (e.g. transporting weeds or pathogens, dumping rubbish). This includes impacts from activities related to the construction or operational phase of the proposal and prescribed impacts
Minimise (DPIE 2020)	a process applied throughout the development planning and design life cycle that seeks to reduce the residual impacts of development on biodiversity values

Term	Description
No net loss (DPIE 2020)	Refers to the standard set out in Chapter 10 of the BAM that in the opinion of the Minister will result in no net loss of biodiversity in NSW
Patch size	An area of native vegetation that: occurs on the development site or biodiversity stewardship site. includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the development site or biodiversity stewardship site.
Plant community type	A plant community type identified using the PCT classification system (NSW only).
Prescribed impacts	Means the prescribed impacts identified in clause 6.1 of the BC Regulation. Prescribed impacts can be direct or indirect impacts.
Residual impact	An impact on biodiversity values that remains after all reasonable measures have been taken to avoid, minimise or mitigate the impacts of development. Under the BAM, an offset requirement is determined for the remaining impacts on biodiversity values.
Subject Land (DPIE 2020)	Is land subject to a development, activity, clearing, biodiversity certification or a biodiversity stewardship proposal. It excludes the assessment area which surrounds the subject land (i.e. the area of land in the 1500 m buffer zone around the subject land or 500 m buffer zone for linear proposals).
Vegetation integrity (DPIE 2020)	The condition of native vegetation assessed for each vegetation zone against the benchmark for the PCT.
Vegetation zone	a relatively homogeneous area of native vegetation on a development site, clearing site, land to be biodiversity certified or biodiversity stewardship site that is the same PCT and has the same broad condition state.

DECLARATIONS

Certification under clause 6.15 *Biodiversity Conservation Act 2016*

I, Mark Aitkens, certify that this report has been prepared based on the requirements of, and information provided under, the Biodiversity Assessment Method and clause 6.15 of the ***Biodiversity Conservation Act 2016*** (BC Act).

Signature:	
Date:	15 January 2026
BAM Assessor Accreditation Number: BAAS17034	

Conflict of Interest

I, Mark Aitkens, declare that I have considered the circumstances and there is no actual, perceived or potential conflict of interest.

This declaration has been made in the interest of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Signature:	
Date:	15 January 2026
BAM Assessor Accreditation Number: BAAS17034	

"In addition, the BAR must be submitted to the decision-maker within 14 days of the date on the relevant finalised credit report(s) generated by the BAM-C" (DPE 2018).

The Proponent has been advised of and warrants compliance with this requirement as the timing of report submission to the determining authority is not managed by the Accredited Assessor. If submitted outside this time window, a revised BAM-C report and report re-certification is required. Any change to the assessment requirements arising from a loss of report currency may necessitate updates to the assessment.

Details and experience of Author's and contributors

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Jordan Schloss	-	ERM – Ecologist	• Targeted threatened flora surveys • Targeted threatened fauna surveys • Bird Utilisation Surveys	• Bachelor of Environmental Science
Mikki Gourlis	-	ERM – Ecologist	• Contributing author • Targeted threatened flora surveys • Targeted threatened fauna surveys	• Bachelor of Zoology and Animal Science
Bart Schiebaan	BAAS18033	Hunter Ecology - Principal Ecologist	• BAM plot surveys • Targeted threatened flora surveys	• Bachelor of Applied Science • Advanced Diploma (Business Management) • Certificate II (Conservation & Land Management) • BAM Accredited Assessor
Lizzie Bowman	BAAS18112	Hunter Ecology - Principal Ecologist	• BAM plot surveys • Targeted threatened flora surveys	• Bachelor of Science • Graduate Certificate (Environmental Management and Sustainability_ • BAM Accredited Assessor
NGH Environmental Pty Ltd (NGH)	-	Consulting Firm	• BAM plot surveys • Targeted threatened flora surveys • Targeted threatened fauna surveys	• BAM accreditation
Nature Advisory Pty Ltd (Nature Advisory)	-	Consulting Firm	• Targeted threatened fauna surveys	• N/A
Damian Wall	BAAS18081	Red-gum Environmental Consulting - Principal Ecologist	• BAM plot surveys • Targeted threatened flora surveys	• Bachelor of Applied Science • Master of Environmental Management

EXECUTIVE SUMMARY

Acciona Energy Australia Global Pty Ltd (Acciona) (the Applicant) proposes to construct, operate, maintain, and decommission the Keri Keri Wind Farm (the Project) within the rural locality of Keri Keri, New South Wales (NSW). The Applicant is seeking development approval under Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) as a State Significant Development (SSD). This requires the preparation of a Biodiversity Development Assessment Report (BDAR) as the Project has potential to have a significant impact on biodiversity values (s7.9 of the *Biodiversity Conservation Act 2016* [BC Act]).

This BDAR has been prepared to assess impacts relating to the amended Project and to address matters raised in public and agency submissions, particularly advice provided by the Conservation Programs, Heritage and Regulation (CPHR) division of the NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW).

THE PROJECT

The Applicant has amended the Project as presented in the Environmental Impact Statement (EIS) in response to submissions received during EIS public exhibition and constraints identified during the development of the EIS. The key changes are:

- Reduction in number of WTGs from 155 to 114;
- Reduction in overhead electrical reticulation and transformed to underground;
- Reduction in number of site access points and biosecurity wash bays to two;
- Reduction in extent of site access tracks;
- Reduction in number of permanent Meteorological masts to three; and,
- Removal of proposed Port of Newcastle transport route reducing need for external road works.

The amended design will have a 32% reduction in native vegetation loss (i.e., 365.86 ha), with key differences between the EIS and amended design as follows:

- No impacts on plant community types (PCTs) 44 and 160;
- Reduced impact on PCT 163 (i.e., avoided 153.11 ha); and
- Reduced impact on PCT 164 (i.e., avoided 206.31 ha).

Impacts on PCT 164 have also been minimized as the condition of this vegetation is less for the amended design (i.e., VIS weighted mean of 75.7) versus a VIS of 97.6 in the EIS.

There is also a substantial impact reduction for threatened species, with the Project avoiding impacts on Little Eagle (*Hieraaetus morphnoides*) breeding habitat and eliminating the need for assumed presence for Slender Darling Pea (*Swainsona murrayana*) through the completion of survey.

AREAS SUBJECT TO ASSESSMENT

For the purposes of this BDAR, the Subject Land is defined as the area of direct impact (i.e., development footprint), which comprises an area of ~777 ha. Impacts on biodiversity that do not involve the clearing of native vegetation (i.e., indirect and prescribed impacts) are also evaluated in the BDAR. This BDAR also considers impacts to native vegetation and threatened species habitat along the transport route within NSW.

METHODS

Impacts to biodiversity values have been assessed in accordance with the Biodiversity Assessment Method 2020 (BAM) (NSW DPIE, 2020a). Field surveys for the Subject Land were undertaken over several events, as summarised in Table E-1-1.

TABLE E-1-1 SUMMARY OF SURVEY EVENTS

Season	Dates	Survey Methods	Company
Subject Land			
Autumn 2020	30 March – 5 April 2020	• Habitat and vegetation assessments • Bird Utilisation Surveys (BUS)	• NGH • Nature Advisory
Spring 2020	28 September – 2 October 2020	• Habitat and vegetation assessments • Vegetation Integrity (BAM) plots • Targeted threatened flora transects • Targeted threatened fauna surveys	• NGH
	12 – 16 October 2020	• BAM plots • Targeted threatened flora transects • Targeted threatened fauna surveys	• NGH
	23 – 26 November 2020	• BUS	• Nature Advisory
Spring 2021	26 October – 12 November 2021	• Habitat and vegetation assessments • BAM plots • Targeted threatened flora transects • Targeted threatened fauna surveys	• ERM • Red-gum Environmental Consulting
Summer 2021/2022	14 – 25 February 2022	• Habitat and vegetation assessments • BUS • Targeted threatened flora transects	• ERM
Spring 2022	26 August – 5 September 2022	• Habitat and vegetation assessments • BUS • Targeted threatened flora transects • Targeted threatened fauna surveys	• ERM
Summer 2022/2023	6 – 9 February 2023	• BAM Plots	• ERM
Winter/Spring 2023[1]	4 – 8 September 2023	• BUS • Targeted threatened flora transects	• ERM
Spring 2023	9 – 13 October 2023	• BUS • Targeted threatened flora transects	• ERM
Summer 2023/2024	19 – 21 December 2023	• Targeted threatened flora transects	• ERM
Autumn 2024	27 – 31 May 2024	• BUS	• ERM
Winter 2024	26 – 30 August 2024	• BUS • Targeted threatened fauna surveys	• ERM
Spring 2024	15 – 28 September 2024	• BAM plots • Targeted threatened flora transects • Targeted threatened fauna surveys	• ERM • Hunter Ecology

[1] Surveys conducted in the first week of September 2023 have been completed as a Winter BUS season due to access restrictions because of flooding throughout Winter 2023

Season	Dates	Survey Methods	Company
	26 – 30 November 2024	• BUS • BAM plots • Targeted threatened flora transects • Targeted threatened fauna surveys	• ERM
Spring 2025	29 September – 2 October 2025	• BAM plots • Targeted threatened flora transects • Targeted threatened fauna surveys	• ERM
Transport Route			
Spring 2025	30 September 2025	• BAM plots • Targeted threatened flora transects	• ERM

BIODIVERSITY VALUES OF THE SUBJECT LAND

The Subject Land comprises 765.06 ha of native vegetation cover comprising three plant community types (PCT) and several condition states (i.e., vegetation zones [VZs]). A summary of this native vegetation cover is provided in Table E-1-2.

TABLE E-1-2 PCTS AND VEGETATION ZONES OF THE SUJECT LAND

PCT	Name	Vegetation Zone	Area (ha)
Subject Land			
164	Cotton Bush open shrubland of the semi-arid (warm) zone	VZ01_PCT164_Grassy	197.37
164	Cotton Bush open shrubland of the semi-arid (warm) zone	VZ02_PCT164_Open	138.82
164	Cotton Bush open shrubland of the semi-arid (warm) zone	VZ03_PCT164_Degraded	18.33
164	Cotton Bush open shrubland of the semi-arid (warm) zone	VZ04_PCT164_Dense	223.98
164	Cotton Bush open shrubland of the semi-arid (warm) zone	VZ05_PCT164_Gilgais	70.92
163	Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	VZ06_PCT163_Shrubland	115.47
Transport Route			
159	Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	VZ07_PCT159_Haul Route	0.17

None of these PCTs form part of a TECs. Ten ecosystem credit species were recorded within the Project Area:

- Southern Whiteface (*Aphelocephala leucopsis*);
- Fork-tailed Swift (*Apus pacificus*);
- Dusky Woodswallow (*Artamus cyanopterus*);
- Spotted Harrier (*Circus assimilis*);
- White-fronted Chat (*Epthianura albifrons*);

- Black Falcon (*Falco subniger*);
- Little Eagle (*Hieraaetus morphnoides*) (dual ecosystem and species);
- Pink Cockatoo (*Lophochroa leadbeateri*) (dual ecosystem and species);
- Plains-wanderer (*Pedionomus torquatus*); and
- Yellow-bellied Sheath-tailed Bat (*Saccolaimus flaviventris*).

Where possible, the Project has avoided habitat preferred by these species such as breeding areas. The Project has avoided all native vegetation within 1 km of the solitary Plains-wanderer observation made within the Project Area. No Important Habitat Area associated with this species occurs within the Project Area.

Two species credit species have been observed within the Subject Land resulting in the preparation of species polygons for these species:

- Mossgiel Daisy (*Brachyscome papillosa*); and
- Chariot Wheels (*Maireana cheelii*).

Other noteworthy findings include:

- No important area mapping coincides with the Subject Land;
- No threatened species have been recorded within the transport route;
- No Serious and Irreversible Impact (SAII) entities were identified for the purposes of assessment under the BAM; and
- No key fish habitat is present, and it is considered unlikely that any aquatic species listed under the *Fisheries Management Act 1994* would be impacted by the Project.

PRESCRIBED IMPACTS

The Project is anticipated to have prescribed impacts as outlined below:

- Impacts to hydrological processes;
- Increased risk of mammal predatory species access;
- Increased risk of vehicle strike; and
- Risk of turbine strike.

Assessment for these is provided including turbine and species risk assessments and collision risk modelling for bird and bat turbine strike.

CUMULATIVE IMPACTS

Relevant future infrastructure projects in the region may result in the removal of 11,000 ha+ of native vegetation and habitat for threatened species. Most of these impacts are on chenopod shrublands, notably PCT 164 which is a degraded native vegetation community that generally comprises few high biodiversity values.

This Project will not clear any woody vegetation, which is rare in the region and likely to contain some of the highest biodiversity values found in the Murrumbidgee Interim Biogeographic Regionalisation of Australia (IBRA) subregion. Project impacts are small, representing ~0.1% of approved/proposed clearing for infrastructure across the region. The habitat of threatened species has been avoided by concentrating the development within areas of PCT 164 that are disturbed, with low diversity and sparse vegetation cover, rather than in other vegetation types that comprise higher biodiversity values. It is concluded that the Project is not likely to make any substantive cumulative impact on biodiversity values within the region.

AVOID AND MINIMISE

The Applicant has completed environmental assessment of the Subject Land in accordance with the Biodiversity Assessment Method 2020 (BAM) and Secretary's Environmental Assessment Requirements (SEARs) and has modified the project layout based on the outcomes of these assessments.

The Project design has evolved through the course of preparing the BDAR to minimise impact on biodiversity values. Amendments to the Project design have maximised the use of existing public and internal access tracks and minimised vegetation clearance required. Turbines originally proposed in proximity to conservation reserves, raptor nesting sites, remnant woodland habitat, ephemeral wetlands and Plains-wanderer habitat have been removed or relocated to avoid and minimise impacts to biodiversity values.

Where possible, the project has been refined to avoid and minimise impacts on biodiversity values such as:

- Habitat features used by raptors (i.e., stick nests) by using buffers;
- Indirect impacts on the adjoining Yanga State Conservation Area by removing WTGs located in proximity to that reserve (no turbine is within 1.2 km of this reserve);
- Removing development from areas with a high incidence of threatened flora;
- Removing development from areas comprising vegetation described as PCT 44/46 (i.e., core habitat for the Plains-wanderer);
- Avoiding the occurrence of the recently listed *Pterostylis pedina* (endangered);
- Avoidance of any crossing of Abercrombie Creek and use of lands south of Abercrombie Creek where potential habitat for additional threatened flora species occurs;
- Where possible, removing WTGs located nearby the existing transmission line easement (i.e., potential perching habitat for raptors), to reduce the risk of prescribed impacts; and
- Avoidance of semi-permanent and permanent water sources, with no such water resources being within 200 m of the Subject Land (i.e., avoiding the potential for impacts on threatened species such as the Southern Myotis and Growling Grass Frog).

Specifically, and in comparison, to the EIS design, impact reductions on biodiversity values are summarised as follows:

- Confirmation that no species at risk of serious and irreversible impact (SAII) would be subject to impacts form the Project;
- Elimination of assumed presence through completion of appropriately timed targeted surveys (i.e., Mossgiel Daisy (*Brachyscome papillosa*) Chariot Wheels (*Maireana cheelii*), Slender Darling Pea (*Swainsona murrayana*));
- Elimination of impacts to the following species credit species:
  - Slender Darling Pea (*Swainsona murrayana*);
  - Little Eagle (*Hieraaetus morphnoides*);
- Elimination of impacts to PCT 26, PCT 44, PCT 160 and associated threatened species (i.e., these no longer occur in the Disturbance Footprint);
- Reduced impacts (i.e., clearing) to PCT 164 by 206.31 ha;
- Reduced impacts (i.e., clearing) to PCT 163 by 153.11 ha;
- Reduction in the number of ecosystem offset credits by 18,048;
- Reduction in the number of species offset credits by 118,153.

MITIGATION

Residual impacts will be mitigated by measures that protect retained and adjacent vegetation and habitat during the construction, operation and decommissioning phases. A Biodiversity Management Plan (BMP) will be prepared to manage impacts on biodiversity values across the Subject land through construction, operational and decommissioning periods.

This will inform a Construction Environment Management Plan (CEMP) prepared in consultation with relevant parties prior to construction. The CEMP will include provisions for clearing protocols, construction timing, and include measures to minimise soil disturbance, runoff and sediment transfer, noise, dust, and vibrations because of the Project.

Other management plans, such as a Construction Traffic Management Plan (CTMP) and Soil and Water Management Plan (SWMP), will incorporate mitigation measures to minimise the impacts relating to traffic, noise, light, soil erosion and water quality.

The Bird and Bat Adaptive Management Plan (BBAMP) framework, prepared as part this BDAR, will enable the implementation of a long-term approach to the mitigation and management of potential impacts on listed threatened and migratory species and other avian species at risk of turbine strike and / or barotrauma. Monitoring will also be incorporated into the BBAMP to identify any potential changes to the species' utilisation of the Subject Land and the surrounding landscape.

RESIDUAL IMPACTS AND BIODIVERSITY OFFSET LIABILITY

The Project's residual impacts correspond to 22,703 ecosystem credits. The Project's direct impact on biodiversity values by PCT is outlined in Table E-1-3.

TABLE E-1-3 IMPACTS THAT REQUIRE OFFSETS – ECOSYSTEM CREDITS

Vegetation Zone	PCT	Condition	TEC	VIS	Biodiversity Risk Weighting	Impact area (ha)	Ecosystem credits required
Subject Land							
VZ01	164	Grassy	No	80.1	1.5	197.37	5,929
VZ02	164	Open	No	53.1	1.5	138.82	2,766
VZ03	164	Degraded	No	36.5	1.5	18.33	251
VZ04	164	Dense	No	91.4	1.5	223.98	7,680
VZ05	164	Gilgais	No	68.2	1.5	70.92	1,815
VZ06	163	Shrubland	No	98.3	1.5	115.47	4,256
Transport Route							
VZ07	159	Transport Route	No	53.9	2.5	0.17	6

The Project has been calculated to have a direct impact on the species credit species summarised in Table E-1-4. Note that the residual impact on species is the extent of known presence following consideration of survey results that demonstrate species absence.

TABLE E-1-4 IMPACTS THAT REQUIRE OFFSETS – SPECIES CREDITS

Common Name	Scientific Name	BC Act Status	EPBC Act Status	Biodiversity Risk Weighting	Loss of habitat (ha)	Number of species credits required
Mossgiel Daisy	*Brachyscome papillosa*	V	V	2.00	162.02	6,444
Chariot Wheels	*Maireana cheelii*	V	V	2.00	27.97	1,217

OFFSET STRATEGY

The Applicant is developing a biodiversity offset strategy in parallel with the BDAR. This strategy will detail the offset approach to be undertaken to retire credit obligations and will be achieved by one or more of the following options:

- Retiring 'like for like' credits as specified in Table E-1-3 and from the Murrumbidgee IBRA subregion or adjacent IBRA subregions within 100 km of the Subject Land; and/or
- Funding a biodiversity conservation action instead of, or in combination with, the retirement of species credits; and/or
- Entering into a Strategic Offset Delivery Agreement with the Environment Agency Head to meet the biodiversity offset obligations; and/or
- In part or full payment into the Biodiversity Conservation Trust (BCT) *in lieu* of satisfying the offset liability specified in Table E-1-3.

PREFACE

1. ASSESSMENT OVERVIEW

Environmental Resources Management Australia Pty Ltd (ERM) has prepared this Amended Biodiversity Development Assessment Report (Amended BDAR) for the Keri Keri Wind Farm (the Project) on behalf of Acciona Energy Australia Global Pty Ltd ('Acciona' or the 'Applicant')

The Project is to be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as State Significant Development (SSD).

The Project was determined to be a controlled action on 2 May 2022, and approval is also sought under Part 9 of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Referral (EPBC 2022/9176).

An Environmental Impact Statement (EIS) accompanying the SSD application (SSD-38358962) has been prepared for the Project (ERM, 2024a). The EIS was publicly exhibited between 24 May 2024 and 20 June 2024 by the NSW Department of Planning, Housing and Infrastructure (DPHI).

This Amended BDAR is prepared in accordance with the Biodiversity Assessment Method 2020 (BAM), with consideration of the NSW Department of Climate Change, Energy, the Environment and Water's (DCCEEW) 'Wind Farms – turbine strike assessment & adaptive impact management' guidelines (NSW DCCEEW, 2024b), as the Biodiversity Offset Scheme (BOS) applies to the Project. It also addresses:

- The Planning Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning and Environment (DPE) (SSD-38358962, dated 14 April 2022); and
- The Supplementary SEARs received from the Commonwealth Department of Agriculture, Water and the Environment (DAWE) - now the Commonwealth DCCEEW.

This Amended BDAR has addressed the Project amendments and relevant issues raised in public and agency submissions. The Amended BDAR will be submitted with the Submission Report and Amendment Report prepared as part of the SSD application.

1.1 RELEVANT LEGISLATION AND POLICIES

This Amended BDAR addresses Stage 1 (Biodiversity Assessment) and Stage 2 (Impact Assessment) of the BAM and omits Stage 3 (Improving Biodiversity Values) as this is only required for Biodiversity Stewardship Site Assessment Reports. The BDAR also addresses the assessment requirements of the EPBC Act and the relevant State Environmental Planning Policies (SEPPs).

1.1.1 ASSESSMENT FRAMEWORK

The Project requires approval under Part 4 of the EP&A Act. Section 1.7 of the EP&A Act specifies that the EP&A Act has effect subject to the provisions of Part 7 of *Biodiversity Conservation Act 2016* (BC Act). Part 7 of the BC Act mandates the application of the BAM (NSW DPIE, 2020a) where the Project exceeds a biodiversity offsets scheme threshold (i.e., s7.2 of the BC Act) and / or is "likely to significantly affect threatened species" upon application of the test (s7.3 of the BC Act). In this case, these thresholds do not apply as the Project is declared SSD thus mandating the preparation of a BDAR (s7.9 of the BC Act) in the absence of a successful BDAR waiver. The Minister for Planning is to take into consideration impacts on serious and irreversible impact (SAII) entities and determine if any additional measures are required to minimise impacts on these entities (s7.16(3) of the BC Act).

1.1.2 REQUIREMENT FOR A BDAR

The BOS applies to the Project as it has been declared SSD (s7.9 of the BC Act). The Applicant has engaged an independent accredited assessor, without any conflicts of interest, to apply the BAM to assess the impacts of the Project on biodiversity values.

1.1.3 APPLICATION OF THE BAM

1.1.3.1 CONTENT

This BDAR has been prepared in accordance with the relevant parts of the BAM, as required under the BC Act, for development identified as "likely to significantly affect threatened species". No streamlined assessment modules were applied in preparing this BDAR. The minimum information supplied in this BDAR is in accordance with the relevant details specified in Table 24 of Appendix K of the BAM.

1.1.3.2 CERTIFICATION

The BDAR is certified by the accredited assessor indicated on Page (viii) of this document as of the date corresponding with the signature. The BAM Calculator (BAM-C) report associated with this BDAR was finalised within 14 days of the date of submission of this BDAR.

1.1.3.3 CHANGES TO THE BAM

Clause 6.31 of the NSW *Biodiversity Conservation Regulation 2017* (BC Regulation) outlines how an accredited assessor can respond to changes to the BAM whilst preparing a biodiversity assessment report. This clause is reproduced below for clarity [underline used for emphasis]:

6.31 Changes in biodiversity assessment method

(1) If the biodiversity method is changed, a biodiversity assessment report may, during the designated period after the method is changed, be prepared on the basis of the method in force before the change, but only if the report states that it has been prepared on that basis.

(2) For the purposes of this clause, the designated period is—

(a) except as provided by this subclause—6 months, or

(b) in the case of a biodiversity development assessment report in respect of State significant development or State significant infrastructure—12 months, or

(c) in the case of a biodiversity certification assessment report for an application that is not a strategic biodiversity certification application—12 months, or

(d) in the case of a biodiversity certification assessment report for a strategic biodiversity certification application—12 months or such longer period as the Minister approves in a particular case.

No definition for 'biodiversity method' is provided in the BC Act, BC Regulation nor BAM 2020, with the use of this term found only in this clause. Therefore, a plain English definition has been applied to interpret this clause.

The Threatened Biodiversity Data Collection (TBDC) and NSW BioNet Atlas (NSW DCCEEW, 2025b) are referred to in Section 1.4 of the BAM as published databases that ***must*** be used in preparing a biodiversity assessment report. These database sources contain methods and specifications not documented in the biodiversity assessment method established by order of the Minister and published on the NSW legislation website (see s6.7(4) of the BC Act). By reference to Section 1.4 of the BAM, changes to these published databases have the effect of changing the BAM. These databases are periodically amended/updated by CPHR, typically without formal notification.

A change in these published databases is a change in the biodiversity method, thus a change in the biodiversity assessment method. For example, the TBDC may be changed to include a new or revised survey method and/or timing specification for a species. As the biodiversity method has changed, so has the BAM. With reference to the specified designated periods above, the accredited assessor may prepare the BDAR based on the method(s) in force before the change and in so doing will state this as the case, where appropriate, in the biodiversity assessment report.

This BDAR contains site-based information derived from the application of the BAM at a particular time. In part, this information is used to determine the plant community types (PCTs) and habitat present within the Project Area, which provides the basis for determining ecosystem and candidate species requiring assessment (i.e., the TBDC defines species associations with PCTs). Changes in the candidate species list because of amendments to the TBDC (i.e., PCT associations) during and/or after the publishing of this BDAR are possible and represents a change in the BAM. For this reason, grounds exist for excluding these changes from the assessment. The biodiversity assessment report will state this if the circumstance arises.

Where appropriate, the accredited assessor may choose to apply the biodiversity method in force before the change and, if so, the decision to do so will be stated in the biodiversity assessment report.

1.1.4 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The EPBC Act provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities, and heritage places – defined as Matters of National Environmental Significance (MNES).

A referral was submitted by the Applicant to the Commonwealth DCCEEW, (EPBC 2022/9176). The referral identified potential for significant impacts to EPBC Act listed MNES, which are likely to occur or use habitat within the Project Area and be impacted by the Project.

The Commonwealth Minister for the Environment and Water determined that the Project is likely to have a significant impact on MNES and therefore is a 'controlled action' under Part 7 of the EPBC Act. Consequently, the Project will be assessed under an Assessment Bilateral Agreement, allowing a single environmental impact assessment process for both the Commonwealth and NSW government. Supplementary SEARs have been provided where the Commonwealth has identified additional matters for consideration, the EPBC Act controlling provisions for the proposed action included:

- Listed threatened species and communities.

The assessment requirements include (but are not limited to) the EIS identifying each EPBC Act listed threatened species and community and migratory species likely to be impacted by the action and a description of the impacts, habitat, survey methodologies and avoidance, mitigation and offset measures to reduce impacts. The threatened species and communities identified in the supplementary SEARs are provided in Table 1-1.

TABLE 1-1 MNES IDENTIFIED IN THE SUPPLEMENTARY SEARS

Threatened Species/Community	EPBC Act Listing
Likely Significant Impact	
Natural Grasslands of the Murray Valley Plains	Critically Endangered
Plains-wanderer (*Pedionomus torquatus*)	Critically Endangered
Winged Peppercress (*Lepidium monoplocoides*)	Endangered
Chariot Wheels (*Maireana cheelii*)	Vulnerable
Mossgiel Daisy (*Brachyscome papillosa*)	Vulnerable
Potential Significant Impact	
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	Critically Endangered
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered
Weeping Myall woodlands	Endangered
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of Southeastern Australia	Endangered
Flathead Galaxias (*Galaxias rostratus*)	Critically Endangered
Australian Painted Snipe (*Rostratula australis*)	Endangered
Australasian Bittern (*Botaurus poiciloptilus*)	Endangered
Corben's Long-eared Bat (*Nyctophilus corbeni*)	Vulnerable
Growling Grass Frog (*Litoria raniformis*)	Vulnerable
Grey Falcon (*Falco hypoleucos*)	Vulnerable
Malleefowl (*Leipoa ocellata*)	Vulnerable
Painted Honeyeater (*Grantiella picta*)	Vulnerable
Austrostipa metatoris	Vulnerable
Slender Darling-pea (*Swainsona murrayana*)	Vulnerable

The assessment of impacts on MNES is provided in several sections of this report, notably Section 5.3 and Section 8.7. A checklist for this assessment is provided in Appendix E.

1.2 BIODIVERSITY CREDITS AND CLASSES

The BAM uses biodiversity credits to measure:

- The residual impacts of a proposal on biodiversity values; or
- Gains in biodiversity values at biodiversity stewardship sites.

In this application, the BDAR is measuring the direct impacts of the Project on biodiversity values using two kinds of credits - 'ecosystem credits' and 'species credits'.

Each ecosystem credit is assigned up to seven attributes that are used to distinguish the type of biodiversity values represented by the credit and to determine whether a credit within a class is 'like' another credit. These attributes are:

- The PCT impacted by the Project;
- Any TEC associated with the PCT;
- The offset trading group for the TEC or, if no associated TEC, for the PCT;
- The vegetation class of the PCT;
- The vegetation formation of the PCT;
- The presence or absence of hollow bearing trees; and
- The Interim Biogeographical Regionalisation for Australia (IBRA) subregion in which the Project occurs.

Each species credit is assigned four attributes. Matching of attributes is used to apply the 'like-for-like' rules as set out in the BC Regulation. These attributes are:

- The threatened species impacted by the Project;
- The threat status of the threatened species;
- The kingdom to which the threatened species belongs; and
- The IBRA subregion in which the Project occurs.

1.3 ACCREDITED PERSON

A BDAR, which documents the assessment and 'No Net Loss' outcomes, must be prepared by a person accredited under s6.10 of the BC Act. An accredited person is referred to as an assessor.

This BDAR was authored by Mark Aitkens (lead) and Freya Robinson (contributor) with contributions from Robert Ashworth and Mikki Gourlis. The BDAR was reviewed and certified by Mark Aitkens (Accredited BAM Assessor – BAAS17034) on 15 January 2026.

The assessment provided in the report is based on the BAM-C (App version 1.5) with BAM data last updated on 5/8/2025 (Version 82) and linked to Development Assessment Case 00029215/BAAS17034/24/00046438. The BAM-C was finalised on 15 January 2026 as part of certifying this BDAR (case number: 00046438).

1.4 DATA AND INFORMATION USED

The full list of information sources referred to in this report is provided in Section 12. Digital shapefiles for all maps and spatial data have been submitted with this report. Information sources included, but were not limited to, the following:

- Proposal layers and concept designs provided by the Applicant;
- NSW BioNet, incorporating the TBDC and BioNet Vegetation Classification (NSW DCCEEW, 2025b) (https://www2.environment.nsw.gov.au/topics/animals-and-plants/biodiversity/nsw-bionet);
- NSW SEED Portal (NSW Government, 2025b) (https://www.seed.nsw.gov.au/);
- NSW State Vegetation Type Map (Edition C2.0.M2.1) (NSW DCCEEW, 2020) (https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map);
- NSW Biodiversity Values Map (NSW DCCEEW, 2025a) (https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap);
- PlantNet (Royal Botanic Gardens and Domain Trust, 2025) (https://plantnet.rbgsyd.nsw.gov.au/);

- Australia's IBRA bioregions and sub-regions, version 7 (Cwth DCCEEW, 2023a) (http://www.environment.gov.au/land/nrs/science/ibra);
- NSW Mitchell Landscapes map (NSW Government, 2025b) and descriptions (NSW Department of Environment and Climate Change (DEC), 2002);
- Commonwealth Government's Species Profiles and Threats (SPRAT) database (Cwth DCCEEW, 2025) (http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl);
- EPBC Act Protected Matters Search Tool (Cwth DCCEEW, 2024b; Cwth DAWE, 2021a) (http://www.environment.gov.au/epbc/protectedmatters-search-tool);
- Guidance to assist a decision-maker to determine a serious and irreversible impact (NSW DPIE, 2019a);
- Biodiversity Assessment Method (BAM) 2020 (NSW DPIE, 2020a);
- Biodiversity Offset Assessment Management System (BOAMS), incorporating the BAM Calculator (BAM-C) (https://customer.lmbc.nsw.gov.au/assessment/s/userlogin);
- 'Species credit' threatened bats and their habitats - NSW survey guide for the Biodiversity Assessment Method (NSW DPIE, 2021);
- Surveying threatened plants and their habitats - NSW survey guide for the Biodiversity Assessment Method (NSW DPIE, 2020b);
- NSW Department of Environment and Conservation (DEC) - Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities (NSW DEC, 2004);
- Cwth. Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) - Survey Guidelines for Australia's Threatened Mammals (Cwth DSEWPC, 2011);
- NSW Survey Guide for Threatened Frogs: A guide for the survey of threatened frogs and their habitats for the Biodiversity Assessment Method (NSW DPIE, 2020c);
- Cwth. Department of the Environment, Water, Heritage and the Arts (DEWHA) - Survey Guidelines for Australia's Threatened Birds (Cwth DEWHA, 2010);
- Koala (*Phascolarctos cinereus*) Biodiversity Assessment Method Survey Guide (NSW DPE, 2022b);
- Threatened reptiles - Biodiversity Assessment Method survey guide (NSW DPE, 2022a);
- Wind Farms – turbine strike assessment and adaptive impact management. Biodiversity Assessment Method Guide (NSW DCCEEW, 2024b);
- Onshore Wind Farm Guidance (Cwth DCCEEW, 2024a);
- Keri Keri Wind Farm Scoping Report (ERM, 2022);
- Preliminary Biodiversity Assessment – Spring Survey Report 2020 (NGH, 2020); and
- Keri Keri Wind Farm Biodiversity Development Assessment Report (ERM, 2024).

1.5 BIODIVERSITY VALUES NOT ASSESSED

The BAM does not assess biodiversity values for:

- Marine mammals;
- Wandering seabirds;
- Biodiversity that is endemic to Lord Howe Island; and / or

- Native vegetation and loss of habitat on Category 1 - exempt land (within the meaning of Part 5A of the *Local Land Services Act 2013* (LLS Act)), other than the additional biodiversity impacts under clause 6.1 of the BC Regulation (referred to as prescribed impacts in the BAM).

This BDAR does not include an assessment of the above matters. The extent of Category 1 - exempt land is outlined in the following section.

1.6 CATEGORY 1 - EXEMPT LAND

The Subject Land comprises rural zoned land and is thus regulated under the *Local Land Services Act 2013* (LLS Act). Under the LLS Act, three land categories are defined relating to vegetation clearing:

- Category 1 – 'Exempt land', land that is not subject to clearing approval;
- Category 2 – 'Regulated Land', land on which clearing of native vegetation may be carried out with or without approval in accordance with an 'allowable activity' or 'code' under the LLS Act (Category 2 – regulated land is further divided into Category 2 – vulnerable regulated land and Category 2 – sensitive regulated land); and
- 'Excluded Land' – Land not categorised on the Native Vegetation Regulatory (NVR) Map and to which the LLS Act does not apply.

The Draft Native Vegetation Regulatory (NVR) Map (accessed 18th September 2025) identifies the Subject Land as containing Category 1 – exempt land, Category 2- regulated land and Category 2 – vulnerable regulated land.

The clearing of vegetation across the Subject Land will be subject to approval and has been considered throughout this BDAR in accordance with the BAM. None of the land identified as Category 1 – exempt land on the draft NVR Map has been segregated from this assessment and, alternatively, has been assessed on its current condition state.

1.7 STRUCTURE OF THE BDAR

A BDAR requires completion of Stages 1 and 2 of the BAM (NSW DPIE, 2020a). These stages are outlined below.

- Stage 1 establishes a consistent approach to assessing the biodiversity values of land; and
- Stage 2 outlines the guidance and requirements to apply the hierarchy of avoid, minimise and offset for assessing direct, indirect or prescribed impacts on biodiversity values arising from the proposed development, activity, clearing or biodiversity certification. Stage 2 also provides guidance on the use of mitigation measures where there is uncertainty on impact timing or extent.

Section structuring in this BDAR follows the corresponding BAM sections to assist readability and for compliance with the BAM. Thus, in omitting the Stage 3 BAM assessment, the BDAR section structuring ends with the last section for Stage 2 (Section 10).

Documents appended to this BDAR include:

- Appendix A – Draft Bird and Bat Adaptive Management Plan (ERM, 2025)
- Appendix B – Bird Utilisation Survey Data
- Appendix C – Bat Call Analysis Reports
- Appendix D – Biodiversity Credit Reports

- Appendix E – Assessment of MNES
- Appendix F – Full Floristic Plot Data
- Appendix G – BAM Plot Data

1.8 BDAR VERSION HISTORY

This Amended BDAR has been prepared in accordance with the BAM (NSW DPIE, 2020a) through contributions made by accredited and non-accredited persons since 2020. Contributors to the preparation of the BDAR are listed under Details and experience of Author's and contributors.

A BDAR was prepared for the Project by ERM in 2024 and, since then, the Project has undergone several design revisions. Additional field surveys have been conducted (i.e., bird utilisation surveys [BUS], microbat survey, targeted threatened species surveys and BAM plots), aiding the refinement of vegetation mapping, threatened species polygon mapping and, collision risk modelling. This Amended BDAR was prepared to address the impacts of the amended Project design and the issues raised in government agency and public submissions on the EIS. Responses to government agency submissions relevant to this BDAR are addressed in Table 1-2.

1.9 RESPONSE TO SUBMISSIONS

Table 1-2 addresses comments in relation to biodiversity assessment presented in Keri Keri Wind Farm Biodiversity Development Assessment Report (ERM, 2024) from the NSW South West Biodiversity Conservation and Science Group (BCS) dated 15 July 2024.

TABLE 1-2 RESPONSE TO SUBMISSIONS

Reference	Submission	Response	Section Addressed
The candidate list of threatened species, survey effort, suitable habitat and species polygons require review as they include error or have not been prepared in accordance with the BAM			
BCS 4.1	Update the BDAR to ensure that the exclusion of suitable habitat for all candidate species (and ecosystem species) is in accordance with the BAM.	Exclusion of candidate species from further assessment has been undertaken in accordance with the BAM because of habitat or geographical constraints. No species have been excluded because of degraded habitat; however, the Subject Land is degraded.	Section 5.2
BCS 4.2	Prior to determination, conduct surveys for candidate species which have been excluded based on the presence/absence of nearby records.	Surveys have been conducted for candidate species in accordance with their relevant guidelines. Discussion of species records is provided to further justify the conclusion of their presence/absence.	Section 2.2.3
BCS 5.1	Provide details of threatened flora survey effort (including in all areas mapped as PCT 44) to demonstrate how much of each associated PCT has been surveyed during the required months.	Threatened flora survey effort has been detailed, quantified and presented in maps within the BDAR.	Section 2.2.3
BCS 5.2	Provide additional information to confirm threatened species surveys were conducted in accordance with relevant guidelines and TBDC for the following species and guilds: *Ardeotis australis* (Australian Bustard), Forest owls, Microbats, and Amphibians. If additional surveys cannot be undertaken, presence must be assumed or an expert report provided.	Threatened species survey effort conducted with reference to their relevant guidelines are presented within the BDAR. Surveys performed are adequate. No assumed presence or expert report is required.	Section 2.2.4
BCS 5.3	Survey using harp trapping to determine the presence or absence of *Myotis macropus* and *Nyctophilus corbeni* within the subject land.	As per Section 5.1.1 of the BAM, targeted survey is not required to identify or confirm the presence of an ecosystem species and therefore harp trapping for *Nyctophilus corbeni* has not been conducted. No permanent or semi-permanent waterbodies occur within 200 m of the Subject Land and so no species polygon can be created for *Myotis macropus*. Harp trapping has not been completed on this basis.	Section 5.1.1 and Section 5.2

Reference	Submission	Response	Section Addressed
BCS 5.4	Include *Myotis macropus* in Table 5.3 of the BDAR and assess it in accordance with Section 4.1.1 of the Biodiversity Assessment Method Operational Manual - Stage 1.	The Southern Myotis (*Myotis macropus*) has been manually added and assessed as a candidate species within this BDAR. Survey effort conducted is considered sufficient and the species has not been detected. No permanent or semi-permanent waterbodies occur within 200 m of the Subject Land and so no species polygon can be created for *Myotis macropus*.	Section 5.2
BCS 6.1	After survey is completed, revise all species polygons for 'area' species to include all suitable habitat.	Species polygons have been revised to reflect survey findings and species polygon rules established under the BAM.	Section 5.2.5
BCS 7.1	Ensure any additional targeted survey to reduce the area of assumed presence is finalised and included in a revised BDAR before the project is determined.	Adequate additional targeted surveys have been conducted (September 2024) with results presented within this amended BDAR. Assumed presence is no longer made in this BDAR.	Section 2.2.3
The assessment and calculation of direct impacts does not include all impacts.			
BCS 8.1	Identify all ancillary infrastructure and revise the assessment and BAM-C to include all direct and indirect impacts to biodiversity.	The Project description including ancillary infrastructure has been provided, the Subject Land has been defined and direct and indirect impacts have been assessed.	Section 2.1 and Section 8
BCS 9.1	Revise the assessment to include all impacts to native vegetation along the haul route and include in separate BAM-C cases.	Assessment of revised haul route has been incorporated into the Subject Land assessed in this BDAR	This document
BCS is unable to advise on Serious and Irreversible Impacts (SAII) as the SAII assessment is incomplete.			
BCS 10.1	Update section 9.1 to present the impacts to the SAII entity Plains-wanderer.	At the request of CPHR, an assessment is provided for the potential SAII entity Plains-wanderer. The Project has avoided impacts on this species.	Section 9.1
BCS 11.1	Survey for *Pilularia novae-hollandiae* and complete a SAII assessment.	*Pilularia novae-hollandiae* is associated with PCT 44, which is no longer being impacted by the Project. Microhabitat surveys were conducted for the Austral Pillwort (*Pilularia novae-hollandiae*) in December 2024 and the species was not detected and is determined to be absent from the Subject Land. No SAII assessment has been completed as the species and its associated PCT habitat is absent from the Development Footprint.	Section 2.2.3

Reference	Submission	Response	Section Addressed
PCT and vegetation zone identification and mapping need to be revised as they have inaccuracies that can affect the biodiversity credit calculation.			
BCS 12.1	Revise the PCT mapping to more accurately reflect vegetation and edaphic patterns evident on aerial imagery.	PCT mapping of the Subject Land has been completed at a scale of 1:1,000 using recent high-resolution imagery, BAM plots and rapid vegetation assessments	Section 2.2.2
BCS 12.2	Sample additional VI plots to demonstrate that PCT allocation and vegetation condition across the subject land has been adequately sampled and mapped.	Additional BAM plots have been completed to inform the vegetation mapping and vegetation integrity scores (VIS) of the Subject Land	Section 2.2.2.4
BCS 12.3	Consider if the use of 'wet' benchmarks is applicable.	Not applicable. Obtained a more contemporary set of BAM plots relevant to the Project from a period with average rainfall.	N/A
BCS 12.4	Update Table 2-4 or include a table in Chapter 4 that shows, for each vegetation zone, the BAM plot identifiers for plots within the Development Footprint, within the subject land, and any BAM plots outside the subject land that were used in vegetation zone calculations, including distance to the vegetation zone.	BAM plots used for mapping native vegetation and calculating VI have been listed against their corresponding vegetation zone and displayed in a figure (Figure 2-5), including those outside the Subject Land used to calculate VIS	Section 2.2.2.4
BCS 12.5	Revise the BDAR and spatial data to ensure the numbering of vegetation zones is consistent with the BAM-C.	Vegetation zone numbering has been ensured to be consistent throughout the BDAR, spatial data and BAM-C	Section 4.2.8
BCS 12.6	Revise the CLUSTER analysis to ensure BAM plot identifiers correspond with field datasheets and spatial data.	Addressed in BDAR	Section 4.2
BCS 12.7	Justify the use of annual native and weed species in the floristic analysis.	Weed species have been removed. Annual native species have been retained in the analysis as the BAM does not state that annual native species can be removed from the consideration of PCT identification. PCT descriptions include annual species. Removing annual species from the analysis would impair its utility in identifying PCTs.	Section 4.2

Reference	Submission	Response	Section Addressed
BCS 12.8	Provide a more complete discussion of the CLUSTER analysis and results with reference to the influence of number of samples, seasonal variation, rainfall records, and variation in disturbance, condition, vegetation patterns across the project area, and the NSW PCT classification.	Additional discussion provided in the CLUSTER analysis. Statistical evidence confirms prior analysis. A detailed consideration of rainfall records is not provided as plot data used in the analysis is from years with average annual rainfall.	Section 4.2
BCS 13.1	Revise the vegetation classification to demonstrate if PCT 44 occurs and include any mapped areas as the original PCT. Separately map different condition states of PCTs 163 and 164 where they exist.	PCT 44 has been avoided by the Project and no longer occurs within the Subject Land. Mapping of the different condition states (vegetation zones) of PCTs 163 and 164 are shown in Figure 4-3.	Section 4.2.8
BCS 14.1	Revise vegetation zone mapping and descriptors according to BAM section 4.3.1. Include additional justification if further ground-truthing demonstrates that one vegetation zone is adequate to represents the variation of each PCT present in the subject land.	PCT 164 has been delineated into several vegetation zones representative of the various condition states observed throughout the Subject Land	Section 4.2.8
BCS 14.2	Ensure vegetation zones in high condition are indicated as such in the BDAR, BAM calculator, and spatial data.	Vegetation zones are detailed throughout the BDAR and their corresponding VIS discussed	Section 4.2.8.2
Specific detail is lacking to show how the proponent has avoided and minimised biodiversity impacts.			
BCS 15.1	Provide detail for all avoid and minimise measures to be implemented through post-approval EMPs, in accordance with BAM 7.1.2 and 7.2.2(2).	Management plans to be implemented post-approval designed to avoid and minimise impacts to biodiversity are detailed.	Section 8.4
BCS 15.2	Document measures to minimise impacts to raptors at proposed turbines that are within 500 m of recorded stick nests.	Amendments to the Project design have ensured no turbines are within 500 m of a stick nest suitable for use by raptors	Section 7.1.2.1
BCS 15.3	Document the difference in biodiversity impacts between the scoping layout and the layout presented in the EIS	A discussion of the differences in impacts to biodiversity values between the current Project design and the layout presented in the EIS has been provided	Section 7.1.2

Reference	Submission	Response	Section Addressed
Assessment of prescribed and indirect impacts associated with the operation of the proposed project are insufficient and require review.			
BCS 16.1	Revise the identification and assessment of all prescribed impacts according to BAM sections 6 and 8.3, with reference to current ecological knowledge, literature and existing species records.	Updated to address updated Project design.	Section 6 and Section 8.3
BCS 16.2	Review the assessment to address the connectivity values of naturally open or non-woody native vegetation. Revise in detail all aspects of the BDAR where connectivity has been assessed and/or is relied on to justify exclusion of species from the assessment.	The Project has avoided major waterways/creeks (i.e., Abercrombie Creek).	N/A
BCS 17.1	Revise the information in section 7 of the BDAR to clearly address the prescribed impact identification requirements in BAM section 6.1.5, the avoid and minimise considerations in BAM section 7.2.1, and the assessment of the (prescribed) impacts of wind turbine strike in BAM section 8.3.5.	The assessment of prescribed impacts has been updated and includes discussion of avoid and minimise measures, including assessment of impacts of wind turbine strike.	Section 6 and Section 8.3
BCS 17.2	Revise the prescribed impact assessment to justify the exclusion of protected birds and bats.	Protected birds and bats excluded from the collision risk modelling is due to the absence of observations in the RSA. It is not possible to model species where there are no observations.	N/A
BCS 17.3	Revise the list of vagrant species to comply with BAM section 5.2.2 and the BAM glossary and revise the assessment to include any species that do not meet the BAM definition of vagrant.	This BDAR no longer excludes any candidate species from further assessment based on vagrancy as survey has been completed to demonstrate that the species are absent.	Section 5.2
BCS 17.4	Prepare a separate BBAMP that is appended to the BDAR.	A draft BBAMP has been prepared as a standalone document and appended to this BDAR.	Appendix A

Reference	Submission	Response	Section Addressed
BCS 18.1	Conduct a full two years of pre-construction BBUS, across all seasons and including paired at height data to ensure the BBAMP is supported by sufficient data.	A full two years of pre-construction BBUS has been conducted. Methodology is discussed and the BBAMP is supported by sufficient data.	Section 2.2.5
BCS 18.2	Provide the raw data from BBUS results in the revised BDAR and digital data package.	Raw data from the BBUS has been attached as an appendix and has been provided with the digital data package.	Appendix B
BCS 19.1	Revise the draft BBAMP in consultation with BCS, and ensure outcomes based on the results of the BBUS data are fully justified with supporting information and literature.	The draft BBAMP is based on the results of bird and bat survey results and relevant supporting literature. It is anticipated that this draft report would be finalised to the satisfaction of the consent authority following project approval and prior to construction.	Appendix A
The indirect impact assessment requires review			
BCS 20.1	Identify and assess all indirect impacts of the proposal on native vegetation and habitat during construction and operation in Section 8.2 and Table 8-4 and include the results in Section 11.4.	The assessment of indirect impacts has been revised and considered in the management measures discussed.	Section 1.18.2
BCS 20.2	Provide details for all measures necessary to mitigate or manage indirect impacts.	Measures for mitigating or managing indirect impacts are discussed.	Section 8.4
Mitigation measures are not specific to the impact, location or affected threatened entities.			
BCS 21.1	Revise Table 8-7 to detail auditable mitigation and management measures to be implemented through post-approval plans	The discussion of mitigation and management measures to be implemented post-approval has been revised.	Section 8.4
BCS 21.2	Include a unique identifier for each mitigation measure in Table 8-7 and ensure they correspond with the EIS.	Table updated with an alpha numeric identifier.	Table 8-6
The assessment of Matters of National Environmental Significance requires review.			
BCS 22.1	Provide a section or chapter in the BDAR and specifically address each of the Bilateral assessment requirements detailed in BDAR Section 1.1.4 and Table 1-1 (and Attachment D to this response).	A review of impacts on MNES is provided. No significant impact on MNES is deemed likely.	Section 5.3

Reference	Submission	Response	Section Addressed
Administrative Issues			
BCS 23.1	Update landscape assessment buffers to include both site based and linear buffers as appropriate and review percent native vegetation categories at completion.	As per Section 3.1.2 of the BAM and note that the Assessment Area is determined by a buffer of 1,500m surrounding the outside edge of the boundary of the Subject Land OR 500m along each side of the centre line of a linear shaped proposal. The Keri Keri wind farm is predominantly a linear shaped proposal and, for this reason, the 500m buffer has been applied. Either buffer option will not alter the calculation of native vegetation cover as both calculations will conclude >70% native vegetation, being the highest category stated in s3.2(3) of the BAM. No amendment to the buffer distance is proposed.	Section 4.2.1
BCS 23.2	Update the BAM-C case to be a site based rather than a linear based assessment.	As per Section 3.1.2 of the BAM and note that the Assessment Area is determined by a buffer of 1,500m surrounding the outside edge of the boundary of the Subject Land OR 500m along each side of the centre line of a linear shaped proposal. The Keri Keri wind farm is predominantly a linear shaped proposal and, for this reason, the 500m buffer has been applied. Either buffer option will not alter the calculation of native vegetation cover as both calculations will conclude >70% native vegetation, being the highest category stated in s3.2(3) of the BAM. No amendment to the buffer distance is proposed.	Section 4.2.1
BCS 24.1	Update the BAM-C to be consistent with the BDAR.	The BAM-C is consistent with the BDAR. Reports generated from the BAM-C that have informed this BDAR have been appended.	Appendix D

STAGE 1: BIODIVERSITY ASSESSMENT

2. INTRODUCTION

The Project is located about 30 kilometres (km) southeast of Balranald, and 75 km southwest of Hay in the Murray River Local Government Area (LGA) (Figure 2-1). The Project is within the South West Renewable Energy Zone (REZ) and is directly south of the Sturt Highway on land that is predominantly used for sheep grazing and cropping. The Project extends over an area of approximately 18,006 hectares (ha) across 66 freehold land parcels (Project Area). Approximately 777 ha will be subject to construction and operation impacts (Development Footprint). The location of the Project is shown in Figure 2-2.

For the purposes of the BDAR, the term 'Development Footprint' is used hereafter to refer to the area likely to be directly impacted during construction and operation of the Project. The 'Subject Land' refers to the Development Footprint and an enveloping 'Micrositing Corridor', which is defined as, generally, a 100 m buffer to the Development Footprint. The extent of the Subject Land is shown in Figure 2-2.

2.1 PROPOSED DEVELOPMENT

The amended Project layout has reduced the extent of the Development Footprint and micro-siting corridor that was assessed within the EIS.

2.1.1 LOCATION

The Project is located within the South West REZ. The Project is accessible via the Sturt Highway and Keri Keri Road. The Subject Land is currently used for agricultural purposes, such as livestock grazing and cropping, and is characterised by large areas of chenopod shrublands and grassland. Isolated remnant patches of woodland vegetation are only present outside the Subject Land. The Project location is shown in Figure 2-2.

Major transport corridors in proximity to the Project include:

- The Sturt Highway located along the northern boundary of the Project that connects Balranald to Adelaide, as well as Sydney and Melbourne via the Hume Highway; and
- Yanga Way which connects Balranald to Swan Hill and Bendigo via the Murray Valley Highway.

2.1.2 SUBJECT LAND

The Subject Land is land to which the BAM is applied and includes the area of direct impacts and any additional areas where the proposal is likely to have indirect impacts, for e.g., around proposed turbine locations. The Subject Land comprises the Development Footprint and a, generally, 100 m buffer applied to the wind turbine locations. Impacts have been calculated for the Development Footprint where the clearing of vegetation and habitat clearing is proposed.

2.1.3 DEVELOPMENT FOOTPRINT

The Development Footprint comprises an area of approximately 777 ha and is nested within the Project Area. This Development Footprint incorporates temporary direct impacts during the construction phase of the Project and final operational footprint.

The Development Footprint represents the potential maximum area of impact associated with the construction and operation of the Project and is presented in Figure 2-3.

2.1.4 ASSESSMENT AREA

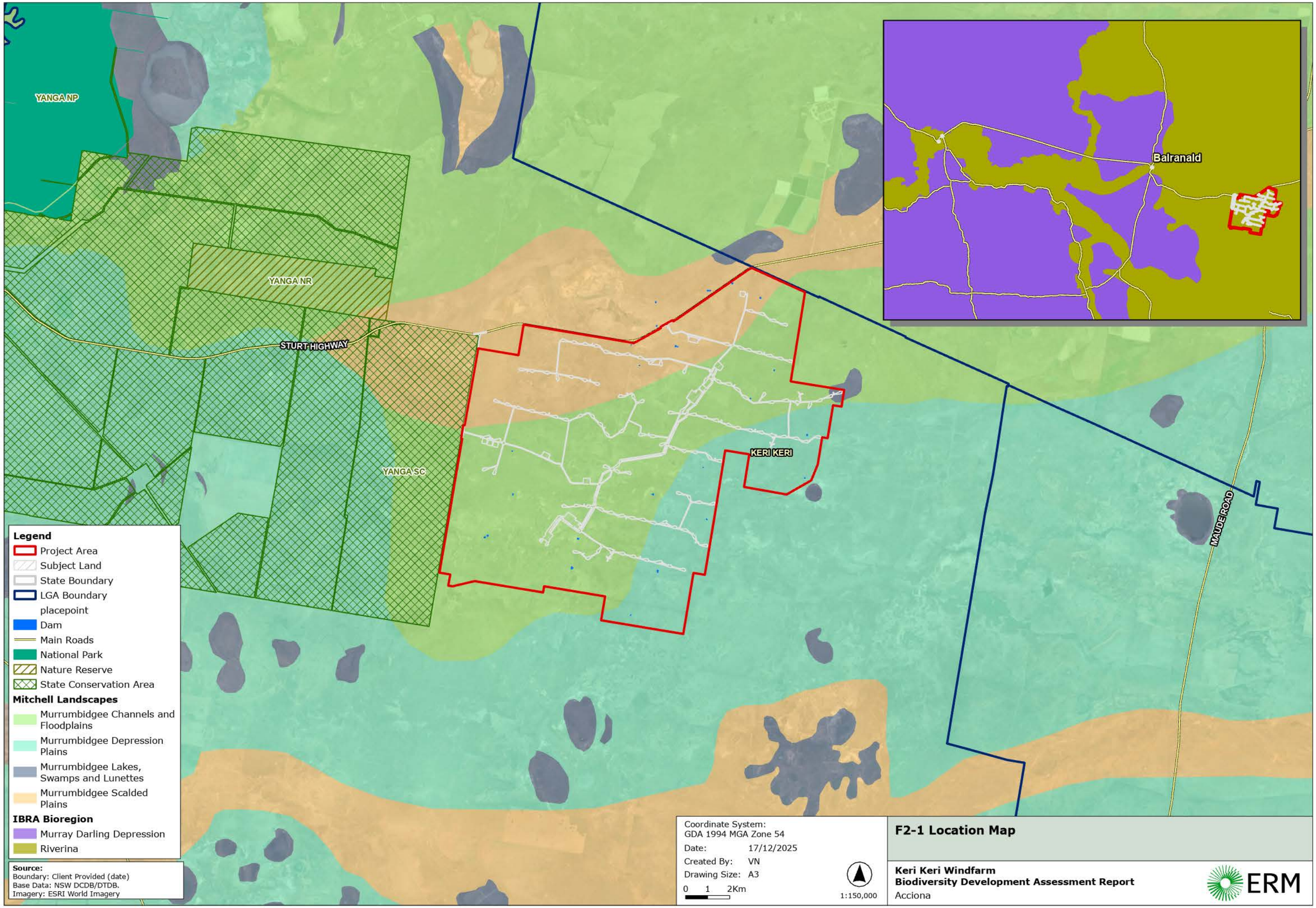
The Assessment Area for a linear development, such as the Project, is all land within a 500 m radius of the Subject Land, as shown in Figure 2-2. The Assessment Area comprises areas of agricultural land, Yanga State Conservation Area, Keri Keri Road and the Sturt Highway. The Subject Land is situated approximately 50 km south-east of Yanga National Park. The Assessment Area does not extend into residential or commercial areas.

2.1.5 PROPERTIES

Lot and DP Details for the Subject Land and haul route are listed in Table 2-1 and presented in Figure 2-2 (Subject Land) and Figure 2-3 (transport route).

TABLE 2-1 SUBJECT LAND LOT AND DP DETAILS

Lot	DP	Title
Subject Land		
9, 12, 13, 14, 54, 55, 56, 57, 58, 83, 84, 85, 86, 87	751231	Freehold
32, 33, 34, 35, 36, 37, 38, 39, 40, 47, 48, 49, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 82, 84, 93, 94	756546	Freehold
77, 78, 79, 80, 81, 82, 85	756558	Freehold
11	1120173	Freehold
1, 19	751175	Freehold



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LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD



Legend

- Project Area
- Subject Land
- Main Road
- Road

Source:
Boundary: Client Provided (date)
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54

Date: 17/12/2025

Created By: VN

Drawing Size: A3

0 1 2Km

1:70,000

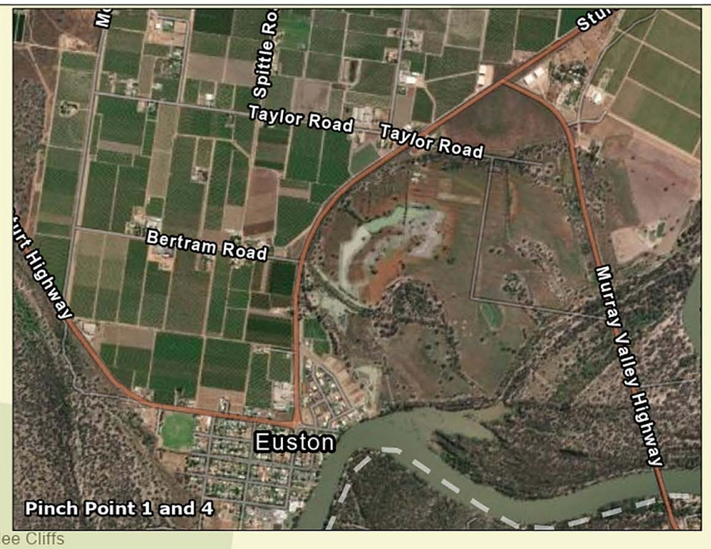
F2-2 The Subject Land

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

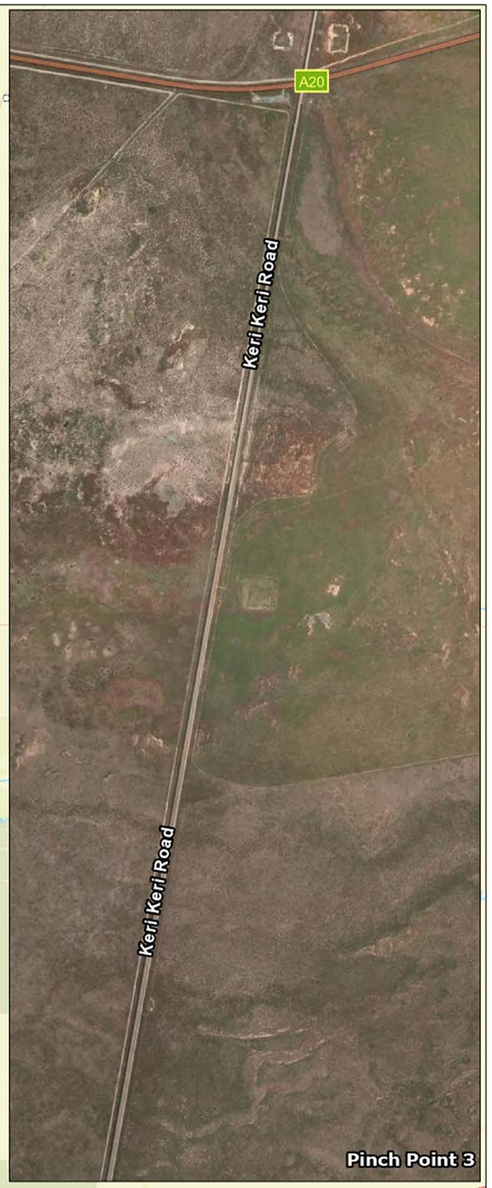
ERM

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Mallee Cliffs

Mildura
Red Cliffs
Kemendok
Colignan
Sunset
Hattah - Kulkyne National Park
Hattah State Forest
Murray - Kulkyne Park
Annuello Flora and Fauna Reserve
Euston
Robinvale
Tol Tol
Belsar Island State Forest
State Forest
Lake Powell
Balranald
Yanga
Yanga
Manangatang

A79
C254
A79
B400
C251
B12

1
2
3
4

Legend
- Pinch Point
- Project Area

Transport Route Location
- Route 1A
- Route 1B
- Route 2A
- Route 2B
- External Road Works
- National Park/ Nature Reserve

Source:
Boundary and Routes : Client Provided
Imagery: ESRI World Street Map

Coordinate System:
GDA 1994 MGA Zone 54
Date: 17/12/2025
Created By: VN / MB / CB
Drawing Size: A3
0 10 20Km
1:500,000

F2-3 Transport Route Location – NSW/VIC Border to Project

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

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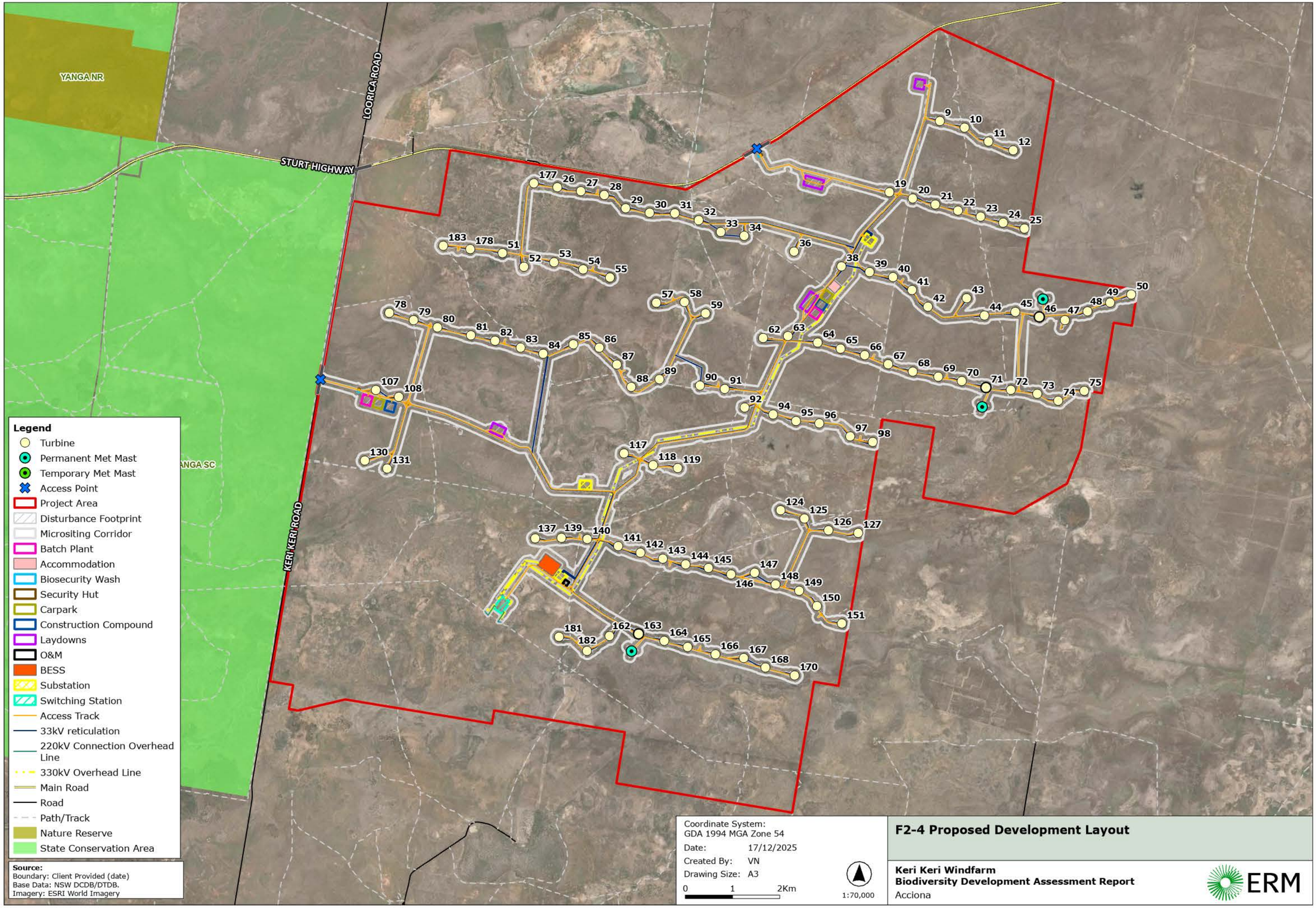
2.1.6 DEVELOPMENT DESCRIPTION

The refined Project layout is shown in Figure 2-4, and includes the Project elements as outlined in Table 2-2.

TABLE 2-2 PROJECT COMPONENTS

Project Elements	EIS (original) Project	Amended Project	Difference - EIS to Amended Project
Project Footprint			
Project Area	18,012	18,006	Reduced by 6 ha (0.03%)
Temporary Development Footprint	1,137 ha	~ 777 ha	Reduced by 360 ha (32%)
Permanent Development Footprint	574 ha	~ 491 ha	Reduced by 83 ha (14%)
WTGs			
WTGs	155	114	Reduced by 41 WTGs (26%)
Rotor Diameter	Up to 183 m	Up to 183 m	No change
Blade Length	Up to 91.5 m	Up to 91.5 m	No change
Uppermost Blade Tip Height	Up to 291.5 m	Up to 291.5 m	No change
Tower (hub) Height	Up to 200 m	Up to 200 m	No change
WTG Hardstand Disturbance Area	Approx. 2.83 ha / WTG	Approx. 2.41 ha / WTG	Reduced by approx. 0.42 ha / WTG
Ancillary Infrastructure			
New 330 kV transmission line	20.0 km	16.17 km	Reduced by 3.83 km
New 220 kV or 330 kV transmission line (Switching Station to proposed connection point)	0.0 km	0.7 km	Increase of 0.7 km
Underground 33 kV transmission line	175.3 km	256.5 km	Increased by 81.2 km
Overhead 33 kV transmission line	64.5 km	0 km	Reduced by 64.5 km (100%)
33/330 kV Substations	3	3	No change

Project Elements	EIS (original) Project	Amended Project	Difference - EIS to Amended Project
	200 m x 300 m +35 m APZ all sides	190 m x 240 m +35 m APZ all sides	Reduced by 4.32 ha
Switching Station	1	1	No change
	200 m x 300 m +35 m APZ on all sides	200 m x 300 m +35 m APZ on all sides	No change
BESS	200 MW / 800 MWh	200 MW / 800 MWh	No change
	400 m x 300 m +35 m APZ all sides	400 m x 300 m +35 m APZ all sides	No change
O&M Facility	3	1	Reduced by 2
Security Hut	4	2	Reduced by 2
Biosecurity Wash Bays	4	2	Reduced by 2
Internal Access Tracks	148.3 km	116.5 km	Reduced by 31.8 km
Site Access Points	4	2	Reduced by 2
Permanent meteorological masts	4	3	Reduced by 1
Temporary Facilities / Activities			
Construction Duration	24 months, with peak construction activities over approx. 12 months	18 months, with peak construction activities over approx. 12 months	Duration has been reduced by 6 months
Construction Workforce	Up to 650 FTE	Up to 650 FTE	No change
Transport Route	From: Port of Adelaide; and Port of Newcastle.	From: Port of Adelaide only.	Elimination of transport route from Port of Newcastle
Temporary Worker Accommodation Camp	1	1	No change
Temporary meteorological masts	4	3	Reduced by 1
Concrete Batching Plants	2	2	No change
Laydown Areas	3	4	Increased by 1
Construction Compound	2	2	No change



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2.2 FIGUMETHODOLOGY

This section provides a detailed account of the methods used to measure biodiversity values across the Subject Land, which is necessary for informing the consideration of avoid and minimize direct impacts (see **Section 7.1**), assessing prescribed impacts (see **Section 7.2** and **Section 8.3**) and indirect impacts (see **Section 8.2**), and calculating residual direct impacts (see **Section 8.1**).

2.2.1 SITE CONTEXT

2.2.1.1 LANDSCAPE FEATURES

Landscape features requiring consideration were initially determined via desktop assessment. The combination of desktop assessment and field surveys undertaken between March 2020 and November 2024 sought to verify the following landscape features (in accordance with Sections 4.2 and 4.3 of the BAM):

- IBRA bioregions and subregions and Mitchell landscape region;
- Native vegetation extent and cleared areas within the Project Area;
- Rivers and streams (classified according to stream order);
- Wetlands within, adjacent to and downstream of the Subject Land;
- Connectivity features; and
- Areas of geological significance and soil hazard features.

2.2.1.2 NATIVE VEGETATION COVER

A desktop assessment was initially conducted to determine the extent (ha) of vegetation cover on the Subject Land and Assessment Area (500 m buffer of Subject Land). The following resources were used:

- Historic aerial imagery (State of NSW and Spatial Services);
- NSW Landuse 2017 v1.2 (NSW DCCEEW);
- NSW Environmental Planning Instrument - Land Zoning (DPHI); and
- NSW State Vegetation Type Map (NSW DCCEEW, 2020).

Desktop and field surveys conducted between 2020 and 2024 confirmed the extent and condition of native vegetation cover on the Subject Land.

Native vegetation in the Assessment Area situated outside of the Subject Land was not ground-verified and in some areas the assessment considered State Vegetation Type Mapping (SVTM) and Woody Vegetation Extent mapping that may be outdated and/or inaccurate. Consequently, there may be some minor additions or omissions to the actual extent of native vegetation as defined in the BAM.

2.2.2 NATIVE VEGETATION, THREATENED ECOLOGICAL COMMUNITIES AND VEGETATION INTEGRITY

Sections of the BAM relevant to vegetation mapping are:

- Section 4.1 Map native vegetation extent on subject land.
- Section 4.2 Identify and map plant community types and ecological communities.
- Section 4.3 Map vegetation zones and assess vegetation integrity (vegetation condition).

The following sections outline the approach taken in generating the vegetation map for the Subject Land.

2.2.2.1 EXISTING INFORMATION

The SVTM (NSW DCCEEW, 2020) and BioNet Vegetation Classification (NSW DCCEEW, 2025b) system were reviewed to identify PCTs and threatened ecological communities (TECs) likely to be present within the Subject Land. This was used as the basis for survey design as part of preparing a site-specific vegetation map identifying PCTs and condition states (i.e., vegetation zones).

Recent high-resolution imagery (ESRI basemaps) was used in ArcMap at a scale of 1:1,000 to generate vector data (i.e., polygons) to describe variation in vegetation structure, character and condition. Field based data was obtained to assign vegetation classification and calculate condition states.

The following sections outline the approach taken in generating the vegetation map for the Subject land.

2.2.2.2 MAPPING NATIVE VEGETATION EXTENT

Section 4.1 of the BAM requires the extent of native vegetation to be mapped across the Subject Land. The definition of native vegetation in the BAM is reproduced below:

Native vegetation: *has the same meaning as in section 1.6 of the BC Act and section 60B of the LLS Act, repeated here:*

1. *For the purposes of this Part, native vegetation means any of the following types of plants native to New South Wales:*
   - i. *trees (including any sapling or shrub or any scrub),*
   - ii. *understorey plants,*
   - iii. *groundcover (being any type of herbaceous vegetation),*
   - iv. *plants occurring in a wetland.*
2. *A plant is native to New South Wales if it was established in New South Wales before European settlement. The regulations may authorise conclusive presumptions to be made of the species of plants native to New South Wales by adopting any relevant classification in an official database of plants that is publicly accessible.*
3. *For the purposes of this Part, native vegetation extends to a plant that is dead or that is not native to New South Wales if:*
   a) the plant is situated on land that is shown on the native vegetation regulatory map as category 2-velunerbale regulated land, and
   b) it would be native vegetation for the purposes of this Part if it were native to New South Wales.
4. *For the purposes of this Part, native vegetation does not extend to marine vegetation (being mangroves, seagrasses or any other species of plant that at any time in its life cycle must inhabit water other than fresh water). A declaration under Section 14.7 of the BC Act that specified vegetation is or is not marine vegetation also has the effect for the purposes of this Part.*

Native vegetation and vegetation community delineation and mapping across the Subject Land involved review and field validation of the SVTM over several field survey events between 2020 and 2024. Each vegetation survey, detailed below, included plot-based vegetation integrity surveys (BAM plots) and/or rapid vegetation assessments at locations where distinct PCTs could be observed within the Subject Land. The extent and structure of the existing vegetation, and dominant species within each stratum were noted. Rapid vegetation assessments and BAM plots also recorded aspects of the landscape such as slope, nearby water sources, soil qualities and signs of disturbance, e.g., clearing, fire damage, grazing and weed invasion, where applicable.

2.2.2.3 RAPID VEGETATION ASSESSMENTS

Rapid vegetation assessments were conducted to supplement BAM plots when determining PCT occurrence and to facilitate delineation of vegetation zones within the Subject Land. Rapid vegetation assessments recorded the dominant canopy (if present), mid stratum and ground stratum species present while also noting aspects of the landscape such as slope, nearby water sources, soil qualities and signs of disturbance. Rapid vegetation assessments conducted across the Subject Land are shown in Figure 2-5.

Rapid vegetation assessments were undertaken at regular intervals while travelling through the Subject Land and at locations where changes in PCT or vegetation condition were observed.

2.2.2.4 PLOT-BASED VEGETATION SURVEY

BAM plots were conducted across the Subject Land in accordance with section 4.2.1 of the BAM. BAM plots were established by walking a random distance into the vegetation zone (VZ) and establishing the plot on a random bearing. The BAM plots were used to calculate the VIS of the VZ. Each BAM plot was established around a central 50 m transect and included:

- A 20 m x 20 m plot examined to identify all flora species present. Searches continued until all flora species within the plot were detected. Data collected for each species included:
  - Stratum in which each species occurred.
  - Growth form for each species.
  - Scientific and common name for each species.
  - Percentage foliage cover (PFC) across the plot, of each species rooted in or overhanging the plot; and
  - Abundance rating for each species.
- A 1,000 m² (20 m x 50 m) plot (incorporating the floristic plot) to assess the functional attributes: number of large and hollow bearing trees, stem size classes, tree regeneration and length of logs; and
- Five 1 m² sub-plots to assess average litter cover (and other groundcover components).

BAM plots were located within the Subject Land as much as practicable. However, due to design refinements over time, there are instances where BAM plots were no longer located within the Subject Land. Where BAM plots were not located within the Subject Land, and they were used to generate VIS within the BAM-C, they were located very close to the Subject Land within a contiguous or representative patch of vegetation commensurate with the finalised VZs.

BAM Plot locations that informed the ground verified PCT mapping are shown in Figure 2-5.BAM Plot locations that informed the ground-verified PCT mapping are shown in Figure 2-5.

2.2.2.5 IDENTIFYING PLANT COMMUNITY TYPES

Assessable vegetation is required to be classified into PCTs using quantitative methods (Section 4.2.3 of the BAM).

The flora composition and structure of full floristic plots was used to cognitively assign best fit PCTs available from the NSW BioNet Vegetation Type Database. This was the first step in identifying the PCTs of the Subject Land, which is referred to as an *a priori*[2] classification. This approach was adopted in this assessment as land use effects on native vegetation are substantive. In addition to the consideration of floristic composition and structure, other factors were considered including topographic position, elevation and climatic variables (e.g., average annual rainfall), and disturbance.

Separate to the *a priori* assignment of BAM plots to PCT, full floristic plots were quantitatively evaluated using the Bray-Curtis similarity (dissimilarity) index (Bray-Curtis Index). A pairwise resemblance matrix was generated for each BAM plot pair using square-root transformed[3] flora percentage cover values to numerically determine between plot similarity. A dummy variable was added (value 0.1) to zero-adjust the Bray-Curtis coefficient, which has the purpose of improving the performance of a classification involving a sparse dataset (i.e., high disparity between alpha and beta diversity).

The Bray-Curtis Index value generated for each BAM plot pair is bounded between 0 and 1. A Bray-Curtis Index value of 0 means the two samples have the same species composition (i.e., they are similar or the same), whereas a value of 1 means the pairwise comparison indicates no similarity.

The pairwise Bray-Curtis Index matrix was generated from PRIMER Version 7 with PERMANOVA Version 1.0.3 (Plymouth Marine Laboratory, Plymouth United Kingdom, Clarke and Gorley 2006).

An analysis of similarities (ANOSIM) was performed on the pairwise resemblance matrix to statistically test the *a priori* classification. This test calculates the Global R statistic, which measures the strength of differences between *a priori* groups. Global R range from -1 to +1, with values closer to +1 indicating stronger differences between groups. A value of 0 suggests no significant difference, while a negative R value, though less common, can occur in specific natural assemblage scenarios. A p value was also generated to determine if the Global R value

[2] *a priori*: cognitive assignment of samples (e.g. BAM plots) into groups (e.g. PCTs) prior to analysis through reasoned self-evident indicators (e.g., landscape indicators and similarities in tree, shrub and groundcover species) as per requirements specified in Section 4.3.1(3) of the BAM.
[3] square root transformation was performed to minimize the effect of high percentage covers

is significant or not (i.e., p <0.05 is significant). To aid interpretation and iterative re-evaluation, pairwise R values were generated to compare *a priori* groups. Where justified, this analysis was used to adjust the assignment of PCTs to BAM plots as an iterative approach to improving the accuracy of the overall classification.

An agglomerative hierarchical clustering analysis (CLUSTER analysis) was performed to visualize the similarity (dissimilarity) resemblance matrix (i.e., dendrogram[4]). This was accompanied by a Canonical analysis of principal coordinates (CAP) plot to aid classification, including the identification of misclassifications (Anderson & Willis, 2003). A SIMPER[5] analysis was performed to characterize species composition for each *a priori* group. These characteristic/indicator species are reported in support of the best fit PCT assignment as listed in the BioNet Vegetation types database.

PCT mapping was informed by the CLUSTER analysis and associated ANOSIM result, CAP, aerial photographic interpretation (phototyping/cognitive imagery analysis), landscape factors such as terrain, aspect, topographic relief, data obtained from rapid vegetation points, and relevant literature.

2.2.2.6 VEGETATION ZONES AND VEGETATION INTEGRITY

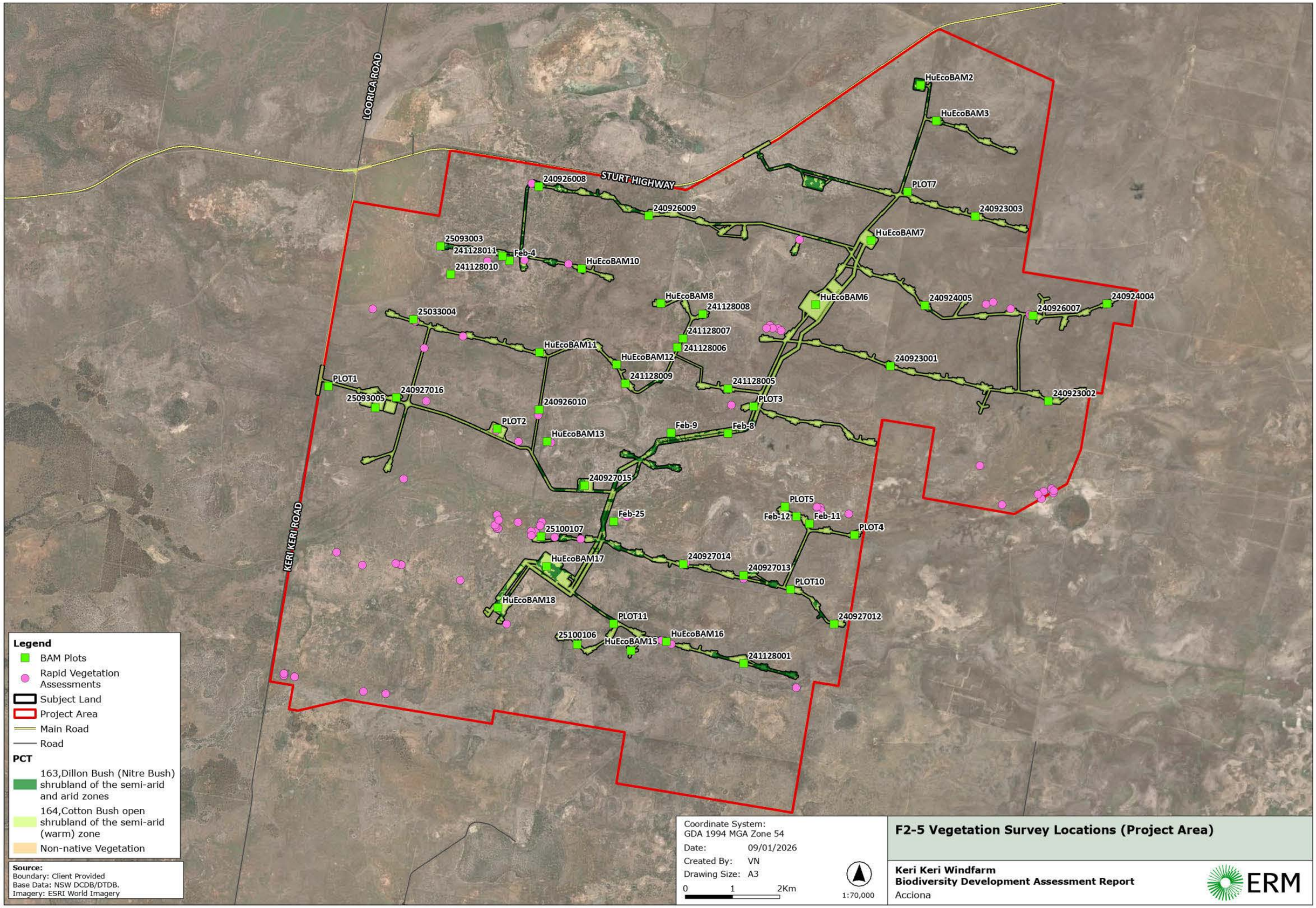
A Vegetation Zone (VZ) is an area of native vegetation comprising a PCT in a similar (homogeneous) condition state. The VZs were defined and refined through vegetation field surveys across the Subject Land. Table 2-3 summarises the BAM plot requirements based on the size and number of vegetation zones within the Subject Land. BAM plot locations for the Subject Land are shown in Figure 2-5 and for the haul route shown in Figure 2-6. BAM plot locations for the Subject Land are shown in Figure 2-5 and for the haul route shown in Figure 2-6.

TABLE 2-3 SUBJECT LAND VEGETATION ZONES AND BAM PLOT REQUIREMENTS

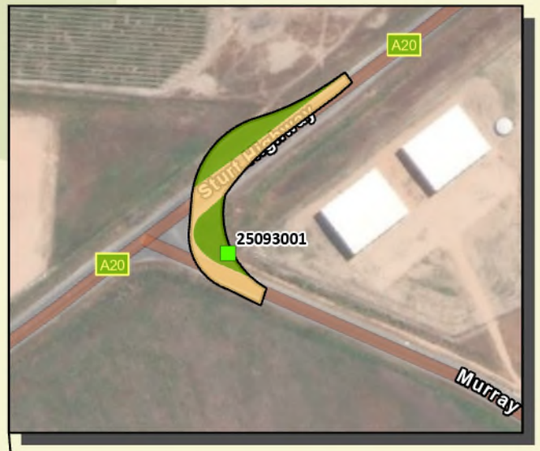
Vegetation Zone	PCT	Condition	Area (ha) within Subject Land	Minimum Plots Required	Plots Used in BAM-C Assessment
Subject Land					
VZ01	164	Grassy	201.71	6	• Feb-8 • Feb-11 • Feb-12 • PLOT3 • PLOT4 • PLOT5 • PLOT11 • 240924005 • 240926010 • 240927015 • 240927016 • HuEcoBAM10 • HuEcoBAM12

[4] A dendrogram is a branching diagram used to visually represent the hierarchical relationship between objects, most commonly in the context of hierarchical clustering. It shows how objects are grouped together based on their similarity or dissimilarity. The height at which branches merge indicates the distance or dissimilarity between the groups being joined.
[5] SIMPER (similarity percentage): A method for identifying the species responsible for observed differences between groups of samples (e.g. species differences between *a priori* groups)

Vegetation Zone	PCT	Condition	Area (ha) within Subject Land	Minimum Plots Required	Plots Used in BAM-C Assessment
					• HuEcoBAM8 • 241128006
VZ02	164	Open	140.29	6	• 240927012 • 241128008 • 241128010 • 25093003 • 25093005 • 25100106 • 241128001
VZ03	164	Degraded	18.33	3	• 241128011 • 241128007 • 241128009 • 25100107
VZ04	164	Gilgais	220.17	6	• Feb-5 • Feb-9 • PLOT1 • PLOT2 • PLOT7 • PLOT10 • 240923001 • 240923002 • 240923003 • HuEcoBAM15 • HuEcoBAM6 • HuEcoBAM7 • 241128005
VZ05	164	Dense	69.38	5	• 240927014 • 240924004 • 240926007 • 240926009 • 240927013 • HuEcoBAM11 • HuEcoBAM16 • 25033004
VZ06	163	Shrubland	115.01	6	• 240926008 • HuEcoBAM17 • HuEcoBAM18 • HuEcoBAM2 • HuEcoBAM3 • HuEcoBAM13
Transport Route					
VZ07	159	Haul Route	0.17	1	• 25093001



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Euston
Robinvale
Tol Tol
Belsar Island State Forest
Balranald
Yanga
Yanga
Yanga
B400
Tooleybuc
B12

Legend

- Project Area
- Subject Land
- Haul Route
- BAM Plots

PCT

- 159,Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone
- Non-native Vegetation

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 15/01/2026
Created By: VN
Drawing Size: A3
0 5 10Km
1:400,000

F2-6 Vegetation Survey Locations (Haul Route)

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2.2.3 THREATENED FLORA SURVEY METHODS

2.2.3.1 REVIEW OF EXISTING INFORMATION

Consultation of the BAM-C, NSW BioNet (NSW DCCEEW, 2025b) and Atlas of Living Australia (ALA) (ALA, 2025) were performed prior to all flora surveys conducted for this BDAR. Threatened flora sightings recorded within and in proximity to the Subject Land reviewed and investigated thoroughly.

2.2.3.2 HABITAT CONSTRAINTS ASSESSMENT

A species credit species can be excluded from further assessment, and therefore targeted surveys, if it is determined that species-specific habitat constraints are not present within the Subject Land (Section 5.2.2 of the BAM). Furthermore, under Section 5.2.3 of the BAM, a species credit species can be considered unlikely to occur on the Subject Land (or within specific vegetation zones) if, after carrying out a field assessment, the assessor determines that the habitat is substantially degraded such that the species is unlikely to utilise the Subject Land (or specific vegetation zone). In addition, a species credit species may be limited in its distribution by geographic constraints, and it can be excluded from further assessment.

2.2.3.3 FIELD SURVEYS

The BAM-C identifies candidate species that require seasonal targeted searches to be conducted across the Subject Land in accordance with the BAM and relevant guidelines.

Targeted field surveys were undertaken in habitat throughout the broader Project Area prior to refinement of the current Subject Land. The Project Area includes the Subject Land. Threatened flora survey effort conducted within the Subject Land is shown in Figure 2-7.

Parallel field traverses

Parallel field traverses were conducted in accordance with the guideline 'Surveying threatened plants and their habitats' (NSW DPIE, 2020b). Traverses were conducted by two ecologists spaced 10 to 15 m apart, as appropriate for the detection of herbs, forbs, grasses and other graminoids, ferns and orchids, as well as larger plant life forms, in open vegetation. Walking speeds were maintained at those suitable for the detection of the target species.

Where a target species was located, fine-scale, targeted searches were conducted to determine the extent of the occurrence of the species and the number of individuals (for 'count' species credit species). The microhabitat and conditions were recorded and taken into consideration when determining the extent of the fine-scale search.

Microhabitat searches

Microhabitat searches for the Austral Pillwort (*Pilularia novae-hollandiae*) were conducted in Spring 2024 (November 2024) by four ecologists throughout the Project Area. Searches were conducted in the south-east of the Project Area where suitable habitat comprising shallow depressions holding water associated with Abercrombie Creek occur.

Vegetation survey events for the Subject Land are provided below:

- Autumn 2020 – 30th to 31st March 2020;
- Spring 2020 – 28th September to 2nd October and 12th to 16th October 2020;

- Spring 2021 – 26th October to 12th November and 22nd November to 2nd December 2021;
- Summer 2023 – 6th to 9th February 2023;
- Spring 2023 – 9th to 13th October 2023;
- Spring 2024 – 15th to 28th September and 26th to 30th November 2024; and
- Spring 2025 – 29th September to 2nd October 2025.

Vegetation survey events for the haul route are provided below:

- Spring 2025 – 30th September 2025.

Table 2-4 provides a summary of the candidate flora species surveyed for within the Subject Land as well as additional threatened species that were subject to targeted surveys prior to refinement of the PCT mapping and Development Footprint, as well as threatened species added as a result of detection during field surveys that are yet to be listed as a candidate species. Effort is provided as total person hours spent targeting that species within associated PCTs according to the PCT mapping and Development Footprint that was available at the time of conducting the survey.

TABLE 2-4 THREATENED FLORA SURVEY SUMMARY

Scientific Name	Common name	Associated PCTs	Recommended Survey Period	Survey Event and Approximate Effort
Candidate Flora Species				
Brachyscome papillosa	Mossgiel Daisy	163, 164	September - November	• Spring 2020 – 8 hours • Spring 2021 – 13 hours • Spring 2022 – 25 hours • Spring 2023 – 50 hours • Spring 2024 – 520 hours • Spring 2025 – 40 hours
Convolvulus tedmoorei	Bindweed	163, 164	June - September	• Spring 2020 – 8 hours • Spring 2022 – 50 hours • Spring 2023 – 42 hours • Spring 2024 – 520 hours • Spring 2025 – 40 hours
Lepidium monoplocoides	Winged Peppercress	163	September - December	• Spring 2021 – 5 hours • Spring 2022 – 11 hours • Spring 2023 – 11 hours • Summer 2023/24 – 35 hours • Spring 2024 – 520 hours • Spring 2025 – 40 hours
Maireana cheelii	Chariot Wheels	164	September - December	• Spring 2020 – 8 hours • Spring 2021 – 9 hours • Spring 2022 – 14 hours • Spring 2023 – 39 hours • Summer 2023/24 – 50 hours • Spring 2024 – 520 hours • Spring 2025 – 40 hours
Swainsona murrayana	Slender Darling Pea	163, 164	September	• Spring 2020 – 8 hours • Spring 2022 – 24 hours • Spring 2023 – 42 hours • Spring 2024 – 520 hours • Spring 2025 – 40 hours

Scientific Name	Common name	Associated PCTs	Recommended Survey Period	Survey Event and Approximate Effort
Additional Threatened Flora Species				
Austrostipa wakoolica	A Spear-grass	17, 28	October – December	• Spring 2020 – 8 hours • Spring 2023 – 1 hour
Brachyscome muelleroides	Claypan Daisy	44	September - November	• Spring 2022 – 4 hours • Spring 2023 – 2 hours • Spring 2024 – 520 hours
Calotis moorei	A Burr-daisy	153	September – November	• Spring 2022 – 5 hours • Spring 2023 – 1 hour
Leptorhynchos orientalis	Lanky Buttons	44	September – November	• Spring 2021 – 3 hours • Spring 2022 – 4 hours • Spring 2023 – 2 hours • Spring 2024 – 520 hours
Solanum karsense	Menindee Nightshade	160	September - November	• Spring 2020 – 8 hours • Spring 2021 – 3 hours • Spring 2022 – 3 hours • Spring 2024 – 520 hours
Pilularia novae-hollandiae	Austral Pillwort	44	October – December	• Spring 2021 – 3 hours • Spring 2024 – 47 microhabitat searches
Pterostylis pedina	-	-	September - October	• Spring 2024 – 520 hours
Sclerolaena napiformis	Turnip Copperburr	44	September - December	• Spring 2020 – 8 hours • Spring 2021 – 3 hours • Spring 2022 – 4 hours • Spring 2023 – 2 hours • Summer 2023/24 – 1 hour • Spring 2024 – 520 hours
Swainsona plagiotropis	Red Darling Pea	44	September	• Spring 2022 – 4 hours • Spring 2023 – 2 hours • Spring 2024 – 520 hours
Swainsona sericea	Silky Swainson-pea	44	September - November	• Spring 2021 – 3 hours • Spring 2022 – 4 hours • Spring 2023 – 2 hours • Spring 2024 – 520 hours

LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD

Legend

- Project Area
- Subject Land

Transect

- Transect 2020
- Transect Dec 2021
- Transect Aug 2022
- Transect Oct 2023
- Transect Sep 2023
- Transect Dec 2023
- Transect Sep 2024
- Transect Oct 2025

PCT

- 163,Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone
- Non-native Vegetation
- Main Road
- Road

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 12/01/2026
Created By: VN
Drawing Size: A3

0 1 2Km

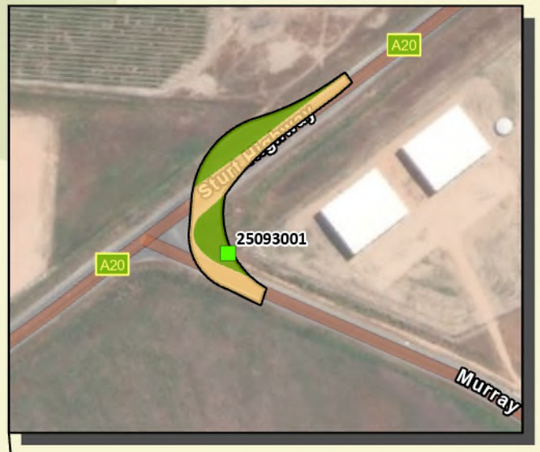
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F2-7a Targeted Threatened Flora Survey Effort (Project Area)

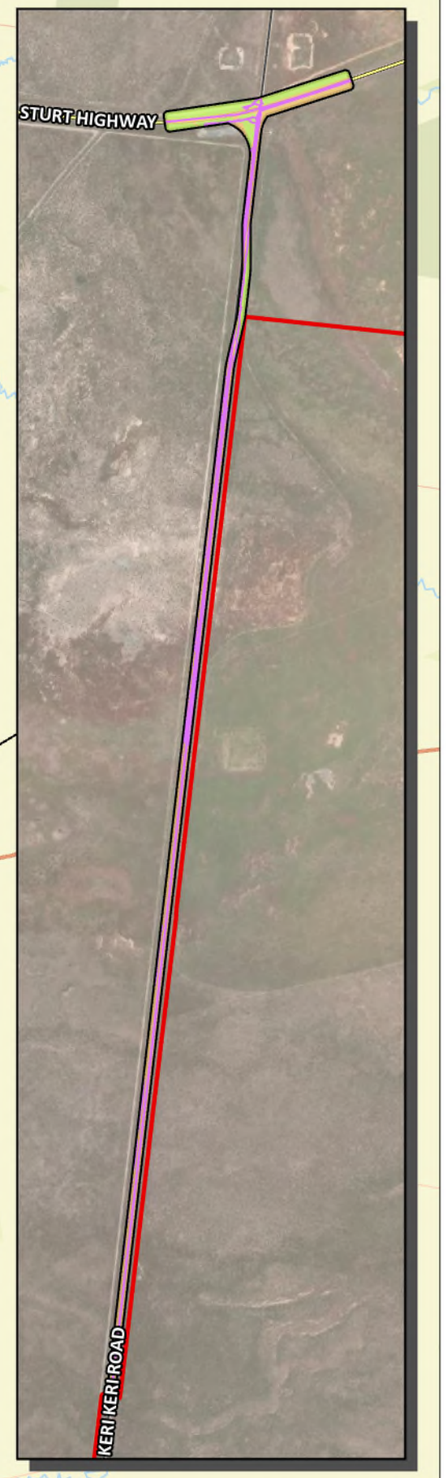
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Legend

- Project Area
- Subject Land
- Haul Route
- BAM Plots
- Transect Sep 2024

PCT

- 159,Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone
- Non-native Vegetation

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 15/01/2026
Created By: VN
Drawing Size: A3
0 5 10Km
1:400,000

F2-7b Targeted Threatened Flora Survey Effort Haul Route)

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2.2.4 THREATENED FAUNA SURVEY METHODS

2.2.4.1 REVIEW OF EXISTING INFORMATION

The BAM-C, NSW BioNet (NSW DCCEEW, 2025b) and ALA (ALA, 2025) were reviewed prior to the fauna surveys conducted for this BDAR. Threatened fauna sightings recorded within the Subject Land were reviewed and investigated thoroughly.

2.2.4.2 HABITAT CONSTRAINTS ASSESSMENT

Desktop assessments and field surveys within the Subject Land and broader Project Area included assessment of habitat constraints and microhabitats and their suitability for threatened fauna species. This included desktop assessment for features such as caves and waterways, and field inspection of microhabitats including leaf litter, stick nests and hollow-bearing trees within the Subject Land.

2.2.4.3 FIELD SURVEYS

The following targeted fauna survey events were completed across the Project Area:

- Autumn 2020 – 30th March to 5th April 2020;
- Spring 2020 – 28th September to 2nd October and 12th to 16th October 2020;
- Spring 2021 – 26th October to 12th November and 22nd November to 2nd December 2021;
- Summer 2021/2022 – 14th to 25th February 2022;
- Spring 2022 – 26th August to 5th September 2022;
- Winter 2023 – 4th to 8th September 2023
- Spring 2023 – 9th to 13th October 2023;
- Autumn 2024 – 27th to 31st May 2024;
- Winter 2024 – 26th to 30th August 2024;
- Spring 2024 – 15th to 28th September and 26th to 30th November 2024; and
- Spring 2025 – 29th September to 2nd October.

Targeted fauna survey effort conducted across the Subject Land and Project Area is detailed in Table 2-5, and displayed in the following figures:

- Figure 2-8 - Diurnal birds;
- Figure 2-9 – Nocturnal birds;
- Figure 2-10 – Amphibians; and
- Figure 2-11 – Microbats.

Surveys for amphibians were in waterbodies located outside and greater than 200m from the disturbance footprint. No waterbody suitable for the Growling Grass Frog (*Litoria raniformis*) or Southern Myotis (*Myotis macropus*) occurs within 200m of the disturbance footprint, meaning that if either species were found, a species polygon cannot be established for these species.

Surveys for forest owls were of a general nature as PCTs 163 and 164 are not associated with forest owls (i.e., chenopod shrubland that do not contain trees with hollows). No area of forest or woodland that contains hollows that may be suitable for large forest owls occur within 800m of the disturbance footprint. Even if detected, a species polygon cannot be generated for Large Forest owls as the polygon is defined by a 800m radius from suitable hollows.

TABLE 2-5 THREATENED FAUNA SURVEY SUMMARY

Target Species	Method	Survey Effort	Comments
Australian Bustard (*Ardeotis australis*)	**Bird Utilisation Surveys (BUS):** Repeated surveys at fixed locations from 2020 to 2025	• 35 BUS surveys points were surveyed between Autumn 2020 and Spring 2022 • 21 BUS survey points were repeatedly surveyed from Winter 2023 through to Spring 2024.	• Total effort for the Australian Bustard within the Project Area equates to 26 hours. • In addition to targeted surveys for the species, BUS surveys conducted between 2020 and 2024 allowed for the detection of the species. • The Australian Bustard has not been detected in the Project Area. • Survey effort for this species is displayed in Figure 2-8
	Diurnal Driven Transects: Diurnal transects driven along tracks within areas of suitable habitat driven at low speed for the detection of the species.	• Five 1-kilometre transects over 1-hour each conducted in Spring 2020 • 1 survey hour during Summer 2022 • 8 survey hours during Spring 2022	
	Diurnal Walking Transects: Surveys were conducted using the point count method over 500m, stopping every 100m to record for 10 minutes walking through areas of suitable habitat with each transect taking 1 hour.	• Six evening and six morning transects conducted in Spring 2020 •	
	Targeted Area Searches: Bird census surveys in areas of suitable habitat noting all species observed. Surveys ranged between 20 and 45 minutes depending on the season and were conducted in the early morning.	• 7 locations were surveyed for 20-minutes each in Winter 2024 • 8 locations were surveyed for 20-minutes each in Spring 2024	

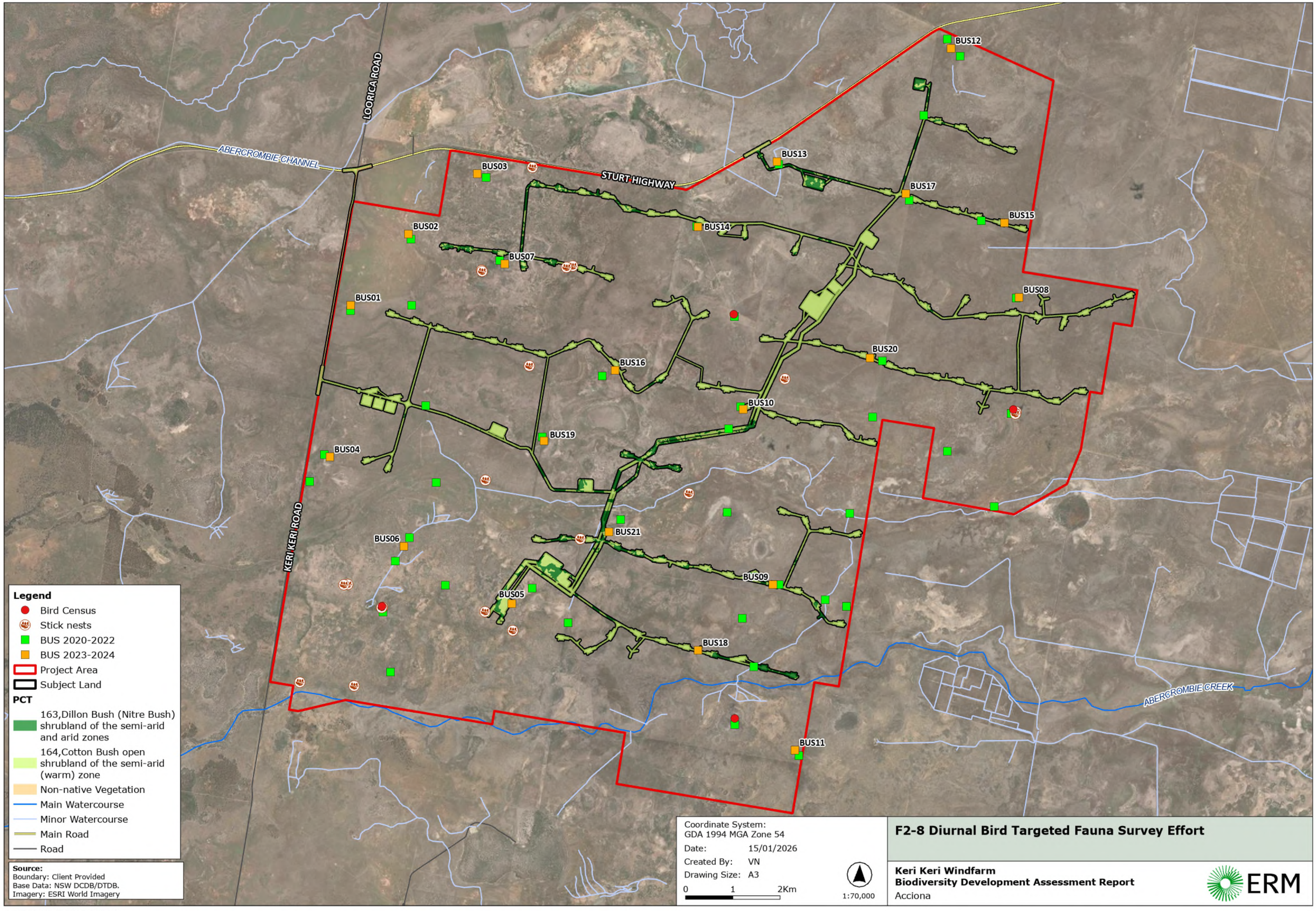
Target Species	Method	Survey Effort	Comments
Bush Stone-curlew (*Burhinus grallarius*)	**Habitat Assessments:** Targeted searches of fallen timber in woodland PCTs were inspected for habitat. Opportunistic observations were taken, noting the presence of various habitat features with consideration to species microhabitats.	• Half an hour of targeted search in Spring 2020	• Total effort for the Bush Stone-curlew within the Project Area equates to 5.75 hours. • In addition to targeted surveys for the species, BUS surveys conducted between 2020 and 2024 allowed for the detection of the species. • The Bush Stone-curlew has not been detected in the Project Area. • Survey effort for this species is displayed in Figure 2-8 and Figure 2-9
	Nocturnal Walking Transects: Nocturnal surveys were conducted on foot using LED head torches which projected 300m into surrounding vegetation.	• One 1-hour survey was conducted in Spring 2020	
	Nocturnal Call Playback: Nocturnal call playback was conducted by playing calls for 30 seconds before listening for a response for 5 minutes. This was repeated up to 3 times at each survey point within suitable habitat.	• Three 1-hour surveys were conducted over three nights in Spring 2020 • 15 minutes conducted each night for five nights in Summer 2022	
Plains-wanderer (*Pedionomus torquatus*)	**Nocturnal Driven Transects:** Nocturnal spotlight surveys from the vehicle using a Fauna Tech spotlight which projected 100m from the vehicle were conducted.	• Three 1-hour surveys over three nights in Spring 2020 • Four survey hours in Spring 2022 • One hour survey in Spring 2025	• Total effort for the Australian Bustard within the Project Area equates to 8 hours. • In addition to targeted surveys for the species, BUS surveys conducted between 2020 and 2024 allowed for the detection of the species. • One Plains-wanderer individual was observed during diurnal transects in Summer 2022 however no areas of breeding habitat have been identified in the Subject Land. • Survey effort for this species is displayed in Figure 2-9
	Habitat Assessments: Desktop assessment of Important Habitat Mapping online. Opportunistic observations were taken, noting the presence of various habitat features with consideration to species microhabitats.	• Six areas of suitable habitat opportunistically recorded in Spring 2021	
Parrots Pink Cockatoo (*Lophochroa leadbeateri*)	**Habitat Assessments:** Systematic survey for appropriate breeding hollows, suitable for use by Pink Cockatoo and Superb Parrot were conducted. This involved walking through woodland areas during day light hours and noting HBTs that meet the breeding criteria of (8-18 cm opening and 4	• 10 hours of effort over three days in Spring 2020	Total effort for Pink Cockatoo and Superb Parrot within the Project Area equates to 22.5 hours. In addition to targeted surveys for the species, BUS surveys conducted

Target Species	Method	Survey Effort	Comments
Superb Parrot (*Polytelis swainsonii*)	m above ground for Superb Parrot and greater than 8.5 cm hollow opening for and at least 8m above the ground for Pink Cockatoo).		between 2020 and 2024 allowed for the detection of the species. No hollow bearing trees occur within the Subject Land. The Pink Cockatoo has been detected foraging within the Subject Land but the requirements for breeding have not been observed. The Superb Parrot has not been detected in the Project Area. Survey effort for these species is displayed in Figure 2-8
	Diurnal Walking Transects: Surveys were conducted using the point count method over 500m, stopping every 100m to record for 10 minutes with each transect taking 1 hour.	• Three evening and three morning diurnal transects were conducted in Spring 2020	
	Targeted Area Searches: Bird census surveys in areas of suitable habitat noting all species observed. Surveys ranged between 20 and 45 minutes depending on the season and were conducted in the early morning.	1.5 hours conducted in Spring 2021 over two targeted areas 7 locations were surveyed for 20-minutes each in Winter 2024 8 locations were surveyed for 20-minutes each in Spring 2024	
<u>Raptors</u> Little Eagle (*Hieraaetus morphnoides*) Square-tailed Kite (*Lophoictinia isura*) White-bellied Sea-Eagle (*Haliaeetus leucogaster*)	**Diurnal Walking Transects:** Surveys were conducted using the point count method over 500m, stopping every 100m to record for 10 minutes walking through areas of suitable habitat with each transect taking 1 hour.	• Six evening and six morning transects conducted in Spring 2020	• Total effort for threatened raptors within the Project Area equates to 17 hours. • In addition to targeted surveys for the species, BUS surveys conducted between 2020 and 2024 allowed for the detection of the species. • Stick nests have been found to occur throughout the Project Area with none being removed. • The Little Eagle has been observed within the Subject Land but the requirements for breeding have not been observed. • The Square-tailed Kite and White-bellied Sea-Eagle have not been detected in the Project Area. • Survey effort for these species is displayed in Figure 2-8
	Stick Nest Searches: Diurnal stick nest surveys, including observation of nest occupation and usage were conducted. All stick nests were inspected for signs of use.	• Spring 2020 • Spring 2021 • Spring 2022 • Winter 2024	
	Targeted Area Searches: Stick nests found to be in use were selected for further survey which involved observation of each stick nests for 30 minutes each	• 3 stick nests targeted in Spring 2020 • 8 stick nests targeted in Winter 2024 • 7 locations were surveyed for 20-minutes each in Winter 2024	

Target Species	Method	Survey Effort	Comments
		• 8 locations were surveyed for 20-minutes each in Spring 2024	
<u>Large Forest Owls</u> Barking Owl (*Ninox connivens*) Masked Owl (*Tyto novaehollandiae*)	**Habitat Assessments:** Systematic survey for appropriate breeding hollows, suitable for use by large forest owls, undertaken in woodland areas. This involved walking through woodland areas during day light hours and noting hollows greater than 15cm diameter hollow entrance.	• 1 hour conducted in Spring 2020 • 1 hour conducted in Spring 2021	• Total effort for the Barking Owl and Masked Owl within the Project Area equates to 6 hours. • No suitable habitat containing hollow bearing trees occurs within the Subject Land. • The Barking Owl and Masked Owl have not been detected in the Project Area. • Survey effort for these species is displayed in Figure 2-9
	Nocturnal Call Playback: surveys included an initial listening period of 10-15 minutes, followed by a 10-minute spotlight search to detect species. Playing of calls intermittently was then conducted for 5 minutes followed by 10 minutes of spotlighting for a total of one hour.	• 1 hour conducted in Spring 2020	
	Nocturnal Walking Transect: Nocturnal surveys were conducted on foot using LED head torches which projected 300m into surrounding vegetation.	• 1 hour conducted in Spring 2020	
	Stag Watches: Surveys conducted for half an hour during dawn and dusk observing hollow bearing trees and stags in suitable habitat for species emerging from or entering hollows.	• Two dusk and two dawn surveys conducted in Spring 2022	
<u>Amphibians</u> Southern Bell Frog (*Litoria raniformis*)	**General Habitat Assessment:** Opportunistic observations were taken, noting the presence of various habitat features with consideration to species microhabitats. Mapping and inspection of suitable habitat including dams and streams, aquatic and semi-aquatic habitat.	• Spring 2020 • Spring 2021 • Summer 2022 • Spring 2022	• Total effort for the Southern Bell Frog within the Project Area equates to 3 hours. • Habitat assessments and tadpole searches conducted in 2024 confirmed no suitable habitat occurs in or within 200 m of the Subject Land. • The Southern Bell Frog has not been detected in the Project Area. • Survey effort for this species is displayed in Figure 2-10
	Amphibian Aural-visual Survey: Spotlighting and active searching was undertaken. The margins (within ~30 m) of suitable waterbodies were carefully searched for active frogs using torches. Advertisement calls were broadcast to elicit a response from any adult males present.	• 40 minutes conducted in Spring 2021 • 2.5 survey hours in Summer 2022	

Target Species	Method	Survey Effort	Comments
	Tadpole Searches: Dams were initially assessed for habitat suitability for the species, recording water depth, presence of emergent vegetation and presence of the plague minnow. Where suitable habitat was identified, visual searches for the presence of any tadpoles was conducted.	• 5 dams assessed in Spring 2024	
<u>Microbats</u> Southern Myotis (*Myotis macropus*) Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) Corben's Long-eared Bat (*Nyctophilus corbeni*)	**Echolocation Call Detectors:** Titley Anabat echolocation call detection devices were placed in proximity to water sources or beside a 'flyway', pointing toward microbat expected flight path and programmed to record from dusk (18:00) to dawn (05:30). Bat call analysis was completed by Green Tape Solutions, analysed using Anabat Insight, with results presented in Appendix C.	• Two devices deployed for four nights in Spring 2020 • Seven devices deployed for 20 nights in Summer 2022	• A definite call from the Yellow-bellied Sheathtail-bat (*Saccolaimus flaviventris*) was detected from the 2020 to 2022 survey effort. • A possible call from the Southern Myotis (*Myotis macropus*) was detected from the 2020 to 2022 survey effort. • No threatened species were detected from the met mast device analysis from 2024 to 2025. • Survey effort for these species is displayed in Figure 2-11
	Met Mast Echolocation Call Detectors: Three devices were deployed to a met mast within the Project Area at three different heights (2.3 m, 30 m and 70 m). Devices recorded between 22nd November 2024 and 28th March 2025. Bat call analysis was completed by Green Tape Solutions, analysed using Anabat Insight, with results presented Appendix C. Bird and bat utilisation survey methodology is described in further detail below in Section 2.2.5.	• Data collected and analysed for three seasons, from Spring 2024 to Autumn 2025	
Resident Raptors and Migratory species	**Bird Utilisation Surveys (BUS):** Bird Utilisation Surveys (BUS) undertaken between 2020 and 2022 were consistent with the requirements for a 'Level One' bird risk assessment in accordance with Best Practice Guidelines for Wind Energy Developments in Australia issued by the Clean Energy Council (2018) and AusWind (2005) Wind Farm and Birds: Interim Standards for Risk Assessment.	• 35 BUS surveys points were surveyed between Autumn 2020 and Spring 2022 • 21 BUS survey points were repeatedly surveyed from Winter 2023 through to Spring 2024.	• 148 BUS surveys were conducted between Autumn 2020 and Spring 2022 for a minimum of 15 minutes. • 335 BUS surveys were conducted between Winter 2023 and Spring 2024

Target Species	Method	Survey Effort	Comments
	BUS methodology changed following the introduction of the Suggested BBUS Method for the South West REZ in 2023 and again in 2024 upon the release of the Wind Farms-turbine strike assessment & adaptive impact management Biodiversity Assessment Method Guide (NSW DCCEEW, 2024) In summary, fixed-point bird counts were undertaken at survey points for up to 30 minutes, at different times of day. During this period, all bird species and numbers of individual birds were recorded. The species, the number of birds, the height of the bird when first observed, and the approximate distance of the birds from the observer were documented. BUS methodology is described in further detail below in Section 2.2.5.		

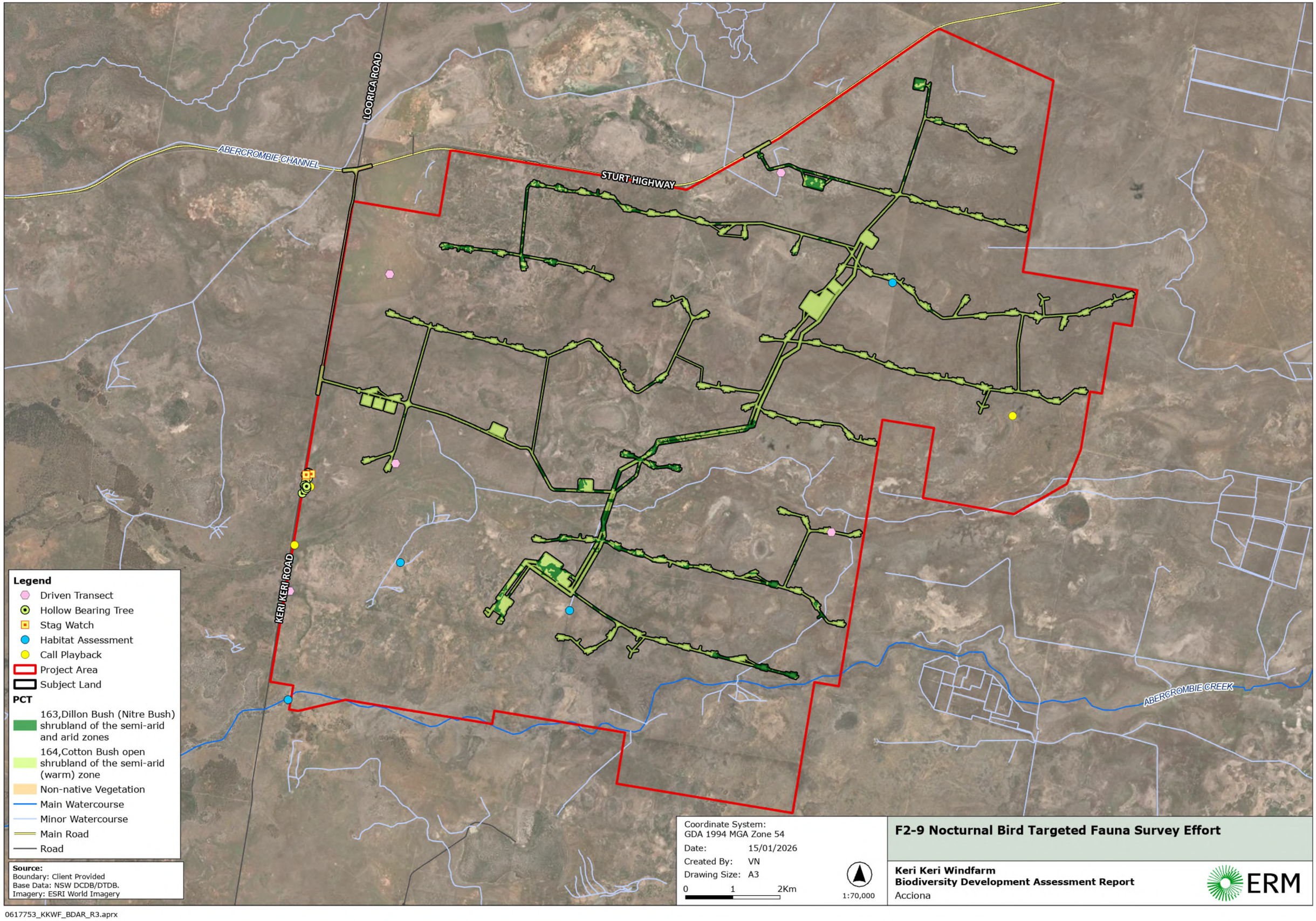


F2-8 Diurnal Bird Targeted Fauna Survey Effort

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

0617753_KKWF_BDAR_R3.aprx



0617753_KKWF_BDAR_R3.aprx

LOORICA ROAD

ABERCROMBIE CHANNEL

STURT HIGHWAY

KERI KERI ROAD

ABERCROMBIE CREEK

Legend

- Frog Survey
- Creek Crossing Assessments
- Project Area
- Subject Land

PCT

- 163,Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone
- Non-native Vegetation
- Main Watercourse
- Minor Watercourse
- Main Road
- Road

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 19/12/2025
Created By: VN
Drawing Size: A3
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1:70,000

F2-10 Amphibian Targeted Fauna Survey Effort

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

0617753_KKWF_BDAR_R0.aprx

LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD

Legend

- Anabats
- Project Area
- Subject Land

PCT

- 163,Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone
- Non-native Vegetation
- Main Road
- Road

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54

Date: 19/12/2025

Created By: VN

Drawing Size: A3

0 1 2Km

1:70,000

F2-11 Microbat Targeted Fauna Survey Effort

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

0617753_KKWF_BDAR_R0.aprx

2.2.5 TARGETED BIRD SURVEYS

2.2.5.1 BIRD CENSUS

Bird census surveys involved the systematic searching of specific habitats for 20-minutes using meandering transects and identifying birds through visual and aural observations (Cwth DEWHA, 2010b). Examples of specific habitats included woodland and riparian areas in the Project area. These surveys were separate and often complimentary to bird utilisation surveys.

2.2.5.2 TARGETED BIRD SURVEYS

Targeted threatened species surveys were conducted using bird census surveys in identified suitable habitat within the Project area. Observations were made from a stationary position with birds being identified through call detection and visual observations.

2.2.5.3 WATERBODY SURVEYS

Waterbody surveys were conducted in the Project area to assess for the presence of waterbirds (particularly migratory species), and woodland bird species utilising the waterbodies. Observations were made from a stationary position, and birds were identified by call detection and visual observations.

2.2.5.4 CALL PLAYBACK SURVEYS

Call playback and spotlighting surveys were conducted across the Project area in habitat suitable for nocturnal birds, such as threatened owls (i.e., Barking Owl and Masked Owl) and the bush stone curlew (i.e., *Burhinus grallarius*).

2.2.5.5 TARGETED DRIVEN FAUNA TRANSECTS

Driven transects were conducted for diurnal and nocturnal avian species due to large extent of the Project area and Subject Land. This was performed specifically within habitat suitable for the Plains-wanderer (*Pedionomus torquatus*).

2.2.6 TARGETED BAT SURVEYS

Bat echolocation detection surveys were undertaken across three survey periods (February 2022, February - March 2023 and December 2023 - March 2024). The timing of the surveys was planned to capture peak activity and abundance of microbat species within the Subject Land. Bat echolocation detection was undertaken using Chorus detectors (Titley Electronics) and Anabat Swift detectors (Titley Electronics). Detectors were placed at surface to survey for bat species foraging in the supra-chenopod canopy space (i.e. 0 – 20 m above surface).

2.2.7 BIRD AND BAT UTILISATION SURVEYS

2.2.7.1 BIRDS

Guidance for BUS has changed since the origination of the Project. However, all BUS have incorporated key concepts which have remained constant since 2022. These are:

- Bird surveys are in a fixed point (i.e., repeated observation point year on year and season after season), run for a set duration (20 minutes), are undertaken at different times of day (i.e., morning (6am to 10am), midday (10am to 2pm), afternoon (2pm to 6pm) and at different times in the year (i.e., summer, autumn, winter, spring) to capture variations in diurnal and seasonal bird activity;

- The data collected during a BUS includes the bird species present, their flying height and their direction of flight, as stipulated by the Band Model (Band, 2000);
- The search radius from the fixed observation point is at least 100 m for small birds and up to 800 m for large birds, using range finders to determine distances.

Surveys involved several years and seasons since 2020 as outlined below:

- 2020: March/April (Autumn), November (Spring);
- 2022: February (Summer), Aug/Sept (Winter);
- 2023: October (Spring); and
- 2024: May (Autumn), August (Winter), November (Spring).

The location of BUS points is shown in Figure 2-8.

2.2.7.2 BATS

Bat echolocation detection surveys were performed on a single meteorological mast from November 2024 to April 2025. The timing of the surveys was planned to capture peak activity and abundance of microbat species within the Subject Land. Bat echolocation detection was undertaken using Ranger detectors (Titley Electronics).

Acoustic detectors were pre-programmed to commence recording 60 minutes before dusk and cease recording 60 minutes after sunrise. Detectors were placed at three heights on the met mast as follows:

- 2 m (i.e., ground surface to measure supra-chenopod shrubland bat activity)
- 30 m (i.e., sub-RSA space); and
- 95 m (i.e., within the RSA to identify species and activity that may interact with WTGs).

The detectors were programmed to obtain an even dataset across the survey period (i.e., recordings on Monday, Wednesday and Friday each week). This programmed approach was designed to minimise the likelihood for poor weather conditions having an adverse effect on results and also to obtain a representative temporal sample to understand seasonal variation.

2.2.8 WEATHER CONDITIONS

Weather conditions during the field survey events were appropriate for detection of target flora and fauna. A summary of the weather conditions during the survey periods, recorded at Balranald (Station No. 049002) is provided in Table 2-6.

TABLE 2-6 WEATHER CONDITIONS DURING SURVEY PERIODS (SUBJECT LAND)

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)
Autumn 2020			
30/03/2020	13.9	25.3	2.4
31/03/2020	9.2	27.0	0
01/04/2020	14.2	24.5	0
02/04/2020	17.6	22.0	30.0
03/04/2020	13.0	25.0	0

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)
04/04/2020	13.1	18.7	21.2
05/05/2020	14.6	20.4	1.0
Spring 2020			
28/09/2020	4.9	19.4	0
29/09/2020	6.5	22.7	0
30/09/2020	12.6	22.0	2.0
01/10/2020	7.0	23.0	0
02/10/2020	10.1	31.6	0
12/10/2020	7.6	29.6	0
13/10/2020	10.7	32.4	0
14/10/2020	12.6	32.5	0
15/10/2020	14.9	34.1	0
16/10/2020	15.1	22.9	0
Spring 2021			
26/10/2021	8.9	26.2	0
27/10/2021	13.6	32.6	0
28/10/2021	17.5	31.7	0
29/10/2021	13.0	21.1	0
30/10/2021	5.6	20.4	0
31/10/2021	6.5	25.1	0
01/11/2021	10.7	28.4	0
02/11/2021	14.9	33.0	0
03/11/2021	18.5	23.1	5.2
04/11/2021	16.0	22.1	12.0
05/11/2021	13.5	30.0	0
06/11/2021	18.2	30.0	0
07/11/2021	14.9	26.9	6.6
08/11/2021	10.9	24.6	0
09/11/2021	11.5	26.8	0
10/11/2021	16.4	21.3	0
11/11/2021	10.9	16.9	0
12/11/2021	10.2	12.9	15.8
22/11/2021	12.1	29.4	0
23/11/2021	18.2	26.4	0

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)
24/11/2021	18.1	28.9	10.2
25/11/2021	18.6	25.1	2.2
26/11/2021	12.2	25.1	10.4
27/11/2021	13.6	25.0	0
28/11/2021	14.7	27.5	0
29/11/2021	14.0	30.6	0
30/11/2021	17.4	33.6	0
01/12/2021	19.2	35.0	0
02/12/2021	18.6	36.9	3.0
Summer 2022			
14/02/2022	23.4	39.5	0
15/02/2022	20.0	39.4	0
16/02/2022	21.6	39.5	0
17/02/2022	17.1	28.5	0
18/02/2022	13.3	27.0	0
19/02/2022	11.9	30.4	0
20/02/2022	13.9	32.1	0
21/02/2022	13.9	27.1	0
22/02/2022	13.8	32.6	0
23/02/2022	16.1	34.5	1.0
24/02/2022	22.4	34.7	0
25/02/2022	20.6	33.7	0
Spring 2022			
26/08/2022	6.9	18.0	0
27/08/2022	7.5	20.6	0
28/08/2022	6.2	25.0	0
29/08/2022	13.4	23.5	0.2
30/08/2022	6.4	17.2	6.6
31/08/2022	1.9	16.4	0.2
01/09/2022	2.9	17.4	0
02/09/2022	5.0	15.5	0
03/09/2022	2.2	16.9	0
04/09/2022	4.3	18.4	0
05/09/2022	3.4	17.1	0

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)
Summer 2023			
06/02/2023	14.5	32.5	0
07/02/2023	13.8	34.8	0
08/02/2023	13.5	33.5	0
09/02/2023	9.2	35.7	0
Winter 2023			
04/09/2023	8.5	23.2	0
05/09/2023	3.8	13.5	0
06/09/2023	-	17.4	0
07/09/2023	2.5	-	0
08/09/2023	7.8	18.8	1.2
09/09/2023	2.0	21.2	1.0
Summer 2023			
19/12/2023	19.5	27.1	0
20/12/2023	9.6	-	0
21/12/2023	-	32.5	0
Autumn 2024			
27/05/2023	-0.2	20.6	0
28/05/2023	0.2	-	0
29/05/2023	-	22.4	0
30/05/2023	2.6	19.0	0
31/05/2023	9.4	-	21.0
Winter 2024			
26/08/2024	9.4	-	13.0
27/08/2024	-	24.5	0
28/08/2024	5.6	20.8	0
29/08/2024	4.0	21.7	0
30/08/2024	10.8	24.0	0
Spring 2024			
15/09/2024	-	18.1	0
16/09/2024	-0.3	-	0
17/09/2024	-	21.8	0
18/09/2024	2.1	26.4	0
19/09/2024	3.9	21.8	0

Date	Minimum Temperature (°C)	Maximum Temperature (°C)	Rainfall (mm)
20/09/2024	5.0	21.2	0
21/09/2024	6.1	22.0	0
22/09/2024	7.1	-	0
23/09/2024	-	-	-
24/09/2024	-	27.6	-
25/09/2024	5.3	18.6	4.2
26/09/2024	6.6	-	1.2
27/09/2024	-	22.3	0
28/09/2024	2.9	23.6	0
Spring 2024[6]			
26/11/2024	19.7	36.9	13.8
27/11/2024	20.1	33.1	15.4
28/11/2024	14.5	31.2	0.8
29/11/2024	16.5	34.8	0
30/11/2024	19.5	30.1	3.0
Spring 2025			
29/09/2025	7.3	27.6	0
30/09/2025	16.2	-	0
1/10/2025	-	24.3	0
2/10/2025	6.0	20.0	0

Source: Bureau of Meteorology - Balranald, NSW Daily Weather Observations. Online resource: *http://www.bom.gov.au/climate/dwo/202504/html/IDCJDW2058.202504.shtml*.

2.2.9 PREDICTED FLYWAY MAPPING METHODS

Predicted flyways have been identified for listed threatened and migratory species most at risk of collision and are presented in Section 3.4. Likely flyways have been identified based on the availability of critical habitat for foraging, breeding and dispersal, soil types, field observations, and publicly available records. The following databases have been accessed to produce flyway mapping:

- NSW (Mitchell) Landscapes V3.1 (NSW DCCEEW, 2017);
- NSW State Vegetation Type Map (Edition C2.0.M2.1) (NSW DCCEEW, 2020);
- Atlas of Living Australia (Atlas of Living Australia, 2025); and
- Australian Soil Classification soil type map of NSW (NSW DCCEEW, 2012).

[6] November 2024 observations were not available for Balranald and were taken from Hay, NSW - Daily Weather Observations http://www.bom.gov.au/climate/dwo/IDCJDW2058.latest.shtml

2.2.10 MATHEMATICAL COLLISION RISK MODELLING

2.2.10.1 OVERVIEW

The Band CRM (Band et al., 2007) has been used to predict the total number of avian collisions that may result from the Project. This method of modelling requires inputs that describe species-specific biometrics, flight speeds and characteristics, and the expected amount of flight activity derived from field surveys in the Study Area. It also requires inputs of WTG information such as blade size and pitch, hub height, rotor rotation period and the proportion of time the WTG will be operational (Band et al., 2007).

The Band CRM uses observational BUS data to determine avian flight heights and the frequency of time of species spent in the RSA. Literature may be used to determine average flock size. The CRM utilises two phases:

Phase 1:

- Assess the number of birds or bats colliding per annum = the number of birds or bats flying through the RSA; and

Phase 2:

- Assess the probability of the bird or bats flying through the RSA being hit by turbine blades (Band et al., 2007).

Phase 1 relies on BUS at selected vantage points to gather information on the frequency of bird and bat flights in the RSA (Band et al., 2007). BUS data collated across several years and seasons (winter, spring, summer and autumn in most years between 2020 to 2024) has been used for phase 1. Note that only CRM assessment of birds within the Study Area is possible due to the data collection methods.

Phase 2 requires knowledge of the characteristics of the bird and bat species, such as length, wingspan, the average flight speed, as well as the breadth and pitch of the WTG blades and its rotation speed (Band et al., 2007).

Assessing Collision Risk for Birds on Migration

Migratory species are not present within their Australian distribution year-round and utilise predictable migration corridors and timed seasonal movements. To account for this seasonal movement, collision risk for migrants is based on the number of birds likely to be moving through the windfarm rather than the observed density of birds. In the absence of tracking studies, it is assumed that migrating birds are distributed equally along the width of a migratory corridor. Bird flux is given as the total number of birds per km of the migration corridor in relation to the total population or sub-population utilising the corridor. Therefore:

$$\text{Bird Flux Density} = \frac{N}{w}$$

Where:

N =Population of birds passing through migratory front

w = migratory front defined as the total width of the corridor based on the position of the Project Area within the species Australian distribution.

2.2.11 ASSUMPTIONS, LIMITATIONS AND DISCLAIMERS

The field and desktop assessments undertaken to inform this report provide a detailed overview of the biodiversity values of the Subject Land; however, results are limited by the state and condition of native vegetation communities investigated at the time of survey.

2.2.11.1 MAPPING OF NATIVE VEGETATION, PCTS AND BROAD CONDITION STATES

Vegetation mapping and classification (i.e., PCTs and broad condition states) is iterative involving analysis of field survey/observations and desktop analysis. Aerial photography interpretation performed prior to field survey was used to inform survey design, with data obtained from field surveys used to re-interpret vegetation type and condition mapping. Updates to vegetation type and broad condition state mapping occurred through this process.

Vegetation classifications are informed by quantitative analytical methods, as required by the BAM. This approach reduces the potential for cognitive bias to adversely influence PCT and condition state assignments. This process may require the use of data obtained from an imperfect sampling design where unavoidable influences from land use related disturbance may inherently confound the analysis. This effect has been minimised where possible.

2.2.11.2 EVALUATING VEGETATION INTEGRITY

Variation in flora composition and structure can occur over time and is likely due to natural seasonal variation, severe weather/climatic events (e.g., drought, floods and fire), land use history and pest vertebrate/invertebrate impacts. The effect of this variation has been limited, where possible, by performing surveys in appropriate conditions to minimise any adverse impact on survey results and associated data analysis contained in this report.

Observer variation is also anticipated where teams of ecologists are used to obtain data from the Subject Land over the course of all investigations. The effect of this has been minimised, where possible, through post survey data review and discussion with investigators.

2.2.11.3 THREATENED SPECIES SURVEY

The threatened species survey requirements were governed by the outputs from the BAM-C, which provides a list of candidate species for consideration. Some of these species may be produced from pseudoscientific processes (e.g., threatened species associations with multiple PCTs arise from a generalised assignment of the species to a vegetation class or formation level, often from a single record or observation location within an IBRA bioregion).

The BAM states that the accredited assessor must use the following databases published by the NSW Department of Planning, Industry and Environment (s1.4.1 of the BAM):

- BioNet Vegetation Classification;
- BioNet Threatened Biodiversity Data Collection; and
- BioNet Atlas.

This BDAR has considered these databases and used this information to contextualise threatened species associations generated by the BAM-C. Notably, this information has been used to consider the six steps of assessment for candidate species specified in s5.2 of the BAM.

The accredited assessor has instructed field staff to keep a keen eye out for unusual or unexpected finds not predicted by the BAM-C and species were manually added to the threatened species survey requirement ahead of a submission received from the regulatory authority.

2.2.11.4 COLLISION RISK MODELLING ASSUMPTIONS AND LIMITATIONS

The application of the Band model has been undertaken for this BAM Plan with assumptions as discussion in the following sub-sections.

Assumed Bird Flight Activity

Bird utilisation surveys provide site specific data to inform bird utilisation however are limited by the short sampling period length within a single twelve-month period. For the purposes of the collision risk model, bird utilisation is assumed to be constant across year regardless of the season. Average hours of daylight (the time between dawn and dusk) have been calculated based on the latitude of the Project Area (Forsythe, et al., 1995); and have been used to calculate bird flight activity, expressed as a density figure. Although the times that birds are active at heights within the RSA is likely to vary depending on season, weather, and bird functional groups, to establish the most conservative estimate of collision risk annually, it has been assumed that birds are active for 100% of available daylight hours.

Nighttime activity has been identified for each species based on an assessment of available literature, known site-level activity, and expert opinion where required, and are expressed as the proportion of daytime activity across five nominal rankings (0%, 25%, 50%, 70% and 100%). Flight behaviours, flapping and gliding, are considered to result in differences in their risk of collision during a single transit through the RSA. All individuals modelled in this CRM have been assumed to be gliding to achieve the most conservative model output and 'worst-case scenario' for that species.

Species Morphometrics

To calculate the total numbers of collisions per annum for each species, species specific morphometric data including wing length, body length, and flight speed is required. Flight speeds are not well understood for Australian birds and where estimates of flight speeds could not be found from within the scientific literature, estimates have been taken from closely related species of similar size.

For some species included in this CRM, only the maximum observed flight speed could be found. Birds likely to be interacting with wind turbines are expected to only rarely fly at maximum speeds and so collision risk may fluctuate to a degree depending on the speed in which the bird is flying.

Insufficient Sample Size

To ensure that modelled outputs remain statistically robust, only those species with suitable sample sizes have been included in the CRM. Observations of a minimum of three individuals of the same species flying at heights within the RSA (N=3) has been determined as the minimum required observations for inclusion within the CRM. A smaller sample size is not considered to provide a statistically adequate prediction of collision risk. Those species with insufficient sample sizes will still be subject to the monitoring, management and mitigation measures identified in the BBAMP and, should sufficient observations be made during pre-construction and construction BUS then an updated CRM will be provided.

Operational Time of Turbines

Turbines are not in constant operation throughout their operational life. Wind speeds below cut in speeds, periods of damaging winds, required maintenance, and other planned operational and managerial shutdowns contributes to non-operational time of the turbines. Specific non-operational times are likely to vary greatly throughout the operational life of the project and so for the purpose of this CRM, an operational time of 75% has been assumed.

2.2.12 LICENCING

Regarding the flora and fauna surveys conducted for this BDAR, ERM operated under the Scientific Licence of SL100196 and Animal Ethics Accreditation number 53055.

3. SITE CONTEXT

3.1 LANDSCAPE FEATURES

Site context features have been identified from an inspection of the Subject Land through desktop assessment of publicly available, relevant digital mapping layers and aerial imagery. Table 3-1 presents the site context features for the Subject Land and Table 3-2 provides the landscape features of the haul route.

TABLE 3-1 LANDSCAPE FEATURES (SUBJECT LAND)

Landscape feature	Description
IBRA Bioregions and Subregions	The Subject Land is located entirely within the Riverina IBRA Bioregion and the Murrumbidgee Subregion (Figure 2-1).
NSW Landscape Regions (Mitchell)	The Subject Land is situated across four NSW Landscape Regions (Figure 2-2): • Murrumbidgee Channels and Floodplains • Murrumbidgee Scalded Plains • Murrumbidgee Depression Plains • Murrumbidgee Lakes, Swamps and Lunettes The Murrumbidgee Channels and Floodplains landscape description has been applied to the BAM-C as it has the largest occurrence across the Subject Land.
Rivers, streams, estuaries and wetlands	The Subject Land is located south of the Murrumbidgee River and Uara Creek. NSW Hydrography mapping (Figure 2-2) shows that one first order ephemeral creek intersects the Subject Land, which is known as Abercrombie Creek. Aquatic habitat associated with Abercrombie Creek and its associated canals/drains are assessed in Section 3.1.1. There are no Ramsar Wetlands or Important Wetlands as listed in the Directory of Important Wetlands of Australia located within the Subject Land. Swamps and inundation areas are present across the broader Project Area, particularly along the western boundary of the site, these wetlands have been mapped in Figure 2-2 and avoided by the Project. Swamps and inundation areas are present across the broader Project Area, particularly along the western boundary of the site, these wetlands have been mapped in Figure 2-2 and avoided by the Project. Farm dams occur throughout the Project Area Figure 2-2). These artificial features possess relatively low vegetation quality with limited emergent or submerged vegetation, however, still provide a valuable resource for fauna.
Habitat connectivity	The Subject Land forms part of a larger area of continuous mixed woodland, grassland and shrubland which extend along the Hay Plain. However, no woodlands or grasslands are located within the Subject Land. The Subject Land is predominantly in a modified condition following a long history of clearing and grazing. Treed vegetation is present in low densities across the broader Project Area, largely restricted to natural drainage lines, with woodlands scattered on sandy rises. The extent of this woody vegetation cover has been dramatically reduced by land clearing for agriculture. Connectivity across this open landscape is considered substantially low for species dependent on woody vegetation.

Landscape feature	Description
	For threatened fauna not dependent on woody vegetation, vegetation within the Subject Land likely provides important connectivity between habitat patches, particularly movement between water sources and shelter. However, fencing, overgrazing and land management practices has reduced the connectivity values of these areas.
Karst, caves, crevices, cliffs, rocks or other geological features of significance	There are no karsts, caves, crevices, cliffs or other geological features of significance within the Subject Land as determined by desktop and field investigations.
Soil hazard features	The overall hazard rating of the soil and land capability of the Subject Land, as advised by eSPADE (eSPADE v2.2) ranges between level 5 – moderate-low capability land and level 6 – low capability land. A search of the ASC Soil Type Map (SEED Map) reveals that the Vertosol soil type dominates the Subject Land. Vertosols are categorised as clay soils with shrink-swell properties that exhibit strong cracking when dry and at depth have slickensides and/or lenticular peds. Although many soils exhibit gilgai microrelief, this feature is not used in their definition. A search of the NSW Environment Protection Authority Contaminated Sites Register (DECCW | Search results) returned no results for the Murray River Council LGA for current or former Declarations of Significantly Contaminated Land.
Areas of outstanding biodiversity value	The Subject Land is not identified as an area of outstanding biodiversity value, listed under the BC Act.
Additional landscape features identified in SEARs	No additional landscape features were identified in the SEARs.

TABLE 3-2 LANDSCAPE FEATURES (HAUL ROUTE)

Landscape feature	Description
IBRA Bioregions and Subregions	The area subject to assessment along the haul route is located within the Riverina IBRA Bioregion and the Robinvale Plains IBRA subregion (Figure 2-3).
NSW Landscape Regions (Mitchell)	The area subject to assessment along the haul route is located within the Murray Channels and Floodplains Mitchell landscape. This has been applied to the BAM-C case for the haul route (Figure 2-3).
Rivers, streams, estuaries and wetlands	The area subject to assessment along the haul route is located north of the Murray River. NSW Hydrography mapping (Figure 2-3) shows that no creeklines are present in the area. There are no Ramsar Wetlands or Important Wetlands as listed in the Directory of Important Wetlands of Australia located within the area.
Habitat connectivity	Habitat connectivity within the area is considered low value, the area subject to assessment is a highly disturbed roadside subject to a number of disturbances and connectivity to higher value areas of habitat in the landscape is disrupted by roads and other infrastructure.
Karst, caves, crevices, cliffs, rocks or other geological features of significance	There are no karsts, caves, crevices, cliffs or other geological features of significance within the area as determined by desktop and field investigations.

Landscape feature	Description
Soil hazard features	The overall hazard rating of the soil and land capability of the area, as advised by eSPADE (eSPADE v2.2) is level 4 – moderate capability land. A search of the ASC Soil Type Map (SEED Map) reveals that the Vertosol soil type occurs in the area. Vertosols are categorised as clay soils with shrink-swell properties that exhibit strong cracking when dry and at depth have slickensides and/or lenticular peds. Although many soils exhibit gilgai microrelief, this feature is not used in their definition. A search of the NSW Environment Protection Authority Contaminated Sites Register (DECCW | Search results) returned no results for the Balranald Shire Council LGA for current or former Declarations of Significantly Contaminated Land.
Areas of outstanding biodiversity value	The Subject Land is not identified as an area of outstanding biodiversity value, listed under the BC Act.
Additional landscape features identified in SEARs	No additional landscape features were identified in the SEARs.

3.1.1 AQUATIC HABITAT

The Subject Land is located south of the Murrumbidgee River and Uara Creek, NSW. Hydrography mapping (Figure 2-2) shows that Abercrombie Creek, an ephemeral first order waterway, intersects the far south-eastern corner of the Subject Land. Wetland communities are present across the southern portion of the Project Area. During field survey events between 2020 and 2024 all natural creek lines were observed to be dry, presenting as minor depressions no greater than 1 m in relief; however, inundation of gilgais across the Subject Land was observed.

During the 2023 surveys, all mapped wetlands were inundated because of substantial rainfall and flooding across the site in previous months. These habitats were observed to support a variety of water birds. The Project design was amended to avoid a large majority of wetland habitat. No area of permanent or semi-permanent waterbody, be it of a natural or anthropogenic origin, occurs within 200 m of the disturbance footprint.

The vegetation of depressions and drainages presents at times dominated by Lignum (*Duma florulenta*), Canegrass (*Eragrostis australasica*) and scattered Nitre Goosefoot (*Chenopodium nitrariaceum*), common of low-lying depressions of the Hay Plains, with chenopod shrublands also occurring. These features are ephemeral, likely to only form water passage during and post heavy rainfall events. It is noted that no woody debris nor instream aquatic vegetation was observed across the creek lines within the Subject Land.

The NSW DPI Fisheries Spatial Data Portal was reviewed to determine aquatic values and potential presence of threatened species in the Subject Land listed under the EPBC Act, BC Act as well as the NSW *Fisheries Management Act 1994* (FM Act). As a result, the Subject Land is not considered to consist of mapped Key Fish Habitat; however, Abercrombie Creek is mapped as providing habitat for the following threatened fish:

- Flathead Galaxias (*Galaxias rostratus*) listed as Critically Endangered under the EPBC Act, BC Act and FM Act; and
- Silver Perch (*Bidyanus bidyanus*) listed as Critically Endangered under the EPBC Act, and Vulnerable under the BC Act and FM Act.

These listed species have been assessed in Section 3.1.1.1 The Subject Land is situated within the distribution of the Lower Murray River endangered ecological community (EEC). All native fish and aquatic invertebrates in natural creeks within this distribution form part of the EEC. This EEC is further discussed in Section 3.1.1.2.

3.1.1.1 AQUATIC THREATENED SPECIES

A likelihood of occurrence assessment was undertaken for threatened aquatic entities across the Subject Land, informed by desktop sources and the field survey results. Desktop sources identified several aquatic threatened species listed under the EPBC Act and BC Act that have been recorded previously or are predicted to occur within a 10 km buffer of the Subject Land. The likelihood of occurrence approach refines the desktop generated list using site-specific and species-specific habitat information. The assessment ranks the likelihood of the species occurring within the Subject Land through analysis of species distribution information and the presence of specific habitat attributes as identified through the desktop analysis and field survey.

The criteria applied are outlined in Table 3-3. The likelihood of occurrence assessment is provided in Table 3-4.

TABLE 3-3 LIKELIHOOD OF OCCURANCE CRITERIA

Factor	Preferred habitat exists	Suitable habitat exists[1]	Habitat does not exist[2]
Records within Subject Land	Known	Known	Known
Records in the locality[3]	Likely	Potential	Unlikely
No records in the locality, but Subject Land is within known distribution	Potential	Unlikely	Unlikely
No records in the locality, and Subject Land is outside of distribution	Unlikely	Unlikely	Unlikely

[1] Habitat may be considered suitable, but not preferred.
[2] Based on sources reviewed and/or field survey results.
[3] 'Locality' refers to a 10 km buffer of the Subject Land.

TABLE 3-4 AQUATIC THREATENED SPECIES LIKELIHOOD OF OCCURANCE ASSESSMENT

Habitat	ALA/BioNet Records	Distribution	Likelihood
Flathead Galaxias (*Galaxias rostratus*)			
Flathead Galaxias are found in still or slow-moving water bodies such as wetlands and lowland streams. They have been associated with a range of habitats including rock and sandy bottoms and aquatic vegetation.	No records within the Subject Land or Locality	The Flathead Galaxias is only known from the southern half of the Murray-Darling Basin system. They have not been recorded and are considered locally extinct in the lower Murray, Murrumbidgee, Macquarie and Lachlan River catchments.	The Flathead Galaxias is considered **unlikely** to occur within the Subject Land as the suitable habitat in the form of slow-moving waterbodies is not present and there is a lack of records in the locality.

Habitat	ALA/BioNet Records	Distribution	Likelihood
Silver Perch (*Bidyanus bidyanus*)			
Silver Perch formerly utilised a diversity of habitats within the Murray-Darling system. The species were consistently reported by anglers and researchers to show a general preference for faster-flowing water, including rapids and races, and more open sections of river, throughout the Murray-Darling Basin.	No records within the Subject Land or Locality	Current core habitat is defined as the Murray River, from the base of Mulwala Weir through to Torrumbarry Weir, through to Euston Weir, and then through to the South Australian border; the lower reaches of the Darling River, from the base of the Menindee Lake weirs through to its junction with the Murray River; and the Edwards/Wakool anabranch system. Silver perch occurrences outside of this core habitat in the Border Rivers and in the Namoi and Lachlan catchments are in wholly and mostly stocked impoundments which do not recruit.	The Silver Perch is considered **unlikely** to occur within the Subject Land as the suitable habitat in the form of fast-flowing waterbodies is not present and there are a lack of records in the locality.

No threatened aquatic species are considered known or likely to occur within the Subject Land. As such, in accordance with the *Threatened Species Assessment Guidelines: the Assessment of Significance* (DPI, 2008), an assessment of significance for threatened species matters listed under the *Fisheries Management Act 1994* is not required.

3.1.1.2 THREATENED AQUATIC ECOLOGICAL COMMUNITIES

The Lower Murray River EEC is a community that includes all native fish and aquatic invertebrates within all natural creeks, rivers, and associated lagoons, billabongs and lakes of the regulated portions of the Murray River downstream of Hume Weir, the Murrumbidgee River downstream of Burrinjuck Dam, the Tumut River downstream of Blowering Dam and all their tributaries' anabranches. Excluded from this recommendation are the Lachlan River and the Darling River and their tributaries, and artificial canals, water distribution and drainage works, farm dams and off-stream reservoirs (DPI, 2007).

The Lower Murray River EEC occurs in a lowland riverine environment, characterised by meandering channels and wide floodplains. The land is generally flat to gently sloping. In their natural state, these lowland rivers experienced extremely variable water flows, ranging from floods to droughts. The EECs drainage system has been greatly modified since European settlement, through activities such as river regulation, agricultural practices and the introduction of non-native species (DPI, 2007).

The creek lines across the Project Area as presented in Figure 2-2 are within the distribution of the EEC; however, largely present as degraded, dried creek beds with a lack of native fish and aquatic invertebrates. In the event the ephemeral creek lines were inundated post heavy rainfall events it remains unlikely that the creek lines present within the Subject Land would return to a condition that was sufficient to support the assemblage of native species required to consider the waterway under the EEC listing. The prolonged history of clearing of riparian vegetation and agricultural processes including stock access and alterations to the hydrological regime have degraded this creek line beyond suitability for the EEC. Measures to avoid impacts to aquatic habitat will be undertaken in accordance with the Department's *Policy and Guidelines for Fish Habitat Conservation and Management* (Update 2013) (DPI, 2013) and *Fish Passage Requirements for Waterway Crossings* (DPI, 2003) and detailed in the SWMP.

3.2 NATIVE VEGETATION COVER AND PATCH SIZE

The assessment of site context involved the application of the site-based method. The following landscape attributes were assessed in the following sections:

- Percent native vegetation cover in the landscape; and
- Patch Size.

3.2.1 NATIVE VEGETATION COVER OF THE ASSESSMENT AREA

The extent of native vegetation across the Assessment Area (500 m buffer around the Subject Land, in accordance with the BAM for linear projects) is shown in Figure 4-1 and summarised in Table 3-5 for the Subject Land, and shown in Figure 3-2 and Table 3-6 for the transport route. These parameters have been used in the BAM-C as the percentage of native vegetation cover (97%) and the cover class (>70%) for the Subject Land and 9% and 0-10% cover class for the haul route. Assessment of native vegetation cover, beyond that ground-truthed within the Subject Land, relies upon the draft Native Regulatory Vegetation map to differentiate between native (i.e., Category 2 – Regulated Land) and non-native vegetation (i.e., Category 1 – Exempt Land).

TABLE 3-5 NATIVE VEGETATION COVER IN THE ASSESSMENT AREA (SUBJECT LAND)

Description	Value
Assessment Area	11,064 ha
Total area of native vegetation cover	10,706.3 ha
Percentage of native vegetation cover	96.8% (97%)
Cover class (0-10, >10-30, >30-70 or >70%)	>70%

TABLE 3-6 NATIVE VEGETATION COVER IN THE ASSESSMENT AREA (TRANSPORT ROUTE)

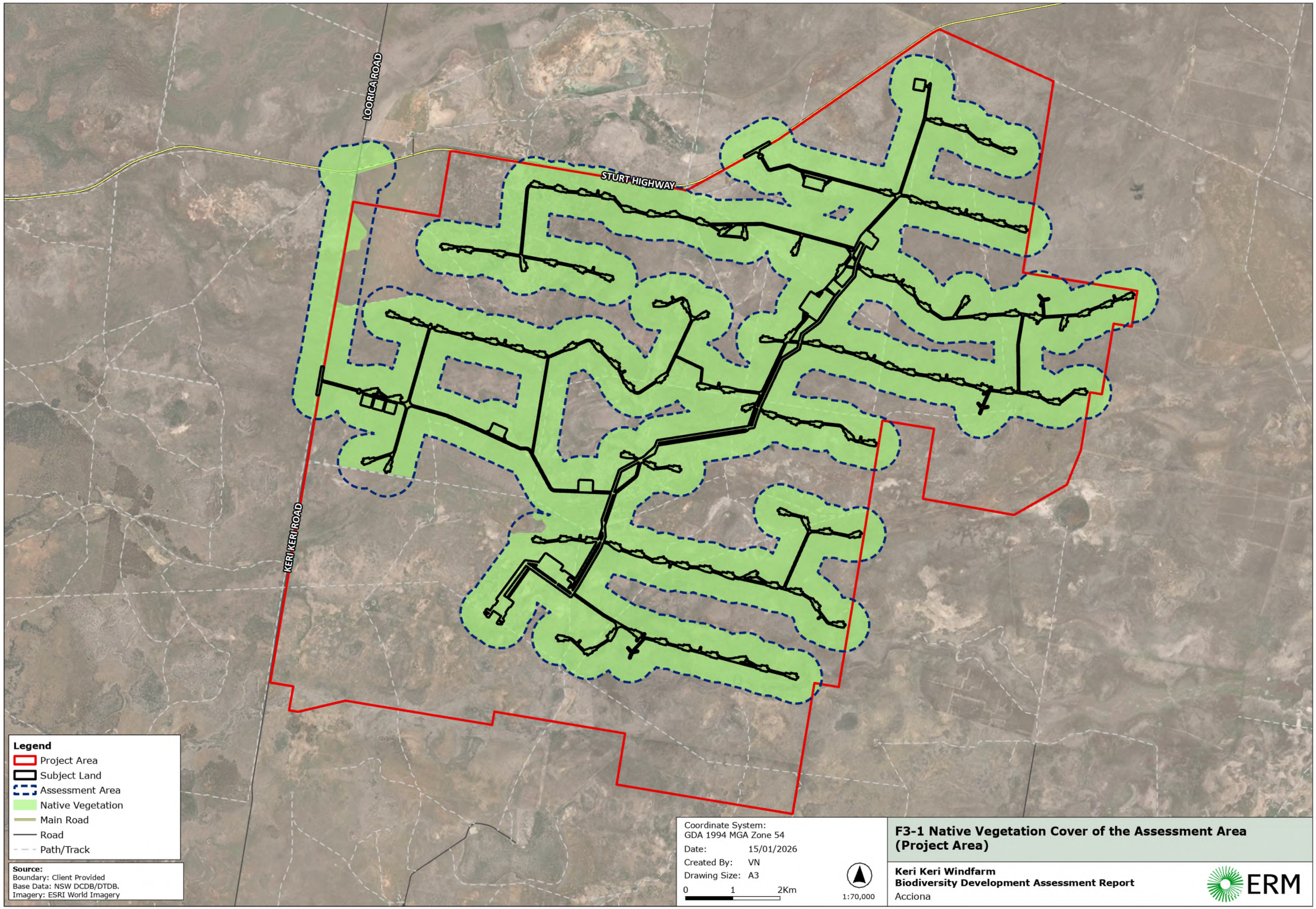
Description	Value
Assessment Area	267.65 ha
Total area of native vegetation cover	51.89 ha
Percentage of native vegetation cover	19.4% (19%)
Cover class (0-10, >10-30, >30-70 or >70%)	11-30%

Assessment of native vegetation cover, beyond that ground-verified within the Subject Land, relies upon the SVTM to differentiate between native (i.e., PCT assigned) and non-native vegetation (i.e., PCT = 0).

3.2.2 PATCH SIZE

Patch size is defined in the BAM as '*an area of native vegetation that occurs on the development site and includes native vegetation that has a gap of less than 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems)*' (NSW DPIE, 2020a). Patch size may extend onto adjoining land that is not part of the Subject Land.

The patch size of the native vegetation on the Subject Land has been calculated as >100 ha for each VZ in the wind farm assessment circle (i.e., VZ 1 to 6) and < 5 ha for the VZ within the haul road (i.e. VZ 7).



F3-1 Native Vegetation Cover of the Assessment Area (Project Area)

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Kalyarr

Euston

Robinvale

Tol Tol

Balranald

Yanga

Yanga

Yanga

A20

B400

B12

C251

Tooleybuc

Legend

- Project Area
- Haul Route
- Assessment Area
- Subject Land
- Native Vegetation

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 15/01/2026
Created By: VN
Drawing Size: A3
0 5 10Km
1:400,000

F3-2 Native Vegetation Cover of the Assessment Area (Haul Route)

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Biodiversity Development Assessment Report
Acciona

ERM

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3.3 BIRD COMMUNITY COMPOSITION

3.3.1 HABITAT

A relatively homogenous landform characterises the Subject Land (i.e., plain) and, with relatively consistent variation in vegetation structure (i.e., scattered low chenopod shrubs and tussock grasses groundcover), represent the main factors in defining bird habitat and associated composition, with the availability of water resources being seasonal and typical of a semi-arid climate.

The sparse occurrence of woody vegetation (i.e., trees and/or tall shrub canopy strata) means that many bird species reliant on hollows and/or tree canopies as part of their lifecycle are likely to have a patchy distribution and limited to the western boundary of the Project Area where canopy species occur. Similarly, water dependent species are also rare to absent as the flat plain that characterises the Subject Land is generally dry with inundation being periodic and limited to lands with low relief.

Non-passerine bird species (birds not within the order Passeriformes) are most likely to benefit from the prevailing habitat characteristics of the Subject Land. Species likely to be observed include raptors, quails and allies, pigeons and doves, cockatoos and parrots, swifts and Emu. If observed, non-passerine species reliant on microhabitat offered by areas of wetland or a tree canopy, would likely be transient such as grebes, pelicans and allies, herons and allies, ducks and allies, waders and gulls, cuckoos and kingfishers.

Smaller and/or generalist passerine species most likely to be observed in the Subject Land include ravens, magpies, wrens and pipits. The presence of anthropogenic features such as fences, posts and dams would provide localised favourable conditions for some smaller passerine species such as larks, robins, wagtails, thornbills and finches. Non-passerine granivores such as parrots would also benefit from the presence of closed depressions like farm dams.

While trees and tall shrubs that typically support the lifecycle of passerine species do occur in the locality, the habitat that these features offer are typically restricted to proximal drainages located outside the Subject Land. Thus, passerine bird species that do occur in the Subject Land are either likely to have large home ranges (i.e., highly mobile) or are present in areas where tree cover is located nearby.

3.3.1.1 RESIDENT RAPTOR HABITAT

As per Section 6.1.5 of the BAM, the likely habitat for resident raptor species has been determined. This aligns with broad habitat types identified across the landscape. Broad habitat types have been grouped based on Keith (2004) vegetation class as presented in Table 3-7.

TABLE 3-7 RAPTOR HABITAT TYPES

Broad Habitat Type	Vegetation Class (Keith 2004)	Extent in Subject Land (ha)
Shrublands	Inland Floodplain Shrublands	765.06
Non-native Vegetation	N/A	12.25

Raptor species are likely to utilise grassland, shrubland, non-native vegetation and man-made structures (transmission towers) in the absence of woody vegetation across the Subject Land to support foraging and nesting behaviours.

Several stick nests suitable for use by raptors were observed across the Subject Land, ranging between 40 cm to > 1 m in width. Stick nest locations are provided in Figure 3-3. As all habitat across the Subject Land conforms with raptor habitat, resident raptors are anticipated to inhabit the entirety of the site. Further detail into raptor site utilisation is provided in the draft BBAMP, attached as Appendix A.

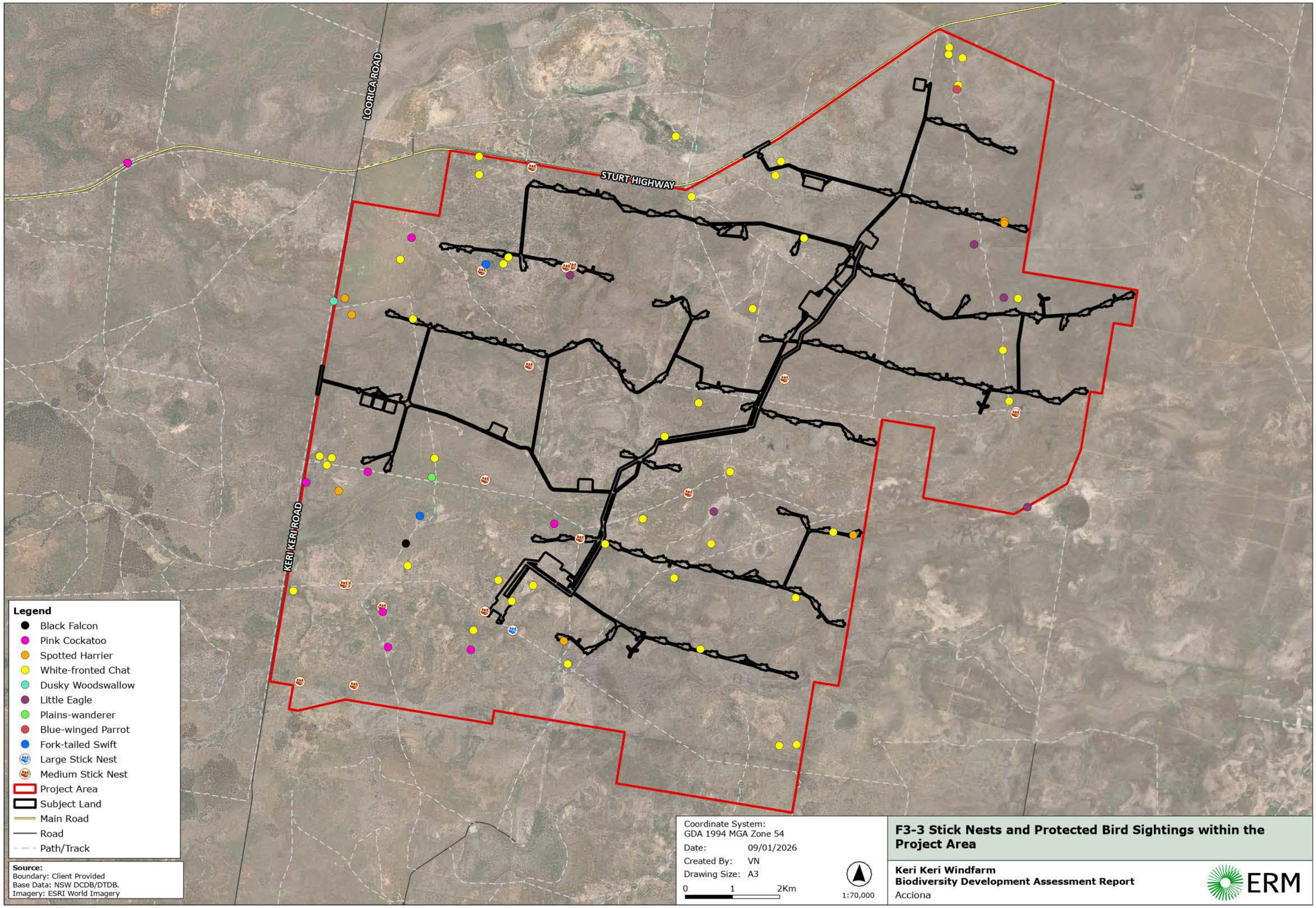
3.3.2 PROTECTED BIRD SPECIES

Threatened and/or migratory avian species (protected species) observed within and in proximity to the Subject Land are detailed in Table 3-8 and observation points are shown in Figure 3-3.

TABLE 3-8 THREATENED BIRD SPECIES OBSERVED

Common Name	Scientific Name	BC Act Status	EPBC Act Status	Number of Sightings
Black Falcon	*Falco subniger*	V	-	2 observations of 1 individual
Blue-winged Parrot	*Neophema chrysostoma*	V	V	1 observation of 1 individual
Dusky Woodswallow	*Artamus cyanopterus*	V	-	2 observations of 7 individuals
Fork-tailed Swift	*Apus pacificus*	-	Mi	1 observation of 13 individuals and 1 observation of 30 individuals
Little Eagle	*Hieraaetus morphnoides*	V	-	4 observations of 1 individual and 1 observation of 3 individuals
Pink Cockatoo	*Lophochroa leadbeateri*	V	-	9 observations totalling 98 individuals observed
Plains-wanderer	*Pedionomus torquatus*	E	CE	1 observation of 1 individual
Southern Whiteface	*Aphelocephala leucopsis*	V	V	Frequent observations totalling 17 individuals
Spotted Harrier	*Circus assimilis*	V	-	7 observations of 1 individual
White-fronted Chat	*Epthianura albifrons*	V	-	Frequent observations of many individuals

Further detail into protected bird species sightings across the Project Area and Subject land are provided in the draft BBAMP, attached as Appendix A. Bird utilisation survey results are provided in Appendix B.



F3-3 Stick Nests and Protected Bird Sightings within the Project Area

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Acciona

ERM

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3.4 PREDICTED FLYWAY MAPPING

Predicted flyway mapping has been undertaken for three listed threatened species, Plains-wanderer (*Pedionomus torquatus*), Blue-winged Parrot (*Neophema chrysostoma*) and Eastern Pink Cockatoo (*Lophochroa leadbeateri leadbeateri*), and two species groups, raptors and migratory shorebirds. This flyway mapping is preliminary and should the construction, and post construction monitoring surveys described in the BBAMP identify material changes to utilisation and movement than these flyways will be updated in accordance with the reporting requirements of the BBAMP.

For this analysis, the two species groups relate to the following species:

- Raptors:
  - Australian Hobby (*Falco longipennis*),
  - Black Falcon (*Falco subniger*),
  - Black Kite (*Milvus migrans*),
  - Black-shouldered Kite (*Elanus axillaris*),
  - Brown Falcon (*Falco berigora*),
  - Grey Falcon (*Falco hypoleucos*),
  - Letter-winged Kite (*Elanus scriptus*),
  - Little Eagle (*Hieraaetus morphnoides*),
  - Nankeen Kestrel (*Falco cenchroides*),
  - Peregrine Falcon (*falco peregrinus*),
  - Spotted harrier (*Circus assimilis*),
  - Square-tailed Kite (*Lophoictinia isura*),
  - Swamp Harrier (*Circus approximans*),
  - Whistling Kite (*Haliastur sphenurus*),
  - White-bellied Sea-eagle (*Haliaeetus leucogaster*), and
  - Wedge-tailed Eagle (*Aquila audax*).
- Migratory Shorebirds:
  - Australian Painted Snipe (*Rostratula australis*),
  - Common Greenshank (*Calidris acuminata*),
  - Common Sandpiper (*Actitis hypoleucos*)
  - Curlew Sandpiper (*Calidris ferruginea*),
  - Latham's Snipe (*Gallinago hardwickii*),
  - Pectoral Sandpiper (*Calidris melanotos*),
  - Ruddy Turnstone (*Arenaria interpres*), and
  - Sharp-tailed Sandpiper (*Calidris acuminata*).

3.4.1 PLAINS-WANDERER

The Plains-wanderer (*Pedionomus torquatus*) has very specific habitat requirements that limit the potential for dispersal. Movement patterns for the species are poorly understood owing to the species' highly cryptic nature, and it is unknown how far, how high or how frequently the disperse. Critical habitat for the species is defined as sparse, treeless lowland native grasslands which often occur on hard red-brown clay soils. The structure of the grassland is more important than floristic diversity and approximately 50% bare ground and most vegetation less than 5cm in height is preferred (DoE, 2016). Following avoidance efforts, no suitable habitat is present within the Subject Land however suitable grasslands are present within the broader Project Area and likely the broader landscape. In the absence of reliable vegetation community mapping, the Mitchell's landscape classifications and Australian Soil Classification Soil Type Map of NSW have been used to predict where suitable conditions to support habitat for the species is likely to occur.

Of the Mitchell's Landscapes intersecting with the Project Area, the Murrumbidgee Depression Plains, characterised as extensive derived grasslands, is the most likely to support suitable habitat for the plains-wanderer. The landscape intersects the Project Area in the south-east however extends to within proximity to the south and west. Vertosols are the dominant soil type within the region however a thin east-west band of rudosols bisects the Project Area. The interaction of these two soil types may establish a matrix of vegetation communities that facilitates connected patches of suitable grassland habitat to facilitate east-west movement through the Project Area.

STURT HIGHWAY

BALRANALD ROAD

MAUDE ROAD

Legend

- Plains-wanderer
- Flyway
- Project Area
- Subject Land
- Over-cleared Land
- Main Road
- Road

Dominant ASC - Order

- Calcarosols (CA)
- Chromosols (CH)
- Rudosols (RU)
- Sodosols (SO)
- Vertosols (VE)
- Water

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 12/01/2026
Created By: VN
Drawing Size: A3
0 1 2Km
1:200,000

F3-4 Predicted Flyway mapping for the Plains-wanderer

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

0617753_KKWF_BDAR_R1.aprx

3.4.2 BLUE-WINGED PARROT

The Blue-winged Parrot (*Neophema chrysostoma*) is a semi-migratory endemic parrot occurring throughout southeastern Australia. Breeding typically occurs south of the Great Dividing Range in southern Victoria, south-east South Australia and northern Tasmania. During the non-breeding period, Autumn to early Spring, variable numbers of individuals disperse throughout south-eastern Australia to important foraging habitat. The chenopod shrublands and grasslands of arid and semi-arid NSW are known to provide habitat critical to the survival of the species (DAWE, 2022). While there is a paucity of monitoring effort in these areas, the region is likely to support a large percentage of the total population. Interactions with the Project are therefore likely to be driven by these seasonal semi-migratory movements.

Figure 3-5 details the predicted flyway for blue-winged parrots in relation to the Project Area. At the landscape scale, blue-winged parrots are likely to be moving in a predominately north-south orientation as they undertake seasonal movements. The Project Area falls within the Murrumbidgee Scalded Plains Mitchells Landscape and is expected to form a matrix of vegetation communities supporting likely food species including bladder saltbush (*Atriplex versicaria*), annual saltbushes (*Atriplex* spp.), bluebush (*Maireana* spp.), wallaby grasses (*Rytidosperma* spp), and windmill grass (*Chloris truncata*) (Mitchell, unpub). This landscape is extensive to the north and south of the Project Area and likely provides a broad corridor to facilitate movement.

At the local scale, movement patterns are likely to be influenced by the availability of habitat features within the landscape. Extensive black box (*Eucalyptus largiflorens*) woodlands are present to the west of the Project Area. The region is not understood to be within the known breeding range for the species however the woodland is likely to provide important roosting and refuge habitat. Short distance movements between roosting and foraging habitat are likely to influence interactions between the species and the Subject Land and may facilitate smaller scale east-west pathways through the Subject Land. Similarly, permanent water provided by artificial dams are likely to accessed by individuals and may facilitate interactions with the Subject Land during intra-site movements.

STURT HIGHWAY

BALRANALD ROAD

MAUDE ROAD

Legend

- Blue-winged Parrot
- Flyway
- Project Area
- Subject Land
- Main Road
- Road
- Over-cleared Land

Dominant ASC - Order

- Calcarosols (CA)
- Chromosols (CH)
- Rudosols (RU)
- Sodosols (SO)
- Vertosols (VE)
- Water

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54

Date: 19/12/2025

Created By: VN

Drawing Size: A3

0 1 2Km

1:200,000

F3-5 Predicted Flyway mapping for the Blue-winged Parrot

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3.4.3 PINK COCKATOO

The Eastern Pink Cockatoo (*Lophochroa leadbeateri leadbeateri*) is found predominantly within arid and semi-arid woodlands, including those dominated by mallee and box eucalypts. The habitat critical to the survival of the subspecies include the availability of suitable nesting hollows and fresh surface water with a matrix of suitable habitat to facilitate movement across the landscape. Diet consists mainly of seeds of native shrubs and trees and is supplemented with roots, bulbs, insect larvae and agricultural crops (DAWE, 2022). Movement patterns within the Riverina region are likely to be heavily influenced by the availability of these critical habitat characteristics.

As a species largely restricted by the availability of suitable woodland habitat, movement at the landscape level is likely to be facilitated by the matrix of woodland habitat present to the west of the Project Area. The grasslands and chenopod shrublands characteristic of the Murrumbidgee Depression Plains and Murrumbidgee Scolded Plains Mitchell's Landscapes have foraging values for the species and are peripheral to the woodlands this species prefers.

At the local scale, movement within the Project Area is likely limited to the south-western portion of the Project Area. Aside from isolated trees in derived vegetation communities, the contiguous woodlands within the broader landscape are connected to the Project Area only through a single patch of black box woodland in the Project's west. Based on the preferential selection of foraging habitat within proximity to roosting and breeding habitat, individuals are less likely to move through the treeless vegetation communities that dominate the northern and eastern areas of the Project Area. The locations of pink cockatoo sightings that inform this BDAR have exclusively been observed in the south-west of the Project and further support this. Agricultural dams and livestock watering points may also supplement natural surface water and support foraging activity in suitable chenopod shrublands to the Project's north and east.

STURT HIGHWAY

BALRANALD ROAD

MAUDE ROAD

Legend

- Pink Cockatoo
- Flyway
- Project Area
- Subject Land
- Over-cleared Land
- Main Road
- Road

Dominant ASC - Order

- Calcarosols (CA)
- Chromosols (CH)
- Rudosols (RU)
- Sodosols (SO)
- Vertosols (VE)
- Water

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54

Date: 19/12/2025

Created By: VN

Drawing Size: A3

0 1 2Km

1:200,000

F3-6 Predicted Flyway mapping for the Pink Cockatoo

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3.4.4 MIGRATORY SHOREBIRDS

While most critical non-breeding habitat for migratory shorebirds in Australia occurs in coastal areas, wetlands in inland areas are known to provide important habitat particularly during periods of high seasonal rainfall and inundation (Clemens, et al., 2021). During such periods, movement between coastal and inland wetlands is common and during wet years inland wetlands may support large numbers of the population (Loyn, et al., 2014). Inland wetlands also provide important temporary stopovers during trans-equatorial movements (Alcorn, et al., 1994). While these broadscale movement patterns are poorly understood, the utilisation of inland wetlands will be the dominant driver of interactions between migratory shorebirds and the Subject Land.

While the broader Project Area contains few large naturally occurring wetlands, large ephemeral wetlands are present within the surrounding landscape, many of which are likely to be influenced by the Murray and Murrumbidgee Rivers and their tributaries. Assuming birds are most likely to fly in direct paths between wetlands, most movement pathways throughout the broader landscape are not expected to coincide with the Project Area. Instead, movement is more likely to occur through a corridor of interconnected wetlands to the south intersecting with the Project Area only through the Abercrombie Creek. Individuals may enter the Project Area through this corridor and access larger agricultural dams however this is likely to be rare and only during periods of very high rainfall. Direct east-west movement through the Project may also occur however suitable wetlands are approximately 57 km apart and is likely to allow for flights above or around wind farm (macro-avoidance).

To date, no migratory shorebirds have been observed within the Project Area following any field investigations informing this BDAR. Due to the highly ephemeral nature of potential habitat, it is unlikely that landscape level utilisation can be properly understood without the implementation of long-term monitoring studies.

LACHLAN RIVER
OXLEY ROAD
MAUDE ROAD
Hay
MURRUMBIDGEE RIVER
Balranald
STURT HIGHWAY
YANGA WAY
BALRANALD ROAD
WAKOOL RIVER
STONY CROSSING ROAD
EDWARD RIVER
SWAN HILL ROAD
MOULAMEIN ROAD
MEMUR RIVER
COBB HI

Legend
- Australian Painted Snipe
- Common Greenshank
- Lathams Snipe
- Pectoral Sandpiper
- Sharp-tailed Sandpiper
- Flyway
- Project Area
- Subject Land
- Main Watercourse
- Main Road
- Road

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 19/12/2025
Created By: VN
Drawing Size: A3
0 5 10Km
1:400,000

F3-7 Predicted Flyway mapping for Migratory Shorebirds

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ERM

0617753_KKWF_BDAR_R0.aprx

3.4.5 RAPTORS

Raptor presence is high within the Project Area with twelve species confirmed to occur within the Project Area. Individuals utilise a diverse range of habitats within home ranges with a matrix of vegetation communities is often required for breeding and foraging (Morcombe, M., 2000; Cherriman, et al., 2021; Larkin, et al., 2020). As the Project Area contains a largely uniform assemblage of grassland and shrubland vegetation communities, it is unlikely that changes in floristic communities will establish materially different habitats that influence movement. Movement is therefore expected to be uniformly distributed throughout these areas.

Changes to stocking rates, particularly when lambs are present, are likely to influence a large raptors spatial activity within their home range, notably the Wedge-tailed Eagle (*Aquila audax*) (Winkel, 2007). Stocking rates are not static and subject to changes in land management practices and so have not been considered when identifying flyways, however suitable mitigation measures have been proposed in the appended BBAMP to reduce raptor activity in relation to livestock near turbines. In the absence of woodland vegetation, artificial structures and infrastructure such as roads are more reliable proxies for identifying likely flight pathways at a local scale.

Roads and road verges are likely to be an important movement corridor within an otherwise largely homogenous landscape. Carrion, particularly roadkill, is an important food source for many large raptor species and is likely to be depended heavily upon during periods of drought (Aumann, 2001; Peisley, et al., 2017). Carrion, particularly roadkill, is an important food source for many large raptor species and is likely to be depended heavily upon during periods of drought (Aumann, 2001; Peisley, et al., 2017). Additionally, the more highly managed road verges often offer a higher prey abundance and increased foraging opportunities for smaller raptors (Dean & Milton, 2003); and is likely to be utilised heavily by species such as the Nankeen Kestrel (*Falco cenchroides*) and Black-shouldered Kite (*Elanus axillaris*). It is expected that the Sturt Highway, running parallel with the north of the Project Area, will provide the primary pathway for raptor movement within the broader landscape due to higher roadkill density. Movement into the Project Area is expected to occur across the length of the highway with turbines closest to the road expected to have the highest risk of collision.

Woodland vegetation is largely absent from the Project Area with natural nesting opportunities largely restricted to contiguous woodland areas to the west. The existing transmission line running through the south of the Project Area provides artificial nesting habitat that is likely to increase raptor utilisation along the length of the transmission line. Numerous observations of breeding wedge-tailed eagles have been made along this transmission line along with small to medium stick nests suitable for the Brown Falcon (*Falco berigora*) and other medium raptors.

Balranald
MURRUMBIDGEE RIVER
STURT HIGHWAY
BALRANALD ROAD
MAUDE ROAD

Legend
- Black Falcon
- Spotted Harrier
- Little Eagle
- Flyway
- Project Area
- Subject Land
- Main Watercourse
- Main Road
- Road

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 19/12/2025
Created By: VN
Drawing Size: A3
0 1 2Km
1:200,000

F3-8 Predicted Flyway mapping for Raptors

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

3.5 BAT COMMUNITY COMPOSITION

3.5.1 HABITAT

Chenopod shrublands in NSW provide important habitats for several specialized bat species, particularly in the arid and semi-arid regions. These environments, dominated by saltbushes (*Atriplex* spp.) and bluebushes (*Maireana* spp.), provide foraging grounds and proximity to essential water sources for microbats.

Chenopod shrublands of the Hay Plains offer foraging opportunities including complex insect populations supported by saltbushes and bluebushes provide high-value prey. These bats are often found where shrublands transition into larger woody structures, such as Black Box or Myall woodlands, which offer better roosting sites. These more complex woodlands and open woodlands are typically found near water courses and wetlands, where there is greater more reliable access to open water necessary for survival despite their ability to tolerate high temperatures and aridity.

The Subject Land contains vast areas of chenopod shrubland that form part of an operational sheep grazing agricultural land use. These lands have been modified through historical clearing and grazing, with other impacts also evident (e.g., severe drought and over abundant rabbit infestations). This land use history, which spans over 100 years, has modified the vegetation cover by simplifying vegetation composition and structure. Surface hydrology has been modified through earthworks (i.e., building of channels and dams) to divert and centralise water accumulation for livestock purposes.

These changes have had influence on the habitat values necessary for microbat species. Floristic composition and structural change are likely to have had similar effect on insect communities, with changes in tree cover resulting in loss of roosting habitat. Alteration to surface water regimes is likely to have impacts spatial-temporal use of the Subject Land, with less water availability for free ranging bats likely to have had a detrimental impact on their use of habitat within the Subject Land during the hotter months of the year.

3.5.2 SURVEY RESULTS

Acoustic call detection surveys were conducted within the Subject Land across four sampling periods. Bat call analysis reports from the sampling periods are provided in Appendix C. Fourteen species or species groups were identified, with the confidence in the species identification ranked as either ‘definite’, ‘probable’ or ‘possible’. The result of the analyses is provided in Table 3-9.

TABLE 3-9 BAT CALL ANALYSIS RESULTS

Scientific Name	Common Name	BC Act	EPBC Act	Targeted methods	Met Mast Survey
Austronomus australis	White-striped Freetail Bat	-	-	Definite	Definite
Chalinolobus gouldii	Gould's Wattled Bat	-	-	Definite	Definite
Chalinolobus morio	Chocolate Wattled Bat	-	-	Definite	Definite
Myotis macropus	Southern Myotis	V	-	Possible	**Absent**
Nyctophilus geoffroyi	Lesser Long-eared Bat	-	-	Possible	Possible

Scientific Name	Common Name	BC Act	EPBC Act	Targeted methods	Met Mast Survey
Nyctophilus gouldi	Gould's Long-eared Bat	-	-	Possible	Possible
Ozimops planiceps	South-eastern Freetail Bat	-	-	Definite	Probable
Ozimops ridei	Ride's Free-Tailed Bat	-	-	Definite	Definite
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Definite	**Absent**
Scotorepens balstoni	Inland Broad-nosed Bat	-	-	Definite	Definite
Scotorepens greyii	Little Broad-nosed Bat	-	-	Definite	**Absent**
Vespadelus darlingtoni	Large Forest Bat	-	-	Probable	**Absent**
Vespadelus regulus	Southern Forest Bat	-	-	Possible	**Absent**
Vespadelus vulturnus	Little Forest Bat	-	-	Possible	Definite

Survey results for the three height treatments are summarised in Table 3-10, with detailed results provided in Appendix C. Diversity was highest at 2 m with all species identified at this location being detected. Activity and species composition reduced substantially at 30 m with composition and activity 95 m being an order of magnitude less than the 2 m height and driven largely by three species/species groups (*Austronomus australis, Ozimops planiceps* and *Ozimops ridei*).

TABLE 3-10 NUMBER OF TOTAL CALLS PER SPECIES ACROSS THREE HEIGHT TREATMENTS

Species	Feeding Guild*	2 m	30 m	95 m	Nights Recorded	Species Total
Austronomus australis	High-flying	57	191	130	48	378
Chalinolobus gouldii	Canopy-foraging	1	18	1	11	20
Chalinolobus morio	Canopy-foraging	10	1	0	8	11
Nyctophilus spp.	Canopy-foraging	29	6	0	20	35
Ozimops planiceps	High-flying	6,143	1,673	317	74	8,133
Ozimops ridei	High-flying	1,499	953	43	77	2,495
Scotorepens balstoni	Canopy-foraging	1	1	0	2	2
Scotorepens greyii	Canopy-foraging	13	8	0	8	21
Vespadelus regulus	Canopy-foraging	1	0	0	1	1
Vespadelus vulturnus	Canopy-foraging	10	0	0	8	10
Total Calls Across Species		7,764	2,851	491		

*Foraging guilds have been determined based on known behaviours sourced from the following citations: (Churchill, 2008; Menkhorst & Knight, 2011; Strahan, 2023)

Passive recording of bat calls from devices attached to the met mast using omnidirectional microphones set at heights of 2 m, 30 m and 95 m is ongoing to allow for further profiling of bat species composition and activity at heights considered at risk of collision, and changes to site level utilisation in relation to weather, time and season.

3.5.3 BAT COMMUNITY

These results provide insight into bat community composition across the broader Project Area and at height (i.e., met mast). Species composition varies between targeted survey locations and the met mast survey. Interestingly, the met mast survey failed to identify the incidence of any threatened species as otherwise detected by the targeted surveys. A summation of this is provided as follows:

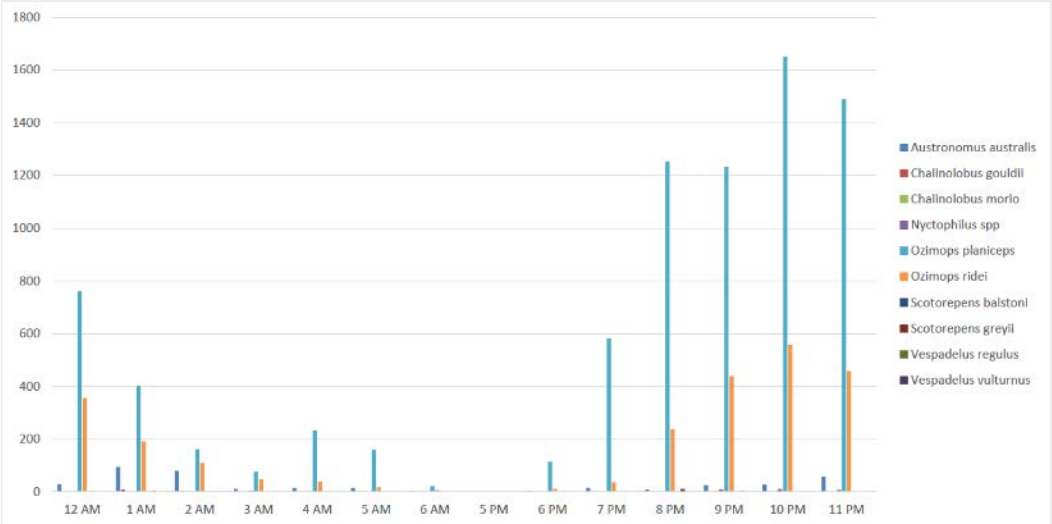
- The Southern Myotis (*Myotis macropus*) was not detected at the met mast and this makes sense as it is an aquatic habitat specialist that feeds on fish and macroinvertebrate over water. No water resources suitable for this species occur within 200m of the Subject Land nor are there any suitable bat roosts in the form of hollow-bearing trees. While this species may have been detected in targeted surveys that focused on water resources, it is not a species that would be typically found within the Subject Land.
- The Yellow-bellied Sheath-tail Bat (*Saccolaimus flaviventris*) was not detected at the met mast. This makes sense as it is a species that prefers woodlands and open woodlands; a habitat structure absent from the Subject Land. The duration of the met mast survey would indicate that if this species were to occur within the Land, it would be a rare occurrence.

Other species not detected at the met mast include Little Broad-nosed Bat, Large Forest Bat and Southern Forest Bat. This also makes sense as these bat species prefer vegetation comprising trees and tall shrubs.

3.5.3.1 BAT ACTIVITY THROUGH THE NIGHT

Bat activity across all species varied across the night. Most of the activity was recorded from about sunset to 1am in the morning. Activity thereafter was significantly less for all species. A profile of bat activity across the night is shown in Chart 3-1.

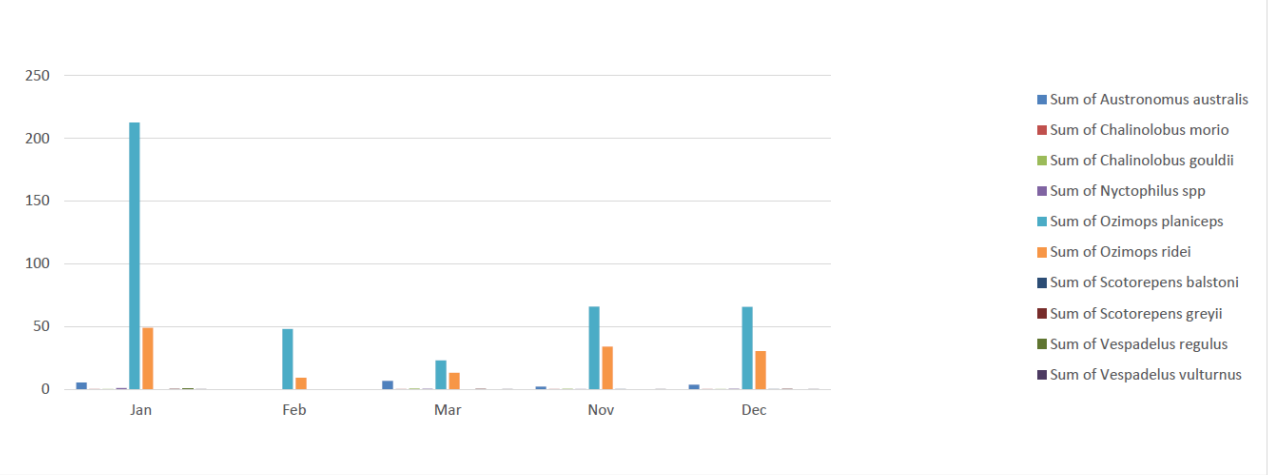
CHART 3-1 NOCTURNAL VARIATION IN BAT ACTIVITY BY SPECIES



3.5.3.2 BAT ACTIVITY BY MONTH

Temporal variation in bat activity was detected over the November to March period at the met mast. Bat activity peaked in January for South-eastern Freetail Bat (*Ozimops planiceps*) and Ride's Free-Tailed Bat (*Ozimops ridei*) as shown in Chart 3-2. The January peak may coincide with the weaning of offspring, as lactation recorded between late November and mid December.

CHART 3-2 TEMPORAL VARIATION IN BAT ACTIVITY (NOVEMBER TO MARCH)



3.5.3.3 BAT ACTIVITY AT HEIGHT

Species known to fly at height were confirmed within the Project Area. Three species were found to fly at the RSA height being White-striped Freetail Bat (*Austronomus australis*), South-eastern Freetail Bat (*Ozimops planiceps*) and Ride's Free-Tailed Bat (*Ozimops ridei*). These results were expected. Most other bat species were recorded at 2 m with substantially fewer recording at the 30 m height.

4. NATIVE VEGETATION, THREATENED ECOLOGICAL COMMUNITIES AND VEGETATION INTEGRITY

4.1 NATIVE VEGETATION EXTENT

This section of the BDAR identifies native vegetation occurring on the Subject Land (Figure 2-2) in accordance with the requirements of Section 4 of the BAM.

4.1.1 MAPPED NATIVE VEGETATION

The Subject Land comprises 765.06 ha of native vegetation (i.e., extent of native vegetation).

4.1.2 AREAS THAT ARE NOT NATIVE VEGETATION

12.25 ha of non-native vegetation occurs in the Subject Land associated with access tracks, roads and farming infrastructure.

4.2 IDENTIFY AND MAP PCTS

The identification and mapping of PCTs and TECs within the Subject Land is to be completed in accordance with Section 4.2 of the BAM and is to be based on the outcomes of the plot-based floristic vegetation survey (Section 4.2.1(4)). This includes circumstances where the vegetation is missing structural layers and has no distinct linear boundary to determine difference between PCTs and planted native vegetation. PCT description is to include:

- PCT name and ID code;
- Class and formation;
- The area in ha;
- Species relied upon for identification of vegetation type;
- Use of BAM plots to identify a PCT (as outlined in Section 4.1.2(2) of the BAM);
- Estimate of percent cleared value of PCT (as outlined in Section 4.2.1(5) of the BAM); and
- TEC status (as outlined in Section 4.2.2 of the BAM).

The mapping of native vegetation is limited to the Development Footprint.

4.2.1 NATIVE VEGETATION OF THE REGION

Native vegetation of the region is formed on an expansive alluvial plain dominated by chenopod shrublands bisected by wooded rivers and creeks. Porteners (1993) noted that vegetation patterns across the region are influenced regions geomorphology, which is predominantly fluvial[7] with minor aeolian[8] and lacustrine[9] elements. Key characteristic geomorphological features of the region include:

- Plains with depressions, or lakes;
- Channelled plains;
- Scalded plains; and
- Featureless plains.

[7] Fluvial: Landforms derived from sediments deposited from streams or rivers
[8] Aeolian: landforms derived sediments deposited from wind action
[9] Lacustrine: Landforms derived from sediments deposited in the bottom of ancient lakes

Stands of woody vegetation such as Black Box (*Eucalyptus largiflorens*) or White Cypress Pine (*Callitris glaucophylla*) or Weeping Myall (*Acacia pendula*) may be observed within the region but are restricted. These woody areas of native vegetation are often associated with channelled plains (gallery forest along creeks and rivers) or aeolian deposits (i.e., sand hills). Neither of these geomorphic features occur within the Subject Land.

The Subject Land is located within the 'channelled plains' and 'scalded plains' geomorphic features, where deep, grey cracking clays are often found. These plains are characterised by low chenopod shrublands, which were once typically dominated by Bladder Bush (*Atriplex vesicaria*); however, this species has suffered considerable dieback over the course of the 20th century especially in the 1977 – 1983 period where widespread drought was experienced (Porteners, 1993). Excessive grazing throughout the region has led to a dominance of Cotton Bush (*Maireana aphylla*), which is now widespread and common notably south-west of Hay (Porteners, 1993).

4.2.2 AGRICULTURAL HISTORY

Livestock grazing and cropping have featured throughout the Hay plains since the late 1800's. Irrigated lands were widely installed prior to and after World War II, further intensifying land use. The advent of agriculture in the region promoted the introduction of the European Rabbit (*Oryctolagus cuniculus*), resulting in a population explosion and widespread destruction of native vegetation prior to biological controls being introduced. Current vegetation cover and condition have been shaped by these land use factors.

4.2.3 STATE VEGETATION TYPE MAP

The SVTM identifies seven PCTs within the Subject land these being:

- 28 White Cypress Pine open woodland of sand plains, prior streams and dunes mainly of the semi-arid (warm) climate zone;
- 46 Curly Windmill Grass - speargrass - wallaby grass grassland on alluvial clay and loam on the Hay Plain, Riverina Bioregion;
- 157 Bladder Saltbush shrubland on alluvial plains in the semi-arid (warm) zone including Riverina Bioregion;
- 160 Nitre Goosefoot shrubland wetland on clays of the inland floodplains;
- 163 Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones;
- 164 Cotton Bush open shrubland of the semi-arid (warm) zone; and
- 166 Disturbed annual saltbush forbland on clay plains and inundation zones mainly of south-western NSW.

The SVTM is a vegetation map generated from environmental variables and has limited ground verification. In the case of the Project Area, it is almost certain that there was no ground-verification in its production. Thus, mapping accuracy in this location has not been verified and therefore must be treated as advisory only. BioNet Vegetation Type database descriptions for these are provided in the Table 4-1.

TABLE 4-1 BIONET VEGETATION TYPE DATABASE DESCRIPTION FOR SVTM PCTS MAPPED IN THE SUBJECT LAND

PCT	BioNet Vegetation Type Database Description
28	Open woodland or a derived grassland with scattered trees up to 15 m high dominated by White Cypress Pine (*Callitris glaucophylla*). Associated small trees or tall shrubs include Buloke (*Allocasuarina luehmannii*), Needlewood (*Hakea leucoptera*), Hooked Needlewood (*Hakea tephrosperma*), Sugarwood (*Myoporum platycarpum*), Pittosporum angustifolium, Western Rosewood (*Alectryon oleifolius subsp. canescens*), Emu Bush (*Eremophila longifolia*) and Wilga (*Geijera parviflora*). Common chenopod shrub species include Black Bluebush (*Maireana pyramidata*), *Maireana enchylaenoides* and Thorny Saltbush (*Rhagodia spinescens*). Copperburr low shrubs include *Sclerolaena diacantha* and *Sclerolaena obliquicuspis*. Forb species include *Tetragonia tetragonioides*, *Calandrinia eremaea*, *Calotis hispidula*, *Tribulus terrestris* and *Zygophyllum ammophilum*. Many stands contain a very sparse shrub understorey that has been grazed out with the ground being dominated by native and exotic grasses and forbs. Native grass species include *Austrostipa scabra subsp. scabra*, *Austrodanthonia caespitosa*, *Aristida behriana*, *Enneapogon nigricans* and *Paspalidium constrictum*. Exotic species include *Schismus barbatus*, *Brassica tournefortii* and *Medicago polymorpha*. Occurs on sandy loam soils on prior streams, source bordering sand dunes and sand plains in south-western NSW. Often present in a mosaic with Belah - Western Rosewood, Acacia or Eucalyptus communities. Few sites are in good condition due to grazing and clearing. Many sites are highly degraded and eroded with a few trees remaining, little regeneration and a depleted understorey. A threatened community requiring protection from grazing, regeneration, soil erosion control and improved reservation.
46	Open to closed tussock grassland generally about 0.3 m high dominated by Curly Windmill Grass (*Enteropogon ramosus*), corkscrew grass (*Austrostipa nodosa* and/or *Austrostipa scabra*) and a number of wallaby grass species (*Austrodanthonia spp.*) with a range of forbs including *Rhodanthe corymbiflora*, *Crassula colorata var. acuminata*, *Erodium crinitum*, *Oxalis perennans*, *Sida trichopoda*, *Sida corrugata*, *Goodenia pusilliflora*, *Goodenia fascicularis*, *Calotis scabiosifolia var. scabiosifolia*, *Calocephalus sonderi*, *Bulbine semibarbata* and *Daucus glochidiatus* form G. A very sparse shrub layer may be present including *Sclerolaena stelligera*, *Maireana excavata* and *Maireana aphylla*. Occurs on medium brown to grey clays and loams on level alluvial plains on the western Riverine Plain (Hay Plain) near Hay and north-east of Deniliquin in the Riverina Bioregion. Contains a high proportion of annual exotic species in Spring dominated by Wimmera Rye Grass (*Lolium rigidum*) and Wild Oats (*Avena fatua*). Very poorly represented in protected areas as of 2005 and susceptible to clearing for cropping.
157	Low to mid-high to 90 cm high, open to sparse chenopod shrubland dominated by Bladder Saltbush (*Atriplex vesicaria*) often with Desert Glasswort (*Pachycornia triandra*), Three-spined Copperburr (*Sclerolaena tricuspis*), *Sclerolaena intricata* and Pigface (*Disphyma crassifolium subsp. clavellatum*). Other commonly occurring small shrubs include Slender Glasswort (Sclerostegia tenuis), Sclerolaena brachyptera, Sclerolaena tenuis, Maireana decalvans, Maireana aphylla, Malacocera tricornis, Dissocarpus biflorus var. biflorus, Atriplex lindleyi and Atriplex pseudocampanulata. Grasses include Chloris truncata, Austrodanthonia setacea and Sporobolus caroli. Ephemeral daises occur after rains including Minuria cunninghamii, Brachyscome smithwhitei and Rhodanthe corymbiflora. The succulent forb Calandrinia volubilis often present. Myall (Acacia pendula) or Black Oak (Casuarina pauper) may occur as isolated trees. In heavily grazed regions Bladder Saltbush may be replaced by a disturbed shrubland complex composed of Nitraria billardierei, Sclerolaena spp. and Cotton Bush (Maireana aphylla) or Desert glasswort (Pachycornia triandra). This has happened on the lake beds of most of the Willandra Lakes and along the heavily grazed floodplains of the Murray River. Floristic variation occurs from north to south and from east to west, however many species are consistently present over the range. Occurs on grey and brown cracking clays and red-brown clay loam soils on alluvial plains including the Hay Plain, in the Darling Ana-Branch region and occurrences in the Scotia mallee around salt lakes in south west NSW. This community grades into ID195 Bladder Saltbush on the floodplains of the Darling Riverine Plain on the Darling and its tributaries near Wilcannia and east of Bourke including the Warrego River. In the Riverina it grades into bluebush and other chenopod shrublands, glasswort/samphire forblands (e.g. ID18), native grasslands, Myall woodlands, and Black Box woodland near watercourses.

PCT	BioNet Vegetation Type Database Description
	It is estimated that over half of this community has been cleared or severely altered through grazing and dieback over the last 150 years. Due to a combination of stock and rabbit grazing, droughts and grub-herbivory dieback, it is considered that Bladder Saltbush may have retreated 100 km to the west on the Riverine Plain leaving behind "derived" grasslands (IDs 44-46). For this reason, the community is considered vulnerable to further destruction and as of 2005 less than 1% or its original extent was protected in reserves or under property agreements.
160	Tall shrubland to two metres high, dominated by Nitre Goosefoot (Chenopodium nitrariaceum) often with Black Roly Poly (Sclerolaena muricata). Low shrubs include Sclerolaena stelligera, Soft Horns (Malacocera tricornis) and Atriplex semibaccata; forb species include Omphalolappula concava, Harmsiodoxa blennodioides and Oxalis perennans. Exotic species may be common including the grasses Hordeum leporinum, Hordeum marinum, Lolium perenne and Avena fatua. Common exotic forbs include Brassica tournefortii; Cirsium vulgare; Echium plantagineum; Erodium cicutarium, Hedypnois rhagadioloides subsp. cretica and Medicago polymorpha. Tall shrubs of Cooba (Acacia salicina) and River Cooba (Acacia stenophylla) may be present. Occurs on cracking clay or sandy clay soils in lake beds, low lying plains, drainage depressions and alluvial plains subject to flooding in the arid and semi-arid zones of far western NSW. Widespread but usually found in discrete stands. In some places this community may be derived from a previous Old Man Saltbush shrubland as it generally occurs in highly disturbed sites. Grades into Lignum communities in wetter sites where drainage is impaired. Grub infestation has killed large areas since the 1990s and is a potential major threat to this community.
163	Low to mid-high open to sparse shrubland dominated by Dillon Bush (Nitraria billardierei) with Cotton Bush (Maireana aphylla) and Thorny Saltbush (Rhagodia spinescens). The ground cover may be sparse or dense depending on the season. It includes low shrubs such as Giant Redburr (Sclerolaena tricuspis), Sclerolaena divaricata and Sclerolaena obliquicuspis, Cannonball Burr (Dissocarpus paradoxus), Salsola tragus subsp. tragus, Atriplex lindleyi and Atriplex holocarpa. Grasses may dominate a site and they include the wallaby grasses Austrodanthonia setacea and Austrodanthonia caespitosa Rough Spear Grass (Austrostipa scabra). A high proportion or the ground cover may be composed of weed species including Hordeum spp., Bromus spp. Cucumis myriocarpus subsp. leptodermis and medics (Medicago spp.). Occurs light grey to brown clay and loam soils that may be saline on alluvial plains and dry lake beds mainly in the Riverina Bioregion in the semi-arid (warm) zone. Dillon Bush (Nitraria billardierei) shrubland occurs in heavily disturbed sites and is probably a derived community possibly from previous Bladder Saltbush ID157) and Old Man Saltbush shrubland communities that were heavily modified by heavy grazing by domestic stock and rabbits. Dillon Bush shrubland also occurs on lands that have been cropped in the past. This community is commonly found adjacent to River Red Gum and Black Box woodlands or dry lake beds such as the Willandra Lakes but also in gypsum dune fields where flooding occurs. Scalding and soil erosion is common-place as are rabbit warrens. This community has increased since European settlement. Unless an area contains a significant species requiring protection, the community is not a priority for conservation.
164	Low to mid-high sparse to mid-dense shrubland usually about 0.8 m high dominated by Cotton Bush (Maireana aphylla) with occasional remnant shrubs of Bladder Saltbush (Atriplex vesicaria s.l.). Smaller shrubs include copperburrs (Sclerolaena muricata, Sclerolaena tricuspis and Sclerolaena bicornis) and annual saltbushes (Atriplex lindleyi, Atriplex leptocarpa). The sparse ground cover contains native forbs such as paper daisies (Rhodanthe spp.), Minuria cunninghamii, and Calotis scabiosifolia var. scabiosifolia and grasses such as Austrodanthonia caespitosa. Often contains a very high cover of weed species including Hordeum spp., Bromus spp., Vulpia spp., Medicago spp., Avena fatua and Lolium perenne. Occurs on grey to grey-brown clays or clay-loam soils on depressed alluvial plains mainly in the Riverina Bioregion of the semi-arid (warm) climatic zone. This is derived community occurring in highly disturbed areas. Areas in which it occupies were probably dominated by Bladder Saltbush and other species prior to European settlement but heavy grazing and other processes have led to the decline of perennial saltbush species leaving this Cotton Bush-dominated community. The severe droughts of the 1990s and 2000s have led to dieback of areas of Cotton Bush.

PCT	BioNet Vegetation Type Database Description
166	A disturbed and probably derived open chenopod, herbland or grassland dominated by annual saltbushes such as Baldoo (Atriplex lindleyi), Atriplex eardleyae and Atriplex angulata along with and Babbagia (Osteocarpum acropterum var. deminuta). Atriplex holocarpa is often present. Many species of copperburr may be present including Sclerolaena divaricata, Sclerolaena intricata, Sclerolaena brachyptera, Sclerolaena decurrens, Sclerolaena diacantha, Sclerolaena stelligera, Sclerolaena ventricosa and Sclerolaena bicornis. Cottonbush (Maireana aphylla) common in places. Other Maireana species include Maireana ciliata, Maireana coronata and Maireana turbinata. Forbs include daisies such as Rhodanthe floribunda and Brachyscome ciliaris. Swainsona peas - Swainsona affinis and Swainsona campylantha may be present after rain. Neverfail grass (Eragrostis setifolia) is common in northern areas. The main weeds species are the grasses Hordeum marinum and Hordeum leporinum along with Capeweed (Arctotheca calendula) and Ward's Weed (Carrichtera annua). This community occurs on clay and loam clay soils on dry lake-beds and alluvial floodplains in the semi-arid and arid zones - mainly in south-western NSW but also to the north. This is probably a derived community from previous perennial chenopod shrublands, although some areas may be similar to a natural state where regular flooding is a feature.

Aerial photography shows the Subject Land to have no tree cover. Thus, PCT 28 is deemed to be absent unless present as a derived native grassland. The presence of a derived type would be determined from floristic analysis.

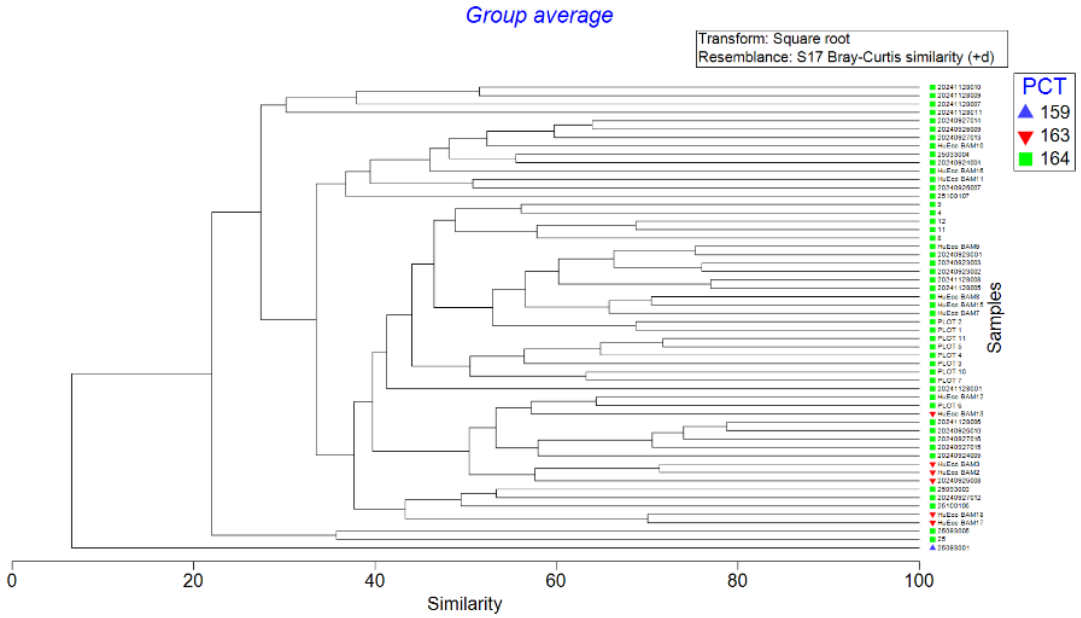
4.2.4 VEGETATION CLASSIFICATION

A resemblance matrix was produced to quantitatively calculate floristic plot similarity (dissimilarity) in the full floristic plot data obtained from the Project Area. This was completed using the Bray-Curtis similarity index and full floristic plots (54 plots, see Section 2.2.2) and is the basis for classifying the vegetation of the Subject Land into PCTs and VZs. Various analytical routines were used to classify the plot data into PCT and VZ groups:

- A hierarchical cluster analysis (CLUSTER analysis) was completed to produce a dendrogram to review *a priori* PCT assignments (i.e., review PCT assignments) as well as evaluating for group sub-structuring (i.e., identify potential vegetation zones);
- Species accumulation plots to review differences between *a priori* groups;
- A Canonical Analysis of Principal coordinates (CAP) to find axes that best discriminate vegetation zones and identify/correct misclassifications in the CLUSTER analysis; and
- An Analysis of Similarities (ANOSIM) to calculate the Global R Statistic and test for group differences.

The CLUSTER analysis and associated dendrogram provided in Chart 4-1 shows *a priori* PCT assignments to each full floristic plot.

CHART 4-1 Dendrogram of BAM Plot Data by a priori PCT assignment



The dendrogram shows high similarity in floristic composition and structure among plots assigned to PCTs 163 and 164 and dissimilarity with PCT 159. The ANOSIM result generally supports this finding (i.e., Global R = 0.225 p=0.04). However, the pairwise comparison between PCT 163 and 164 show no significant difference between these *a priori* groups (i.e., R statistic of 0.082 p=0.226). This makes sense as floristic composition and structure across the Subject Land is relatively homogenous and reflects the impact of historical land clearing, past and ongoing agricultural use and effects of historic drought and overabundant rabbit populations.

Species accumulation plots were prepared for *a priori* groups 163 (Chart 4-2) and 164 (Chart 4-3) to examine the rate of new species observations by sample.

CHART 4-2 Species accumulation for the PCT 163 plot group

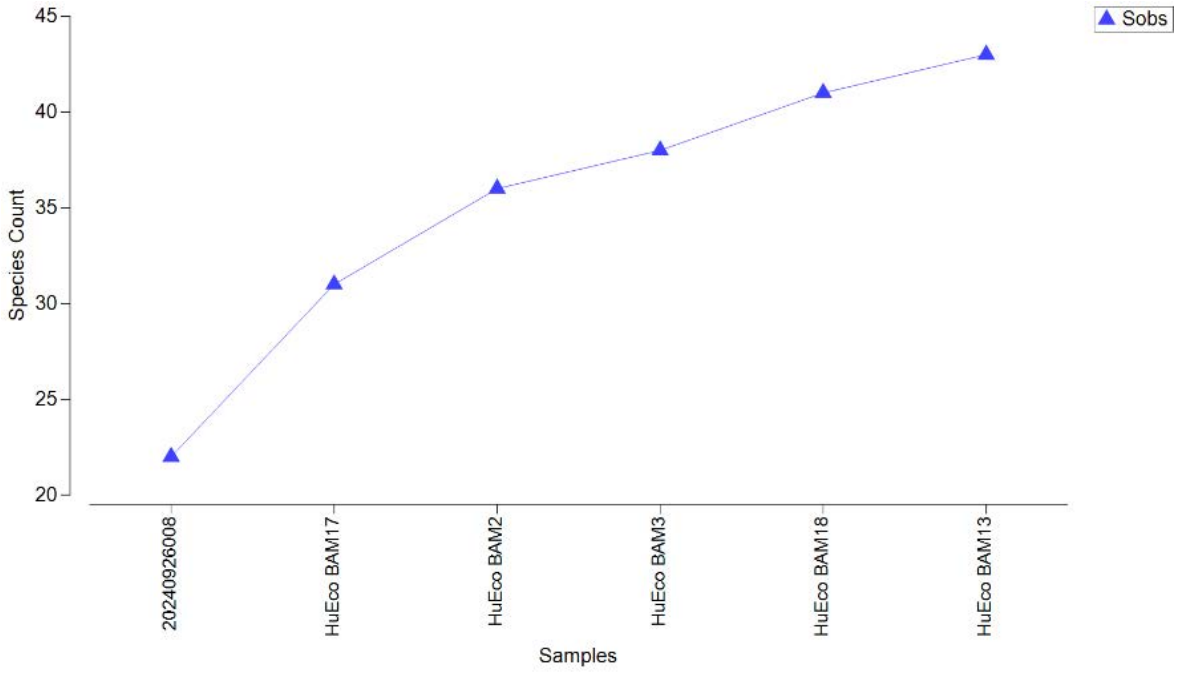
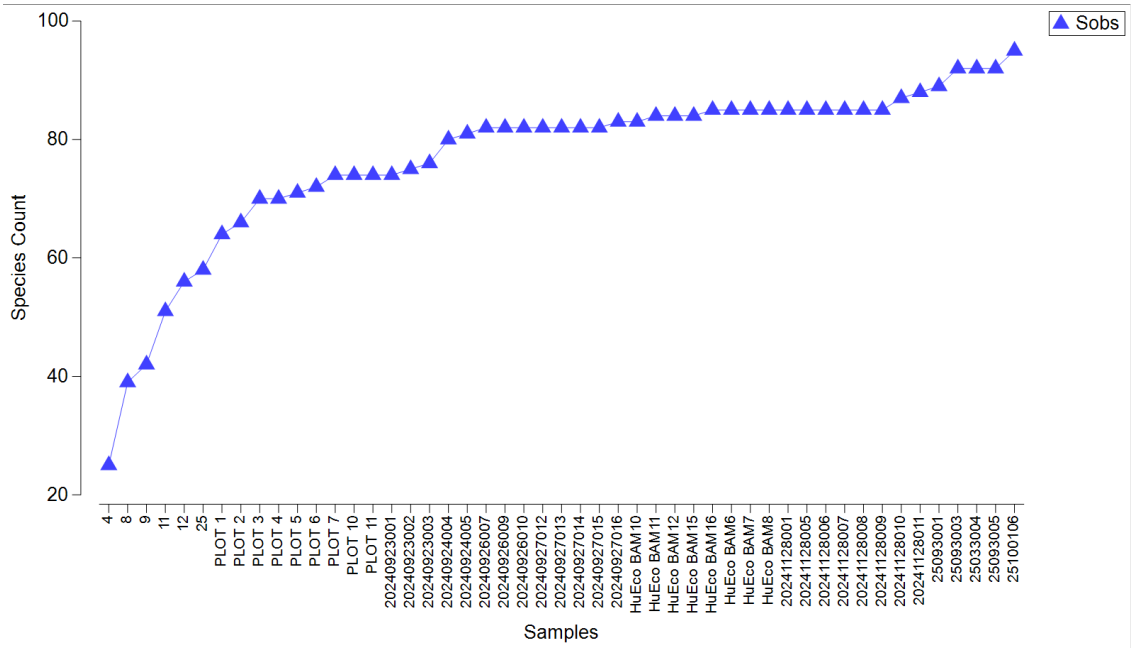
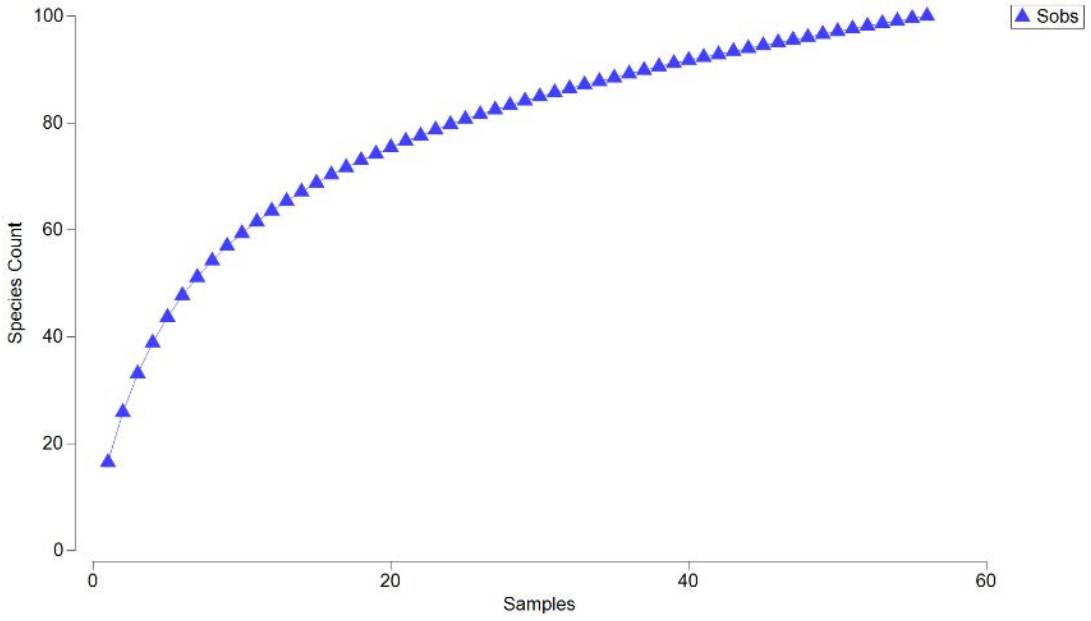


CHART 4-3 Species accumulation for the PCT 164 plot group



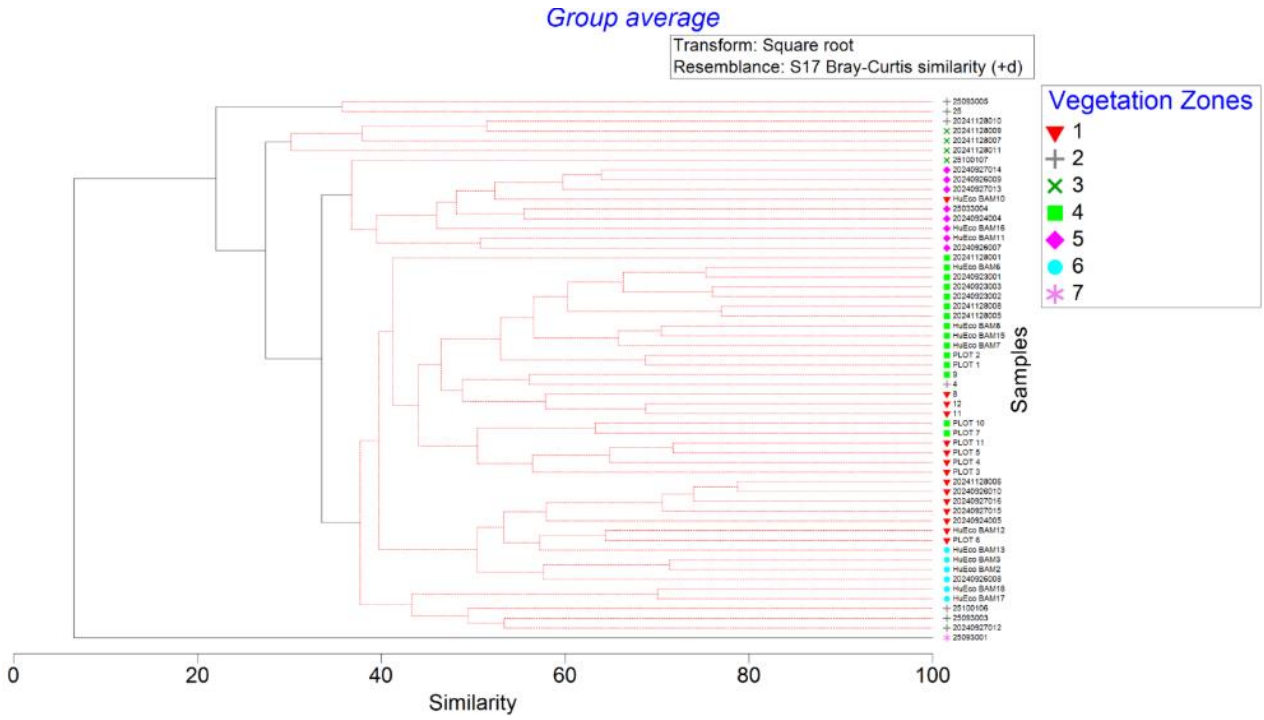
Greater species accumulation was observed in *a priori* plot group PCT 164 than PCT 163 (i.e., 58 species versus 43 species after six plots). However, species accumulation differences are minor when viewed across all plots (i.e., 47.8 species ±6.7), as shown in Chart 4-4.

CHART 4-4 Species accumulation for all plots



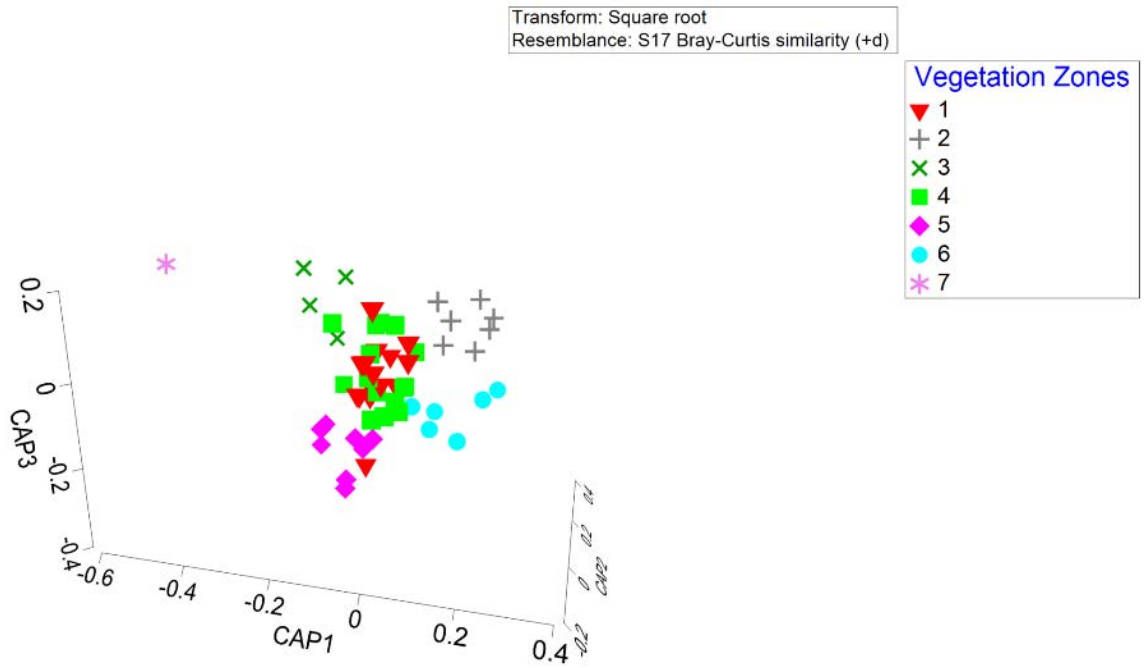
This finding supports a closer examination of the classification to reveal group sub structuring to delineate vegetation zones. The dendrogram provided in Chart 4-5 examines this aspect of the classification.

CHART 4-5 DENDOGRAM OF BAM PLOT DATA BY VEGETATION ZONE



A three-dimensional (3D) CAP plot, as displayed in Chart 4-6, supports the delineation of sub group structure.

CHART 4-6 CAP PLOT OF BAM PLOTS BY VEGETATION ZONE



The ANOSIM result also supports the sub group structure used to describe the variance in plant species composition and structure across the Subject Land (i.e., Global R = 0.626 p=0.001). Except for vegetation zone 7, which represents PCT 159 with only one plot, all vegetation zone pairwise comparisons were significantly different from each other (i.e. $p < 0.05$). This result quantitatively supports the delineation of vegetation zones of similar condition states.

Most full floristic plots used in this analysis were obtained from spring 2024; a year comprising typical rainfall accumulation (i.e., was not a dry or wet year).

4.2.5 FLORISTIC COMPOSITION

The full floristic dataset associated with BAM plots used in this assessment is provided in Appendix F. The SIMPER output produced for each sub group (i.e., proposed vegetation zones) is provided in Table 4-2. This lists the flora species characteristic of each statistically differing sub group and is the basis for defining vegetation zones.

TABLE 4-2 SIMPER ANALYSIS OF VEGETATION ZONES

Species	Average Cover (%)	Average Similarity	Sim/SD	Contribution %	Cumulative %
Group 1: Average similarity 47.12 (Vegetation Zone 01)					
Austrostipa scabra	15.8	16.33	3.97	34.67	34.67
Rytidosperma caespitosum	8.6	10.89	1.02	23.12	57.79
Rhodanthe stuartiana	3.8	5.60	1.63	11.88	69.67
Maireana aphylla	3.5	4.51	1.00	9.57	79.24
Plantago drummondii	0.3	2.23	2.24	4.74	83.98
Nitraria billardierei	0.7	1.11	0.58	2.36	86.34
Group 2: Average similarity 40.18 (Vegetation Zone 02)					
Maireana aphylla	2.1	9.40	2.57	23.40	23.40
Rhodanthe stuartiana	1.6	6.52	1.34	16.24	39.64
Sclerolaena brachyptera	0.6	4.08	0.98	10.16	49.80
Plantago drummondii	0.3	3.64	1.97	9.06	58.86
Rytidosperma caespitosum	0.4	3.51	1.15	8.74	67.60
Nitraria billardierei	0.5	2.10	0.70	5.23	72.83
Bulbine semibarbata	0.1	1.95	1.49	4.86	77.69
Brachyscome lineariloba	0.1	1.58	0.89	3.92	81.61
Minuria cunninghamii	0.1	1.46	0.87	3.64	85.24
Group 3: Average similarity 31.36 (Vegetation Zone 03)					
Rytidosperma caespitosum	0.4	7.27	1.44	23.18	23.18
Austrostipa scabra	0.5	6.57	3.24	20.94	44.12
Sclerolaena muricata	0.2	5.46	2.92	17.42	61.54
Rhodanthe stuartiana	1.0	3.49	0.89	11.12	72.66

Species	Average Cover (%)	Average Similarity	Sim/SD	Contribution %	Cumulative %
Sida trichopoda	0.1	2.70	0.84	8.61	81.27
Sclerolaena bicornis	0.6	2.42	0.90	7.72	88.99
Group 4: Average similarity 52.85 (Vegetation Zone 04)					
Maireana aphylla	17.2	20.42	3.84	38.64	38.64
Rhodanthe stuartiana	6.0	8.79	1.77	16.63	55.26
Rytidosperma caespitosum	4.2	7.97	1.07	15.09	70.35
Austrostipa scabra	3.0	6.64	1.79	12.57	82.92
Plantago drummondii	1.2	3.38	1.28	6.40	89.32
Group 5: Average similarity 45.94 (Vegetation Zone 05)					
Rhodanthe stuartiana	7.0	13.41	2.16	29.20	29.20
Duma florulenta	4.0	9.92	1.50	21.60	50.80
Rytidosperma caespitosum	3.6	6.23	1.33	13.56	64.35
Sclerolaena muricata	0.6	2.93	1.27	6.37	70.73
Chloris truncata	1.4	2.85	0.87	6.21	76.94
Leiocarpa panaetioides	0.1	1.81	1.59	3.94	80.88
Maireana aphylla	0.6	1.77	0.68	3.86	84.74
Einadia nutans	0.1	1.38	0.71	3.00	87.74
Group 6: Average similarity 52.61 (Vegetation Zone 06)					
Nitraria billardierei	17.6	13.54	1.85	25.74	25.74
Rytidosperma caespitosum	16.1	13.35	1.32	25.37	51.12
Austrostipa scabra	3.0	5.36	1.27	10.18	61.29
Maireana aphylla	2.2	4.74	1.34	9.01	70.30
Rhodanthe stuartiana	1.5	3.30	1.18	6.28	76.58
Sclerolaena tricuspis	1.6	2.59	0.78	4.92	81.50
Rhagodia spinescens	0.3	1.43	0.78	2.72	84.22
Plantago drummondii	0.1	1.09	1.34	2.08	86.30

Cotton Bush (*Maireana aphylla*) is present in all sub groups with varying average per cent cover. Grass and forb species composition and cover varies between groups, with Dillon Bush (*Nitraria billardierei*) having increased presence in two sub groups and Lignum (*Duma florulenta*) in one group. T his SIMPER analysis shows that:

- Group 1 is defined by scattered Cotton Bush (*Maireana aphylla*) with high grass cover (*Austrostipa scabra* and *Rytidosperma caespitosum*);
- Group 2 is distinguished by several species including forbs with low vegetation cover;
- Group 3 comprises species typical of disturbance such as *Sclerolaena muricata* and *Sclerolaena bicornis* with very low vegetation cover;

- Group 4 consistently has the highest occurrence of Cotton Bush (*Maireana aphylla*) with low grass cover;
- Group 5 includes a scattered occurrence of Lignum (*Duma florulenta*), a species typically found in seasonally most soils and is often associated with the presence of gilgais; and
- Group 6 is defined by the presence of Dillon Bush (*Nitraria billardierei*).

Assignment of these groups to PCTs to the vegetation zones present is further discussed below.

4.2.6 PLANT COMMUNITY TYPES

BioNet Vegetation Classification PCTs identified and mapped within the Subject Land are listed in Table 4-3 with extent shown in Figure 4-2.

TABLE 4-3 PCTS IDENTIFIED WITHIN THE SUBJECT LAND

PCT ID	PCT name	Area (ha)
Subject Land		
163	Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	115.47
164	Cotton Bush open shrubland of the semi-arid (warm) zone	649.42
159	Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	0.17

A detailed description of each PCT within the Subject Land and haul route is provided in Table 4-4 PCT 164 Cotton Bush open shrubland of the semi-arid (warm) zone (PCT 164), Table 4-5 (PCT 163) and Table 4-6 (PCT 159).

TABLE 4-4 PCT 164 COTTON BUSH OPEN SHRUBLAND OF THE SEMI-ARID (WARM) ZONE

PCT 164 - Cotton Bush open shrubland of the semi-arid (warm) zone	
PCT ID	164
PCT name	Cotton Bush open shrubland of the semi-arid (warm) zone
Vegetation formation	Arid Shrublands (Chenopod sub-formation)
Vegetation class	Riverine Chenopod Shrublands
TEC Status	PCT 164 has no associated BC Act or EPBC Act listed TECs
Percent cleared value	8.00%
NSW BioNet Vegetation Classification PCT Description	Low to mid-high sparse to mid-dense shrubland usually about 0.8 m high dominated by Cotton Bush (*Maireana aphylla*) with occasional remnant shrubs of Bladder Saltbush (*Atriplex vesicaria*). Smaller shrubs include copperburrs*Sclerolaena muricata, Sclerolaena tricuspis* and *Sclerolaena bicornis*) and annual saltbushes (*Atriplex lindleyi, Atriplex leptocarpa*). The sparse ground cover contains native forbs such as paper daisies (Rhodanthe spp.), *Minuria cunninghamii*, and *Calotis scabiosifolia* var. *scabiosifolia* and grasses such as *Austrodanthonia caespitosa*. Often contains a very high cover of weed species including *Hordeum* spp., *Bromus* spp., *Vulpia* spp., *Medicago* spp., *Avena fatua* and *Lolium perenne*. Occurs on grey to grey-brown clays or clay-loam soils on depressed alluvial plains mainly in the Riverina Bioregion of the semi-arid (warm) climatic zone.

PCT 164 - Cotton Bush open shrubland of the semi-arid (warm) zone	
	This is derived community occurring in highly disturbed areas. Areas in which it occupies were probably dominated by Bladder Saltbush and other species prior to European settlement but heavy grazing and other processes have led to the decline of perennial saltbush species leaving this Cotton Bush-dominated community. The severe droughts of the 1990s and 2000s have led to dieback of areas of Cotton Bush.
Description within Subject Land	PCT 164 occurs extensively across the Subject Land in various condition states. It presents as a low to mid-high shrubland between 0.5 and 1.2 m in height, it occurs on alluvial plains associated with the Murrumbidgee River on red, red-brown and grey-brown clay soils. The shrub layer is dominated by Cotton Bush (*Maireana aphylla*) with Saltbush (*Atriplex* spp.) and Copperburr (*Sclerolaena* spp.) species also commonly recorded. The groundcover is dominated by Ringed Wallaby Grass (*Rytidosperma caespitosum*), Rough Speargrass (*Austrostipa scabra*) or *Lolium perenne*. *Rhodanthe* spp., *Minuria cunninghamii* and *Vulpia* spp. were also commonly recorded. An upper stratum is absent. The PCT was distinguished by the presence of Cotton Bush (*Maireana aphylla*). Vegetation zones were delineated based on the density of vegetation cover, level of disturbance and other soil features.
Associated species present	• Middle stratum: *Maireana aphylla* (Cotton Bush), *Nitraria billardierei* (Dillon Bush), *Sclerolaena muricata* (Black Rolypoly), *Atriplex vesicaria* (Bladder Saltbush), *Duma florulenta* (Lignum), *Rhagodia spinescens* (Thorny Saltbush), *Eragrostis australasica* (Canegrass), *Maireana turbinata*, *Maireana pentagona* (Hairy Bluebush), *Lycium australe* (Australian Boxthorn), *Chenopodium nitrariaceum* (Nitre Goosefoot) • Ground stratum: *Sclerolaena tricuspis* (Giant Redburr), *Rhodanthe corymbiflora* (Small White Sunray), *Rytidosperma caespitosum* (Ringed Wallaby Grass), *Sporobolus caroli* (Fairy Grass), *Goodenia fascicularis* (Mallee Goodenia), *Calocephalus sonderi* (Pale Beauty-heads), *Rhodanthe stuartiana, Rhodanthe pygmaea* (Pygmy Sunray), *Sclerolaena brachyptera* (Short-winged Copperburr), *Atriplex pseudocampanulata, Atriplex leptocarpa* (Slender-fruit Saltbush), *Atriplex lindleyi* (Eastern Flat-top Saltbush), *Leiocarpa panaetioides* (Woolly Buttons), *Osteocarpum acropterum* (Bonefruit), *Minuria cunninghamii* (Bush Minuria), *Malacocera tricornis* (Soft Horns), *Sclerolaena bicornis, Daucus glochidiatus* (Native Carrot), *Plantago cunninghamii* (Sago-weed), *Podolepis muelleri* (Small Copper-wire Daisy), *Calotis scabiosifolia*, *Brachyscome lineariloba* (Hard-headed Daisy)
Other PCTs considered	The PCT filter tool on the BioNet Vegetation Classification system was used to assign a PCT to the vegetation zone observed within the Subject Land. Filters used included Formation (Arid Shrublands (Chenopod sub-formation), Class (Riverine Chenopod Shrublands), IBRA subregion (Murrumbidgee) and the four dominant species observed as advised by the SIMPER analysis (*Maireana aphylla, Rytidosperma caespitosum, Austrostipa scabra* and *Rhodanthe stuartiana*). The following PCTs were considered further: • PCT 46 is a predominantly grassy herbaceous plant community. It is dominated by Curly Windmill Grass (*Enteropogon ramosus*), which is largely absent from vegetation within the Subject Land. This PCT is also forb rich, which is not the case for PCT 164 vegetation within the Project Area. • PCTs 158, 168, 196, 211, 212, 254 and 377 – do not include any of the four dominant species • PCTs 236 and 466 – include one of the four dominant species • PCTs 157, 159 and 195 – include two of the four dominant species • PCTs 163 and 164 – include three of the four dominant species

PCT 164 - Cotton Bush open shrubland of the semi-arid (warm) zone	
	• PCT 164 was determined to be the best-fit PCT due to the common observation of Cotton Bush (*Maireana aphylla*) occurring as the dominant shrub and the suite of ground stratum species including several Asteraceae species that are not listed to be diagnostic of PCT 163 but are of PCT 164.
Vegetation Zones	Five distinct condition states for areas mapped as PCT 164 occur within the Subject Land, as outlined below: • Vegetation Zone 01 (VZ01) – grassy • Vegetation Zone 02 (VZ02) – open • Vegetation Zone 03 (VZ03) – degraded • Vegetation Zone 04 (VZ04) – dense • Vegetation Zone 05 (VZ05) – gilgais Most of the plots used in calculating VIS for this VZ were completed in 2024, following an average rainfall year in 2023 (240 – 399 mm annual rainfall) and therefore the average rainfall benchmark was used.



PHOTOGRAPH 1 PCT 164, VEGETATION ZONE 1 (PLOT 241129006)

PCT 164 - Cotton Bush open shrubland of the semi-arid (warm) zone



PHOTOGRAPH 2 PCT 164, VEGETATION ZONE 2 (PLOT 241129010)



PHOTOGRAPH 3 PCT 164, VEGETATION ZONE 3 (PLOT 241129009)

PCT 164 - Cotton Bush open shrubland of the semi-arid (warm) zone



PHOTOGRAPH 4 PCT 164, VEGETATION ZONE 4 (PLOT 241129005)



PHOTOGRAPH 5 PCT 164, VEGETATION ZONE 5 (PLOT 240926007)

TABLE 4-5 PCT 163 DILLON BUSH (NITRE BUSH) SHRUBLAND OF THE SEMI-ARID AND ARID ZONES

PCT 163 - Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	
PCT ID	163
PCT name	Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Vegetation formation	Arid Shrublands (Chenopod sub-formation)
Vegetation class	Riverine Chenopod Shrublands
TEC Status	PCT 163 is associated with: • Artesian Springs Ecological Community in the Great Artesian Basin – Critically Endangered (BC Act) (part)
Percent cleared value	26.00%
NSW BioNet Vegetation Classification PCT Description	Low to mid-high open to sparse shrubland dominated by Dillon Bush (*Nitraria billardierei*) with Cotton Bush (*Maireana aphylla*) and Thorny Saltbush (*Rhagodia spinescens*). The ground cover may be sparse or dense depending on the season. It includes low shrubs such as Giant Redburr (*Sclerolaena tricuspis*), *Sclerolaena divaricata* and *Sclerolaena obliquicuspis*, Cannonball Burr (*Dissocarpus paradoxus*), *Salsola tragus* subsp. *tragus, Atriplex lindleyi* and *Atriplex holocarpa*. Grasses may dominate a site, and they include the wallaby grasses *Austrodanthonia setacea* and *Austrodanthonia caespitosa,* Rough Spear Grass (*Austrostipa scabra*). A high proportion or the ground cover may be composed of weed species including *Hordeum* spp., *Bromus* spp. *Cucumis myriocarpus* subsp. *leptodermis* and medics (*Medicago* spp.). Dillon Bush (*Nitraria billardierei*) shrubland occurs in heavily disturbed sites and is probably a derived community possibly from previous Bladder Saltbush ID157) and Old Man Saltbush shrubland communities that were heavily modified by heavy grazing by domestic stock and rabbits. Dillon Bush shrubland also occurs on lands that have been cropped in the past. This community is commonly found adjacent to River Red Gum and Black Box woodlands or dry lake beds such as the Willandra Lakes but also in gypsum dune fields where flooding occurs. Scalding and soil erosion is common-place as are rabbit warrens. This community has increased since European settlement. Unless an area contains a significant species requiring protection, the community is not a priority for conservation.
Description within Subject Land	PCT 163 within the Subject Land occurs as a low shrubland between 0.5 and 1 m in height. It occurs on alluvial plains on light grey/brown clay soils. The shrub layer is dominated by Dillon Bush (*Nitraria billardierei*) with Cotton Bush (*Maireana aphylla*), Thorny Saltbush (*Rhagodia spinescens*) and Giant Redburr (*Sclerolaena tricuspis*) also commonly recorded. The groundcover is dominated by Ringed Wallaby Grass (*Rytidosperma caespitosum*) and Rough Speargrass (*Austrostipa scabra*). An upper stratum is absent. Depending on the season, the community can present with a dense grassy understorey, and scalds are also common. The PCT was distinguished by presenting as a shrubland dominated by Dillon Bush (*Nitraria billardierei*).
Associated species present	Middle stratum: *Nitraria billardierei* (Dillon Bush), *Rhagodia spinescens* (Thorny Saltbush), *Maireana aphylla* (Cotton Bush), Ground stratum: *Sclerolaena tricuspis* (Giant Redburr), *Austrostipa scabra* (Rough Speargrass), *Rytidosperma caespitosum* (Ringed Wallaby Grass), *Atriplex lindleyi* (Eastern Flat-top Saltbush), *Sclerolaena brachyptera* (Short-winged Copperburr), *Salsola australis* (Buckbush), *Einadia nutans* (Climbing Saltbush), *Walwhalleya proluta, Austrostipa elegantissima* (Feather Speargrass)

PCT 163 - Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	
Other PCTs considered	The PCT filter tool on the BioNet Vegetation Classification system was used to assign a PCT to the vegetation zone observed within the Subject Land. Filters used included Formation (Arid Shrublands (Chenopod sub-formation), Class (Riverine Chenopod Shrublands), IBRA subregion (Murrumbidgee) and the four dominant species observed as advised by the SIMPER analysis (*Nitraria billardierei, Maireana aphylla, Rytidosperma caespitosum* and *Austrostipa scabra*). The following PCTs were considered further: • PCT 236 – does not include any of the four dominant species • PCTs 216, 159, 157 – includes two of the four dominant species • PCT 164 – includes three of the four dominant species, was distinguished from areas of PCT 164 present within the Subject Land by the dominance of Dillon Bush rather than Cotton Bush • PCT 163 was determined to be the best-fit PCT, including all four of the dominant species present and matching the landscape and soil profiles observed within the Subject Land.
Vegetation Zones	One condition state for areas mapped as PCT 163 occurs within the Subject Land, as outlined below: • Vegetation Zone 06 (VZ06) – shrubland Plots used in calculating VIS for this VZ were completed in 2024, following an average rainfall year in 2023 (240 – 399 mm annual rainfall) and therefore the average rainfall benchmark was used.

PCT 163 - Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones



PHOTOGRAPH 6 PCT 163, VEGETATION ZONE 06 (PLOT HUECO BAM 3)



PHOTOGRAPH 7 PCT 163, VEGETATION ZONE 06 (PLOT HUECO BAM17)

TABLE 4-6 PCT 159 OLD MAN SALTBUSH SHRUBLAND

PCT 159 - Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	
PCT ID	159
PCT name	Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
Vegetation formation	Arid Shrublands (Chenopod sub-formation)
Vegetation class	Riverine Chenopod Shrublands
TEC Status	PCT 159 is associated with Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions, listed as Endangered under the BC Act
Percent cleared value	92.00%
NSW BioNet Vegetation Classification PCT Description	Tall shrubland up to 2.5 m high, dominated by Old Man Saltbush (*Atriplex nummularia*) with a lower chenopod shrub layer dominated by bluebushes such as *Maireana microcarpa, Maireana appressa, Maireana pyramidata* and *Maireana brevifolia*, Thorny Rhagodia (*Rhagodia spinescens*), Bladder Saltbush (*Atriplex vesicaria*) and Nitre Goosefoot (*Chenopodium nitrariaceum*). Low ground shrubs include *Dissocarpus biflorus, Atriplex lindleyi* and a number of copperburr species (*Sclerolaena* spp.). Forb species include *Senecio runcinifolius, Brachyscome lineariloba, Geococcus pusillus, Calandrinia eremaea, Bulbine bulbosa, Tetragonia tetragonioides, Crassula colorata* var. *colorata, Crassula sieberiana* subsp. *sieberiana* and *Osteocarpum acropterum* var. *deminuta*; grass species include *Chloris truncata, Austrodanthonia caespitosa, Austrostipa nodosa* and *Walwhalleya proluta*. Exotic species may be common in places and include *Hordeum marinum, Hordeum leporinum, Schismus barbatus, Xanthium spinosum, Heliotropium europaeum* and *Schismus barbatus*. Eastern occurrences in the Riverina Bioregion often contain scattered Myall trees (*Acacia pendula*). Occurs on cracking grey and brown clay or brown loam soils that are sometimes gilgaied on floodplains in drainage depressions in the Riverina and Murray Darling Depression Bioregions. Prior to European occupation this community would have been extensive. Continuous grazing by stock and rabbits, and perhaps the devastating droughts of the late 19th Century eliminated most of this community leaving "derived" grasslands or shrublands. Most of the remaining areas have been severely degraded and salinity is an increasing problem in the Riverina. Over the last few decades Old Man Saltbush has been planted in restoration projects for fodder and as a means of reducing rising saline watertables. In assessing its status, it is important to exclude these planted areas. Due to its reduction in extent, this community is an endangered community and as of 2005 it is poorly represented in conservation reserves. This community grades into Black Box (ID13 or ID15) on floodplains and into Weeping Myall woodland (ID26) or bluebush communities on the outer floodplains. This community shares some species with the Old Man Saltbush shrubland community of north western NSW (1D158).
Description within Subject Land	Vegetation comprises *Chenopodium nitrariaceum* (Nitre Goosefoot), *Maireana brevifolia*, *Atriplex lindleyi* (Eastern Flat-top Saltbush) and *Atriplex semibaccata* (Climbing Saltbush). No Old Man Saltbush occurs for reasons relating to the roadsides disturbed character. Several exotic species occur in abundance including Wards Weed (*Carrichtera annua*) and *Hordeum* spp..

PCT 159 - Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	
Associated species present	• Middle stratum: *Chenopodium nitrariaceum* (Nitre Goosefoot), *Maireana brevifolia* • Ground stratum: *Atriplex lindleyi* (Eastern Flat-top Saltbush), *Atriplex semibaccata* (Climbing Saltbush), *Sclerolaena diacantha* (Grey Copperburr)
Other PCTs considered	The PCT filter tool on the BioNet Vegetation Classification system was used to assign a PCT to the vegetation zone observed within the Subject Land. Filters used included Formation (Arid Shrublands (Chenopod sub-formation), Class (Riverine Chenopod Shrublands), IBRA subregion (Robinvale Plains) and the two dominant species observed (*Maireana brevifolia* and *Chenopodium nitrariaceum*). The following PCTs were considered further: • PCT 157 matches the vegetation formation and class and IBRA subregion but only contains one of the two dominant species. • PCTs 15 and 58 contain both dominant species and occurs in the subregion but do not match the vegetation formation and class. • PCT 152 contains one of the dominant species, occurs in the subregion and is the correct vegetation formation but not class.
Vegetation Zones	PCT 159 occurs as one patch along the haul route, the vegetation zone has been defined as follows: • Vegetation Zone 07 (VZ07) – haul route



PHOTOGRAPH 8 PCT 159, VEGETATION ZONE 7

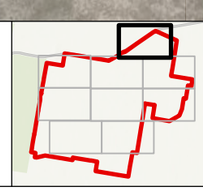
STURT HIGHWAY

Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

PCT

- 163,Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone
- Non-native Vegetation



Coordinate System:
GDA 1994 MGA Zone 54

Date: 09/01/2026
Created By: VN
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F4-1 Plant Community Types (Project Area)
Map 1 of 9

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STURT HIGHWAY

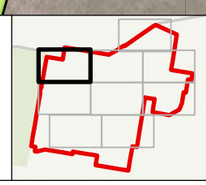
KERI KERI ROAD

Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

PCT

- 163,Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone



Coordinate System:
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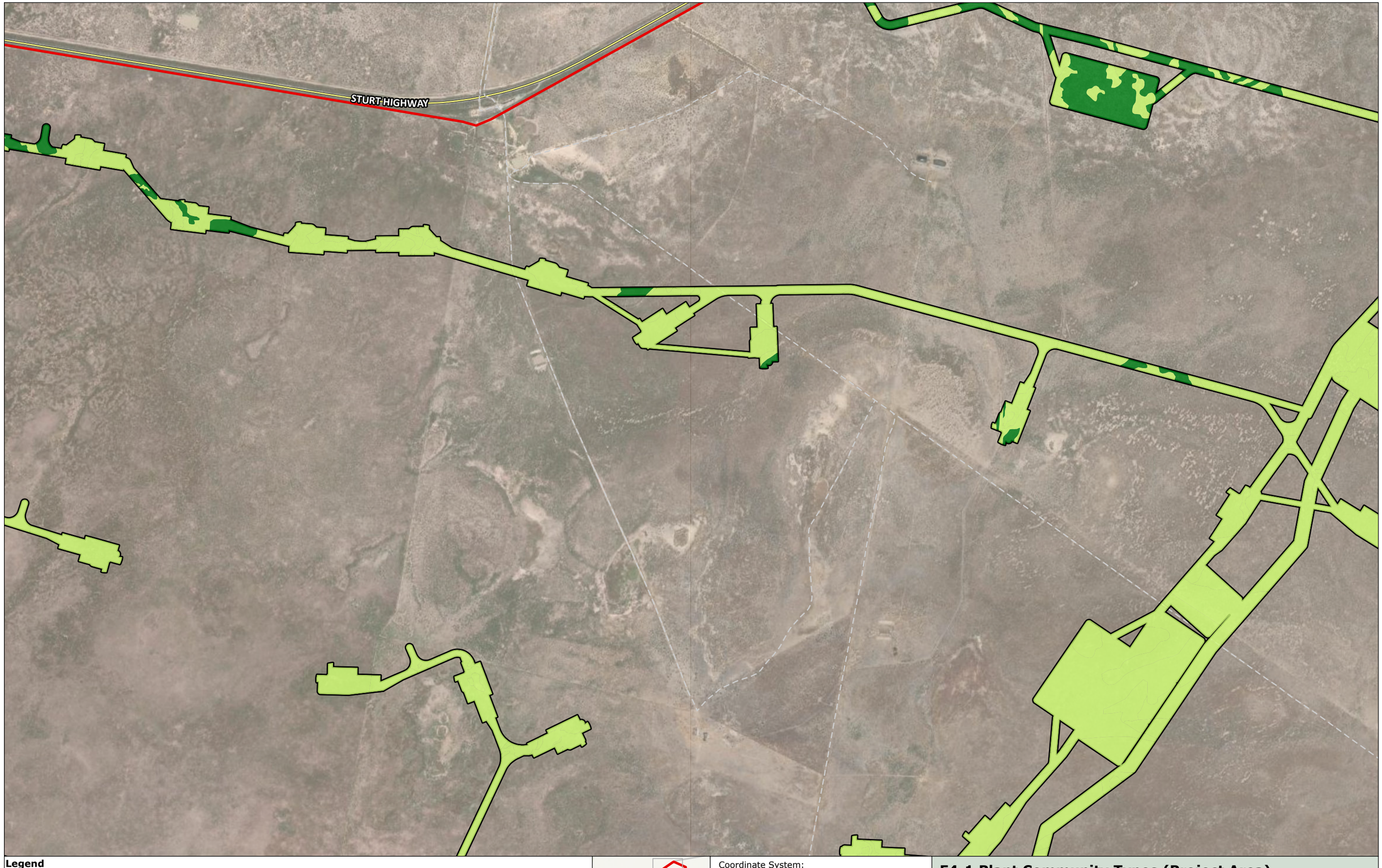
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F4-1 Plant Community Types (Project Area)
Map 2 of 9

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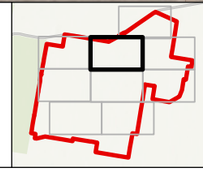


Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

PCT

- 163,Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone



Coordinate System:
GDA 1994 MGA Zone 54

Date: 09/01/2026

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F4-1 Plant Community Types (Project Area)
Map 3 of 9

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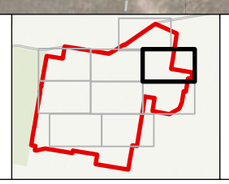
ERM

Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

PCT

- 163,Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone



Coordinate System:
GDA 1994 MGA Zone 54

Date: 09/01/2026

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F4-1 Plant Community Types (Project Area)
Map 4 of 9

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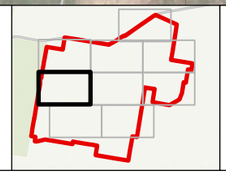


Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

PCT

- 163,Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone
- Non-native Vegetation



Coordinate System:
GDA 1994 MGA Zone 54

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F4-1 Plant Community Types (Project Area)
Map 5 of 9

Keri Keri Windfarm
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Acciona

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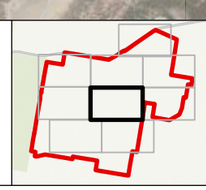
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Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

PCT

- 163,Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone



Coordinate System:
GDA 1994 MGA Zone 54

Date: 09/01/2026

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F4-1 Plant Community Types (Project Area)
Map 6 of 9

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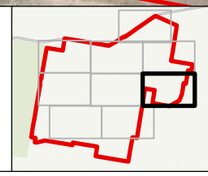
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Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

PCT

- 164,Cotton Bush open shrubland of the semi-arid (warm) zone



Coordinate System:
GDA 1994 MGA Zone 54

Date: 09/01/2026

Created By: VN

Drawing Size: A3

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F4-1 Plant Community Types (Project Area)
Map 7 of 9

Keri Keri Windfarm
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Acciona

ERM

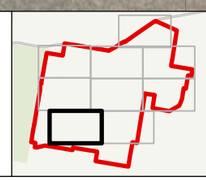
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Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

PCT

- 163,Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone



Coordinate System:
GDA 1994 MGA Zone 54

Date: 09/01/2026

Created By: VN

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F4-1 Plant Community Types (Project Area)
Map 8 of 9

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

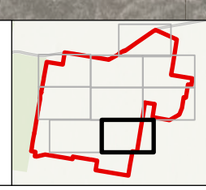
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Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

PCT

- 163,Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone



Coordinate System:
GDA 1994 MGA Zone 54

Date: 09/01/2026

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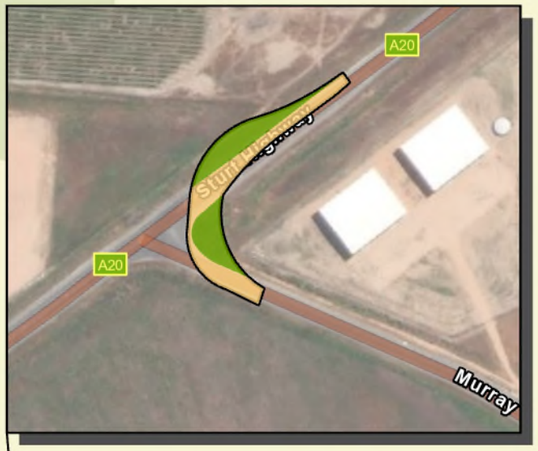
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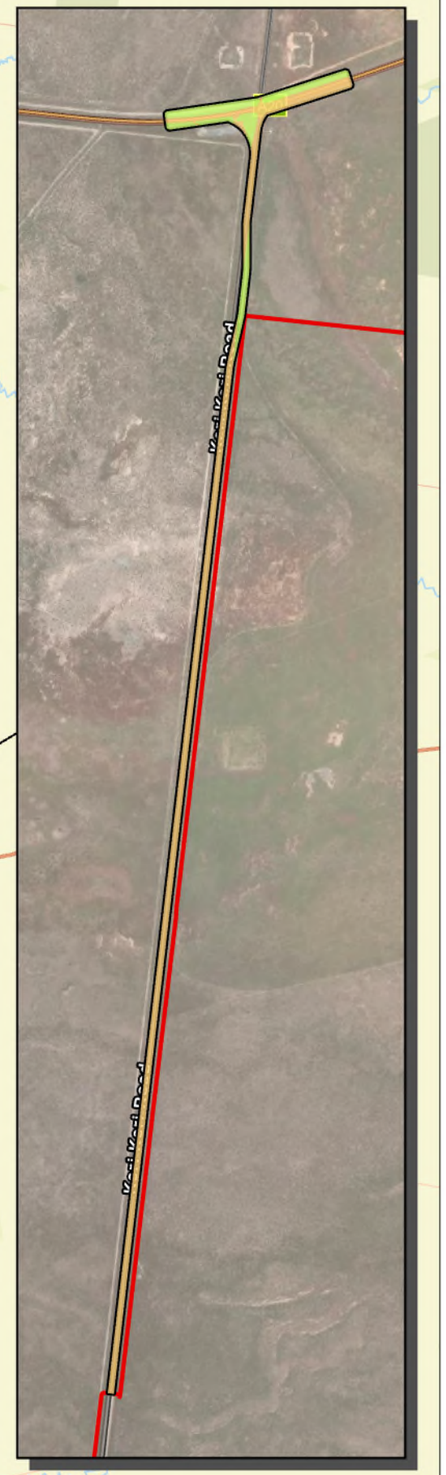
F4-1 Plant Community Types (Project Area)
Map 9 of 9

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM









Euston
Robinvale
Tol Tol
Belsar Island State Forest
Balranald
Yanga
Yanga
Yanga
B400
B12
Tooleybuc

Legend

- Project Area
- Subject Land
- Haul Route

PCT

- 159,Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
- 164,Cotton Bush open shrubland of the semi-arid (warm) zone
- Non-native Vegetation

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 15/01/2026
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F4-2 Plant Community Types (Haul Route)

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

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4.2.7 THREATENED ECOLOGICAL COMMUNITIES

Three EPBC Act TECs were identified through desktop assessment using the Protected Matters Search Tool (Cwth DCCEEW, 2024b) as having the potential to occur within the Subject Land. Two additional TECs listed under the BC Act has the potential to occur based on PCT association. One TEC has been considered for further assessment as identified in the supplementary SEARs. These communities are presented in Table 4-7.

Based on field verification surveys undertaken across the Subject Land, no TECs have been identified as occurring within the Subject Land.

TABLE 4-7 THREATENED ECOLOGICAL COMMUNITIES INVESTIGATION (SUBJECT LAND)

TEC	BC Act	EPBC Act	Associated PCT	Recorded within the Subject Land
Artesian Springs Ecological Community in the Great Artesian Basin	Critically Endangered	-	163	No – Subject Land is situated outside distribution of TEC; TEC is restricted to northwest NSW.
Weeping Myall Woodlands /Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions	Endangered	Endangered	159	No - No observations of the key diagnostic species, Weeping Myall (*Acacia pendula*), recorded across Subject Land.
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	-	Endangered	-	No - No associated PCTs nor observations of the key diagnostic species, Buloke (*Allocasuarina luehmannii*), recorded across Subject Land.
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of Southeastern Australia	-	Endangered	-	No – No associated PCTs nor observations of the key diagnostic species, Grey Box (*Eucalyptus microcarpa*), recorded across Subject Land.
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	-	Critically Endangered	-	No - No associated PCTs nor mallee box woodland communities recorded across Subject Land.
Additional MNES (Supplementary SEARs)				
Natural Grasslands of the Murray Valley Plains	-	Critically Endangered	-	No – Further discussed in Section 4.2.6.1

4.2.7.1 NATURAL GRASSLANDS OF THE MURRAY VALLEY PLAINS TEC

Vegetation of the Subject Land has been assessed against the key diagnostic characteristics of the Natural Grasslands of the Murray Valley Plains TEC, as required by the Supplementary SEARs.

This TEC is listed as 'Critically Endangered' under the EPBC Act and is currently not listed as a TEC under the BC Act. A substantial part of the TEC lies within Victoria, in which it is listed under the *Flora and Fauna Guarantee Act* (FFG Act) as the threatened Northern Plains Grassland ecological community and this listing does not extend into the Murray-Darling Depression IBRA Bioregion.

The TEC is characterised by native perennial tussock grasses with broad-leaved herbs interspersed between the tussocks and a lack of woody vegetation. The ecological community may display as an herb or forbland depending on seasonal conditions and forbs may be in equal or higher abundance to grasses. Soils on which the ecological community occurs is mostly restricted to heavy-textured grey, brown and red clays (Cwth DSEWPC, 2012).

The Subject Land has been assessed against the key diagnostic characteristics for the determination of presence of the threatened community, as required by the Supplementary SEARs. As described by the (Cwth DSEWPC, 2012), the naming of this TEC has intentionally used the term 'natural' to emphasise that the grassland community must be naturally occurring and not derived from another vegetation formation. The comparison of species between Tables 1(A) and 1(B) within the key diagnostic characteristics assessment is used to determine whether an area is a naturally occurring grassland or a derived community. The species in Table 1(A) are those more frequent in the grassland community and that are generally absent or sparse in those derived from chenopod shrublands, while the species in Table 1(B) are not considered to be the TEC.

Table 4-8 compares the vegetation of the Subject Land against the key diagnostic characteristics of the TEC listing.

TABLE 4-8 KEY DIAGNOSTIC CHARACTERISTICS FOR THE NATURAL GRASSLANDS OF THE MURRAY VALLEY PLAINS TEC

Key Diagnostic Characteristic	Response
In the Riverina Bioregion, Murray Darling Depression Bioregion or NSW South Western Slopes Bioregion?	Yes – however, the Murrumbidgee subregion is the northern most extent of the community, and the Subject Land is beyond the predicted distribution.
On a landscape of flat alluvial lowland plains with heavy-textured grey, brown and red clays?	Yes – the Subject Land is predominately heavy textured grey soils with areas of brown and red clays.
Characteristic genera are present: Grasses – *Rytidosperma, Austrostipa, Chloris* and *Enteropogon* species Forbs – *Arthropodium, Bulbine, Calotis, Chrysocephalum, Leptorhynchos, Minuria, Ptilotus, Rhodanthe, Sida and Swainsona* species Small shrubs - *Atriplex* and *Maireana* species	Yes – three grass genera (*Rytidosperma*, *Austrostipa* and *Chloris*), six forb genera (*Bulbine*, *Calotis, Leptorhynchos, Minuria, Rhodanthe* and *Sida*) and two small shrub genera (*Atriplex* and *Maireana*) present.
Trees and large shrubs > 1 m are generally absent to sparse?	Yes – trees and large shrubs are generally absent from the Subject Land.

Key Diagnostic Characteristic	Response
Presence or past records of 'diagnostic' indicator fauna species such as the Plains-wanderer, Striped Legless Lizard, Hooded Scaly-foot or Curl Snake within the patch?	Yes – Plains-wanderer observed within the Project Area. No records or observations of the other indicator fauna species.
The following applies to grasslands occurring in NSW in the Murrumbidgee IBRA subregion:	
There are more species present from Table 1(A) than in Table1(B)?	No – 3 species from Table 1(A): • *Bulbine bulbosa* • *Linum marginale* • *Myriocephalus rhizocephalus* 16 species from Table 1(B): • *Atriplex lindleyi* • *Austrostipa scabra* • *Bulbine semibarbata* • *Chenopodium nitrariaceum* • *Einadia nutans* • *Malacocera tricornis* • *Nitraria billardierei* • *Rhagodia spinescens* • *Sclerolaena brachyptera* • *Sclerolaena diacantha* • *Sclerolaena muricata* • *Sclerolaena stelligera* • *Sclerolaena tricuspis* • *Sida intricata* • *Sida trichopoda* • *Zygophyllum glaucum*
Is there reliable evidence that a patch was once a woodland or shrubland with > 10% cover of trees and shrubs > 1 m? (If yes, patch is not considered part of the ecological community)	Unknown
Soil type and landscape position corresponds with the ecological community and not other vegetation types?	No – the soil type and landscape position correspond with the chenopod shrubland and derived grassland communities of the area.
Conclusion	Vegetation communities within the Subject Land do not conform with the Natural Grasslands of the Murray Valley Plains TEC

Due to the location and species composition of the Subject Land, it is evident that these grasslands are derived from chenopod shrublands and therefore do not conform with the Natural Grasslands of the Murray Valley Plains TEC.

4.2.8 VEGETATION ZONES

Seven vegetation zones (VZs) were delineated to describe condition states within PCTs across the Subject Land as per Section 4.3 of the BAM.

A total of 56 BAM plots were used in this assessment to calculate vegetation integrity, meeting (exceeding) the BAM minimum requirement (i.e., 33 required for all zones). Details of vegetation zones and BAM plot requirements are provided in Table 4-9. VZs within the Subject Land are displayed in Figure 4-3 and within the haul route are displayed in Figure 4-4.

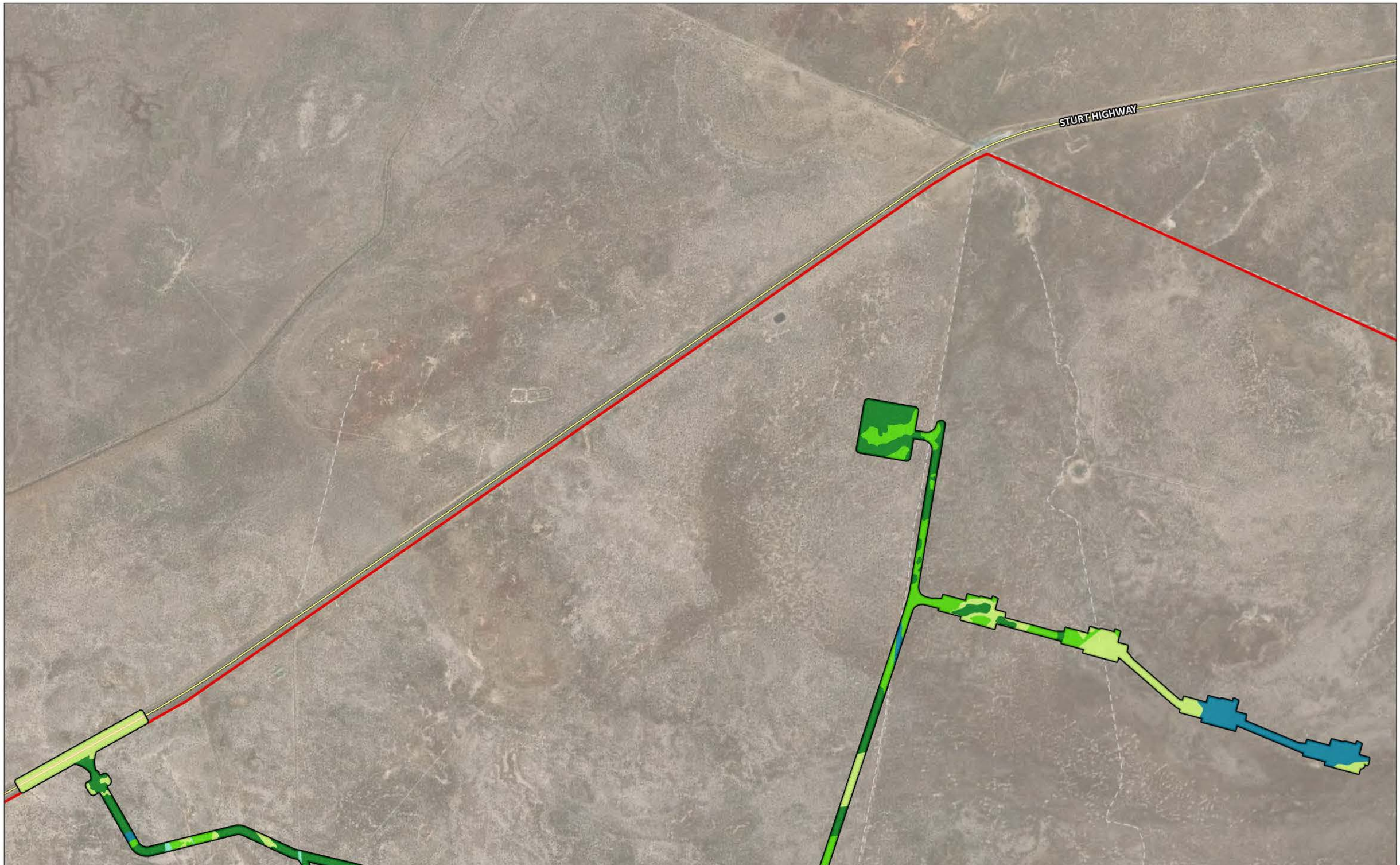
TABLE 4-9 VEGETATION ZONES AND PATCH SIZE WITHIN THE SUBJECT LAND

VZ	PCT ID	Condition	Area (ha) in Subject Land	Patch Size Class	No. BAM plots required	No. BAM plots completed / used in assessment	BAM Plot ID
Subject Land							
VZ01	164	Grassy	197.37	> 100 ha	6	15	• Feb-8 • Feb-11 • Feb-12 • PLOT3 • PLOT4 • PLOT5 • PLOT6 • PLOT11 • 240924005 • 240926010 • 240927015 • 240927016 • HuEcoBAM10 • HuEcoBAM12 • 241128006
VZ02	164	Open	138.82	> 100 ha	6	7	• Feb-4 • Feb-25 • 240927012 • 241128010 • 25093003 • 25093005 • 25100106
VZ03	164	Degraded	18.33	> 100 ha	3	4	• 241128007 • 241128009 • 241128011 • 25100107
VZ04	164	Gilgais	223.98	> 100 ha	6	15	• Feb-9 • PLOT1 • PLOT2 • PLOT7 • PLOT10

VZ	PCT ID	Condition	Area (ha) in Subject Land	Patch Size Class	No. BAM plots required	No. BAM plots completed / used in assessment	BAM Plot ID
							• 240923001 • 240923002 • 240923003 • HuEcoBAM15 • HuEcoBAM6 • HuEcoBAM7 • HuEcoBAM8 • 241128001 • 241128005 • 241128008
VZ05	164	Dense	70.92	> 100 ha	5	8	• 240924004 • 240926007 • 240926009 • 240927013 • 240927014 • HuEcoBAM11 • HuEcoBAM16 • 25033004
VZ06	163	Shrubland	115.47	> 100 ha	6	6	• 240926008 • HuEcoBAM13 • HuEcoBAM17 • HuEcoBAM18 • HuEcoBAM2 • HuEcoBAM3
Transport Route							
VZ07	159	Haul Route	0.17	< 5 ha	1	1	• 25093001

4.2.8.1 PATCH SIZE

Patch size area was assigned to each vegetation zone as a class, being < 5 ha, 5-24 ha, 25-100 ha or ≥ 100 ha. The patch size for all zones within the Subject Land (VZs 01 through 06) was ≥ 100 ha, the maximum patch size to be entered into the BAM-C and the patch size for the haul route (VZ07) was < 5 ha.



Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

Vegetation Zone

- PCT163 - VZ6
- PCT164 - VZ1
- PCT164 - VZ2
- PCT164 - VZ3
- PCT164 - VZ4
- Non-native Vegetation

Coordinate System:
GDA 1994 MGA Zone 54

Date: 09/01/2026
Created By: VN
Drawing Size: A3

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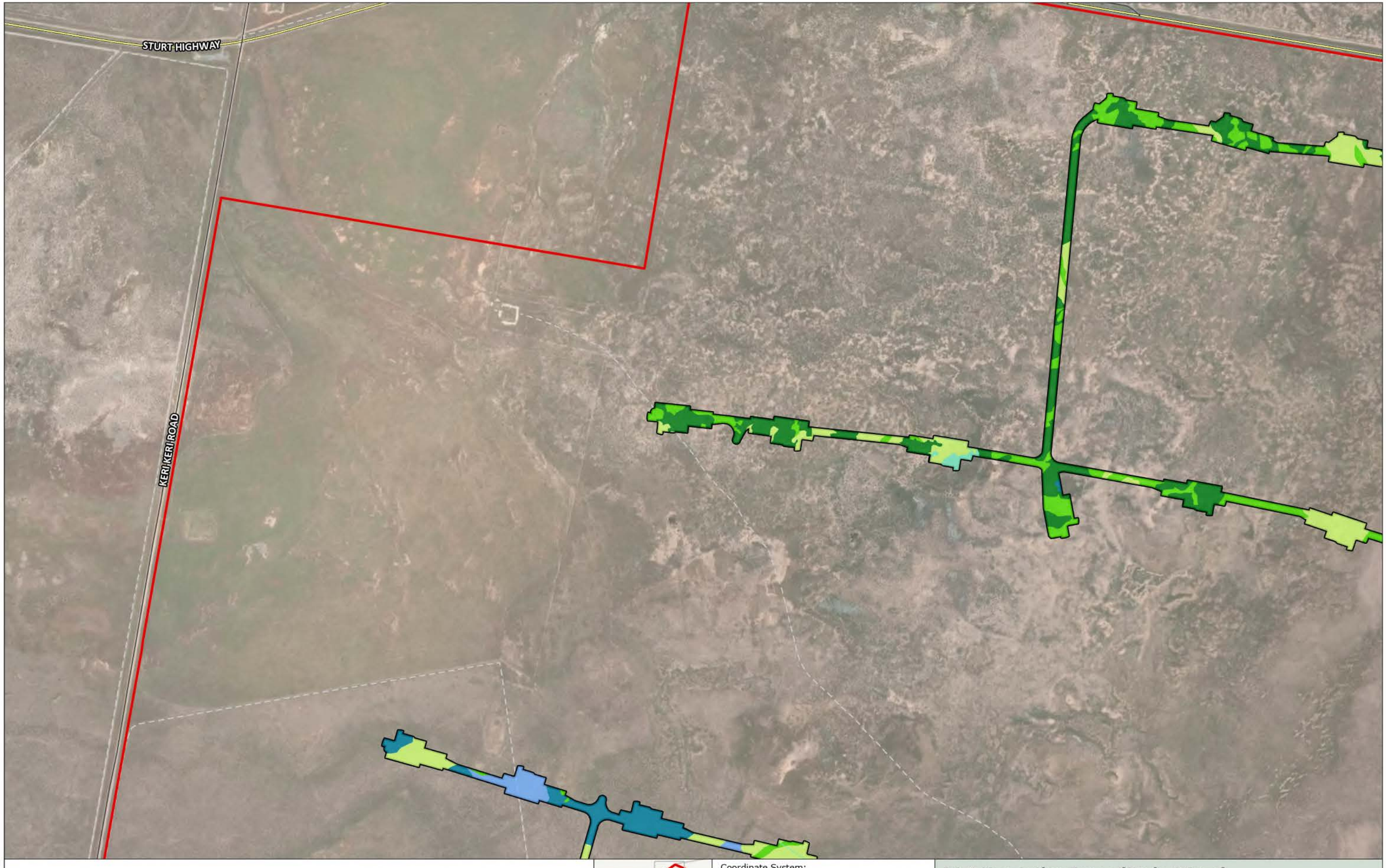
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F4-3 Vegetation Zones (Project Area)
Map 1 of 9

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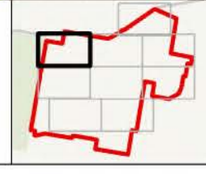


Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

Vegetation Zone

- PCT163 - VZ6
- PCT164 - VZ1
- PCT164 - VZ2
- PCT164 - VZ3
- PCT164 - VZ4
- PCT164 - VZ5



Coordinate System:
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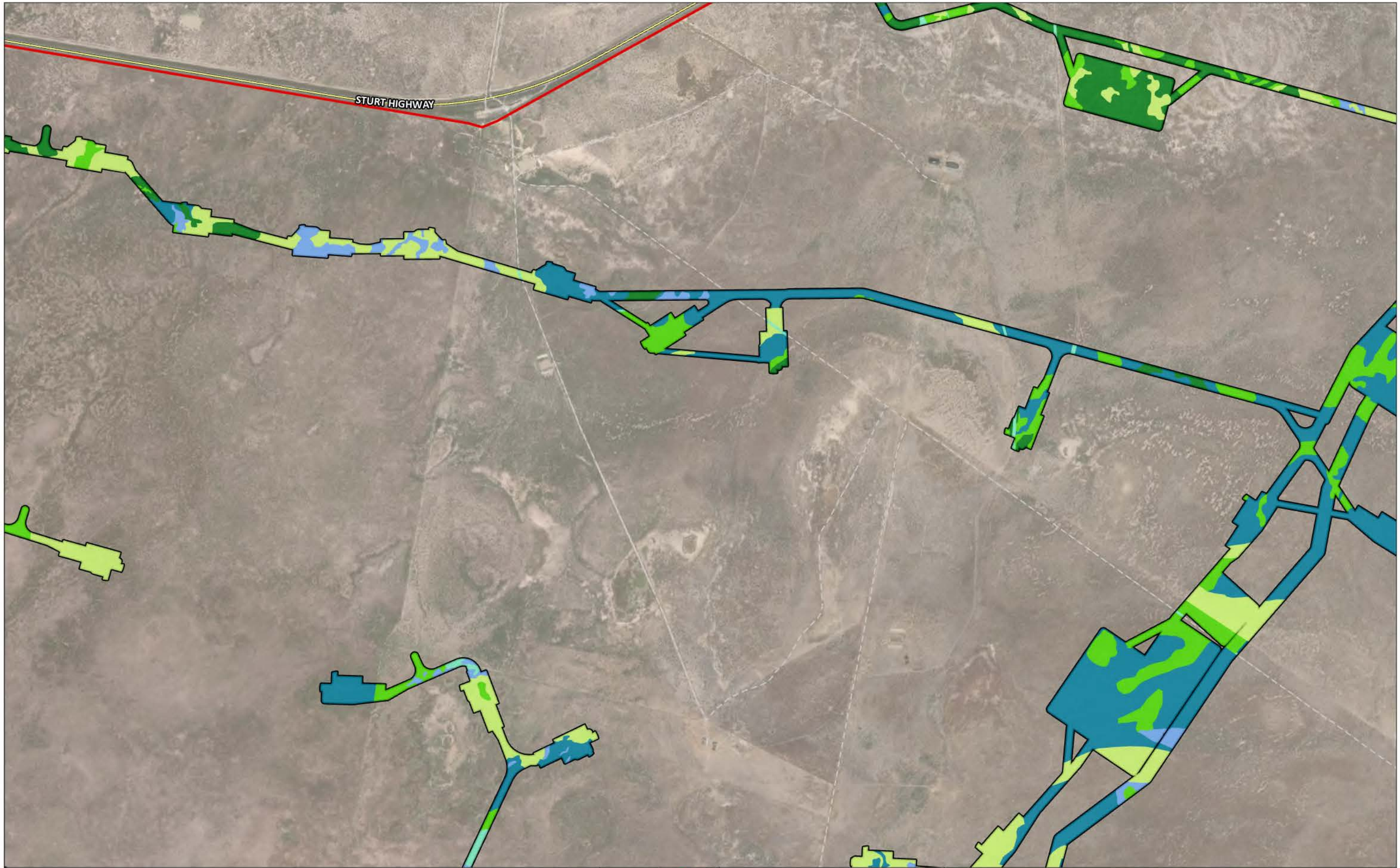
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F4-3 Vegetation Zones (Project Area) Map 2 of 9

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Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

Vegetation Zone

- PCT163 - VZ6
- PCT164 - VZ1
- PCT164 - VZ2
- PCT164 - VZ3
- PCT164 - VZ4
- PCT164 - VZ5

Coordinate System:
GDA 1994 MGA Zone 54

Date: 09/01/2026
Created By: VN
Drawing Size: A3

0 200 400m

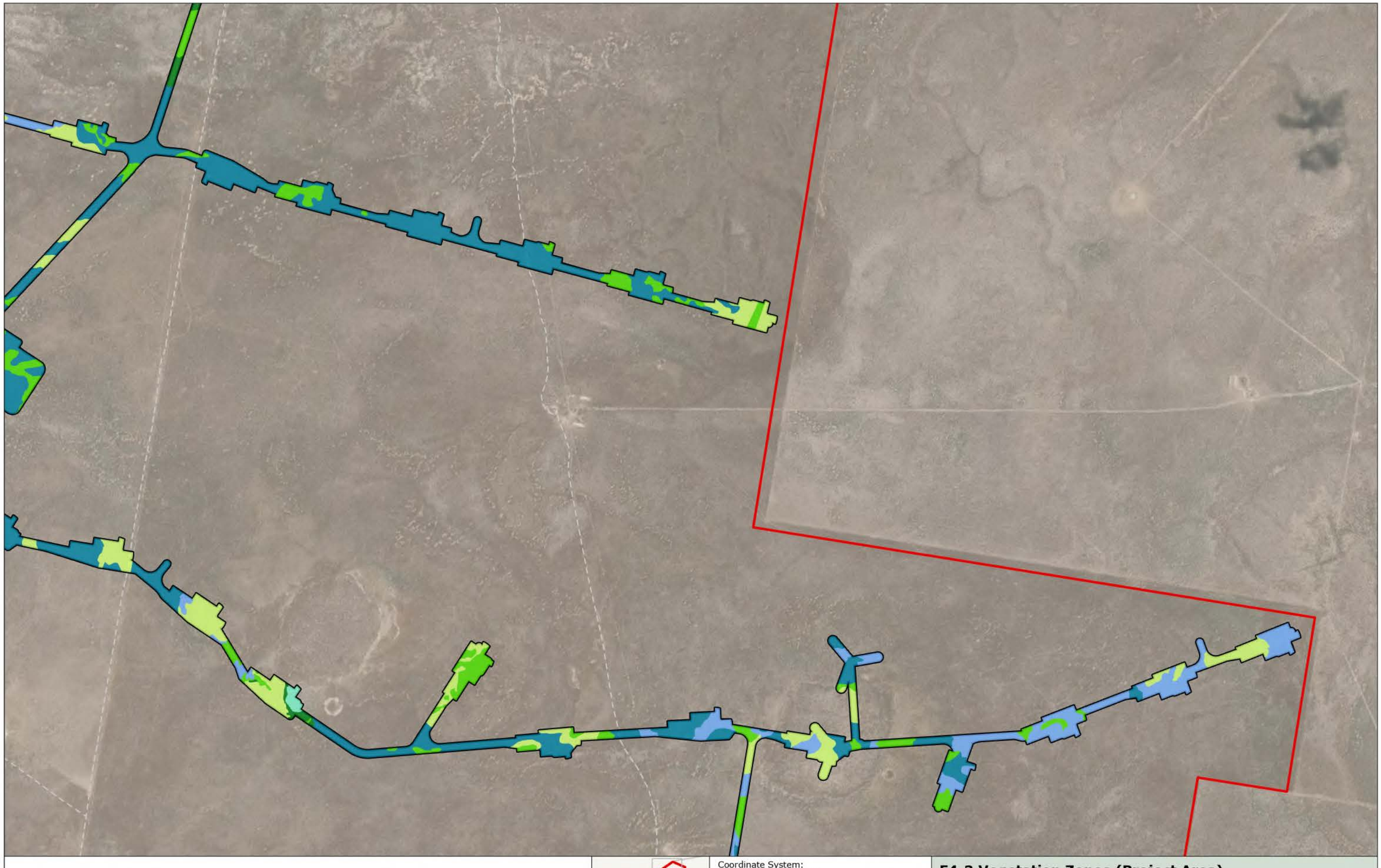
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F4-3 Vegetation Zones (Project Area)
Map 3 of 9

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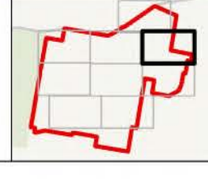


Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

Vegetation Zone

- PCT163 - VZ6
- PCT164 - VZ1
- PCT164 - VZ2
- PCT164 - VZ3
- PCT164 - VZ4
- PCT164 - VZ5



Coordinate System:
GDA 1994 MGA Zone 54
Date: 09/01/2026
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F4-3 Vegetation Zones (Project Area)
Map 4 of 9

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Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

Vegetation Zone

- PCT163 - VZ6
- PCT164 - VZ1
- PCT164 - VZ2
- PCT164 - VZ3
- PCT164 - VZ4
- PCT164 - VZ5
- Non-native Vegetation

Coordinate System:
GDA 1994 MGA Zone 54
Date: 09/01/2026
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Drawing Size: A3
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F4-3 Vegetation Zones (Project Area)
Map 5 of 9

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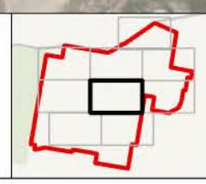


Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

Vegetation Zone

- PCT163 - VZ6
- PCT164 - VZ1
- PCT164 - VZ2
- PCT164 - VZ3
- PCT164 - VZ4
- PCT164 - VZ5



Coordinate System:
GDA 1994 MGA Zone 54
Date: 09/01/2026
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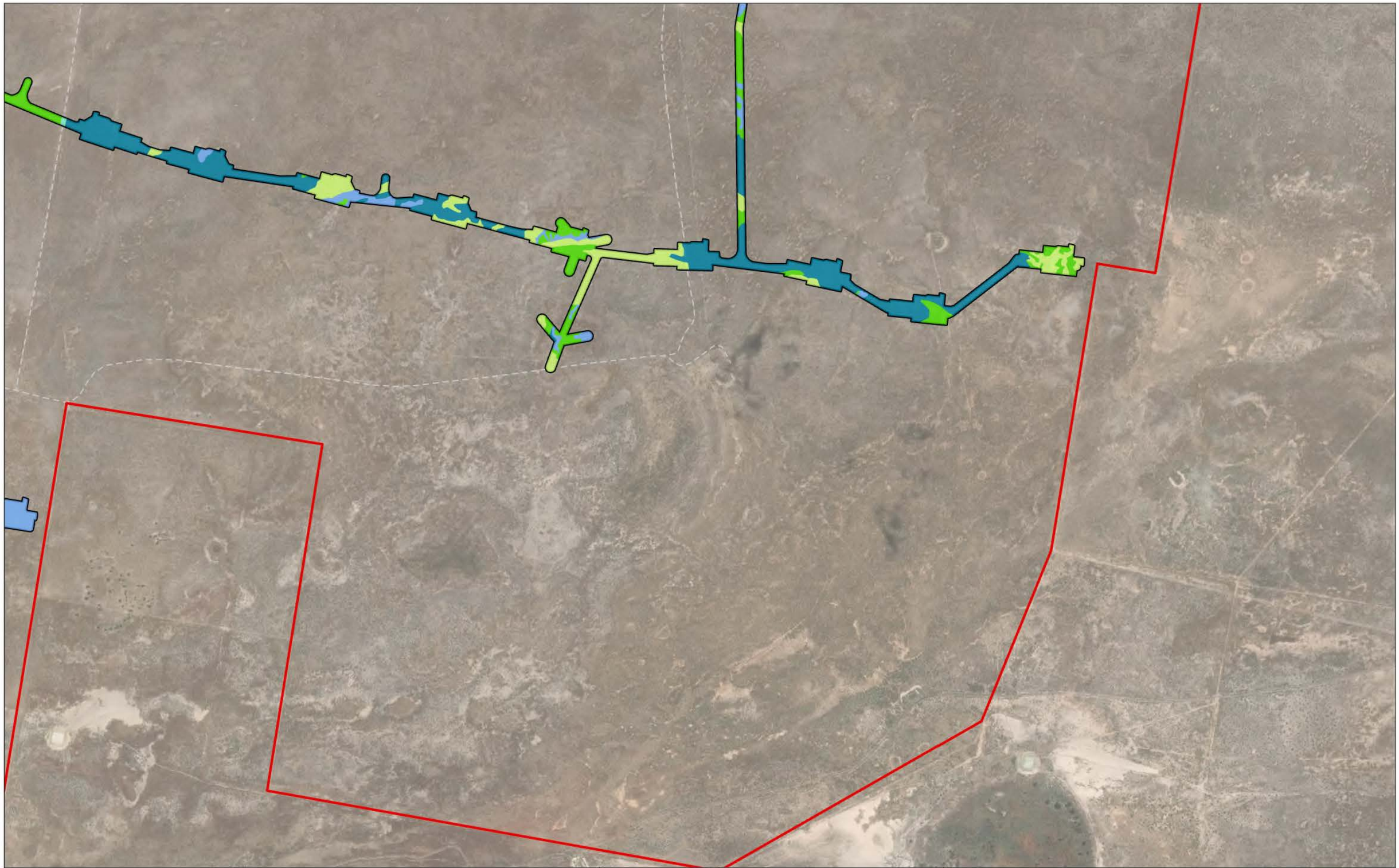
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F4-3 Vegetation Zones (Project Area)
Map 6 of 9

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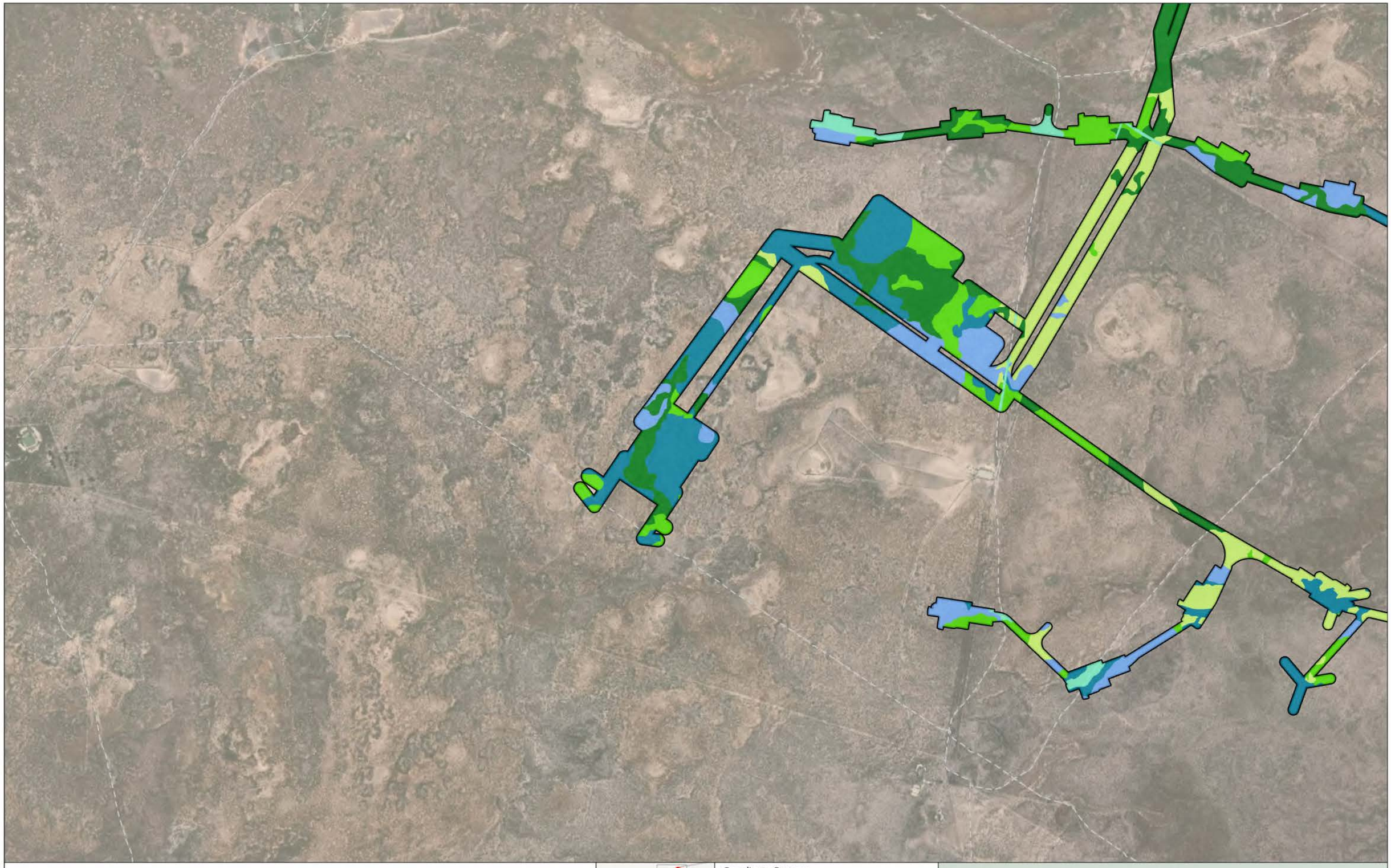


F4-3 Vegetation Zones (Project Area)
Map 7 of 9

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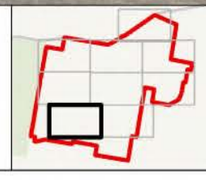


Legend

- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

Vegetation Zone

- PCT163 - VZ6
- PCT164 - VZ1
- PCT164 - VZ2
- PCT164 - VZ3
- PCT164 - VZ4
- PCT164 - VZ5



Coordinate System:
GDA 1994 MGA Zone 54

Date: 09/01/2026
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Drawing Size: A3

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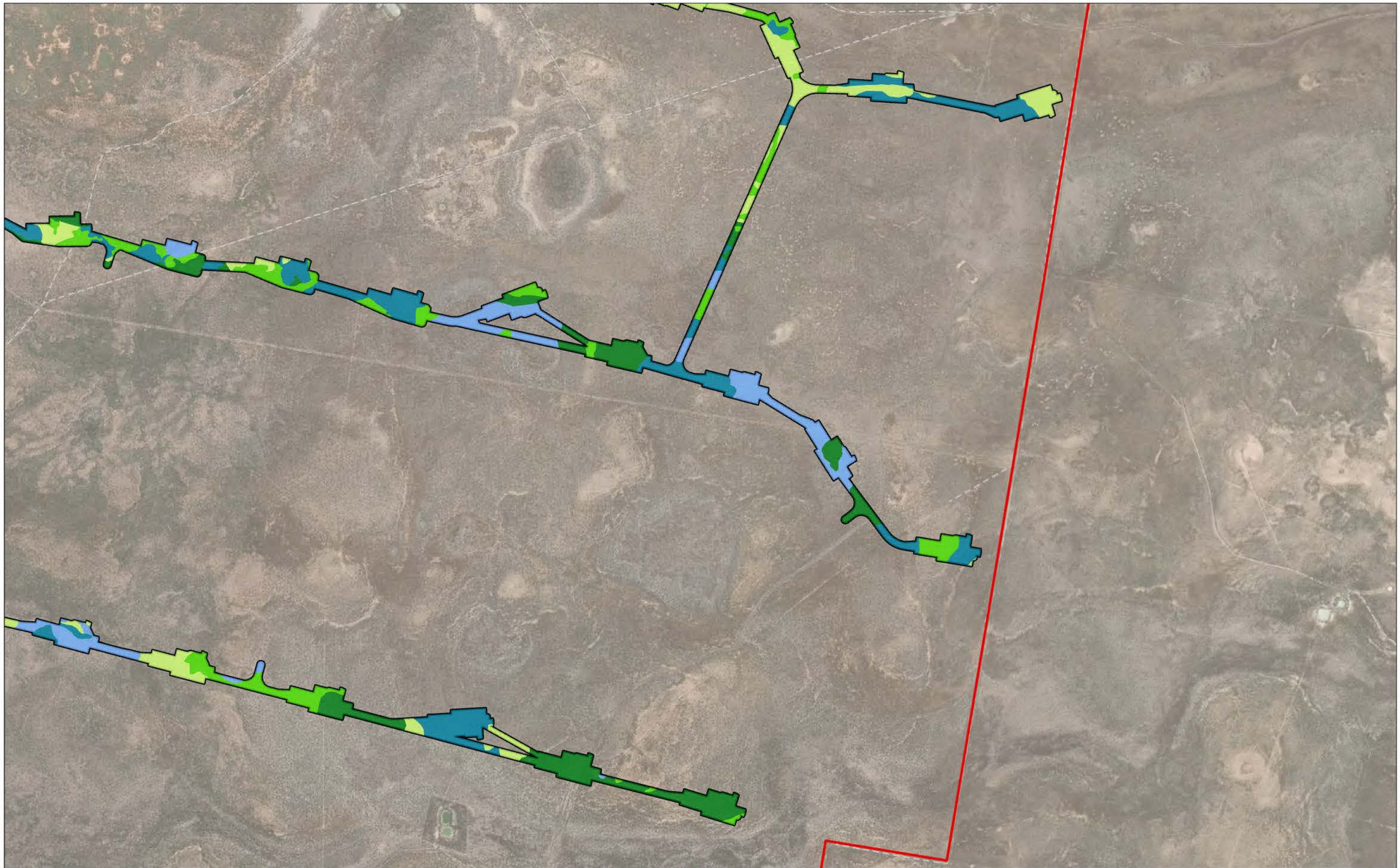
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F4-3 Vegetation Zones (Project Area)
Map 8 of 9

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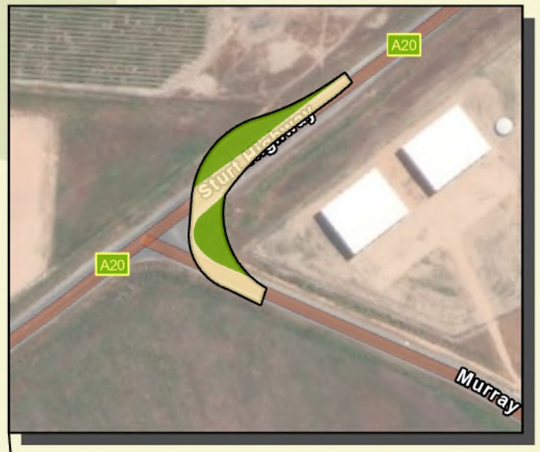


F4-3 Vegetation Zones (Project Area)
Map 9 of 9

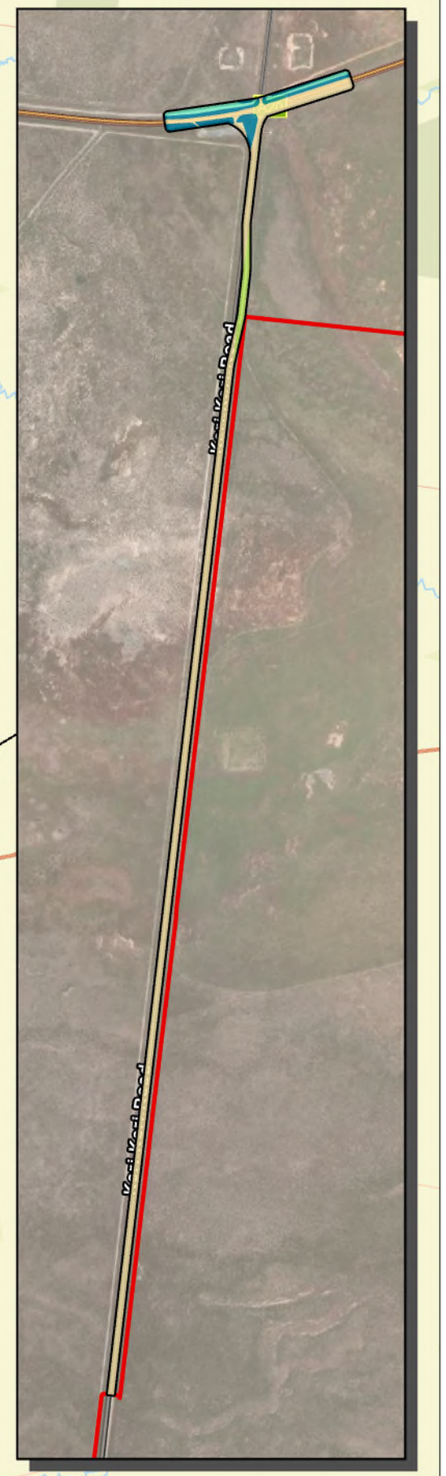
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Euston
Robinvale
Tol Tol
Belsar Island State Forest
Balranald
Yanga
Yanga
Yanga
B400
B12
Tooleybuc

Legend
- Project Area
- Subject Land
- Haul Route

Vegetation Zone
- PCT 159 - VZ7
- PCT164 - VZ1
- PCT164 - VZ3
- PCT164 - VZ4
- Non-native Vegetation

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 15/01/2026
Created By: VN
Drawing Size: A3
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F4-4 Vegetation Zones (Haul Route)

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Biodiversity Development Assessment Report
Acciona

ERM

4.2.8.2 VEGETATION INTEGRITY SCORES

The VIS has been calculated in the BAM-C using the BAM plot data (i.e., compositional, structural and functional values) (see Appendix G) for each vegetation zone mapped within the Subject Land. The VIS for each VZ is provided in Table 4-10.

TABLE 4-10 VEGETATION ZONES VEGETATION INTEGRITY SCORES

VZ	Composition condition score	Structure condition score	Function condition score	Vegetation integrity score	Hollow bearing trees present?
VZ01	92.6	69.3	…	80.1	No
VZ02	94.9	29.8	…	53.1	No
VZ03	72.3	18.4	…	36.5	No
VZ04	84.3	99.2	…	91.4	No
VZ05	86.5	53.8	…	68.2	No
VZ06	97.7	98.9	…	98.3	No
VZ07	61.5	47.3	…	53.9	No

Context is important when interpreting the 'high' VISs calculated for most of these VZs. VZs 1 to 6 are degraded PCTs, as mentioned in Section 4.2.6.

For PCT 163, the BioNet Vegetation Classification says the following under the 'Derived community comments' section:

> "A variable natural community in parts, e.g. as part of a mosaic of shrubland communities. Derived from outer floodplain lignum belt communities due to overgrazing. Further west, more likely to be derived from previous Bladder Saltbush (VCAID 157) and Old Man Saltbush shrubland communities (e.g. VCAID 159). This community is commonly found in heavily disturbed sites adjacent to River Red Gum and Black Box woodlands or on dry lake beds, but also in gypsum dune fields where flooding occurs. Can be derived from its variants (VCAID 163), and from other variable communities with which it intergrades.
>
> Often occurs in quite disturbed areas (e.g. near watering points) where it could be considered a coloniser community where grazing sensitive species such as bladder saltbush and old man salbush have been eliminated. Like Cottonbush, the presence of Dillonbush is usually an indicator of overgrazing at some time.
>
> Cleared for irrigated crops and improved pasture in some areas."

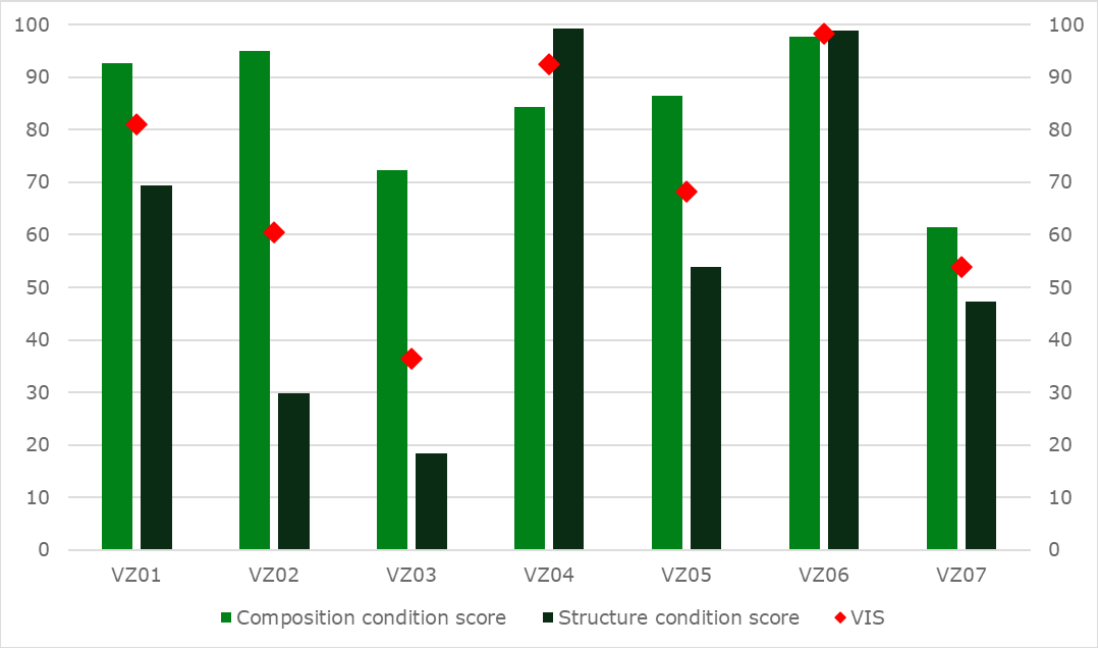
For PCT 164, the BioNet Vegetation Types classification says the following:

> "This is derived community occurring in highly disturbed areas. Areas in which it occupies were probably dominated by Bladder Saltbush and other species prior to European settlement but heavy grazing and other processes have led to the decline of perennial saltbush species leaving this Cotton Bush-dominated community. The severe droughts of the 1990s and 2000s have led to dieback of areas of Cotton Bush" and,

"Derived community occurring in highly disturbed areas (usually indicates that an area has been overgrazed at some time, maybe many years ago). Areas which it occupies were probably dominated by Bladder Saltbush, Old Man Saltbush and other species prior to European settlement. Seedbank for bladder saltbush is gone".

Chart 4-7 graphically shows the compositional and structural score variation between VZs.

CHART 4-7 VEGETATION ZONE COMPOSTION AND STRUCTURE SCORES



Vegetation structure is the main source of variation between the five vegetation zones established for PCT 164 (VZs 1 to 5). VZ 3, which represents degraded vegetation, has the lowest native species composition and per cent cover. Significant per cent cover differences exist between VZs 1, 2 and 4, with less variation in species composition. VZ 5 warrants separation due to the low coverage of Lignum (*Duma florulenta*) and other species compositional variance.

5. HABITAT SUITABILITY FOR THREATENED SPECIES

5.1 HABITAT SUITABILITY

'Ecosystem credit species' are threatened species whose occurrence can generally be predicted by vegetation surrogates and/or landscape features, or that have a low probability of detection using targeted surveys. The BAM-C and NSW BioNet (NSW DCCEEW, 2025b) identify the threatened species assessed for ecosystem credits. A targeted survey is not required to identify or confirm the presence of ecosystem credit species.

'Species credit species', also referred to as 'candidate species', are threatened species for which vegetation surrogates and/or landscape features cannot reliably predict the likelihood of their occurrence. These species are identified in the BAM-C and NSW BioNet (NSW DCCEEW, 2025b). A targeted survey or an expert report is required to confirm the presence or absence of these species on the Subject Land. Alternatively, for a development, activity, clearing or biodiversity certification proposal only, the Applicant may elect to assume the species is present.

In some circumstances NSW BioNet (NSW DCCEEW, 2025b) may identify a threatened species that requires assessment for ecosystem credits and species credits (referred to as 'dual credit species'). For dual credit species, part of the habitat is assessed as species credits (e.g., breeding habitat or land mapped on an important habitat map for a species) and the remaining habitat components for the species are assessed as ecosystem credits (e.g., foraging habitat).

For a small number of threatened species, a habitat constraint may refer to a mapped location (Important Mapped Area) that identifies areas that are considered important for those species. No species with Important Habitat Mapping have required to be assessed for the Subject Land.

The following sections identify the ecosystem credit species, species credit species, dual credit species and species subject to potential serious and irreversible impacts (SAII) associated with the Subject Land.

5.1.1 ECOSYSTEM CREDIT SPECIES

The ecosystem credit species predicted to occur on or use the Subject Land by the BAM-C are listed in Table 5-1 and for the haul route are listed in Table 5-2.

No ecosystem credit species have been excluded from further assessment. Six ecosystem credit species have been found to occur within or near the Subject Land, as presented in Figure 2-2 . No ecosystem species were observed within the haul route. Ecosystem species observed and recorded within or near the Subject Land include:

- Black Falcon (*Falco subniger*);
- Little Eagle (*Hieraaetus morphnoides*);
- Pink Cockatoo (*Lophochroa leadbeateri*);
- Southern Whiteface (*Aphelocephala leucopsis*);
- Spotted Harrier (*Circus assimilis*); and
- White-fronted Chat (*Epthianura albifrons*).

The Plains-wanderer (*Pedionomus torquatus*) was manually added to the BAM-C for the Subject Land as an ecosystem credit species due to observations of the species in the Project Area but not within proximity to the Subject Land.

TABLE 5-1 PREDICTED ECOSYSTEM CREDIT SPECIES (SUBJECT LAND)

Common name	Scientific name	Listing Status		Species retained for further assessment	Associated PCTs	Sensitivity to gain class	Comment
		BC Act	EPBC Act				
Magpie Goose	*Anseranas semipalmata*	V	-	Yes	163	Moderate	Retained
Southern Whiteface	*Aphelocephala leucopsis*	V	V	Yes	163, 164	Low	Retained
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V	-	Yes	163, 164	Moderate	Retained
Pied Honeyeater	*Certhionyx variegatus*	V	-	Yes	163	Moderate	Retained
Little Pied Bat	*Chalinolobus picatus*	V	-	Yes	163, 164	High	Retained
Spotted Harrier	*Circus assimilis*	V	-	Yes	163, 164	Moderate	Retained
White-fronted Chat	*Epthianura albifrons*	V	-	Yes	163, 164	Moderate	Retained
Grey Falcon	*Falco hypoleucos*	V	V	Yes	163, 164	Moderate	Retained
Black Falcon	*Falco subniger*	V	-	Yes	163, 164	Moderate	Retained
Brolga	*Grus rubicunda*	V	-	Yes	163	Moderate	Retained
White-bellied Sea-Eagle (Foraging)	*Haliaeetus leucogaster*	V	-	Yes	163, 164	High	Retained
Little Eagle (Foraging)	*Hieraaetus morphnoides*	V	-	Yes	163, 164	Moderate	Retained
Pink Cockatoo (Foraging)	*Lophochroa leadbeateri*	V	E	Yes	163	Moderate	Retained
Blue-winged Parrot	*Neophema chrysostoma*	V	V	Yes	163, 164	Low	Retained
Redthroat	*Pyrrholaemus brunneus*	V	-	Yes	163	Moderate	Retained
Manually Added Ecosystem Species							
Plains-wanderer	*Pedionomus torquatus*	E	CE	Yes	N/A	High	Manually added

TABLE 5-2 PREDICTED ECOSYSTEM CREDIT SPECIES (TRANSPORT ROUTE)

Common name	Scientific name	Listing Status		Species retained for further assessment	Associated PCTs	Sensitivity to gain class	Comment
		BC Act	EPBC Act				
Dusky Woodswallow	*Artamus cyanopterus cyanopterus*	V	-	Yes	159	Moderate	Retained
Little Pied Bat	*Chalinolobus picatus*	V	-	Yes	159	High	Retained
Spotted Harrier	*Circus assimilis*	V	-	Yes	159	Moderate	Retained
White-fronted Chat	*Epthianura albifrons*	V	-	Yes	159	Moderate	Retained
Grey Falcon	*Falco hypoleucos*	V	V	Yes	159	Moderate	Retained
Black Falcon	*Falco subniger*	V	-	Yes	159	Moderate	Retained
White-bellied Sea-Eagle (Foraging)	*Haliaeetus leucogaster*	V	-	Yes	159	High	Retained
Black-breasted Buzzard (Foraging)	*Hamirostra melanosternon*	V	-	Yes	159	Moderate	Retained
Little Eagle (Foraging)	*Hieraaetus morphnoides*	V	-	Yes	159	Moderate	Retained
Pink Cockatoo (Foraging)	*Lophochroa leadbeateri*	V	E	Yes	159	Moderate	Retained

LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD

Legend

- Black Falcon
- Pink Cockatoo
- Spotted Harrier
- White-fronted Chat
- Dusky Woodswallow
- Little Eagle
- Plains-wanderer
- Fork-tailed Swift
- Subject Land
- Project Area
- Main Road
- Road
- Path/Track

Source:
Boundary: Client Provided (date)
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 17/12/2025
Created By: VN
Drawing Size: A3

0 1 2Km

1:70,000

F5-1 Ecosystem Species Observations

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5.1.2 CANDIDATE SPECIES

The candidate species (species credit species) identified by the BAM-C are listed in Table 5-3 and Table 5-4.

TABLE 5-3 CANDIDATE SPECIES (SUBJECT LAND)

Common name	Scientific name	Listing status		Dual credit species
		BC Act	EPBC Act	
Fauna				
Pink-tailed Legless Lizard	*Aprasia parapulchella*	V	V	No
Australian Bustard	*Ardeotis australis*	E	-	No
White-bellied Sea-eagle (Breeding)	*Haliaeetus leucogaster*	V	-	Yes
Little Eagle (Breeding)	*Hieraaetus morphnoides*	V	-	Yes
Pink Cockatoo (Breeding)	*Lophochroa leadbeateri*	V	E	Yes
Flora				
Mossgiel Daisy	*Brachyscome papillosa*	V	V	No
Bindweed	*Convolvulus tedmoorei*	E	-	No
Winged Peppercress	*Lepidium monoplocoides*	E	E	No
Chariot Wheels	*Maireana cheelii*	V	V	No
Slender Darling Pea	*Swainsona murrayana*	V	V	No
Additional Species (manually added as these are not associated with mapped PCTs)				
Growling Grass Frog	*Litoria raniformis*	E	V	No
Southern Myotis	*Myotis macropus*	V	-	No
-	*Pterostylis pedina*	E	-	No

TABLE 5-4 CANDIDATE SPECIES (TRANSPORT ROUTE)

Common name	Scientific name	Listing status		Dual credit species
		BC Act	EPBC Act	
Fauna				
White-bellied Sea-eagle (Breeding)	*Haliaeetus leucogaster*	V	-	Yes
Black-breasted Buzzard (Breeding)	*Hamirostra melanosternon*	V	-	Yes
Little Eagle (Breeding)	*Hieraaetus morphnoides*	V	-	Yes
Pink Cockatoo (Breeding)	*Lophochroa leadbeateri*	V	E	Yes

The process for determining if there is a requirement to further assess these species in the BDAR is discussed in the following sections.

5.2 HABITAT SURVEYS: CANDIDATE SPECIES CREDIT SPECIES

The accredited assessor must use Subsections 5.2.1 to 5.2.6 of the BAM to identify habitat suitability for threatened species on the Subject Land. This is a six-step process, which is outlined in the following sections.

5.2.1 IDENTIFY THREATENED SPECIES FOR ASSESSMENT

Threatened species that are likely to occur on or use the subject land, thus predict the species that require assessment, are determined in this step. Six criteria are used to identify those threatened species that have or may have suitable on the Subject Land, with all relevant criteria needing to be satisfied for the species to be retained for assessment.

TABLE 5-5 IDENTIFY THREATENED SPECIES FOR ASSESSMENT

Scientific Name	BAM Section 5.2.1 Criteria						Retain?
	a[10]	b[11]	c[12]	d[13]	e[14]	f[15]	
Fauna							
Aprasia parapulchella	✗	N/A	✓	N/A	N/A	species	No
Ardeotis australis	✓	N/A	✓	N/A	N/A	species	Yes
Haliaeetus leucogaster	✓	N/A	✓	N/A	N/A	species	Yes
Hamirostra melanosternon	✓	N/A	✓	N/A	N/A	species	Yes
Hieraaetus morphnoides	✓	N/A	✓	N/A	N/A	species	Yes
Litoria raniformis	✓	N/A	✗	✓	✓	species	No
Lophochroa leadbeateri	✓	N/A	✓	N/A	N/A	species	Yes
Myotis macropus	✓	N/A	✗	✓	✓	species	No
Pedionomus torquatus	✓	N/A	✗	✓	✓	species	Yes
Flora							
Brachyscome papillosa	✓	N/A	✓	N/A	N/A	species	Yes
Convolvulus tedmoorei	✓	N/A	✓	N/A	N/A	species	Yes
Lepidium monoplocoides	✓	N/A	✓	N/A	N/A	species	Yes
Maireana cheelii	✓	✓	✓	N/A	N/A	species	Yes
Pterostylis pedina[16]	✓	N/A	✗	N/A	N/A	species	Yes
Swainsona murrayana	✓	N/A	✓	N/A	N/A	species	Yes

[10] s5.2.1(2)(a) distribution of the species includes the IBRA subregion within which the subject land is mostly located
[11] s5.2.1(2)(b) the subject land is within any geographic limitations of the species distribution within the IBRA subregion
[12] s5.2.1(2)(c) the species is associated with any of the PCTs occurring within the subject land
[13] s5.2.1(2)(d) the native vegetation cover within the assessment area is equal to, or greater than, the minimum class needed for the species
[14] s5.2.1(2)(e) the patch size (associated with the relevant vegetation zone) is equal to, or greater than, the minimum specified for that species
[15] s5.2.1(2)(f) the species is identified as being assessed for ecosystem credits or species credits in the TBDC
[16] Manually added as the species was provisionally listed as endangered on 17 January 2025

The Pink-tailed Legless Lizard (*Aprasia parapulchella*) is excluded from further assessment as the Subject Land does not fall within the predictive model distribution footprint as defined by the *Aprasia parapulchella* distribution for Biodiversity Assessment Methods assessments Interpretive guide (24/07/2025).

Both the Southern Myotis and Growling Grass Frog are not associated with PCTs 163 or 164. Further, waterbodies relied on by these species and necessary for species polygon establishment are not within the Subject Land nor are they within the 200 m radius of the Subject Land. Even if detected, it is not possible to establish a species polygon for these species using the rules specified in the guidance documents.

The Plains Wanderer (*Pedionomus torquatus*) is assessed by the BAM by Important Habitat Area maps. The Subject Land does not comprise an area included in the Important Habitat Area map for this species. No habitat area, as defined by associated PCTs, occurs within the Subject Land, despite one observation of the species within the Project Area. The Project has avoided habitat as defined by associated PCTs (e.g. PCTs 44 and 46).

Pterostylis pedina does not satisfy s5.2.1(2)(c) of the BAM, thus permitting its exclusion from the assessment. However, this species was manually added for consideration in the assessment and has been retained as it was only recently listed as endangered via the provisional listing process in January 2025[17] and preliminary determination in December 2025.

Candidate Species with a geographic limitation and/or an associated PCT, as identified in Table 5-6 (i.e., s5.2.1(2)(b) of the BAM), are listed in Table 5-7 with relevant information obtained from the BAM-C and/or TBDC.

TABLE 5-6 CANDIDATE SPECIES WITH GEOGRAPHIC LIMITATION AND/OR ASSOCIATED PCT

Scientific Name	Geographical Limitations	Associated PCTs
Fauna		
Ardeotis australis	N/A	163, 164
Haliaeetus leucogaster	N/A	159, 163, 164
Hamirostra melanosternon	N/A	159
Hieraaetus morphnoides	N/A	159, 163, 164
Lophochroa leadbeateri	N/A	159, 163
Flora		
Brachyscome papillosa	-	163, 164
Convolvulus tedmoorei	-	163, 164
Lepidium monoplocoides	-	163
Maireana cheelii	☑ West of Darlington Point, west of Jerilderie	164
Swainsona murrayana	-	163, 164

[17] CPHR are yet to update the TBDC to include this species, this being the reason why it did not meet the relevant criterion

5.2.2 ASSESS THE HABITAT CONSTRAINTS AND VAGRANT SPECIES ON THE SUBJECT LAND

According to the BAM, a threatened species is considered unlikely to occur on the Subject Land or a vegetation zone if:

- The habitat constraints for the species are not present in the vegetation zone or Subject Land; or
- The species is a vagrant in the IBRA subregion.

Four species in the BAM-C have habitat constraints. These are discussed in Table 5-7.

TABLE 5-7 ASSESSMENT OF CANDIDATE SPECIES EXCLUSION

Common Name	Scientific Name	Habitat Constraint/ Geographic Limitation	Comment
White-bellied Sea-Eagle (Breeding)	*Haliaeetus leucogaster*	Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	Subject Land and Transport Route do not contain living or dead mature trees within 1 km of a waterbody **Excluded**
Black-breasted Buzzard (Breeding)	*Hamirostra melanosternon*	Waterbodies - Land within 40 m of riparian woodland on inland watercourses/ waterholes containing dead or dying eucalypts	Transport route does not fall within 40 m of riparian woodland **Excluded**
Little Eagle (Breeding)	*Hieraaetus morphnoides*	Nest trees - live (occasionally dead) large old trees within vegetation	Subject Land and Transport Route do not contain any nest trees **Excluded**
Pink Cockatoo (Breeding)	*Lophochroa leadbeateri*	Living or dead tree with hollows greater than 10cm diameter	Subject Land and Transport Route do not contain any hollow bearing trees **Excluded**
Chariot Wheels	*Maireana cheelii*	Heavy grey clay soils and claypans or shallow depressions	Subject Land contains heavy grey clay soils and claypans or shallow depressions **Retained**

The BAM defines vagrant as *occasional records of species in NSW that are outside their normal distribution or habitat, including escaped animals and planted specimens*.

One species satisfies the definition of vagrant species, which is discussed in Table 5-8.

TABLE 5-8 CANDIDATE SPECIES NORMAL DISTRIBUTION AND HABITAT

Species	Normal Distribution[18]	Normal Habitat	Comment
Bindweed *Convolvulus tedmoorei*	This species has been recorded from northern inland areas of South Australia, south-western (sic western) Queensland and western NSW. There are few known records from NSW: two areas on the Murrumbidgee and Darling River floodplains in central-western NSW (from Toganmain Station, Darlington Point, and from a locality 8km north-west of Louth); and two other records from east of Broken Hill on the road to Wilcannia, and from the Menindee Road, Scarsdale.	Grows in self-mulching grey clay soils on the floodplains of the Darling and Murrumbidgee Rivers.	Except for the 'Hay Plains' record, the normal distribution of this species in NSW is within the Darling Riverine Plains, Broken Hill Complex and Channel Country Bioregions. Six observations are recorded in these three IBRA regions, which are not the same bioregions as that of the Subject Land. There are six records of the species in the Channel Country IBRA Region and five records in the Stony Plains IBRA region (located in South Australia). These two IBRA regions appear to define the normal distribution of the species (i.e., arid parts of Australia). The nearest record to the 1969 Hay Plains record, which is ~99km east-northeast of the Subject Land, is ~420 km (near Broken Hill) which is the same as travelling from Sydney to Albury (a large distance). There are no records east or south of the 1969 Hay Plains record. Habitat generally consistent with Subject Land, however, recorded occurrences of the species in its normal distribution indicate a preference for flooded landscapes. **Excluded**

Notwithstanding, comprehensive survey performed in September 2024 across the entire Development Footprint failed to detect the incidence of this species within the impact area. The argument of vagrancy is supported by the survey result and warrants exclusion of this species from further assessment.

[18] Taken from online CPHR species profile (accessed 25 June 2025)

5.2.3 FURTHER ASSESSMENT OF CANDIDATE SPECIES CREDIT SPECIES

A candidate species is considered unlikely to occur on the Subject Land (or vegetation zone) and does not require further assessment if:

- After performing a field assessment, the accredited assessor determines that the microhabitats required by the species:
  - are absent; or
  - are degraded; or
- An expert report is obtained stating the species is unlikely to occur.

No expert report has been obtained for the Project.

The following sections discuss the extent of degraded habitat by vegetation zones.

PCT 164 is described in the NSW BioNet vegetation type database as a:

> *…derived community occurring in highly disturbed areas. Areas in which it occupies were probably dominated by Bladder Saltbush and other species prior to European settlement but heavy grazing and other processes have led to the decline of perennial saltbush species leaving this Cotton Bush-dominated community. The severe droughts of the 1990s and 2000s have led to dieback of areas of Cotton Bush*.

PCT 163 is described in the NSW BioNet vegetation type database as a:

> *… derived community possibly from previous Bladder Saltbush (ID157) and Old Man Saltbush shrubland communities that were heavily modified by heavy grazing by domestic stock and rabbits. Dillon Bush shrubland also occurs on lands that have been cropped in the past.*

The vegetation of the Subject Land has been heavily grazed and modified. Bladder bush (*Atriplex vesicaria*) and other perennial saltbush species that were once common and abundant in the area (Portener 1993) are absent/uncommon and never dominant in the Subject Land. The presence of perennial and annual exotics and presence of disturbance affiliated natives such as *Sclerolaena tricuspis* and *Sclerolaena muricata* exemplifies the grazing land use applied to this land.

No candidate species are being excluded based on habitat degradation.

5.2.4 DETERMINE THE PRESENCE OF A CANDIDATE SPECIES CREDIT SPECIES

A threatened species survey is required to determine presence or absence of a candidate species within the Subject Land. Alternatively, the Applicant may elect to assume the species is present or obtain an expert report.

Threatened species surveys were conducted with the findings summarised in Table 5-9. Candidate species were surveyed in accordance with their relevant guidelines and NSW BioNet (NSW DCCEEW, 2025b) survey specifications.

TABLE 5-9 SUMMARY OF SURVEY EFFORT FOR CANDIDATE SPECIES

Target Species	Recommended Survey Period	Associated PCTs	Method	Months Surveyed	Outcome
Fauna					
Australian Bustard (*Ardeotis australis*)	All year	163, 164	Survey effort for Australian Bustard across the Subject Land has consisted of 33 person hours across surveys conducted in Spring 2020, Summer 2022 and Spring 2022. Survey methods included nocturnal driven transects, diurnal driven transects, diurnal walking transects, targeted area searches and BUS.	September 2020 October 2020 February 2022 August 2022 September 2022 September 2024 November 2024 September 2025	**Species not present** There are no species-specific survey guidelines available for this species, however, the combination of the diurnal driven transects, BUS, targeted avian surveys and the cumulative hours spent traversing the Subject Land is considered adequate for detection of the species and therefore the species is determined not to occur.
Flora					
Mossgiel Daisy (*Brachyscome papillosa*)	September - November	163, 164	Visibility allowed for walking parallel transect surveys using 10 to 15 m separations.	• October 2020 • November 2021 • September 2022 • October 2023 • September 2024 • September 2025	**Species present** The Mossgiel Daisy was found extensively throughout the Subject Land across PCTs 160, 163 and 164. A species polygon has been created, further discussed in Section 05.2.5.2 and shown in Figure 5-1.A species polygon has been created, further discussed in Section 05.2.5.2 and shown in Figure 5-1.
Bindweed (*Convolvulus tedmoorei*)	June - September	163, 164	Visibility allowed for walking parallel transect surveys using 10 to 15 m separations.	• September 2020 • August 2022 • September 2023 • September 2024 • September 2025	**Species not present** Comprehensive survey was conducted for the Bindweed throughout the Subject Land. The species was not detected and is therefore determined to be absent.
Winged Peppercress (*Lepidium monoplocoides*)	September - December	163	Visibility allowed for walking parallel transect surveys using 10 to 15 m separations.	• November 2021 • September 2022 • October 2023 • December 2023 • September 2024 • September 2025	**Species not present** Comprehensive survey was conducted for the Winged Peppercress throughout the Subject Land. The species was not detected and is therefore determined to be absent.
Chariot Wheels (*Maireana cheelii*)	September - December	164	Visibility allowed for walking parallel transect surveys using 10 to 15 m separations.	• October 2020 • November 2021 • September 2022 • October 2023 • December 2023 • September 2024 • September 2025	**Species present** The Chariot Wheels was found extensively throughout the Subject Land across PCTs 160, 163 and 164. A species polygon has been created, further discussed in Section 05.2.5.2 and shown in Figure 5-1. A species polygon has been created, further discussed in Section 05.2.5.2 and shown in Figure 5-1.

Target Species	Recommended Survey Period	Associated PCTs	Method	Months Surveyed	Outcome
Pterostylis pedina	September – October	N/A	Visibility allowed for walking parallel transect surveys using 10 to 15 m separations.	• September 2024 • September 2025	**Species present beyond Subject Land** *Pterostylis pedina* was found occurring in an isolated patch within the Project Area. The patch has been subsequently avoided by the Project, and the observed individuals are no longer within the Subject Land. Comprehensive survey was conducted for the *Pterostylis pedina* throughout the Subject Land. The species was not detected and is therefore determined to be absent.
Slender Darling Pea (*Swainsona murrayana*)	September	163, 164	Visibility allowed for walking parallel transect surveys using 10 to 15 m separations.	• September 2020 • September 2022 • September 2023 • September 2024 • September 2025	**Species not present** Survey for the Slender Darling Pea identified it in the south of the Project Area and has been avoided. Comprehensive survey was conducted for the Slender Darling Pea throughout the Subject Land. The species was not detected and is therefore determined to be absent.

Adequate survey for *Pterostylis pedina* was performed while the species was observed in its flowering state within the Project Area. A photograph of the species observed by the author of this report during the survey period is provided in Plate 5-1. The species is absent from the Development Footprint.



PLATE 5-1 *PTEROSTYLIS PEDINA* (KERI KERI, SEPTEMBER 2024)

5.2.5 DETERMINE THE AREA OR COUNT, AND LOCATION OF SUITABLE HABITAT FOR A SPECIES CREDIT SPECIES (A SPECIES POLYGON)

A species polygon is required where:

- A candidate species is detected within the Subject Land after performing a threatened species survey; or
- The important habitat map is coincident with part or all of the Subject Land; or
- The candidate species is assumed to be present; or
- An expert report identifies part or all the Subject to comprise habitat for a candidate species.

5.2.5.1 CANDIDATE SPECIES FOUND NOT TO OCCUR

Following the targeted survey effort for threatened candidate species, as described in Table 5-9, the following species have been determined as not occurring within the Subject Land:

- Australian Bustard (*Ardeotis australis*);
- Bindweed (*Convolvulus tedmoorei*);
- Winged Peppercress (*Lepidium monoplocoides*);
- Slender Darling Pea (*Swainsona murrayana*); and
- *Pterostylis pedina.*

5.2.5.2 CANDIDATE SPECIES FOUND TO OCCUR FOLLOWING SURVEY EFFORT

Species' polygons have been developed for candidate species found present within the Subject Land based on the species' polygon specifications outlined in NSW BioNet (NSW DCCEEW, 2025b) and relevant guidelines for the species.

Two candidate species have been observed within the Subject Land, as listed below:

- Mossgiel Daisy (*Brachyscome papillosa*); and
- Chariot Wheels (*Maireana cheelii*).

Species' polygons are described below and presented in Figure 5-2 and Figure 5-3. A summary of all candidate species known to be present, with details of their threatened and SAII status and biodiversity risk weighting, is provided in Table 5-10.

TABLE 5-10 SUMMARY OF SPECIES' POLYGONS

Species	SAII Status	Biodiversity Risk Weighting	Species' Polygon VZ	Area (ha) of VZ in Species' Polygon	Total Species' Polygon Area (ha)
Mossgiel Daisy (*Brachyscome papillosa*)	No	2.00	• VZ01 • VZ02 • VZ03 • VZ04 • VZ05 • VZ06	• 40.22 • 20.36 • 3.12 • 56.27 • 26.96 • 15.09	162.02
Chariot Wheels (*Maireana cheelii*)	No	2.00	• VZ01 • VZ02 • VZ03 • VZ04 • VZ05 • VZ06	• 1.17 • 3.33 • 0.17 • 9.18 • 2.32 • 11.8	27.97

5.2.5.3 MOSSGIEL DAISY (BRACHYSCOME PAPILLOSA)

Mossgiel Daisy (*Brachyscome papillosa*) was surveyed in October 2020, November 2021, September 2022, October 2023, September 2024 and September 2025 using parallel field traverses. Conditions were appropriate for the detection of the species, with flowering and fruiting records confirmed. Observations are generally associated with grey soils within *Maireana aphylla* shrublands (PCT 164 VZs 1 and 4), aligning with habitat described by the species' conservation advice (Cwth DEWHA, 2008) and NSW BioNet (NSW DCCEEW, 2025b). Figure 5-2 displays species occurrence recorded within the Subject Land and the Project Area.

The species' polygon for *Brachyscome papillosa* was based on polygons within which the species has been observed. The total area of species' polygon for *Brachyscome papillosa* is 162.02 ha. Refer to Figure 5-2 for a map of the species' polygon.



PHOTOGRAPH 9 MOSSGIEL DAISY (*BRACHYSCOME PAPILLOSA*) WITHIN THE SUBJECT LAND

5.2.5.4 CHARIOT WHEELS (*MAIREANA CHEELII*)

Maireana cheelii was surveyed in October 2020, November 2021, September 2022, October 2023, December 2023, September 2024 and September 2025 using parallel field traverses. Conditions were appropriate for the detection of the species, with fruiting records confirmed. The species was recorded in association with grey claypan microhabitats, and often in VZs 2 and 6 on scalded surfaces with Hairy Bluebush (*Maireana pentagona*). The observed microhabitats align with those described by NSW BioNet (NSW DCCEEW, 2025b).

The species' polygon for *Maireana cheelii* was based on polygons within which the species has been observed. The total area of species' polygon for *Maireana cheelii* is 27.97 ha. Refer to Figure 5-3 for a map of the species' polygon.



PHOTOGRAPH 10 CHARIOT WHEELS (*MAIREANA CHEELII*) WITHIN THE SUBJECT LAND

LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD

Legend

- Mossgiel Daisy (*Brachyscome papillosa*)
- Mossgiel Daisy (*Brachyscome papillosa*)
- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54

Date: 19/12/2025

Created By: VN

Drawing Size: A3

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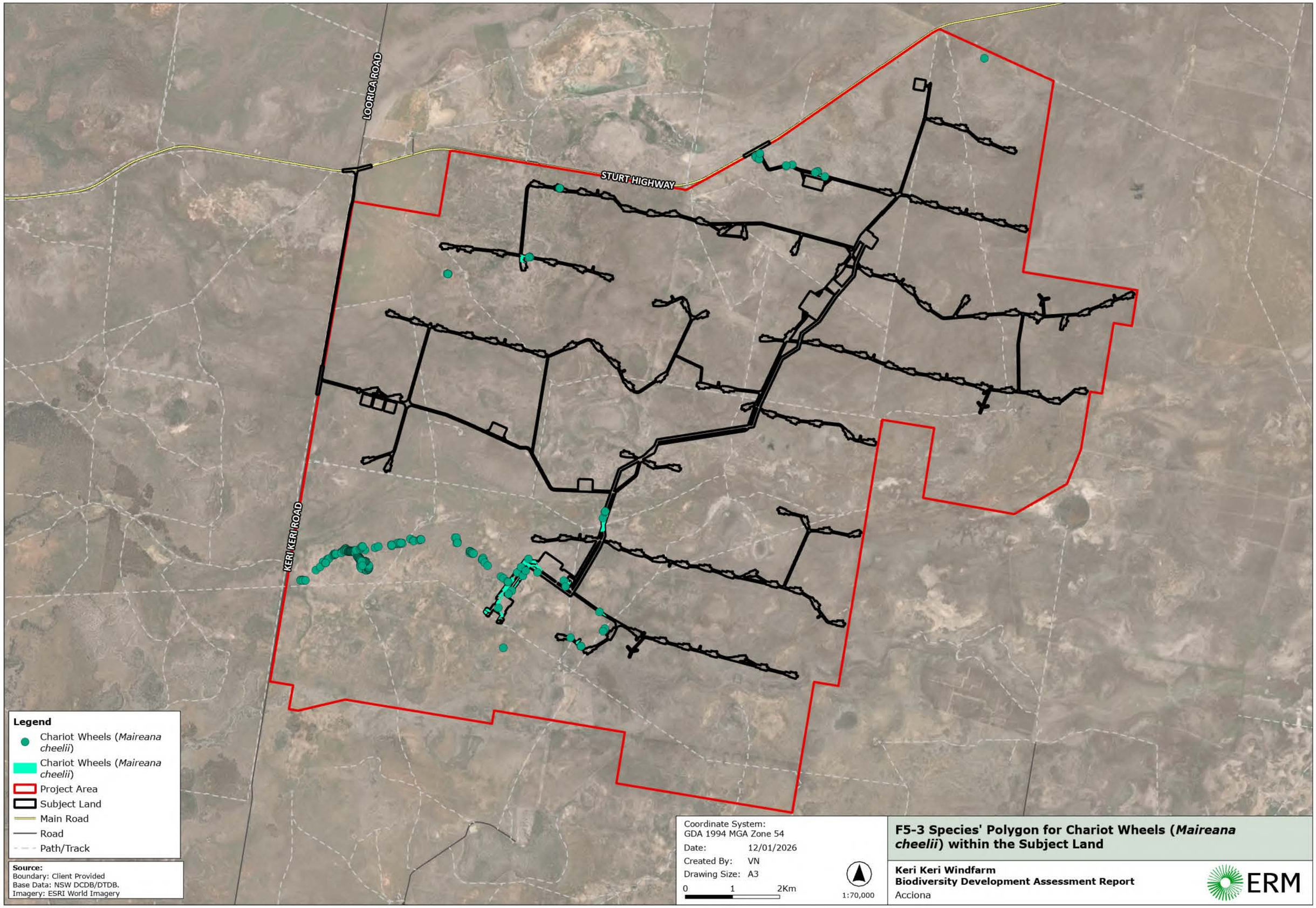
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F5-2 Species' Polygon for Mossgiel Daisy (*Brachyscome papillosa*)

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F5-3 Species' Polygon for Chariot Wheels (*Maireana cheelii*) within the Subject Land

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5.3 SUPPLEMENTARY SEARS REQUIREMENTS

Supplementary SEARs provided by the Commonwealth, identified additional threatened species for consideration, as listed in Table 1-1. Table 5-11 identifies the methods used to survey for threatened species.

TABLE 5-11 MNES SURVEY METHODS AND RESULTS

Threatened Species/Community	EPBC Act	Survey Method	Survey Result
Threatened Communities			
Natural Grasslands of the Murray Valley Plains	Critically Endangered	Vegetation mapping at a capture scale of 1:1,000 involving site investigation (i.e., BAM plots and rapid data points). Refer to Section 4 for methods.	Candidate patches of this TEC (i.e., PCTs 44 and 46) do not occur within Subject Land. Vegetation of the Subject Land does not match the description of this TEC (see Section 4.2.7.1). TEC is absent and would not be impacted by the Project.
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	Critically Endangered	Vegetation mapping at a capture scale of 1:1,000 involving site investigation (i.e., BAM plots and rapid data points). Refer to Section 4 for methods.	Candidate patches of this TEC do not occur within Subject Land. Vegetation of the Subject Land does not match the description of this TEC. TEC is absent and would not be impacted by the Project.
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	Endangered	Vegetation mapping at a capture scale of 1:1,000 involving site investigation (i.e., BAM plots and rapid data points). Refer to Section 4 for methods.	Candidate patches of this TEC do not occur within Subject Land. Vegetation of the Subject Land does not match the description of this TEC. TEC is absent and would not be impacted by the Project.
Weeping Myall woodlands	Endangered	Vegetation mapping at a capture scale of 1:1,000 involving site investigation (i.e., BAM plots and rapid data points). Refer to Section 4 for methods.	Candidate patches of this TEC do not occur within Subject Land. Vegetation of the Subject Land does not match the description of this TEC. TEC is absent and would not be impacted by the Project.
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of Southeastern Australia	Endangered	Vegetation mapping at a capture scale of 1:1,000 involving site investigation (i.e., BAM plots and rapid data points). Refer to Section 4 for methods.	Candidate patches of this TEC do not occur within Subject Land. Vegetation of the Subject Land does not match the description of this TEC. TEC is absent and would not be impacted by the Project.
Threatened Species			
Plains-wanderer (*Pedionomus torquatus*)	Critically Endangered	Spotlighting Refer to Table 2-5 for targeted survey	The Plains-wanderer was found to occur within the Project Area but not within the Subject Land. Survey results, vegetation

Threatened Species/Community	EPBC Act	Survey Method	Survey Result
		effort conducted for this species.	mapping (i.e., no associated PCT habitat) and absence of Important Habitat Mapping within the Subject Land demonstrates that the Project is not likely to have an impact on the species and its habitat.
Winged Peppercress (*Lepidium monoplocoides*)	Endangered	Parallel transects Refer to 2.2.3 for targeted survey effort conducted for this species.	Targeted surveys for this species failed to detect it within the Subject Land. The Project is not expected to have a direct impact on the species and its habitat (i.e., avoided impact).
Chariot Wheels (*Maireana cheelii*)	Vulnerable	Parallel transects Refer to 2.2.3 for targeted survey effort conducted for this species.	Targeted surveys have identified an impact on this species and its habitat. A species polygon has been established for direct impacts on this species. Offsets to be used to address impact on the species. See Section 5.2.5.2.
Mossgiel Daisy (*Brachyscome papillosa*)	Vulnerable	Parallel transects Refer to 2.2.3 for targeted survey effort conducted for this species.	Targeted surveys have identified an impact on this species and its habitat. A species polygon has been established for direct impacts on this species. Offsets to be used to address impact on the species. See Section 5.2.5.2.
Slender Darling-pea (*Swainsona murrayana*)	Vulnerable	Parallel transects Refer to 2.2.3 for targeted survey effort conducted for this species.	Targeted surveys for this species failed to detect it within the Subject Land. The Project is not expected to have a direct impact on the species and its habitat (i.e., avoided impact).
Flathead Galaxias (*Galaxius rostratus*)	Critically Endangered	None	Section 3.1.1 determined that the species is unlikely to occur as no suitable habitat occurs within the Subject Land and there are no records within the locality.
Australian Painted Snipe (*Rostratula australis*)	Endangered	Bird census points Refer to Table 2-5 for survey effort conducted for threatened bird species	Survey conducted across the Subject Land did not detect presence of this species. Species is not likely to be directly or indirectly impacted by the Project.
Australasian Bittern (*Botaurus poiciloptilus*)	Endangered	Bird census points Refer to Table 2-5 for survey effort conducted for threatened bird species	Survey conducted across the Subject Land did not detect presence of this species. Species is not likely to be directly or indirectly impacted by the Project.

Threatened Species/Community	EPBC Act	Survey Method	Survey Result
Corben's Long-eared Bat (*Nyctophilus corbeni*)	Vulnerable	Passive acoustics survey Refer to Table 2-5 for survey effort conducted for microbat species	Survey conducted across the Subject Land did not detect presence of this species. Species is not likely to be directly or indirectly impacted by the Project. For this reason, the species is not likely to experience a significant impact. Ecosystem credits associated with the species will be used to offset direct impacts on native vegetation impacted by the Project.
Growling Grass Frog (Southern Bell Frog) (*Litoria raniformis*)	Vulnerable	Tadpole survey Refer to Table 2-5 for targeted survey effort conducted for this species.	Survey conducted across the Subject Land did not detect presence of this species. Species is not likely to be directly or indirectly impacted by the Project.
Grey Falcon (*Falco hypoleucos*)	Vulnerable	Bird census points Refer to Table 2-5 for survey effort conducted for threatened and resident raptor species	Survey conducted across the Subject Land did not detect presence of this species. Species is not likely to be directly or indirectly impacted by the Project.
Malleefowl (*Leipoa ocellata*)	Vulnerable	Bird census points Refer to Table 2-5 for survey effort conducted for threatened bird species	Survey conducted across the Subject Land did not detect presence of this species. Species is not likely to be directly or indirectly impacted by the Project.
Painted Honeyeater (*Grantiella picta*)	Vulnerable	Bird census points Refer to Table 2-5 for survey effort conducted for threatened bird species	Survey conducted across the Subject Land did not detect presence of this species. Species is not likely to be directly or indirectly impacted by the Project.
Austrostipa metatoris	Vulnerable	Parallel transects Refer to 2.2.3 for targeted survey effort conducted for this species.	Survey conducted across the Subject Land did not detect presence of this species. Species is not likely to be directly or indirectly impacted by the Project.
Additional MNES			
Fork-tailed Swift (*Apus pacificus*)	Migratory	N/A	While this species is not a Candidate or Ecosystem species and was not identified in the SEARs, the species was recorded within the Subject Land. The species has been assessed for impacts from the Project as part of the draft BBAMP, attached as Appendix A

Further analysis and assessment are provided in Section 8.7.

6. IDENTIFYING PRESCRIBED IMPACTS

Prescribed impacts are identified in Clause 6.1 of the BC Regulation. Prescribed impacts are those that are additional to the clearing of native vegetation and associated habitat. These include:

- Development occurring on the habitat of threatened species or ecological communities associated with:
- Karst, caves, crevices, cliffs, rock outcrops and other geological features of significance.
- Human-made structures;
- Non-native vegetation;
- Development occurring on areas connecting threatened species habitat, such as biodiversity corridors;
- Impacts to water quality, waterbodies and hydrological processes that sustain threatened species and TECs;
- Wind turbine strikes on protected animals; and
- Vehicle strikes affecting threatened species or animals that are part of a TEC.

The BAM does not provide an approach to determine the number and class of biodiversity credits that are required for a prescribed impact. However, prescribed impacts on biodiversity may be considered by a consent authority when they determine the biodiversity credits required to be retired (or other conservation measures required to be taken) under a planning approval.

An assessment of the relevance of these prescribed impacts to the Project is provided in Table 6-1 for the Subject Land.

TABLE 6-1 ASSESSMENT OF PRESCRIBED IMPACTS WITHIN THE SUBJECT LAND

Feature	Present?	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature
Karst, caves, crevices, cliffs, rocks or other geological features of significance	No	Not present within Subject Land.	N/A
Human-made structures	Yes	Human-made structures subject to impacts as a result of the Project include fences, gates, windmills and water troughs and other agricultural infrastructure.	Raptors and other avian species are known to frequently use human-made structures for foraging, perching and nesting. While current human-made structures may be removed during construction of the Project, it is noted that additional fencing and infrastructure will be installed for and by the Project. Therefore, there is no expected limitation to the availability of these features, and no further assessment is provided.

Feature	Present?	Description of feature characteristics and location	Threatened entities that use, are likely to use, or are part of the habitat feature
Non-native vegetation	Yes	12.25 ha within the Subject Land are mapped as non-native vegetation. This area includes access tracks and water and feed points for stock that has become highly degraded in a localised area. Vegetation within these areas is dominated by exotic species.	Non-native vegetation is likely to provide supplementary foraging habitat for raptors, granivorous and insectivorous birds. The proportion of non-native vegetation in relation to the rest of the Subject Land is minimal. It is possible that areas of non-native vegetation will increase because of the Project and thus there is no expected limitation to the availability of this feature, and no further assessment is provided.
Habitat connectivity	Yes	The Subject Land is predominantly in a modified condition following a long history of clearing and grazing. Connectivity across this open landscape is considered substantially low for species dependent on woody vegetation and significant for grassland and shrubland species.	Threatened fauna species such as the Plains-wanderer (*Pedionomus torquatus*) and White-fronted Chat (*Epthianura albifrons*) utilise shrublands and grasslands. The Subject Land likely provides important connectivity between habitat patches for these species however, fencing, overgrazing and land management practices has reduced the connectivity values of these areas. Further assessment of this prescribed impact is provided in Section 8.3.
Waterbodies, water quality and hydrological processes	No	Abercrombie Creek, unnamed creek lines and farm dams are present within the Project Area however have been avoided by the Subject Land.	No impacts will occur to waterbodies, water quality and hydrological processes that support threatened entities because of the Project.
Wind turbine strikes	Yes	The Project involves the construction of wind turbines.	Threatened, migratory, nomadic and resident avian species may be impacted by wind turbine strike and/or barotrauma. Mitigation measures will be implemented to reduce these risks. Further assessment of this prescribed impact is provided in Section 8.3 and the draft BBAMP is provided as Appendix A.
Vehicle strike	Yes	Increased traffic as a result of the Project occurring on the existing and proposed access tracks presents the risk of vehicle strike to protected and threatened species.	Ground-dwelling threatened species such as the Plains-wanderer (*Pedionomus torquatus*) are at risk of vehicle strike because of Project activities. In addition, avian species may fly low across roads and tracks and be hit by moving vehicles. Mitigation measures will be implemented to reduce the risk of vehicle strike. Further assessment of this prescribed impact is provided in Section 8.3.

6.1 TURBINE RISK ASSSESSMENT

Project refinement was informed by biodiversity investigations aimed at defining of areas of high ecological value and habitat quality for avoid and minimise considerations. Risk factors associated with the current turbine layout can be categorised by natural and artificial habitat and landscape features with the potential to influence the activity of at-risk species. The risk rating for each turbine has been calculated based on the. A risk matrix has been used to assess turbine-specific risk in relation to turbine proximity to relevant habitat features such as:

- Places for perching and nesting:
  - Woodland vegetation; and
  - Transmission lines
- Places of foraging:
  - Water sources and wetlands; and
  - Sealed high-traffic roads.

6.1.1 DISTANCE FROM TRANSMISSION LINE

Wedge-tailed Eagles (*Aqula audax*), Brown Falcon (*Falco berigora*), and Nankeen Kestrel (*Falco cenchroides*) have been observed utilising the existing transmission line towers as artificial breeding habitat and for opportunistic perching. Australian Raven (*Corvus coronoides*) and Australian Magpie (*Gymnorhina tibicen*) also use these structures for breeding and disused nests may be appropriated by opportunistic raptors such as the Black Falcon (*Falco subniger*). It is expected that in an otherwise treeless landscape, artificial structures will increase the availability of nesting habitat for raptors and subsequently will have a higher rate of activity than the surrounding landscape. While foraging behaviour is expected to occur over long distances from the nest, territorial defense, fledgling flights, and courtship displays, are likely to occur more frequently along the transmission line extent.

Risk in relation to the transmission line is given as a function of distance and has been informed by known raptor nesting behaviour, particularly the Black Falcon. Fledgling Black Falcons were found to remain within two kilometres of the nest in the first eight weeks since fledging (Debus, et al., 2017). Fledgling flights observed in wedge-tailed eagles suggest similar behaviours in fledging juveniles (Silva & Croft, 2007).

6.1.2 DISTANCE FROM WOODY VEGETATION

Woodland vegetation provides important habitat for foraging and breeding that are likely to drive high utilisation rates among birds and bats. While the Project Area is largely treeless, woodland vegetation present in the western edge may facilitate foraging flights within the surrounding grassland and shrubland.

6.1.3 DISTANCE FROM WATER SOURCES

Ephemeral creek lines and farm dams are present within the Project area; these have the potential to provide habitat for wetland, nomadic and migratory species during periods of seasonal inundation. To account for changes in the risk level of turbine collision during periods of inundation, farm dams and ephemeral creek lines have been mapped as areas of important habitat for this turbine risk assessment. Collision events are expected to occur primarily during climbing and descending flights particularly when moving between roosting and foraging sites (Navarrete & Griffis-Kyle, 2016).

Risk is predicted to increase the closer a turbine is located to wetlands and water sources providing foraging habitat for species. A review of displacement distances for birds has found that many waders and waterfowl demonstrated median displacement distances of 500 m from turbines (Tolvanen, et al., 2023). This displacement distance has informed turbine risk with those turbines within 200 m of water sources predicted to have the highest risk, with risk further reducing with distance.

6.1.4 DISTANCE FROM MAJOR SEALED ROADS

Rural roads lead to a high density of roadkill that attracts and influences the behaviour of diurnal raptors (Peisley, et al., 2017; Lambertucci, et al., 2009). Major roads, particularly the Sturt Highway, are expected to be a major corridor of raptor movement within the landscape based on this availability of foraging resources. Turbines located within proximity to major roads are expected to be at a higher risk of collision with risk decreasing as distance from roads increases. To account for the high soaring flight patterns that are typical of foraging raptors, turbines within 500 m of the Sturt Highway have been considered to possess the highest risk.

6.1.5 TURBINE RISK MATRIX

Risk ratings for each turbine have been quantified using the following matrix. It has been assumed that each habitat feature identified has an equal effect on the strike risk at a given turbine.

TABLE 6-2 TURBINE RISK MATRIX

Variable	Description	Score
Distance from transmission line	Is the turbine located within the following buffer distances of the transmission line: • Over 1000 m • Within 500 m to 1000 m • Within 200 m to 500 m • Less than 200 m	• Over 1000 m: 0 • Within 500 m to 1000 m: 1 • Within 200 m to 500 m: 2 • Within 0-200 m: 3
Distance from woody vegetation	Is the turbine located within the following buffer distances of water sources: • Over 1000 m • Within 500 m to 1000 m • Within 200 m to 500 m • Less than 200 m	• Over 1000m: 0 • Within 500 m to 1000 m: 1 • Within 200 m to 500 m: 2 • Within 0-200 m: 3
Distance from water source. Inclusive of: • Major wetlands and lakes • All farm dams, swamps and inundation areas • Ephemeral creek lines	Is the turbine located within the following buffer distances of water sources: • Over 1000 m • Within 500 m to 1000 m • Within 200 m to 500 m • Less than 200 m	• Over 1000 m: 0 • Within 500 m to 1000 m: 1 • Within 200 m to 500 m: 2 • Within 0-200 m: 3
Distance from major sealed roads. Inclusive of: ▪ The Sturt Highway	Is the turbine located within the following buffer distances of major sealed roads: • Over 2000 m • Within 1000 m to 2000 m • Within 500 m to 1000 m • Less than 500 m	• Over 2000 m: 0 • Within 1000 m to 2000 m: 1 • Within 500 m to 1000 m: 2 • Within 0-500 m: 3

Variable	Description	Score
Distance to Conservation Reserves. Inclusive of: Yanga State Conservation Area (SCA)	Is the turbine within the following buffer distances of Yanga State Conservation Area: • Over 2000 m • Within 1000 m to 2000 m • Within 500 m to 1000 m • Less than 500 m	• Over 2000 m: 0 • Within 1000 m to 2000 m: 1 • Within 500 m to 1000 m: 2 • Within 0-500 m: 3
Distance to stick nests	Is the turbine located within the following buffer distances of a stick nest: • Over 2000 m • Within 1000 m to 2000 m • Within 500 m to 1000 m • Less than 500 m	• Over 2,000 m: 0 • Within 1000 m to 2000 m: 1 • Within 500 m to 1000 m: 2 • Within 0-500 m: 3

TABLE 6-3 TURBINE STRIKE RISK RATINGS

Total Score	Risk Rating
≥9	Very High
7-8	High
5-6	Moderate
≤4	Low

6.1.6 ASSUMPTIONS

The habitat value of vegetation across the Project Area is uniform (i.e., chenopod shrublands) regardless of vegetation maturity, vegetation integrity condition score or extent. Potential changes to hydrology resulting from construction activities have not been assessed in this preliminary turbine risk assessment; however, they will be addressed, where required, in as part of the approved BBAMP.

6.1.7 RESULTS

Six WTGs of the revised Project design have been identified as having a moderate risk with the remaining 108 turbines having a low risk. Of the 41 old turbines no longer included in the revised design, one has been identified with a high risk rating, 10 as moderate risk and the remaining 29 as low risk. The turbine risk results are provided in Table 6-4.

TABLE 6-4 TURBINE RISK ASSESSMENT RESULTS

Turbine ID	Distance to woody vegetation (m)	Woody score	Distance to transmission line (m)	Transmission score	Distance from water (m)	Distance to major sealed road (m)	Road score	Distance to Yanga SCA	Yanga Score	Distance to Stick Nest	Stick Nest Score	Water Score	Total Score	Risk
Revised Project Layout														
9	10,401	0	11,336	0	681	1	1661	1	12434	0	6351	0	2	Low
10	10,871	0	11,855	0	716	1	2074	0	12944	0	6101	0	1	Low
11	11,296	0	12,357	0	964	1	2602	0	13428	0	5739	0	1	Low
12	11,776	0	12,885	0	1,294	0	2887	0	13945	0	5526	0	0	Low
19	9,046	0	10,324	0	2,146	0	2291	0	11322	0	4518	0	0	Low
20	9,518	0	10,829	0	1,844	0	2680	0	11820	0	4670	0	0	Low
21	9,980	0	11,320	0	1,414	0	3059	0	12305	0	4699	0	0	Low
22	10,445	0	11,811	0	985	1	3436	0	12790	0	4424	0	1	Low
23	10,912	0	12,136	0	652	1	3814	0	13276	0	4189	0	1	Low
24	11,382	0	12,069	0	522	1	4192	0	13763	0	4002	0	1	Low
25	11,826	0	12,003	0	401	2	4550	0	14221	0	3873	0	2	Low
26	2,374	0	3,405	0	1,482	0	426	3	4308	0	681	2	5	Moderate
27	2,756	0	3,905	0	1,046	0	426	3	4811	0	1150	1	4	Low
28	3,171	0	4,404	0	705	1	424	3	5312	0	1637	1	5	Moderate

Turbine ID	Distance to woody vegetation (m)	Woody score	Distance to transmission line (m)	Transmission score	Distance from water (m)	Distance to major sealed road (m)	Road score	Distance to Yanga SCA	Yanga Score	Distance to Stick Nest	Stick Nest Score	Water Score	Total Score	Risk
29	3,510	0	4,917	0	807	1	625	2	5791	0	1656	1	4	Low
30	3,981	0	5,430	0	748	1	636	2	6306	0	1979	1	4	Low
31	4,502	0	5,946	0	406	2	597	2	6836	0	2433	0	4	Low
32	4,978	0	6,472	0	345	2	807	2	7356	0	2840	0	4	Low
33	5,416	0	6,989	0	463	2	1186	1	7854	0	3219	0	3	Low
34	5,906	0	7,489	0	945	1	1479	1	8358	0	3138	0	2	Low
36	6,951	0	8,594	0	1,153	0	2281	0	9453	0	2695	0	0	Low
38	7,960	0	9,645	0	1,876	0	3043	0	10496	0	2661	0	0	Low
39	8,559	0	10,250	0	1,264	0	3452	0	11103	0	2884	0	0	Low
40	9,049	0	10,634	0	770	1	3812	0	11599	0	3135	0	1	Low
41	9,469	0	10,415	0	308	2	4264	0	12044	0	3275	0	2	Low
42	9,529	0	10,106	0	82	3	4747	0	12438	0	2897	0	3	Low
43	10,064	0	10,387	0	464	2	5066	0	13213	0	2614	0	2	Low
44	9,940	0	10,073	0	942	1	5580	0	13649	0	2138	0	1	Low
45	10,362	0	10,230	0	1,363	0	5890	0	14278	0	2106	0	0	Low
46	10,574	0	10,188	0	1,466	0	6266	0	14796	0	2059	0	0	Low

Turbine ID	Distance to woody vegetation (m)	Woody score	Distance to transmission line (m)	Transmission score	Distance from water (m)	Distance to major sealed road (m)	Road score	Distance to Yanga SCA	Yanga Score	Distance to Stick Nest	Stick Nest Score	Water Score	Total Score	Risk
47	10,854	0	10,193	0	1,381	0	6618	0	15341	0	2192	0	0	Low
48	11,302	0	10,440	0	1,342	0	6523	0	15778	0	2602	0	0	Low
49	11,755	0	10,687	0	1,160	0	6427	0	16217	0	3044	0	0	Low
50	12,182	0	10,916	0	747	1	6340	0	16631	0	3473	0	1	Low
51	780	1	3,195	0	1991	0	1991	1	3386	0	570	2	4	Low
52	1,270	0	3,715	0	2,514	0	2203	0	3884	0	895	2	2	Low
53	1,882	0	4,114	0	2,479	0	2001	0	4494	0	277	3	3	Low
54	2,511	0	4,692	0	2,298	0	2048	0	5126	0	238	3	3	Low
55	3,099	0	5,256	0	2,026	0	2124	0	5715	0	831	2	2	Low
57	4,173	0	6,370	0	1,614	0	2505	0	6775	0	1940	1	1	Low
58	4,748	0	6,869	0	1,372	0	2480	0	7360	0	2492	0	0	Low
59	5,238	0	7,376	0	1,593	0	2769	0	7841	0	2167	0	0	Low
62	6,551	0	8,083	0	2,511	0	3603	0	9132	0	971	2	2	Low
63	7,047	0	8,410	0	2,560	0	3784	0	9642	0	903	2	2	Low
64	7,689	0	8,644	0	2,392	0	4207	0	10285	0	1035	1	1	Low
65	8,045	0	8,808	0	2,054	0	4556	0	10785	0	1344	1	1	Low

Turbine ID	Distance to woody vegetation (m)	Woody score	Distance to transmission line (m)	Transmission score	Distance from water (m)	Distance to major sealed road (m)	Road score	Distance to Yanga SCA	Yanga Score	Distance to Stick Nest	Stick Nest Score	Water Score	Total Score	Risk
66	8,073	0	8,920	0	1,713	0	4923	0	11312	0	1768	1	1	Low
67	8,074	0	8,794	0	1,539	0	5326	0	11823	0	2203	0	0	Low
68	8,157	0	8,704	0	1,405	0	5720	0	12363	0	2343	0	0	Low
69	8,324	0	8,664	0	1,420	0	6095	0	12913	0	1804	1	1	Low
70	8,515	0	8,637	0	1,316	0	6448	0	13420	0	1317	1	1	Low
71	8,702	0	8,565	0	828	1	6851	0	13947	0	815	2	3	Low
72	8,987	0	8,582	0	515	1	7192	0	14474	0	470	3	4	Low
73	9,290	0	8,570	0	434	2	7578	0	15040	0	584	2	4	Low
74	9,489	0	8,484	0	265	2	7951	0	15501	0	920	2	4	Low
75	10,029	0	8,764	0	531	1	8093	0	16008	0	1507	1	2	Low
78	1,499	0	1,130	0	1,894	0	3113	0	1245	1	2151	0	1	Low
79	1,265	0	1,664	0	1,989	0	3388	0	1779	1	1780	1	2	Low
80	1,230	0	2,188	0	1,974	0	3672	0	2302	0	1519	1	1	Low
81	1,481	0	2,913	0	2,015	0	3817	0	3027	0	1380	1	1	Low
82	1,825	0	3,438	0	2,199	0	3846	0	3552	0	889	2	2	Low
83	2,280	0	3,995	0	2,482	0	3900	0	4108	0	418	3	3	Low

Turbine ID	Distance to woody vegetation (m)	Woody score	Distance to transmission line (m)	Transmission score	Distance from water (m)	Distance to major sealed road (m)	Road score	Distance to Yanga SCA	Yanga Score	Distance to Stick Nest	Stick Nest Score	Water Score	Total Score	Risk
84	2,695	0	4,488	0	2,797	0	3948	0	4602	0	389	3	3	Low
85	2,993	0	5,082	0	3,303	0	3646	0	5198	0	1039	1	1	Low
86	3,470	0	5,636	0	3,105	0	3624	0	5751	0	1534	1	1	Low
87	3,981	0	5,894	0	2,936	0	3916	0	6177	0	1858	1	1	Low
88	4,511	0	5,668	0	2,374	0	4335	0	6556	0	2209	0	0	Low
89	4,898	0	6,136	0	2,170	0	4112	0	7118	0	2486	0	0	Low
90	5,701	0	6,501	0	1,751	0	4267	0	7986	0	1796	1	1	Low
91	6,195	0	6,734	0	1,644	0	4413	0	8515	0	1285	1	1	Low
92	6,483	0	6,643	0	1,285	0	4885	0	8996	0	1043	1	1	Low
94	6,390	0	6,857	0	915	1	5193	0	9614	0	796	2	3	Low
95	6,333	0	7,013	0	779	1	5491	0	10115	0	929	2	3	Low
96	6,404	0	7,243	0	735	1	5733	0	10610	0	1199	1	2	Low
97	6,360	0	7,178	0	495	2	6276	0	11300	0	1850	1	3	Low
98	6,452	0	7,123	0	829	1	6610	0	11791	0	2298	0	1	Low
107	2,199	0	1,133	0	1,223	0	4681	0	1239	1	2992	0	1	Low
108	2,426	0	1,636	0	748	1	4895	0	1741	1	2532	0	2	Low

Turbine ID	Distance to woody vegetation (m)	Woody score	Distance to transmission line (m)	Transmission score	Distance from water (m)	Distance to major sealed road (m)	Road score	Distance to Yanga SCA	Yanga Score	Distance to Stick Nest	Stick Nest Score	Water Score	Total Score	Risk
117	5,409	0	4,415	0	1,081	0	5747	0	6641	0	1604	1	1	Low
118	5,508	0	4,550	0	700	1	5936	0	7290	0	954	2	3	Low
119	5,316	0	4,791	0	396	2	5985	0	7814	0	576	2	4	Low
124	4,420	0	5,261	0	540	1	7179	0	10110	0	1981	1	2	Low
125	4,389	0	5,328	0	249	2	7492	0	10636	0	2510	0	2	Low
126	4,360	0	5,147	0	340	2	7895	0	11179	0	3063	0	2	Low
127	4,631	0	5,174	0	222	2	8184	0	11808	0	3617	0	2	Low
130	1,114	0	1,158	0	1200	0	6149	0	1257	1	2580	0	1	Low
131	1,548	0	1,654	0	1178	0	6359	0	1753	1	2087	0	1	Low
137	4,819	0	1,876	0	822	1	7827	0	5089	0	948	2	3	Low
139	5,163	0	2,193	0	655	1	7725	0	5634	0	393	3	4	Low
140	4,782	0	2,478	0	134	3	7658	0	6177	0	155	3	6	Moderate
141	4,272	0	2,717	0	532	1	7709	0	6847	0	824	2	3	Low
142	3,907	0	2,864	0	887	1	7801	0	7334	0	1314	1	2	Low
143	3,581	0	3,023	0	1112	0	7904	0	7823	0	1492	1	1	Low
144	3,300	0	3,192	0	914	1	8025	0	8320	0	1510	1	2	Low

Turbine ID	Distance to woody vegetation (m)	Woody score	Distance to transmission line (m)	Transmission score	Distance from water (m)	Distance to major sealed road (m)	Road score	Distance to Yanga SCA	Yanga Score	Distance to Stick Nest	Stick Nest Score	Water Score	Total Score	Risk
145	3,119	0	3,398	0	639	1	8126	0	8809	0	1640	1	2	Low
146	2,946	0	3,549	0	640	1	8311	0	9303	0	1942	1	2	Low
147	3,019	0	3,857	0	331	2	8351	0	9790	0	2191	0	2	Low
148	2,874	0	3,869	0	675	1	8679	0	10267	0	2669	0	1	Low
149	2,940	0	3,800	0	568	1	8927	0	10782	0	3122	0	1	Low
150	2,865	0	3,527	0	174	3	9339	0	11207	0	3618	0	3	Low
151	2,930	0	3,231	0	404	2	9848	0	11788	0	4258	0	2	Low
162	3,042	0	1,036	0	1028	0	9618	0	6983	0	2055	0	0	Low
163	2,577	0	1,416	0	968	1	9517	0	7583	0	2369	0	1	Low
164	2,086	0	1,595	0	745	1	9641	0	8144	0	2806	0	1	Low
165	1,682	0	1,762	0	505	1	9773	0	8653	0	3234	0	1	Low
166	1,298	0	1,963	0	586	1	9958	0	9260	0	3458	0	1	Low
167	1,201	0	2,230	0	247	2	10099	0	9863	0	3680	0	2	Low
168	1,175	0	2,098	0	153	3	10365	0	10349	0	4032	0	3	Low
170	1,452	0	2,011	0	108	3	10646	0	10985	0	4463	0	3	Low
177	2,047	0	2,907	0	1791	0	426	3	3808	0	342	3	6	Moderate

Turbine ID	Distance to woody vegetation (m)	Woody score	Distance to transmission line (m)	Transmission score	Distance from water (m)	Distance to major sealed road (m)	Road score	Distance to Yanga SCA	Yanga Score	Distance to Stick Nest	Stick Nest Score	Water Score	Total Score	Risk
178	213	2	2,610	0	1,328	0	2020	0	2699	0	501	2	4	Low
181	3,970	0	427	2	594	1	9798	0	5934	0	995	2	5	Moderate
182	3,310	0	509	1	779	1	9994	0	6566	0	1635	1	3	Low
183	229	2	2,008	0	776	1	2043	0	2125	0	956	2	5	Moderate
Turbines removed from old layout														
1	11,301	0	11,296	0	326	2	448	3	13058	0	7884	0	5	Moderate
3	11,679	0	11,680	0	651	1	858	2	13633	0	7514	0	3	Low
4	12,331	0	12,408	0	856	1	1351	1	14399	0	7148	0	2	Low
5	12,795	0	12,622	0	1330	0	1677	1	14794	0	6926	0	1	Low
6	9,039	0	9,795	0	584	1	424	3	10925	0	6111	0	4	Low
7	9,664	0	10,449	0	767	1	771	2	11577	0	6353	0	3	Low
8	9,938	0	10,820	0	983	1	1249	1	11928	0	6229	0	2	Low
13	12,234	0	13,368	0	1643	0	2985	0	14463	0	5540	0	0	Low
14	6,612	0	7,698	0	259	2	423	3	8909	0	4592	0	5	Moderate
15	7,254	0	8,360	0	380	2	779	2	9392	0	4467	0	4	Low
16	7,693	0	8,850	0	853	1	1152	1	9872	0	4396	0	2	Low

Turbine ID	Distance to woody vegetation (m)	Woody score	Distance to transmission line (m)	Transmission score	Distance from water (m)	Distance to major sealed road (m)	Road score	Distance to Yanga SCA	Yanga Score	Distance to Stick Nest	Stick Nest Score	Water Score	Total Score	Risk
17	8,138	0	9,341	0	1337	0	1531	1	10354	0	4381	0	1	Low
18	8,589	0	9,832	0	1794	0	1911	1	10837	0	4422	0	1	Low
76	2,323	0	125	3	1515	0	2909	0	240	3	3060	0	6	Moderate
77	1,847	0	616	1	1779	0	2901	0	732	2	2567	0	3	Low
105	1,959	0	136	3	2023	0	4462	0	231	3	3908	0	6	Moderate
106	1,986	0	633	1	1689	0	4588	0	738	2	3425	0	3	Low
109	2,786	0	2,149	0	427	2	5073	0	2254	0	2138	0	2	Low
110	3,026	0	2,637	0	355	2	5450	0	2741	0	1661	1	3	Low
111	3,240	0	3,126	0	704	1	5638	0	3230	0	1293	1	2	Low
112	3,554	0	3,437	0	1118	0	5685	0	3936	0	1100	1	1	Low
113	4,026	0	3,315	0	1010	0	5955	0	4412	0	1007	1	1	Low
114	4,229	0	3,749	0	1216	0	5752	0	5032	0	1578	1	1	Low
116	5,134	0	4,024	0	985	1	5941	0	6127	0	1735	1	2	Low
128	522	1	165	3	601	1	5936	0	249	3	2888	0	8	High
129	624	1	632	1	714	1	6125	0	731	2	2627	0	5	Moderate
153	1,526	0	390	2	1221	0	8182	0	682	2	757	2	6	Moderate

Turbine ID	Distance to woody vegetation (m)	Woody score	Distance to transmission line (m)	Transmission score	Distance from water (m)	Distance to major sealed road (m)	Road score	Distance to Yanga SCA	Yanga Score	Distance to Stick Nest	Stick Nest Score	Water Score	Total Score	Risk
154	1,427	0	699	1	1028	0	8048	0	1140	1	702	2	4	Low
179	1,709	0	754	1	651	1	7989	0	1619	1	878	2	5	Moderate
155	2,052	0	814	1	259	2	7950	0	2101	0	1254	1	4	Low
157	3,861	0	875	1	851	1	8447	0	4021	0	1111	1	3	Low
171	796	1	410	2	352	2	11455	0	9010	0	4297	0	5	Moderate
172	504	1	400	2	658	1	11807	0	9572	0	4905	0	4	Low
173	506	1	319	2	921	1	11973	0	10202	0	5505	0	4	Low
174	786	1	494	2	950	1	12096	0	10758	0	5699	0	4	Low
175	1,331	0	402	2	1279	0	12264	0	11324	0	5962	0	2	Low
176	2,856	0	924	1	305	2	7961	0	3063	0	1559	1	4	Low
156	2,440	0	866	1	116	3	7945	0	2586	0	1565	1	5	Moderate
180	3,366	0	877	1	546	1	8240	0	3562	0	1477	1	3	Low
158	4,344	0	821	1	1301	0	8699	0	4454	0	842	2	3	Low
184	829	1	1,381	0	291	2	1755	1	1498	1	1559	1	6	Moderate

6.2 BIRD AND BAT RISK ASSESSMENT

For the purposes of this Amended BDAR, impacts to avian species during the operation of the Project are limited to direct mortality through collision with WTGs and the indirect impacts of barotrauma. Other impacts on avian species are assessed in this report.

Although suitable habitat for avian species is present throughout the Subject Land, not all avian species move at heights considered to be at risk of collision with WTGs. The operation of the WTGs will pose a negligible risk to avian species which do not fly within the RSA (72.5 m to 255.5 m above surface). A literature review was undertaken to identify the following aspects of avian species' behaviour and ecology:

- Are flight heights known for avian species?
- Is the avian species known to be behaviorally restricted by the height of available vegetation?
- Is it known whether the species disperses over long distances, uses relatively rigid territory boundaries or is behaviorally sedentary?

The results of the literature review and knowledge of whether the species is listed as threatened, migratory or is a raptor was used to delineate the level of risk that turbines pose to avian species which are known to or likely to utilise the Subject Land. Risk has been determined as a function of the consequence of turbine strike and / or barotrauma caused by turbines on a species and the likelihood that turbine strike and / or barotrauma will occur.

The consequence ratings of turbine strike and / or barotrauma on avian species are summarised in Table 6-5, the likelihood ratings in Table 6-6 and a risk matrix combining the consequences and likelihood of turbine strike are presented in Table 6-7.

TABLE 6-5 CONSEQUENCES CRITERIA FOR TURBINE STRIKE AND/OR BAROTRAUMA

Minor	Moderate	Major	Severe
Protected (non-threatened) species AND Occasional loss of individuals not reducing local or regional population viability	Species listed as vulnerable under BC Act or EPBC Act OR Species listed as migratory under EPBC Act OR Moderate loss of numbers of individuals leading to minor reduction in viability of localised population of species for up to five years.	Species listed as endangered under BC Act or EPBC Act OR Major loss in numbers of individuals, leading to a reduction in the viability of regional or state population between five and ten years.	Species listed as critically endangered under BC Act or EPBC Act OR Extreme loss in numbers of individuals, leading to a reduction in regional or state population viability for a period of at least ten years.

TABLE 6-6 LIKELIHOOD CRITERIA FOR TURBINE STRIKE AND/OR BAROTRAUMA

Likelihood	Description
Very Likely	*Very High* likelihood of turbine strike based on a combination of the following: • Species known to occur within the Assessment Area[19] • Preferred breeding and/or foraging habitat known to occur within Assessment Area; • Species exhibits flight characteristics most susceptible to collision (i.e., flying heights frequently within the RSA such as soaring, circling at height etc.) • The Project is located within known avian migratory or habitual flight pathways • Landscape feature(s) likely to increase avian activity are present within the Subject Land (including woody canopy, waterbodies, riparian corridors, updraft locations, caves etc.)
Likely	*High* likelihood of turbine strike based on a combination of the following: • Species has been observed within 10 km of the Assessment Area, but not within Assessment Area, and is within typical foraging and breeding distribution • Preferred breeding and/or foraging habitat known to occur within Assessment Area • Species exhibits flight characteristics susceptible to collision (i.e., known to fly within and above the supra-canopy[20] flight height including the RSA) • Landscape feature(s) likely to increase avian activity are present within the Subject Land (including woody canopy, waterbodies, riparian corridors, updraft locations, caves etc.)
Moderately Likely	*Moderate* likelihood of turbine strike based on a combination of following: • Species observed within 10 km of the Assessment Area and is within typical foraging and breeding distribution • Low amounts of preferred breeding or foraging habitat present within the Subject Land and likely to be impacted by the Project • Species exhibits flight characteristics less susceptible to collision (i.e., predominantly at or below supra-canopy flight height but sometimes in the RSA); and • Landscape feature(s) likely to increase avian activity are present within the Subject Land (including woody canopy, waterbodies, riparian corridors, updraft locations, caves etc.), but only in small areas
Less Likely	*Low* likelihood of turbine strike based on a combination of the following: • Few species observations within 10 km of the Assessment Area, with local occurrence likely associated with nomadic movement due to unfavourable environmental conditions in typical foraging and breeding distribution (e.g., effects of drought) • Preferred breeding habitat is not present within the Subject Land • Species rarely exhibits flight characteristics that is susceptible to collision (i.e., predominantly below supra-canopy heights) • Landscape feature(s) likely to increase avian activity are not present within the Subject Land (including woody canopy, waterbodies, riparian corridors, updraft locations, caves etc.)
Unlikely	*Almost zero* likelihood of turbine strike based on a combination of the following: • Species not detected and is considered unlikely to occur based on an analysis of records within 10 km of the Assessment Area • No suitable breeding or foraging habitat is present within the Project Area • Species almost never flies at heights within the RSA • Landscape feature(s) likely to increase avian activity are not present within the Subject Land (including woody canopy, waterbodies, riparian corridors, updraft locations, caves etc.)

[19] Observation records suitably inform the risk assessment (e.g., observations less than 5 years regarded as recent; observations > 5 years but no greater than 20 years are informative but not recent (adapted from OEH 2018)
[20] Supra-canopy height: taken to be 30 m above tree canopy height

TABLE 6-7 RISK MATRIX FOR TURBINE STRIKE AND/OR BAROTRAUMA

	Consequence scale			
Likelihood scale	Minor	Moderate	Major	Severe
Unlikely	Low	Low	Moderate	Moderate
Less Likely	Low	Low	Moderate	High
Moderately Likely	Low	Moderate	High	Very High
Likely	Moderate	High	High	Very High
Very Likely	Moderate	High	Very High	Very High

6.2.1 ASSUMPTIONS

The species assessed for risk of collision with turbines and / or barotrauma are based on a combination of the following:

- All ecosystem species predicted to occur by the BAM-C and listed candidate species;
- EPBC Act listed threatened and migratory species which are subject to risk of turbine collision and / or barotrauma and are known or likely to occur within the Subject Land; and
- Raptors and other species known or likely to fly within the RSA within the Subject Land.

Note that NSW BioNet (NSW DCCEEW, 2024b) and ALA avian records within 10 km of the Subject Land were analysed for this risk assessment. Threatened or migratory avian species recorded as occurring within 10 km of the Subject Land and likely to use the Subject Land based on habitat requirements, but not recorded during survey efforts, were included in the risk assessment.

6.2.2 COLLISION AND/OR BAROTRAUMA RISK ASSESSMENT

The risk assessment of resident threatened, resident raptor, migratory and nomadic avian species is provided in Table 6-8 and summarised below:

- No species at very high risk of collision.
- 17 species with **high** risk including:
  - Black Falcon (*Falco subniger*);
  - Little Eagle (*Hieraaetus morphnoides*);
  - Curlew Sandpiper (*Calidris ferruginea*);
  - Grey Falcon (*Falco hypoleucos*);
  - Pink Cockatoo (*Lophochroa leadbeateri*);
  - Regent Parrot (eastern subspecies) (*Polytelis anthopeplus monarchoides*);
  - Sharp-tailed Sandpiper (*Calidris acuminata*);
  - Spotted Harrier (*Circus assimilis*);
  - White-throated Needletail (*Hirundapus caudacutus*);
  - Australian Pelican (*Pelicanus conspicillatus*);
  - Black Kite (*Milvus migrans*);
  - Brown Falcon (*Falco berigora*);
  - Nankeen Kestrel (*Falco cenchroides*);

  - Australian Magpie (*Gymnorhina tibicen*);
  - Straw-necked Ibis (*Threskiornis spinicollis*);
  - Wedge-tailed Eagle (*Aquila audax*); and
  - Fork-tailed Swift (*Apus pacificus*).
- 107 species with **moderate** risk.
- 27 species with **low** risk.

The PMST also identified the Malleefowl (*Leipoa ocellata*); however, the species is considered unlikely to occur with the nearest records located approximately 110 km west of the Project Area and an absence of suitable habitat. Further, this species is not likely to fly within the RSA as it is a ground bird. As such the species has been excluded from further assessment.

TABLE 6-8 BIRD AND BAT RISK ASSESSMENT

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Threatened Birds						
Australasian Bittern *Botaurus poiciloptilus*	E	E	Less Likely	Major	Moderate	The Australasian bittern is a large wetland bird typically found in freshwater wetlands throughout south-eastern Australia (Cwth TSSC, 2019). Wetlands dominated by sedges, rushes, or reeds are considered critical habitat for the species however Australian rice fields also provide extensive areas of habitat (Herring, et al., 2019). Previously thought to be largely sedentary, recent tracking studies have shown extensive movements between wetlands in southern Australia (Bitterns in Rice Project, 2016). No detections have been made of the species following seasonal surveys conducted to date. The Project is within the species' known distribution. No records of the species are known within the Subject Land, with the nearest records located 14 km north in the town of Hay (2006), and 25 km south along the Cobb Highway (2023). The Project contains numerous ephemeral waterways and wetlands dominated by canegrass (*Eragrostis australasica*) and agricultural dams that may provide suitable habitat for the species. The species' presence within the Subject Land is likely to be sporadic and driven by seasonal inundation. While flight heights for the species are poorly understood it is likely that individuals may fly within or above the RSA when undergoing long distance movements. Collisions are considered moderately likely based on the presence of suitable habitat and potential flight heights within the RSA. The species is listed as endangered under both EPBC and BC Acts and mortalities have the potential to cause a major reduction in regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Australian Bustard *Ardeotis australis*	-	E	Less Likely	Major	Moderate	The Australian bustard is a large, heavy, ground-dwelling bird typically found on dry plains, grasslands and open woodlands. The Australian bustard is known to rarely fly, instead dispersing on foot when disturbed (Abbot, 2008). Juveniles are completely flightless and rely on camouflage. While the Australian bustard is known to fly, spatial movement is considered to be largely intra-regional with inter-continental movement considered uncommon (Ziembicki & Woinarski, 2007). While suitable habitat is present within the Subject Land, no detections have been made during targeted fauna transects nor opportunistic observations. Recent records of the species are sparse throughout the region and none are present within the Subject Land. Recent records exist approximately 22 km east of the Subject Land in the Oolambeyan National Park and along the Sturt Highway, approximately 35 km north-east and north-west of the Subject Land. While a mortality is likely to lead to a major reduction in the regional population, it is considered less likely to occur.
Australian Painted Snipe *Rostratula australis*	E	E	Less Likely	Major	Moderate	The Australian painted snipe is an endemic shorebird found throughout Australia and typically inhabits shallow, brackish or freshwater terrestrial wetlands supporting a mosaic of low, patchy vegetation including lignum and canegrass (Garnett & Baker, 2021). Ephemeral wetlands and waterways within the Subject Land may provide suitable foraging habitat for the species, however, this will be driven by the presence of episodic inundation. No observations of the species have been made following seasonal surveys from 2021 to the present day. No recent records (20 years) are present within the Subject Land; however, three records (2011-2015) are present within Hay, north of the Subject Land. A scarcity of records in southern Australia since 2015 suggest that breeding has rarely occurred there in recent years (Garnett & Baker, 2021). Due to a small national population size, mortalities are considered to result in a major reduction in regional populations. As species' presence is driven by the presence of suitable environmental conditions and the species is increasingly rarer in southern Australia, it is considered less likely that a collision even will occur.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Black Falcon *Falco subniger*	-	V	Very Likely	Moderate	High	The black falcon is the largest of Australian falcons and occurs in low densities throughout inland, arid and semi-arid areas (Morcombe, M., 2000). The black falcon is typically found along tree-lined water courses or isolated woodlands, with nesting often occurring in the abandoned stick nests of other species. Foraging often occurs at height with prey largely consisting of birds, reptiles, small mammals and occasionally carrion. The species is known to occur within the Subject Land and has been observed flying at heights considered within the RSA over grasslands and open shrublands. While less abundant than the brown falcon, the species is considered very likely to collide with WTGs. As a listed vulnerable species under the BC Act, a mortality has the potential to lead to a moderate reduction in regional populations.
Black-chinned Honeyeater *Melithreptus gularis*	-	V	Less Likely	Moderate	Low	The Black-chinned Honeyeater primarily inhabits the upper canopy of drier open forests and woodlands, particularly those dominated by box and ironbark eucalypts (NSW DCCEEW, 2022). Commonly associated tree species include Mugga Ironbark (*Eucalyptus sideroxylon*), White Box (*E. albens*), Inland Grey Box (*E. microcarpa*), Yellow Box (*E. melliodora*), Blakely's Red Gum (*E. blakelyi*), and Forest Red Gum (*E. tereticornis*). According to Bionet records, there are two known occurrences of the species within 50 km of the Project Area. However, suitable habitat is not present within the Project Area, and the species was not recorded during seasonal surveys. As such, the likelihood of a collision event is considered less likely. As a listed vulnerable species under the BC Act, any mortality is likely to lead to a moderate reduction in regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Blue-billed Duck *Oxyura australis*	-	V	Less Likely	Moderate	Low	The blue-billed duck is a small duck species endemic to temperate regions of Australia (Marchant & Higgins, 1990). An almost entirely aquatic species, suitable habitat constitutes open lakes or dams with deep freshwater swamps preferred during the breeding season (Marchant & Higgins, 1990). As natural wetlands and swamps are almost exclusively ephemeral in the Project area, suitable habitat is likely to be restricted to large agricultural dams with emergent aquatic vegetation. While some dams are present these are not likely to be considered important habitat and may only provide temporary refugia during long distance movements. Due to the absence of important habitat, a collision event is considered less likely to occur. As a listed vulnerable species under the BC Act, a mortality is likely to lead to a moderate reduction in regional populations.
Blue-winged Parrot *Neophema chrysostoma*	V	V	Moderately Likely	Moderate	Moderate	The blue-winged parrot is a slender parrot inhabiting a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands, often near wetlands (Cwth DCCEEW, 2023f). Recent records of the species are sparse throughout the region, and none are present within the Subject Land. Recent records exist approximately 10 km south, along the Sturt Highway. Potentially suitable woodland habitat is present within the broader Project area and may support the species during seasonal movements. As a listed vulnerable species under the EPBC and BC Act, a mortality is likely to lead to a moderate impact to regional populations. While no detections have been made within the Project area, it is considered moderately likely that a collision event will occur due to the presence of low amounts of suitable habitat in the Project area.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Brolga *Grus rubicunda*	-	V	Less Likely	Moderate	Low	The brolga is a large wetland bird found throughout eastern Australia. In southern Australia, brolgas breed in shallow, seasonally inundated freshwater wetlands dominated by a diversity of herbs and sedges (Veltheim, et al., 2022). During non-breeding or 'flocking' season, brolgas tend to roost communally on deep freshwater marshes and permanent fresh or saline wetlands (Department of Sustainability and Environment, 2012). Ephemeral wetlands and waterways present within the Project area and may provide suitable breeding habitat during periods of heavy inundation. However, due to the absence of large, deep and permanent wetlands within the Subject Land, it is unlikely that suitable non-breeding habitat is present. Brolgas have not been detected following seasonal surveys conducted since 2021, including following periods of heavy rainfall, and recent records are sparse within the surrounding landscape. The closest records are approximately 13 km north in the town of Hay and are adjacent to the Murrumbidgee River. The brolga is listed as vulnerable under the BC Act and while is likely to be locally rare, mortalities may lead to moderate reductions in regional populations. Considering the lack of consistently suitable habitat, it is considered unlikely that individuals will interact with the Project and so a collision is less likely to occur.
Brown Treecreeper (south-eastern) *Climacteris picumnus victoriae*	V	V	Less Likely	Moderate	Low	The brown treecreeper is the largest treecreeper endemic to eastern Australia, inhabiting woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species. Brown treecreepers primarily forage both on the ground and in mature live and dead trees (Cwth DCCEEW, 2023c). The species was detected in Winter 2022; however, records are now no longer within the Project area. Other recent records of the species are sparse throughout the region, and none are present within the Subject Land. Recent records exist approximately 9 km towards the Southwest Woodland Nature Reserve. The species is generally considered to be restricted to suitable vegetation for both foraging and movement. As suitable woodland is at least 200 m from WTGs, the species is considered less likely to collide with WTGs. As a listed vulnerable species under the EPBC Act and BC Act, a mortality has the potential to result in a moderate reduction in regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Bush Stone-curlew *Burhinus grallarius*	-	E	Less Likely	Major	Moderate	Bush stone-curlew are nocturnal, ground-dwelling birds preferring open forests and grassy woodlands (Murialdo, et al., 2015). Although capable of flight, the species rarely does so unless threatened and rarely, if ever, at heights considered to be at risk of collision. Potential habitat is restricted to remnant black box (*Eucalyptus largiflorens*) woodland patchily distributed in the Project area, with proposed infrastructure located at least 200 m away. Targeted surveys, including call playback, spotlighting and diurnal flushing transects, have returned no positive detections. No recent records are present within the Subject Land, with the closest records located adjacent to the Mid Western highway approximately 16 km north. Due to an absence of records and detections during targeted surveys, it is considered less likely that a collision event will occur. As a listed endangered species under the BC Act, a collision is likely to result in a major reduction in regional populations.
Common greenshank *Tringa nebularia*	E, Ma, Mi	E	Less Likely	Major	Moderate	The common greenshank is a large shorebird, widespread in coastal regions, occurring in all types of wetlands and has the widest distribution of any shorebird in Australia. In NSW the species is widespread west of the Great Dividing Range, especially between the Lachlan and Murray Rivers and the Darling-Baaka River drainage basin. The common greenshank forages at the edge of wetlands, in soft mud on mudflats, in channels, or within shallows around the edge of waterbodies. While suitable habitat is known to occur within the Project area, suitability is reliant on the presence of seasonal and episodic inundation. Some agricultural dams may also support the species; however, many do not have the preferred fringing and emergent vegetation. No observations of the species have been made during field investigations to date, and no recent records are known to occur within 10 km of the Project area, with the closest occurring approximately 21 km south of the Project area. While no detections have been made, the species is considered moderately likely to collide with WTGs due to the proximity of suitable non-breeding habitat. As a listed migratory and endangered species under the EPBC Act and endangered under the BC Act, a mortality has the potential to result in a major reduction in population numbers.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Curlew Sandpiper *Calidris ferruginea*	CE, Ma, Mi	CE	Less likely	Severe	High	The curlew sandpiper is a migratory shorebird most commonly found in the far southeast and northwest of Australia. They are observed in many coastal sites and may also be seen inland in suitable wetland habitats. In NSW the curlew sandpiper is widespread east of the Great Divide and is sometimes found in freshwater wetlands in the Murray-Darling Basin (Cwth DCCEEW, 2023b). No observations of the species have been made during field investigations to date, and no recent records are known to occur within 10 km of the Subject Land. While no detections have been made, the species is considered moderately likely to combine with WTG due to the proximity of suitable non-breeding habitat. As a listed migratory and critically endangered species under the EPBC Act and critically endangered under the BC Act, a mortality has the potential to result in a severe reduction in population.
Diamond Firetail *Stagonopleura guttata*	V	V	Less likely	Moderate	Low	The diamond firetail is found on the south-east mainland of Australia from south-east Queensland to Eyre Peninsula, South Australia and about 300 km inland from the sea. Diamond firetails inhabit eucalypt, acacia or casuarina woodlands, open forests and other lightly timbered habitats, including farmland and grassland with scattered trees. They prefer areas with relatively low tree density, few large logs, and little litter cover but high grass cover (Cwth DCCEEW, 2023g). Foraging occurs at ground level for seeds, vegetative matter and invertebrates, however flight heights within the RSA may occur during broader landscape movements. Nesting occurs within shrubby understorey with preferential selection for beneath raptor nests or within mistletoe (Cooney & Watson, 2005). Scattered records are present within 10 km of the Subject Land, found mainly to the south-east. With scattered records and suitable habitat with the Project area, a collision is considered moderately likely to occur. As a listed vulnerable species under the EPBC Act and BC Act, a collision has the potential to moderately impact on regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Dusky Woodswallow *Artamus cyanopterus cyanopterus*	-	V	Moderately Likely	Moderate	Moderate	The dusky woodswallow is a medium sized bird found throughout southern and eastern Australia. In NSW the species primarily inhabits open eucalypt woodland forests and woodlands, as well as disturbed agricultural lands. The dusky woodswallow primarily forages for insects which it does within or above the canopy and is known to reach heights consistent with the RSA. Remnant woodlands are patchily distributed throughout the Project area which are likely to provide suitable habitat. A single observation made in 2022 during survey efforts is present within to the south of the Subject Land. Scattered records are also present within 10 km of the Subject Land. With scattered records and potentially suitable habitat within the Project area, a collision is moderately likely to occur. As a listed vulnerable species under the BC Act, a collision has the potential to moderately impact regional populations.
Flame Robin *Petroica phoenicea*	-	V	Less Likely	Moderate	Low	The Flame Robin, endemic to southeastern Australia, breeds in upland moist eucalypt forests with grassy ground layers and variable shrub cover (NSW DCCEEW, 2017). In winter, it moves to drier forests, open woodlands, pastures, and grasslands. It forages from low perches, pouncing on invertebrates on the ground or woody debris, making it less likely to fly at heights relevant to the RSA. According to Bionet records, there are two known occurrences of the species within 50 km of the Project Area. While some suitable habitat may be present within the Project Area, the species was not recorded during seasonal surveys. As a listed vulnerable species under the BC Act, any mortality is likely to lead to a moderate reduction in regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Freckled Duck *Stagonopleura guttata*	-	V	Less Likely	Moderate	Low	The freckled duck is found primarily in southern Australia and typically breeds in large temporary swamps created by seasonal inundation. The freckled duck prefers permanent freshwater swamps and creeks with a high density of fringing vegetation, including Lignum, *Typha* sp. and tea-tree, however, it breeds in large temporary swamps typically within the Bulloo and Lake Ayre Basins, and Murray-Darlin system (NSW DCCEEW, 2024b). Large ephemeral swamps are present within the Project area and may provide suitable breeding habitat for the freckled duck during periods of high inundation. Some agricultural dams may be of a suitable size to provide non-breeding habitat; however, many do not have the preferred fringing and emergent vegetation. No observations of the species have been made during field investigations to date, and no recent records are known to occur within 10 km of the Subject Land. Records from 2015 are present along the Murrumbidgee River approximately 14 km north of the Subject Land. Due to a low number of recent records and the infrequent presence of suitable breeding conditions, it is less likely that a collision event will occur. As a listed vulnerable species under the BC Act, a collision event may result in a moderate reduction in regional population.
Gilbert's Whistler *Pachycephala inornate*	-	V	Less Likely	Moderate	Low	The Gilbert's whistler is a an arid shrubland specialist that is known to forage predominantly on or near the ground, in shrub thickets, or the canopy of low growing trees. In woodlands the species is considered to prefer habitat with a high density of understorey shrubs (NSW DCCEEW, 2024b). Large-scale movement is generally believed to be limited, with breeding pairs likely to hold and defend territories all year round. While remnant patches of black box (*Eucalyptus largiflorens*) and river red gum (*E. camaldulensis*) woodland are patchily distributed in the locality, understoreys are typically sparse or dominated by lignum and largely lack the dense shrub layer that is considered typical habitat for the species. No observations of the species have been made following field investigations conducted to date and the closest records are located approximately 35 km northeast of the Subject Land. Due to the lack of preferred habitat, it is less likely that a collision event will occur. As a listed vulnerable species under the BC Act, a collision has the potential to lead to a moderate reduction to regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Grey Falcon *Falco hypoleucos*	V	V	Likely	Moderate	High	Grey falcons are generally confined to arid and semi-arid areas of Australia (Garnett & Baker, 2021). Foraging habitat is variable and ranges from timbered lowland plans to tussock grasslands with breeding occurring largely in the tallest trees along watercourses (Cwth TSSC, 2020). Foraging habitat within the Subject Land is widespread and dominated by low open shrublands and tussock grasslands. black box (*Eucalyptus largiflorens*) and river red gum (*E. camaldulensis*) woodland along ephemeral watercourses in the surrounding area may also provide suitable breeding habitat. No observations of the species have been made following site investigations conducted to date, with the most recent record (2008) approximately 5 km north of the Subject Land. The species is considered to be present in low densities throughout its range (Cwth TSSC, 2020), however, as a precautionary approach the species is considered to be likely to collide with WTGs as some suitable foraging habitat is within the Project area. As a low density species, listed as vulnerable under EPBC Act and BC Act, a collision has the potential to result in a moderate reduction in regional populations.
Grey-crowned Babbler (eastern subspecies *Pomatostomus temporalis temporalis*	-	V	Less Likely	Moderate	Low	Foraging and dispersal habitat for the grey-crowned babbler is defined as open forests and woodlands with an open shrub cover. The species is known to form territorial groups with long distance dispersal limited (Morcombe, M., 2000). Flight heights are largely restricted to canopy heights of vegetation and potentially suitable habitat is largely restricted to black box (*Eucalyptus largiflorens*) woodland patchily distributed throughout the Project area. Observations of the species have been made south of the Project area during survey efforts, within wooded riparian areas. Due to the absence of suitable habitat in close proximity to proposed infrastructure and the species' known flight behaviour, the species is considered less likely to collide with WTGs. As a listed vulnerable species under the BC Act, a collision has the potential to lead to a moderate reduction in regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Latham's Snipe *Gallinago hardwickii*	V, Ma, Mi	V	Less likely	Moderate	Low	The Latham's snipe is a migratory, non-breeding bird in south-eastern Australia. It typically feeds in soft mudflats or shallow water at night, early morning or evening. They shelter during the day in small wetlands including urban water bodies, saltmarshes, as well as creek edges, where there is adequate shallow flooded or inundated substrate (Cwth DCCEEW, 2024b). No observations of the species have been made following field investigations, and the most recent record (2022) is located approximately 25 km south of the Subject Land. Suitable ephemeral wetlands are present throughout the broader Project area; however, habitat suitability will be dependent on episodic inundation following high seasonal rainfall. Due to the presence of suitable habitat near the Subject Land, the species is considered moderately likely to collide with WTGs. As a vulnerable species under the EPBC Act and the BC Act, a collision does have the potential to lead to a moderate reduction in regional populations.
Little Eagle *Hieraaetus morphnoides*	-	V	Very Likely	Moderate	High	The little eagle has a broad range throughout mainland Australia and can be found in a variety of ecosystems, except for the heavily forested parts of the Great Dividing Range (NSW DCCEEW, 2024b). It typically occurs in open woodland, grassland and arid regions particularly within close proximity to open woodland and riparian zones suitable for breeding. While hunting, the little eagle is known to soar at heights of 100 m or more in search prey and will typically take prey on the ground or from trees and shrubs in open woodlands. Nesting often occurs in large woodland patches and riparian zones and nest site selection is likely to be influenced by the availability of prey and presence of suitably sized trees (ACT Government, 2025).The species is known to be present within the Project area, following detections over numerous survey periods. Potential foraging habitat is present in Subject Land. Breeding was confirmed within the Project area during September 2024, with chicks observed in a nest approximately 850 m from the nearest proposed turbine and, therefore, a collision event is considered very likely to occur. As a listed vulnerable species under the BC Act, a mortality has the potential to lead to a moderate reduction in regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Magpie Goose *Anseranas semipalmata*	-	V	Less Likely	Moderate	Low	The magpie goose is a large water bird that is considered relatively common in northern Australia; however, it has largely disappeared from southern Australia (NSW DCCEEW, 2024b). Suitable habitat is largely shallow wetlands, less than 1 m deep, with dense growth of rushes or sedges. The species is also known to forage on flooded grasslands and floodplains (NSW DCCEEW, 2024b). Large agricultural dams are present within the Subject Land, however, generally do not contain emergent reeds and rushes. During periods of seasonal inundation, suitable foraging habitat may be present in the numerous ephemeral wetlands in the Project area, however, these is unlikely to provide suitable breeding habitat. No observations of the species have been made following field investigations, and the most recent record (2022) is located approximately 25 km south of the Subject Land. Due to the general absence of the species in southern Australia and the seasonality of suitable habitat, it is considered less likely for the species to collide with proposed WTGs. As a vulnerable species under the BC Act a collision does have the potential to lead to a moderate reduction in regional populations.
Malleefowl *Leipoa ocellata*	V	E	Unlikely	Major	Low	Malleefowl are mostly confined to inland semi-arid scrub, preferring dry mallee habitats with low growing eucalypts and shrubs (EOH, 2024). During mid-summer and autumn, malleefowl feeds mostly on ants and wattle or senna seeds in summer and autumn to blossoms, herbs, and invertebrates in cooler months. They primarily move on foot and rarely fly, except when disturbed or roosting. According to Bionet records the species has 17 records within 50km of the Project Area. Mallee vegetation is not present throughout Project Area, and the species was not recorded during seasonal surveys. As such it is considered that the likelihood of collision is less likely. As an Endangered species under the BC Act and Vulnerable species under EPBC Act, the consequence of a single mortality would be considered major in the state population.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Painted Honeyeater *Grantiella picta*	V	V	Less Likely	Moderate	Low	The painted honeyeater is endemic to mainland Australia, being found mainly in NSW on the inland slopes of the Great Dividing Range. The species is found in dry open forests and woodlands and is strongly associated with mistletoe. They are migratory to nomadic, generally moving north-west into semi-arid regions of the interior in winter and returning southward in spring or summer (Cwth DCCEEW, 2025c; NSW DCCEEW, 2024b). No observations of the species have been made within 10 km of the Subject Land nor through surveys, and no suitable habitat occurs within the Subject Land. While flight heights are not known for the species, it is likely that they do not typically exceed that of the canopy and so the species is unlikely to be flying at heights at risk of collision.
Pied Honeyeater *Certhionyx variegatus*	-	V	Less Likely	Moderate	Low	The pied honeyeater is a nomadic species found in arid and semi-arid ecosystems categorised by shrublands and woodlands, particularly those dominated by *Eremophila, Grevillea* and Mulga (Higgins, et al., 2001). Potential habitat within the Project area is restricted to remnant black box (*Eucalyptus largiflorens*) woodlands. While flights above the canopy have been described for the species, suitable habitat is largely located more than 200 m away from proposed WTGs and so flights are not likely to lead to an increase in collision risk. No observations have been made following field investigations to date, and the closest recent records are located approximately 14-20 km north and south of the Subject Land. Due to limited suitable habitat, it is considered less likely that a collision event will occur. As a listed vulnerable species under the BC Act, a mortality has the potential to result in a moderate impact to regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Pink Cockatoo *Lophochroa leadbeateri*	E	V	Moderately Likely	Major	High	The pink cockatoo is found across arid and semi-arid inland Australia inhabiting a wide range of treed and tree-less habitats, always nearby water sources (NSW DCCEEW, 2024b). Foraging usually occurs on the ground or low shrubs for fruits and seeds of both exotic and native species, particularly chenopods (NSW DCCEEW, 2024b). Pink cockatoos are obligate hollow-nesters and require woodland habitat containing suitably sized tree hollows. Unlike other threatened cockatoos, pink cockatoos do not like nesting close to other breeding pairs and require a minimum distance of at least 1 km between breeding pairs (Cwth DCCEEW, 2023d; NSW DCCEEW, 2024b). Suitably sized tree hollows are known to be present within the Project area, particularly in black box (*Eucalyptus largiflorens*) woodland in the west, but not in the Subject Land. Potential foraging habitat is present in chenopod shrublands in the Subject Land. No observations of the species have been made within the Subject Land to date. NSW BioNet species records are not present within the surrounding landscape (NSW DCCEEW, 2024b) and only scattered records are present from the ALA (CSIRO, 2025). The most recent (2023) is located approximately 10 km south of the Subject Land. Despite the paucity of records within the region and the lack of observation during field assessments, the species may interact with the Project and is capable of flying at heights at risk of collision. Therefore, it is considered moderately likely to collide with WTGs. As a listed endangered species under the EPBC Act and vulnerable under the BC Act, a mortality is likely to lead to a major impact on regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Plains-wanderer *Pedionomus torquatus*	CE	E	Unlikely	Severe	Moderate	The Plains-wanderer is ground-dwelling bird that is known to rarely fly beyond two to three meters in height. The species inhabits sparse grasslands with approximately 50% bare ground and most vegetation being less than 5cm in height (Cwth TSSC, 2015). Foraging and nesting in patches with tall, dense grasses also suggests a need for a habitat mosaic (Antos & Schultz, 2020). Suitable habitat is present throughout the Subject Land. Records of the Plains-wanderer were detected within the Project area during seasonal surveys. Flight heights are poorly understood and so the species is considered moderately likely to collide with WTGs as a precautionary approach. As a critically endangered species under the EPBC Act and endangered under the BC Act, a mortality of a single individual would have a severe impact on the national population of the species.
Redthroat *Pyrrholaemus brunneus*	-	V	Less Likely	Moderate	Low	The redthroat is a mostly ground dwelling bird occurring mostly in arid and semi-arid regions containing acacia and chenopod shrublands. Observations of foraging behaviour identified that foraging heights rarely exceeded 1 m and never exceeded heights of 3 m (NSW DCCEEW, 2024b). Suitable habitat is likely to be present in chenopod shrublands throughout the Subject Land. No observations of the species have been made following field assessments conducted to date and the closest recent records are located approximately 80 km north-west of the Subject Land. The redthroat is considered less likely to collide with WTG due to the absence of local records and the species' known flight behaviours. As a listed vulnerable species under the BC Act, a mortality has the potential to lead to a moderate reduction in regional populations. The species has been assessed as having a low risk of collision.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Regent Parrot (eastern subspecies) *Polytelis anthopeplus monarchoides*	V	E	Less likely	Major	Moderate	The Eastern Regent Parrot, found in the lower Murray-Darling basin of SA, NSW, and Victoria, feeds mainly on seeds, with some buds, flowers, and insect larvae (Baker-Gabb & Hurley G, 2011). It forages mostly on the ground in mallee, crops, and riparian woodlands, and breeds almost exclusively in River Red Gum forests along major floodplains. Outside the breeding season, it spends much of the day foraging or resting in large trees and may travel long distances between roosts and feeding areas. According to Bionet records the species has 38 records within 50km of the Project Area. Mallee vegetation is not present throughout Project Area, and the species was not recorded during seasonal surveys. Although the species' maximum flight height is unknown, it is likely that individuals may fly at heights considered at risk of collision, particularly during long-distance movements between foraging and nesting sites. As such it is considered that the likelihood of collision is moderately likely. As an Endangered species under the BC Act and Vulnerable species under EPBC Act, the consequence of a single mortality would be considered major in the state population.
Rufous Fieldwren *Calamanthus campestris*	-	V	Less Likely	Moderate	Low	The Rufous Fieldwren forages by working through the undergrowtj and pver the ground, feeding on insects and seeds (NSW DCCEEW, 2017). It inhabits low shrublands, particularly saltbush and bluebush communities, and also areas around inland saline lakes. Suitable habitat is present in chenopod shrublands throughout the Project Area. Two observations of the species were recorded during seasonal surveys by ERM Ecologists. Maximum flight height is unknown, however based on the species' foraging and habitat behaviour, it is unlikely to fly within the RSA range. Therefore, the risk of turbine strike is considered less likely. As Vulnerable species under the BC Act, the consequence of a single mortality would be considered moderate in the state population.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Sharp-tailed Sandpiper *Calidris acuminata*	V, M	-	Less Likely	Moderate	Low	The sharp-tailed sandpiper is a migratory shorebird with a global distribution. Breeding occurs in northern Siberia. During the non-breeding season, it is estimated that approximately 91% of the East Asian-Australasian Flyway population resides in Australia and New Zealand (Cwth DCCEEW, 2024a). The species forages in fresh and hypersaline environments, feeding on the edge of mudflats and wetlands. The species has been observed within the Project area foraging within ephemeral wetlands. While suitable habitat is known to occur within the Project area, suitability is reliant on the presence of seasonal and episodic inundation. The species is considered an occasional visitor of inland areas with much of the Australian population occurring in coastal areas (Cwth DCCEEW, 2024a). The species is considered likely to collide with WTGs. As a listed vulnerable and migratory species under the EPBC Act, mortalities have the potential to lead to a moderate reduction in the population.
South-eastern Hooded Robin *Melanodryas cucullata cucullata*	E	E	Less Likely	Major	Moderate	The south-eastern hooded robin is widespread across Australia. The species is found from Brisbane to Adelaide and throughout much of inland NSW, inhabiting dry eucalypt and acacia woodlands and shrublands with an open understorey, some grassy areas and a complex ground layer. They avoid woodlands with tall trees or dense tree cover but sometimes occur in tall, dense heaths with scattered open areas. While they can occur in patches as small as 2.9 ha, in agricultural landscapes they prefer larger patches greater than 10 ha with moderately deep to deep soils. The hooded robin is a largely sedentary species typically seen in pairs or small groups. The south-eastern hooded robin tends to forage on insects and small lizards taken from the ground, hunting for invertebrates by 'perch and pounce' in grassy clearings where rocks and fallen timber litter the ground (Cwth DCCEEW, 2023e). Foraging typically occurs at ground level or a few metres above ground in vegetation and is not considered to exceed that of the canopy (Antos, et al., 2008). No observations have been made following field investigations to date, and the closet recent records are located approximately 50 km south of the Subject Land. Potential habitat is restricted to remnant black box (*Eucalyptus* largiflorens) woodlands patchily distributed within the Project area. Proposed infrastructure is beyond 200 m of these remnant woodlands. As a listed

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
						endangered species under the EPBC Act and BC Act, a collision has the potential to have a major impact on regional populations.
Southern Whiteface *Aphelocephala leucopsis*	V	V	Less Likely	Moderate	Low	The southern whiteface occurs across most of mainland Australia south of the tropics, from the north-eastern edge of the Western Australian wheatbelt, east to the Great Dividing Range. The species lives in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs or both. The southern whiteface forages almost exclusively on the ground, favouring habitats with low tree densities and an herbaceous understorey litter cover (Cwth DCCEEW, 2023a). The species is known to occur within the Subject Land following multiple detections of the species across the broader Project area. While the species is considered unlikely to fly at heights within the RSA, the species may be at risk during broader landscape movement and so is moderately likely to collide with WTGs. As a vulnerable species under the EPBC Act and BC Act, a mortality event has the potential to result in a moderate reduction in regional populations.
Speckled Warbler *Pyrrholaemus sagittatus*	-	V	Less Likely	Moderate	Low	The Speckled Warbler lives in a wide range of Eucalyptus dominated communities that have a grassy understorey, often on rocky ridges or in gullies. Typical habitat would include scattered native tussock grasses, a sparse shrub layer, some eucalypt regrowth and an open canopy. The species diet consists of seeds and insects, with most foraging taking place on the ground. No observations were made of the species during surveys, and no records of the species exist within the Study Area or Locality, with the closest record being approximately 24 km from the Study Area. Preferred habitat is absent within the Study Area. Although the species' maximum flight height is unknown, it is less likely that individuals may fly at heights considered at risk of collision during local seasonal movements. As a listed vulnerable species under the BC Act, a mortality has the potential to cause a moderate impact to regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Spotted Harrier *Circus assimilis*	-	V	Likely	Moderate	High	The spotted harrier typically inhabits open wooded country in tropical and temperate Australia, particularly in arid and semi-arid areas. Breeding habitat is characterised by open or remnant woodland with nests rarely being built in isolated trees. The spotted harrier is a diurnal species feeding primarily on ground active birds, mammals, and reptiles and hunting behaviour is characterised by quartering, or systematic searching, of the landscape low to the ground (NSW DCCEEW, 2024b). Although no observations of the spotted harrier were made flying at heights considered at risk of turbine collision, the species is known to be present and suitable foraging and nesting habitat is present throughout the Project area. Despite no observations within the RSA and hunting strategies typically remaining low to the ground, it is likely that individuals may occasionally reach heights considered at risk of collision. As a listed vulnerable species under the BC Act, a mortality event has the potential to result in a moderate impact to regional populations.
Square-tailed Kite *Lophoictinia isura*	-	V	Moderately Likely	Moderate	Moderate	The square-tailed kite is a medium-sized raptor found throughout much of Australia, particularly in coastal and subcoastal areas. In NSW, scattered records suggest that the species is present further inland, however, it is largely restricted to major river systems and areas of reliable water (NSW DCCEEW, 2024b). It is a specialist hunter of passerine birds, particularly nestlings and honeyeaters, and typically takes prey from the outer foliage of the canopy (NSW DCCEEW, 2024b). While some woodland habitat is present within the Project area, it is unlikely to be of sufficient size or connectivity to provide adequate foraging habitat. Breeding habitat is also unlikely to be present; however, it is possible that individuals may interact with the Project during periods of seasonal inundation and overland flooding. The species has not been observed following field investigations and historic records are largely associated with major watercourses, the closest of which is approximately 30 km south. Due to suitable habitat only occasionally being present, it is considered moderately likely that a collision event will occur. As a listed vulnerable species under the BC Act, a mortality has the potential to cause a moderate impact to regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Superb Parrot *Polytelis swainsonii*	V	V	Moderately Likely	Moderate	Moderate	The Superb parrot is found throughout eastern inland NSW. In the Riverina, the superb parrot nests in loose colonies in large, living or dead trees with many hollow branches, typically near a watercourse. On the inland slopes, they use at least six species of eucalypt but have a particular reliance on Blakely's red gum (E. blakelyi). After breeding they use a variety of woodland types and other habitat types, including artificial habitats such as crops and recreation reserves. They typically feed on the ground, where they take a variety of native and introduced seeds, but also in shrubs and trees on seeds and blossom (Cwth TSSC, 2016). No observations have been made following field investigations to date, and the closet recent records are located approximately 25 km to the east (within the Oolambeyan National Park) and 30 km south of the Subject Land. Woodland habitat within the broader Project area has the potential to support the species and thus the species is considered moderately likely to collide with WTGs. As a listed vulnerable species under the EPBC and BC Acts, a mortality has the potential to lead to a moderate reduction in regional populations.
Swift Parrot *Lathamus discolor*	CE	E	Unlikely	Severe	Moderate	Swift parrots are migratory birds, endemic to south-eastern Australia. They breed in Tasmania and are found mainly in southern and central Victoria and eastern New South Wales in winter. Swift parrots are found in dry sclerophyll forests and woodlands, suburban parks and gardens, and flowering fruit trees. They only breed in Tasmania and migrate to mainland Australia in autumn and winter (NSW DCCEEW, 2024b). In south-eastern Australia, they occur in areas where eucalypts flower profusely or where there are lerp infestations. They will return to certain foraging sites on a cyclical basis pending food availability. As swift parrots are highly mobile, they traverse over unsuitable habitats between suitable foraging, roosting and breeding habitat, meaning there may be occasional flights over wind farms, (Smales, 2005). While there have been many recorded collisions of swift parrots with human made structures such as windows, fences and cars, there has been no recorded evidence of collisions with wind turbines (Smales, 2005). Experts suggest that swift parrots can avoid collisions with structures if situated at a substantial distance away from foraging resources (so they can gain enough height to safely pass over the object). While there is a lack of understanding of the height at which swift parrots will fly, other

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
						parrots in south-eastern Australia are expected to fly within the RSA (Smales & Muir, 2005). No records of the species have been made within the Subject Land following seasonal surveys conducted to date. The closest records is approximately 80 km south in the town of Deniliquin. Suitable habitat is not present within the Subject Land and therefore it considered less likely that a collision will occur. As a listed critically endangered species, a single mortality has the potential to result in a severe impact on regional populations.
Turquoise Parrot *Neophema pulchella*	-	V	Less Likely	Moderate	Low	The Turquoise Parrot favours open, grassy woodland with dead trees near permanent water. It also inhabits coastal heaths and pastures with exotic grasses and weeds, along roadsides and in orchards. Turquoise Parrots are generally resident in an area, but some local seasonal movement occurs. Turquoise Parrots forage mostly on or near the ground for seeds of grasses and shrubs. No records of the species exist within the Study Area or Locality, with the closest record being approximately 50km from the Study Area. Preferred habitat is absent within the Study Area. Although the species' maximum flight height is unknown, it is less likely that individuals may fly at heights considered at risk of collision during local seasonal movements. As a listed vulnerable species under the BC Act, a mortality has the potential to cause a moderate impact to regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Varied Sittella *Daphoenositta chrysoptera*	-	V	Less Likely	Moderate	Low	The Varied Sittella is sedentary and inhabits most of mainland Australia except the treeless deserts and open grasslands. Inhabits eucalypt forests and woodlands, especially those containing rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Feeds on arthropods gleaned from crevices in rough or decorticating bark, dead branches, standing dead trees and small branches and twigs in the tree canopy. No records of the species exist within the Study Area or Locality, with the closest record being approximately 11km from the Study Area. It is less likely that indivudals will fly at heights considered at risk of collision. As a listed vulnerable species under the BC Act, a mortality has the potential to cause a moderate impact to regional populations.
White-bellied Sea-eagle *Haliaeetus leucogaster*	-	V	Moderately Likely	Moderate	Moderate	The white-bellied sea-eagle is a large raptor distributed along the coastline of mainland Australia and Tasmania. It also extends inland along some of the larger waterways, especially in eastern Australia. The species is found in coastal habitats and around terrestrial wetlands, characterised by the presence of large areas of open water (larger rivers, swamps, lakes, the sea). Terrestrial habitats include coastal dunes, tidal flats, grassland, heathland, woodland, forest and even urban areas. Recent records exist within the locality approximately 10 km northwest of the Project area along the Murrumbidgee River. Habitat suitability is likely to be dependent on heavy seasonal rainfall and episodic flooding. Ephemeral wetlands present within the broader Project area are likely to provide suitable habitat following heavy rainfall. The species is considered moderately likely to collide with WTGs. As a listed vulnerable species under the BC Act, a mortality has the potential to result in a moderate reduction in regional population.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
White-fronted Chat *Epthianura albifrons*	-	V	Less Likely	Moderate	Low	The white-fronted chat is a small ground-feeding, insectivorous passerine typically occurring in open country, particularly salt-marshes and other wetlands (Jenner, et al., 2016). The species is found throughout the southern half of Australia in temperate and arid climates (NSW DCCEEW, 2024b). The species is known to be present within the Subject Land and has been regularly observed, particularly when seasonal inundation is present. Despite regular observations, no individuals have been observed flying at heights considered to be at risk of collision. As a listed vulnerable species under the BC Act, it is likely that a collision event may lead to a moderate reduction in regional populations.
White-throated needletail *Hirundapus caudacutus*	V, M	-	Likely	Moderate	High	The white-throated needle-tail is a migratory species with a global distribution. Breeding in Siberia, the species is typically present in Australia between September and April where it is almost exclusively an aerial flyover with only occasional observations made of roosting behaviour. There is evidence that this species can stop to forage within elevated eucalypt forests while in Australia. No detections of the species have been made following survey efforts to date; however, it is likely that foraging behaviour may lead to a risk of collision. Potential foraging habitat is noted to be present throughout the Subject Land within proximity to WTGs. As collisions with WTG are known to have occurred in operational wind farms, it is considered likely that a collision event will occur. As a listed vulnerable species under the EPBC Act, it is possible that a collision will result in a moderate reduction in regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Threatened Bats						
Corben's Long-eared bat *Nyctophilus corbeni*	V	V	Less Likely	Moderate	Low	The Corben's long-eared bat is found throughout a range of inland woodland vegetation types, including river red gum and black box woodlands, throughout southern central Queensland to eastern South Australia (Cwth TSSC, 2011). Roosting occurs in tree hollows with hunting occurring as slow flights through the understorey and occasionally on the ground (NSW DCCEEW, 2024b). Presence of the species is considered to be 'possible', following the potential detection of calls. It is not known to what extent the species is likely to be at risk of collision however considering the high rate of bat mortalities found at operational wind farms (Symbolix, 2020; Moloney, et al., 2019); it is considered to be moderately likely to collide with WTGs. As a listed vulnerable species under the BC Act and EPBC Act, mortalities have the potential to result in a moderate impact to regional populations.
Inland Forest Bat *Vespadelus baverstocki*	-	V	Less Likely	Moderate	Low	In NSW, the Inland Forst bat has been most regularly captured in the far south west, north from the Murray River to Menindee, and at least as far east as the Balranald-Ivanhoe Road. Roosts in tree hollows and abandoned buildings. Known to roost in very small hollows in stunted trees only a few metres high. The habitat requirements of this species are poorly known but it has been recorded from a variety of woodland formations, including Mallee, Mulga and River Red Gum. Most records are from drier woodland habitats with riparian areas inhabited by the Little Forest Bat. However, other habitats may be used for foraging and/or drinking. Following extensive field survey efforts throughout the Project area, suitable tree hollows may be present in the fringing woodland vegetation outside the Subject Land. No detections have been made within the Project Area to date, and the closest records are located 38 km northwest of the Subject Land. As a listed vulnerable species under the BC Act, mortalities have the potential to lead to a moderate impact on regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Little Pied Bat *Chalinolobus picatus*	-	V	Moderately Likely	Moderate	Moderate	The Little Pied bat is found in inland Queensland and NSW (including on the western plains and slopes). The species inhabits dry open forest, open woodland, mulga woodlands, chenopod shrublands, cypress pine forest and mallee and Bimble box (*Eucalyptus populnea*) woodlands. The little pied bat roosts in caves, rock outcrops, mine shafts, tunnels, tree hollows and buildings (NSW DCCEEW, 2024b). Following extensive field survey efforts throughout the Project area, no caves, outcrops or mine shafts are known to occur; however, suitable tree hollows may be present in the fringing woodland vegetation outside the Subject Land. No detections have been made within the Project area to date, and the closest records are located 80 km north of the Subject Land. As a listed vulnerable species under the BC Act, mortalities have the potential to lead to a moderate impact on regional populations.
Southern Myotis *Myotis Macropus*	-	V	Less Likely	Moderate	Moderate	The southern myotis is typically found within 100 km of the coast from Australia's north-west to western Victoria. The species is known to occur in inland areas in proximity to major rivers and waterbodies (NSW DCCEEW, 2024b). The species has a unique hunting strategy that involves trawling for small fish and aquatic invertebrates over streams and pools which it catches with its feet. Roosting habitat is variable and includes artificial structures, dense foliage and hollow-bearing trees. Species presence is considered 'probable' following the analysis of acoustic calls recorded on acoustic detection devices. Although the relative flight heights of the species are not known, microbat species are known to collide with operational windfarms (Moloney, et al., 2019; Symbolix, 2020). It is not known to what extent the species is likely to be at risk of collision, however, due to the presence of agricultural dams and ephemeral wetlands in the Project area, it is considered likely. As a listed vulnerable species under the BC Act, mortalities have the potential to result in moderate impacts to regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Yellow-bellied Sheath-tailed Bat *Saccolaimus flaviventris*	-	V	Likely	Moderate	High	The yellow-bellied sheath-tailed bat is a large and distinctive microbat species throughout northern and eastern Australia (NSW DCCEEW, 2024b). When foraging, the species flies high and fast over the canopy of forests and woodlands but is known to forage at lower heights in more open areas. Roosting occurs primarily in hollow-bearing trees, however, artificial structures such as buildings are also used on occasion (NSW DCCEEW, 2024b). The species is considered to occur within the Project area following the positive detection of acoustic calls. It is not known to what extent the species flies at heights within the RSA, however, as the species is known to fly at height while hunting, it is considered likely that a collision event will occur. As a listed vulnerable species under the BC Act, mortalities have the potential to lead to a moderate impact on regional populations.
Non-threatened species known to fly within the RSA						
Australian Magpie *Gymnorhina tibicen*	-	-	Very Likely	Minor	High	The Australian magpie is a large passerine bird found throughout a variety of habitat types including grasslands, woodlands, dry forests, and disturbed agricultural areas (Morcombe, M., 2000). The species is known to occur throughout all available habitat types within the Subject Land and has been observed flying at heights at risk of collision. The species is considered very likely to collide with WTGs. As a non-listed species, collisions are expected to have a minor impact to regional populations.
Australian Pelican *Pelecanus conspicillatus*	-	-	Likely	Moderate	High	The Australian pelican is a very large waterbird widespread throughout coastal areas and inland waterbodies of suitable size and depth (Morcombe, 2003). The species is not considered to be migratory or to undertake seasonal movements but is nomadic and spatially responds to the availability of foraging resources and suitability of habitat. The species is known to form large flocks in large bodies of water with movement between coastal and inland areas known to occur during episodic flooding (Johnston, et al., 2015). Large flocks (approximately 50 individuals) have been observed within the Project area, occurring on large dams and flooded ephemeral wetlands. Flight heights within the RSA have also been observed. Species presence is expected to be seasonal and dependent on suitable conditions; however, the Australian

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
						pelican is considered likely to collide with WTG. While the species is not currently listed, due to the large seasonal movements known for the species, mortalities have the potential to impact national populations and may have a moderate impact.
Black Kite *Milvus migrans*	-	-	Very Likely	Minor	High	The black kite is a medium sized raptor with a global distribution. The species is known to be present throughout most habitat types in Australia and will forage aerially as well as feed on carrion. Large flocks of black kites are known to occur when conditions are suitable or food resources are abundant (Morcombe, M., 2000). In the Subject Land the species has been observed across all available habitat types and is regularly seen flying at heights considered at risk of collision. The species is considered very likely to collide with WTGs. As a non-listed and highly abundant species, a mortality is likely to have a minor impact on regional populations.
Brown Falcon *Falco berigora*	-	-	Very Likely	Minor	High	The brown falcon is a medium-sized raptor found throughout virtually all habitat types across Australia. The species is locally common within its range and preferred habitat consists of open grassland and agricultural areas. The species is common throughout the Project area and is regularly observed flying at heights considered within the RSA. Due to their abundance within the Project area and their known foraging behaviour, it is considered very likely that the species will collide with WTGs. As a non-listed and locally abundant species, a mortality is likely to have a minor impact on regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Intermediate Egret *Ardea intermedia*	Ma	-	Likely	Minor	Moderate	Intermediate egrets are found in suitable habits in the east of Australia. Suitable habitat includes a wide variety of wetlands, including man-made wetlands such as rice fields and sewage ponds (Menkhorst, et al., 2019). Wo individuals of the species were observed flying within the RSA during field investigations and suitable habitat may occur within the Project area following inundation of wetlands following heavy rain. The species is likely to only to occur in low numbers when suitable habitat is present in the Project area and is considered likely to collide with wind turbines during dispersal. As a non-listed species, a mortality is likely to have a minor impact on regional populations.
Nankeen Kestrel *Falco cenchroides*	-	-	Very Likely	Minor	High	The nankeen kestrel is a small raptor occurring largely in open grasslands, woodlands and agricultural areas throughout mainland Australia (Morcombe, M., 2000). Prey species are diverse and include insects, small mammals, lizards and small birds. Prey is located from a perched position or by hovering short distances above the ground (Birdlife Australia, n.d.). The species is locally common and has been observed throughout all habitat types occurring within the Subject Land. While most observations occur below the RSA, the species has been observed to fly at heights considered at risk of collision. It is unknown to what degree the species will avoid turbines while foraging, however, hovering may increase the risk of collision and so the species is considered very likely to collide with WTGs. As a non-listed and locally abundant species, a mortality will likely have a minor impact on regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Straw-necked Ibis *Threskiornis spinicollis*	-	-	Very Likely	Minor	High	The straw-necked ibis is a large waterbird distributed throughout much of Australia except far inland areas. Preferred habitat varies but the species is known to occur throughout grasslands, croplands, pasturelands, agricultural dams, wetlands and swamps. The species is highly nomadic and known to move in response to the availability of suitable habitat and foraging resources. The species has been observed flying in large flocks (approximately 150 individuals) within the RSA. While species presence is likely to fluctuate in response to environmental conditions, the species is very likely to collide with WTG. As a non-listed species, a mortality is expected to have a minor impact to regional populations.
Wedge-tailed Eagle *Aquila audax*	-	-	Very Likely	Minor	High	The wedge-tailed eagle is a very large eagle and Australia's largest living bird of prey. The species is found throughout Australia and occurs in almost all habitats (Higgins, et al., 2001). Nesting typically occurs in wooded areas, however, areas with minimal woody vegetation, isolated trees and artificial structures are readily used. Individual territories are extensive and dependent on the availability of prey; however, they can exceed 50 km^2. Foraging and hunting frequently occurs at great heights (up to and potentially exceeding 2 km) with long periods of time spent surveying territories for prey. The species is locally abundant within the Project area and patches of woodland, isolated trees, and artificial structures provide abundant opportunities for nesting. As soaring and foraging behaviour increases the risk of collision, the species is considered very likely to collide with WTG infrastructure. Wedge-tailed eagles are a non-listed and locally abundant species and so mortalities are likely to have a minor impact on the population.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Whistling Kite *Haliastur sphenurus*	-	-	Very likely	Minor	High	The whistling kite is common and widespread over mainland Australia and found over open woodland, farmland and wetlands. They are opportunistic hunter, soaring above the ground when searching for prey. Prey may be carrion or live animals (Australian Museum, 2024). The whistling kite has been observed flying within RSA height during seasonal surveys and suitable habitat occurs across the Project area. It is considered very likely that the whistling kite will collide with WTGs. As a non-listed and locally abundant species, mortalities are likely to have a minor impact on the population.
Non-threatened raptors known to occur within the Project area						
Black-shouldered Kite *Elanus axillaris*	-	-	Likely	Minor	Moderate	The black-shouldered kite is found throughout mainland Australia and inhabits open country with scattered trees, such as grasslands, farms and roadsides. The species is locally common and had been observed throughout all habitat types occurring within the Subject Land. While all observations occur below the RSA, it is considered likely that the species will fly at heights considered at risk of collision. As a non-listed and locally abundant species, a mortality will likely have a minor impact on regional populations.
Australian Hobby *Falco longipennis* Peregrine Falcon *Falco peregrinus* Swamp Harrier *Circus approximans*	-	-	Likely	Minor	Moderate	These raptor species have been observed throughout seasonal survey events. These species have been observed in low numbers and loss of the occasional individual is not considered to lead to a reduction in the viability of the local or regional population, however, they have the potential to fly within the RSA.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Eastern Barn-owl *Tyto javanica*	-	-	Less Likely	Minor	Low	The eastern barn-owl occurs across Australia is open country such as farms, heathlands and open woodlands. It is a nocturnal bird and roosts in hollows, caves or tree branches during the day (Australian Museum, 2022). The species has been observed on two occasions during seasonal surveys and there are records within 10 km of the Subject Land. However, due to hunting preferences being focused on ground-dwelling fauna, it is considered less likely to fly within RSA height. As a non-listed and locally abundant species, a mortality will likely have a minor impact on regional populations.
Non-threatened, migratory avian species						
Fork-tailed Swift *Apus pacificus*	Mi	-	Likely	Moderate	High	The fork-tailed swift is a medium to large swift with a global distribution. The species is present within Australia during the non-breeding season (approximately October – March in NSW) only, is almost exclusively aerial, and occurs throughout a wide variety of habitat types. No detections of the species have been made following seasonal surveys; however, records are known to occur within the Project area and along the Cobb Highway. The species is considered likely to collide with WTGs. As non-threatened migratory species under the EPBC Act, a mortality event has the potential to result in a moderate impact to regional populations.
Pectoral Sandpiper *Calidris melanotos* Common Sandpiper *Actitis hypoleucos*	Mi	-	Moderately Likely	Moderate	Moderate	These non-threatened migratory species have not been observed following field surveys and do not have recent records within 10 km of the Project area. However, ephemeral wetlands present within the Project area have the potential to support these species during periods of episodic inundation following high rainfall. There is moderate likelihood that these species will fly within the RSA. The loss of an occasional individual is considered to lead to moderate reduction in the local or regional population viability. They have all been assessed as having a moderate risk of collision.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Yellow Wagtail *Motacilla flava*	Mi	-	Less Likely	Moderate	Low	The yellow wagtail is a migratory species with a global distribution that is present in Australia in the winter and is found near wetlands in open country (Morcombe, M., 2000). The species is considered rare and typically associated with coastal areas when in Australia and so a collision event is considered less likely to occur.
Non-threatened resident, nomadic avian species						
Australian Raven *Corvus coronoides*			Likely	Minor	Moderate	The Australian raven is found throughout a variety of habitat types including grasslands, woodlands, dry forests, and disturbed agricultural areas (Morcombe, M., 2000). The species is known to occur throughout all available habitat types within the Subject Land and has been observed flying at heights near the RSA. The species is considered likely to collide with WTGs. As a non-listed species, collisions are expected to have a minor impact on regional populations.
Galah *Eolophus roseicapilla*			Likely	Minor	Moderate	The Galah is found throughout a variety of habitat types in Australia including woodlands, grasslands, roadside and agricultural areas often in large flocks. Galahs feed on seeds mostly from the ground and have been observed throughout the Subject Land. The species has been observed flying near RSA height and is considered likely to be at risk of collision with WTGs. As a non-listed species, a mortality is expected to have a minor impact on regional populations.
Fairy Martin *Petrochelidon ariel*			Likely	Minor	Moderate	The fairy martin is a small and common bird found throughout Australia. The species is insectivorous and predominantly feeds aerially, often in flocks, and is known to reach large heights while doing so (Morcombe, M., 2000). The species has been observed throughout all habitat types present within the Project area and has been observed flying near RSA height. It is considered likely to be at risk of collision. As a non-listed species that is locally abundant, a collision would likely lead to a minor impact on regional populations. The species has been assessed to have a moderate risk of collision.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Little Raven *Corvus mellori*			Likely	Minor	Moderate	The little raven is found throughout a variety of habitat types including grasslands, woodlands, dry forests, and disturbed agricultural areas (Morcombe, M., 2000). The species is known to occur throughout all available habitat types within the Subject Land and has been observed flying near RSA heights. It is considered likely to be at risk of collision. As a non-listed species, collisions are expected to have a minor impact on regional populations.
Masked Woodswallow *Artamus personatus*			Likely	Minor	Moderate	The masked woodswallow is a common and highly nomadic species found throughout Australia. The species typically inhabits open forests, woodland, heath, roadsides and farmland largely in arid and semi-arid zones (Morcombe, M., 2000). The species has been observed throughout a variety of habitat types within the Subject Land but typically occurs within proximity to woodland or scattered trees and shrubs. Flight heights near the RSA have been observed within the Project area. The species is considered likely to collide with WTGs. As a non-listed and locally abundant species, a mortality is likely to have a minor impact on regional populations.
Yellow-billed Spoonbill *Platalea flavipes*			Likely	Minor	Moderate	The yellow spoonbill is a large wetland bird found throughout much of Australia and inhabits shallow swamps of fresh or brackish water, brackish pastures, and small pools and dams (Morcombe, M., 2000). The species has been observed within the Project area foraging along dam edges and throughout flooded grasslands and ephemeral wetlands. Flight heights near the RSA have also been observed. Presence within the Subject Land is likely to be driven by the presence of inundation and episodic flooding and movement between wetlands may increase risk of collision. The species is considered likely to collide with WTGs. As a non-listed species, a mortality is not expected to negatively impact on regional populations.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Black-tailed Native Hen (*Tribonyx ventralis*) Black-faced Cuckoo-shrike *(Coracina novaehollandiae)* Crested Pigeon (*Ocyphaps lophotes*) Grey Butcherbird (*Cracticus torquatus*) Grey Shrike-thrush *(Colluricincla harmonica)* Ground Cuckoo-shrike (*Coracina maxima*) Olive-backed Oriole (*Oriolus sagittatus*) Zebra Finch *(Taeniopygia guttata)*			Less likely	Minor	Low	These non-threatened, resident and nomadic species have been observed through surveys. It is considered less likely that they will fly within RSA height due to habitat requirements. In addition, loss of the occasional individual is not considered to lead to a reduction in the local or regional population viability.
Australasian Grebe (*Tachybaptus novaehollandiae*), Australasian Shoveler (*Anas rhynchotis*) Australian Ringneck (*Barnadius zonarius* var. *barnardi*) Australian White Ibis (*Threskiornis moluccus*) Australian Wood Duck (*Chenonetta jubata*) Banded Lapwing (*Vanellus tricolor*) Black-eared Cuckoo (*Chrysococcyx osculans*) Black-faced woodswallow (*Artamus cinereus*) Black-fronted Dotterel (*Elseyornis melanops*) Black-winged stilt (*Himantopus himantopus*) Black Swan (*Cygnus atratus*)			Likely	Minor	Moderate	These non-threatened, resident and nomadic species have been observed through surveys. It is considered likely that they may fly within the RSA on occasion, but loss of the occasional individual is not considered to lead to a reduction in the local or regional population viability.

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Bluebonnet (*Northiella haematogaster*)						
Brown Songlark (*Cincloramphus cruralis*)						
Budgerigar (*Melopsittacus undulatus*)						
Cockatiel (*Nymphicus hollandicus*)						
Crimson Rosella (*Platycercus elegans*)						
Eastern Rosella (*Platycercus eximius*)						
Fan-tailed Cuckoo (*Cacomantis flabellifromis*)						
Great Egret (*Ardea alba*)						
Grey Fantail (*Rhipidura albiscapa*)						
Grey Teal (*Anas gracilis*)						
Hardhead (*Aythya australis*)						
Hoary-headed Grebe (*Poliocephalus poliocephalus*)						
Horsfield's Bronze-Cuckoo (*Chalcites basalis*)						
Horsfield’s Bushlark (*Mirafra javanica*)						
Inland Dotterel (*Peltohyas australis*)						
Little Black Cormorant (*Phalacrocorax sulcirostris*)						
Pacific Black Duck (*Anas superciliosa*)						
Pallid Cuckoo (*Cacomantis pallidus*)						
Pied Cormorant (*Phalacrocorax varius*)						
Pink-eared Duck (*Malacorhynchus membranaceus*)						
Plumed Whistling Duck (*Dendrocygna eytoni*)						
Rainbow bee-eater (*Merops ornatus*)						
Red-kneed dotterel (*Erythrogonys cinctus*)						

Species	Listing Status		Event Likelihood	Event Consequence	Risk Rating	Comments
	EPBC Act	BC Act				
Royal Spoonbill (*Platalea regia*) Rufous songlark (*Megalurus mathewsi*) Tree Martin (*Petrochelidon nigricans*) Welcome swallow (*Hirundo neoxena*) White-backed swallow (*Cheramoeca leucosterna*) White-breasted woodswallow (*Artamus leucorynchus*) White-browed woodswallow (*Artamus superciliosus*) White-faced heron (*Egretta novaehollandiae*) White-necked heron (*Ardea pacifica*)						
Status listing for EPBC and BC Acts: CE = Critically Endangered; E = Endangered; V = Vulnerable; M = Migratory; Ma = Marine						

6.3 COLLISION RISK MODELLING

The CRM included bird species assessed as having a moderate and high collision risk, as detailed in Table 6-9. The species that were assessed as having low risk of collision, as determined by the risk assessment, were not considered in the CRM as these species are not likely to be impacted by the WTGs.

TABLE 6-9 COLLISION RISK MODEL INCLUSION CRITERIA

Risk Category	Included in CRM
Low	No
Moderate	Yes (only with sightings in RSA)
High	Yes (only with sightings in RSA)
Very High	Yes (only with sightings in RSA)

Threatened species and non-threatened raptors which have been assessed as high risk of collision that have not been recorded in the RSA are listed below:

- Little Eagle (*Hieraaetus morphnoides*);
- Curlew Sandpiper (*Calidris ferruginea*);
- Grey Falcon (*Falco hypoleucos*);
- Pink Cockatoo (*Lophochroa leadbeateri*); and
- White-throated Needletail (*Hirundapus caudacutus*).

These species will be monitored during further bird surveys during the construction and operational phases of the Project. The CRM will be updated should a sufficient sample size (n=3) becomes available, in line with the review process outlines in the BBAMP.

6.3.1 WINDFARM AND WTG PARAMETERS

Turbine parameters used in the CRM are outlined in Table 6-10.

TABLE 6-10 WTG PARAMETERS FOR THE PROJECT

Parameters	Modelled Specifications
Number of WTGs	114
Width of Windfarm	16.70 km
Latitude	-34.77842 Degrees
Number of Blades	3
Rotation Speed	11.8 Rotations per Minute
Max Blade Width	4.825 m
Blade Pitch	7.1 Degrees
Hub Height	164 m
Rotor Radius	91.5 m
Risk Height Range	72.5-255.5 m

6.3.2 BIRD SPECIES PARAMETERS

Table 6-11 provides morphometric parameters, known flight speeds for those species retained for inclusion within the CRM. Collision risk for an individual species is informed by the calculation of bird density, measured as birds/km^2, using the proportion of the total number of individuals that were observed flying within the RSA compared to the total number of individuals of that species recorded across all survey periods. Additionally, the number of potential transits through the area swept up by the rotor considers the potential for nocturnal flight activity in relation to observed daytime utilization. Table 6-11 also provides the observed abundance, calculated bird density and expected nocturnal activity factor applied in the CRM.

The Fork-tailed Swift (*Apus pacificus*) is the only migratory species suitable for inclusion within the CRM. The movements and population dynamics of the species are poorly understood, particularly within its Australian distribution however it is generally considered that the entirety of the global population is present within Australia during the non-breeding season (DoE, 2015). When present, the Fork-tailed Swift is widespread throughout Australia and so the boundaries of movement corridors are poorly defined. While sporadic movement within the region are likely, broad north-south movements are still expected.

For this CRM, the width of the movement corridor has been defined as the maximum east-west overland distance in line with the Project Area. This is approximately 1,154 km and extends from Spencer Gulf, South Australia to Jervis Bay, NSW. Accurate population estimates are not available; however, the species has been assumed to possess a population of at least 100,000 individuals (DoE, 2015). Migration passages are expected to occur between the months of October to April based on the historic records (Cornell Lab of Ornithology, 2025; ALA, 2025; DoE, 2015). Modelling has assumed a population of 100,000 individuals and a migration corridor of 1,154km.

TABLE 6-11 BIRD SPECIES PARAMETERS USED IN THE CRM

Species Name	Wingspan (m)	Length (m)	Average Flight Speed (m/s)	Expected nocturnal Activity (%)	Total Individuals Observed	Total Individuals in RSA	Calculated Bird Density (birds/km^2)	Proportion of Total Individuals Observed in the RSA (%)
Australian Magpie	0.76	0.4	16.7	0	165	5	0.0032	3.03
Australian Raven	1	0.5	16.7	0	614	14	0.0128	2.28
Black Falcon	1.15	0.5	13.6	0	1	1	0.0001	100.00
Black Kite	1.45	0.54	17.3	0	67	11	0.0014	16.42
Brown Falcon	1.15	0.45	13.6	0	44	8	0.0009	18.18
Fork-tailed Swift	0.41	0.2	36	N/A	5	5	0.0001	100.00
Great Cormorant	0.83	0.68	14.6	25	13	12	0.0002	92.31
Little Black Cormorant	1	0.62	14.6	25	45	40	0.0005	88.89
Nankeen Kestrel	0.74	0.3	8	0	147	13	0.0031	8.84
Spotted Harrier	1.31	0.55	3.4	0	15	2	0.0002	13.33
Wedge-tailed Eagle	2.3	1.0	8	0	70	45	0.0014	64.29

6.3.3 COLLISION RISK MODELLING RESULTS

A summary of the CRM outputs is presented in Table 6-12.

TABLE 6-12 ESTIMATED COLLISION RISK MORTALITIES

Species	Estimated annual number of collisions (based on RSA)			Modelled collisions over a 30-year operational lifetime relative to avoidance rates		
	98%	99%	99.5%	98%	99%	99.5%
Australian Magpie	0.2	0.1	0.1	6	3	3
Australian Raven	0.9	0.4	0.2	27	12	6
Black Falcon	0.1	0.1	0.1	3	3	3
Black Kite	0.7	0.4	0.2	21	12	6
Brown Falcon	0.4	0.2	0.1	12	6	3
Fork-tailed Swift	5.1	2.5	1.3	153	75	39
Great Cormorant	0.8	0.4	0.2	24	12	6
Little Black Cormorant	1.7	0.8	0.4	51	24	12
Nankeen Kestrel	0.5	0.2	0.1	15	6	3
Spotted Harrier	0.1	0	0	3	0	0
Wedge-tailed Eagle	2.8	1.4	0.7	84	42	21
Total	**13.3**	**6.5**	**3.4**	**399**	**195**	**102**

For the eleven species included in the model, collision risk has been calculated as the number of collisions per species per annum. In practice, it is expected that birds demonstrate a high level of avoidance of WTGs (Band *et al*., 2007). Avoidance rate is defined as the capacity for a bird to avoid a collision. This may take different forms – the bird may avoid the whole wind farm by flying over or around it (macro-avoidance), the bird may fly only in the airspace between or below the RSA (meso-avoidance) or the bird may fly in close proximity to a turbine but does not collide with it (micro-avoidance) (Cook, et al., 2018).

Known avoidance rates are not available for all species. Further research is necessary to determine species-specific avoidance rates. For the Project's CRM, 98%, 99% and 99.5% avoidance rates have been assumed to calculate a reasonable assumption of collision numbers per annum for the given species. These avoidance rates are typically used during collision risk modelling (Smales & Muir, 2005).

Two species are threatened being the Black Falcon (*Falco subniger*) and Spotted Harrier (*Circus assimilis*). Mortality rates for the Black Falcon are based on a very small sample size (n=2) with only a single observation from within the RSA. While ordinarily this would not satisfy the inclusion criteria for the CRM, this species is data deficient in the Riverina and so mortality estimates have been completed as a precautionary approach. Collision risk for both listed species is likely to be influenced by abundance and activity levels of potential prey species, particularly rodents, with agricultural practices likely to influence site level utilisation and subsequent collision risk.

Operational mitigation and management measures identified to have the potential to further reduce the risk of collision and/or barotrauma to birds and bat. The specific measures proposed have been outlined in the appended BBAMP. Potential mitigation measures and their triggers for implementation are species specific and will be implemented following the detection of a mortality to a listed matter.

STAGE 2: IMPACT ASSESSMENT (BIODIVERSITY VALUES AND PRESCRIBED IMPACTS)

7. AVOID AND MINIMISE IMPACTS

Since conception Project design has evolved through the consideration of technical, environmental, social, and commercial constraints. This has included consideration of the outcomes of engagement with associated landowners, non-associated landowners, the community, local government, State and Australian Government Agencies, and business and stakeholder groups. The Applicant has commissioned environmental assessment of the Project Area in accordance with the SEARs and has modified the project layout based on the outcomes of these assessments, consideration of technical, environmental surveys and assessments, constructability, and community feedback.

The Project layout has significantly reduced since submission of the EIS, with several turbines removed because of environmental constraints. This BDAR has assessed the revised Project layout, with a comparison of impacts between the original and revised layouts by PCT and threatened species provided in **Table 7-1** and **Table 7-2** respectively.

TABLE 7-1 EXTENT OF AVOIDED IMAPCTS ON PCTS (EIS VS REVISED LAYOUT)

PCT	PCT Name	Impact area (ha)		Ecosystem credit requirement (#)	
		EIS	Revised layout	EIS	Revised layout
44	Forb-rich Speargrass – Windmill Grass – White Top grassland of the Riverina Bioregion	4.78	0	102	0
159	Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	0.00	0.17	0	6
160	Nitre Goosefoot shrubland wetland on clays on the inland floodplains	1.84	0	52	0
163	Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	268.58	115.47	9,282	4,256
164	Cotton Bush open shrubland of the semi-arid (warm) zone	855.73	649.42	31,315	18,441

TABLE 7-2 EXTENT OF AVOIDED IMAPCTS ON THREATENED SPECIES (EIS VS REVISED LAYOUT)

Common Name	Scientific Name	Habitat loss (ha)		Number of species credits required	
		EIS	Revised layout	EIS	Revised layout
Little Eagle	*Hieraaetus morphnoides*	16.33	0.00	580	0
Mossgiel Daisy	*Brachyscome papillosa*	1,025.17	162.02	49,199	6,444
Chariot Wheels	*Maireana cheelii*	773.06	27.97	37,542	1,217
Slender Darling Pea	*Swainsona murrayana*	792.81	0.00	38,493	0

This comparison shows a 32% reduction in the loss of native vegetation (i.e., 365.86 ha), as outlined below:

- No impacts on PCTs 44 and 160;
- Reduced impact of 153.11 ha on PCT 163; and
- Reduced impact of 206.31 ha on PCT 164.

Impacts on PCT 164 have also been minimized as the condition of this vegetation is less for the revised footprint (i.e., weighted mean VIS of 75.7) versus a VIS of 97.6 (ERM 2024).

There is also a substantial impact reduction for threatened species, with the Project avoiding impacts on Little Eagle breeding habitat and eliminating the need for assumed presence for Slender Darling Pea through the completion of survey.

7.1 PROJECT LOCATION AND DESIGN

7.1.1 STRATEGIC DEVELOPMENT CONTEXT

The Project is in the South West REZ. The South West REZ encompasses some of Australia's best natural energy resources. The location of the South West REZ was selected based on detailed geospatial mapping, which identified areas of high renewable energy resource potential (e.g. wind speeds, solar irradiance), proximity to existing transmission infrastructure, and interactions with existing land uses. The South West REZ was declared by the Minister for Energy and Environment on 4 November 2022. The declaration begins the process of formalising the REZ under the *Electricity Infrastructure Investment Act 2020*, establishes EnergyCo as the Infrastructure Planner for the REZ, and sets the intended network capacity. The declaration of the South West REZ also supports the implementation of the Australian Energy Market Operator's Integrated System Plan.

The Project proposes to connect to Project EnergyConnect, subject to the Applicant gaining Access Rights, and will include a BESS that will provide dispatchable energy capabilities including potential energy arbitrage, demand management and ancillary services opportunities. The Project will therefore augment the security and reliability of the electricity system in the National Electricity Market, through consistent energy generation and energy storage.

7.1.2 PROJECT DESIGN AND ITERATION

The Project originally consisted of up to 176 WTGs (refer Scoping Report (ERM, 2022)) and was refined to up to 155 WTGs in the EIS. The amended Project comprises 114 WTGs, with the majority removed done so to avoid sensitive Aboriginal cultural heritage, ecological areas, and to minimise potential visual and noise impacts to surrounding dwellings.

Table 7-3 outlines the evolution of Project, including amendments made in response to feedback received during exhibition of the EIS and in response to environmental constraints. Figure 7-1 displays the Project's layout as presented in the Scoping Report and Figure 7-1 displays the layout presented in the EIS and original BDAR.

TABLE 7-3 PROJECT REFINEMENTS SINCE SCOPING PHASE

Project Elements	EIS (original) Project	Amended Project	Difference between EIS and Amended Project
Project Footprint			
Project Area	18,012	18,006	Reduced by 6 ha (0.03%)
Temporary Development Footprint	1,137 ha	~ 777 ha	Reduced by 360 ha (32%)
Permanent Development Footprint	574 ha	~ 491 ha	Reduced by 83 ha (14%)
WTGs			
WTGs	155	114	Reduced by 41 WTGs (26%)
Rotor Diameter	Up to 183 m	Up to 183 m	No change
Blade Length	Up to 91.5 m	Up to 91.5 m	No change
Uppermost Blade Tip Height	Up to 291.5 m	Up to 291.5 m	No change
Tower (hub) Height	Up to 200 m	Up to 200 m	No change
WTG Hardstand Disturbance Area	Approx. 2.83 ha / WTG	Approx. 2.41 ha / WTG	Reduced by approx. 0.42 ha / WTG
Ancillary Infrastructure			
330 kV transmission line	20.0 km	16.17 km	Reduced by 3.83 km
New 220 kV or 330 kV transmission line (Switching Station to proposed connection point)	0.0 km	0.7 km	Increase of 0.7 km
Underground 33 kV transmission line	175.3 km	256.5 km	Increased by 81.2 km
Overhead 33 kV transmission line	64.5 km	0 km	Reduced by 64.5 km (100%)
33/330 kV Substations	3	3	No change
	200 m x 300 m +35 m APZ all sides	190 m x 240 m +35 m APZ all sides	Reduced by 4.32 ha
Switching Station	1	1	No change

Project Elements	EIS (original) Project	Amended Project	Difference between EIS and Amended Project
	200 m x 300 m +35 m APZ on all sides	200 m x 300 m +35 m APZ on all sides	No change
BESS	200 MW / 800 MWh	200 MW / 800 MWh	No change
	400 m x 300 m +35 m APZ all sides	400 m x 300 m +35 m APZ all sides	No change
O&M Facility	3	1	Reduced by 2
Security Hut	4	2	Reduced by 2
Biosecurity Wash Bays	4	2	Reduced by 2
Internal Access Tracks	148.3 km	116.5 km	Reduced by 31.8 km
Site Access Points	4	2	Reduced by 2
Permanent meteorological masts	4	3	Reduced by 1
Temporary Facilities / Activities			
Construction Duration	24 months, with peak construction activities over approx. 12 months	18 months, with peak construction activities over approx. 12 months	Duration reduced by 6 months
Construction Workforce	Up to 650 FTE	Up to 650 FTE	No change
Transport Route	From: • Port of Adelaide; and • Port of Newcastle.	From: • Port of Adelaide only.	Elimination of transport route from Port of Newcastle
Temporary Worker Accommodation Camp	1	1	No change
Temporary meteorological masts	4	3	Reduced by 1
Concrete Batching Plants	2	2	No change
Laydown Areas	3	4	Increased by 1
Construction Compound (e.g., site office, car parking, storage)	2	2	No change

Additional field surveys were conducted since submission of the EIS and original BDAR to further inform the delineation of biodiversity values across the Subject Land including threatened fauna and flora presence, stick nest locations and utilisation, habitat connectivity values and potential SAII presence. These factors are further described below.

7.1.2.1 RESIDENT RAPTORS AND STICK NESTS

During field survey events, it was observed that the existing transmission line running east-west in the south of the Project Area is supporting several large stick nests suitable for use by raptors. While no evidence of use by any threatened species was observed during field survey events, there is potential for these to be utilised by threatened species in the future. The transmission line is also used as perching habitat for several raptor and other avian species. As a result of the concentration in stick nests in this area and avian use of the transmission line, there is also an anticipated risk of turbine collision.

Additionally, increased raptor activity was observed along the Sturt Highway, running east-west along the northern boundary of the Project Area, due to the availability of foraging resources such as carrion from road collisions.

The transmission line and highway were therefore considered as environmental constraints, and each turbine was assigned a risk rating of between 0 and 2 based on their proximity to these features. Five turbines occurring in proximity to the transmission line and 12 turbines in the north-east near the highway have been removed following evaluation of the constraints assessment.

7.1.2.2 PLAINS-WANDERER HABITAT

A review of records for the Plains-wanderer, observed opportunistically within the Project Area and recorded in the locality, in conjunction with PCT mapping was conducted to determine areas of the Subject Land likely to support habitat for the species. Areas of PCT 44 in the south-west of the Project Area, where the species was observed, were considered as habitat, in addition to Yanga State Conservation Area (SCA) adjacent to the western boundary of the Project Area and areas in proximity to Abercrombie Creek in the south-east. These areas were assessed as an environmental constraint for their value as Plains-wanderer habitat and habitat connectivity. Proximity to Plains-wanderer habitat within the Subject Land was rated between 0 and 1 and proximity to the Yanga State Conservation Area was rated between 0 and 1. Nine turbines and a site entry point in the south-west of the Project Area have been removed in addition to seven turbines along the western boundary and the five turbines in the south-east.

Additionally, the Project has been designed to maximise the use of existing tracks, minimising vegetation clearance and, where possible, limiting an increase in access routes which may be used by predatory species which prey upon the Plains-wanderer. The Project design will also allow for the implementation of plain wire fencing to replace existing barbed wire fencing, hence reducing the risks of entanglement by the Plains-wanderer and other fauna.

7.1.2.3 THREATENED FLORA

Four threatened flora species have been observed within the Project Area:

- Chariot Wheels (*Maireana cheelii*);
- Mossgiel Daisy (*Brachyscome papillosa*);
- *Pterostylis pedina;* and
- Slender Darling (*Swainsona murrayana*).

Sixteen turbines identified in the constraints analysis as containing high concentrations of threatened flora have been removed from the Project as well as five turbines in the south-west in proximity to the Austral Pillwort potential habitat occurrence.

Chariot Wheels and Mossgiel Daisy have been observed to occur throughout the Subject Land in varying densities. Areas of heavy occurrence were identified and presented in the constraints analysis with each turbine assigned a rating between 0 (low or no occurrence) and 1 (moderate and heavy occurrence).

Habitat potentially suitable for Austral Pillwort, an SAII, was observed in the south-east of the Project Area. Records of the species occur to the east along Abercrombie Creek. This was assessed in the environmental constraints analysis as a rating of either 0 or 1 for each turbine for proximity to this feature. Targeted surveys for Austral Pillwort within suitable micro-habitats has failed to detect the species within the Project Area.

One individual Slender Darling Pea was observed in the south-west of the Project Area and was avoided during the EIS stage.

One clump of *Pterostylis pedina* was observed in the northwest of the Project Area. The Project was amended to avoid this clump through removal of an access track. No clumps of this species are known to occur within the Subject Land.

7.1.2.4 ALTERNATIVE LOCATIONS

The Project Area is identified as a highly suitable site for the proposed wind farm development. During the site selection process for the Project, various criteria were considered, including:

- Proximity and access to existing 330 kV line;
- Accessibility to the Project via a major road;
- An area that would avoid or limit the need to remove native vegetation or impact on other environmental values;
- A site with topographical features that would require minimal earthworks/ soil disturbance;
- A site with minimal flooding or bushfire risk;
- Minimal impact on surrounding privately or publicly owned land; and
- Minimal environmental impacts.

The Applicant considered several alternative sites that did not meet these criteria. The site location for the Project was selected as it ranked highest in each of these criteria.

A project of this magnitude requires significant land area, proximity to existing or proposed transmission networks and available network capacity. Many alternative sites were limited in providing these critical elements.

Due to the wind resource, sparsely populated locality, the proposed route of Project EnergyConnect, and being located within the South West REZ, it is considered that the site is optimal for wind energy generation.

Further, as part of the site identification process, engagement with Murray River Shire Council was undertaken to identify potential areas for renewable energy development in the locality, prior to engaging with the host landholders.

7.1.3 FURTHER MEASURES TO AVOID AND MINIMISE IMPACTS

Biodiversity impacts will be further avoided and minimised through mitigation measures designed to protect retained and adjacent vegetation and habitat during the construction, operation and decommissioning phases. These measures are summarised in Section 8.4 of this amended BDAR.

YANGA NR

YANGA SC

LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD

Legend

- High
- Moderate
- Low
- Removed Turbines
- Project Area
- Subject Land
- Main Road
- Road
- Path/Track
- Nature Reserve
- State Conservation Area

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 19/12/2025
Created By: VN
Drawing Size: A3
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F7-1 Turbine Risk Rating

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

0617753_KKWF_BDAR_R0.aprx

YANGA NR

LOORICA ROAD

STURT HIGHWAY

YANGA SC

KERI KERI ROAD

Legend

- Turbines
- Indicative potential location for workers accomodation, to be confirmed in EIS
- Indicative potential primary site access points, to be confirmed in EIS
- Indicative potential secondary site access point, to be confirmed in EIS
- Project Area
- O&M
- Laydown
- Construction Compound
- Batch Plant
- BESS
- Switching Station
- Substation
- Proposed Internal Transmission Line
- Access Track
- Main Road
- Road
- Path/Track
- Nature Reserve
- State Conservation Area

Source:
Boundary: Client Provided (date)
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

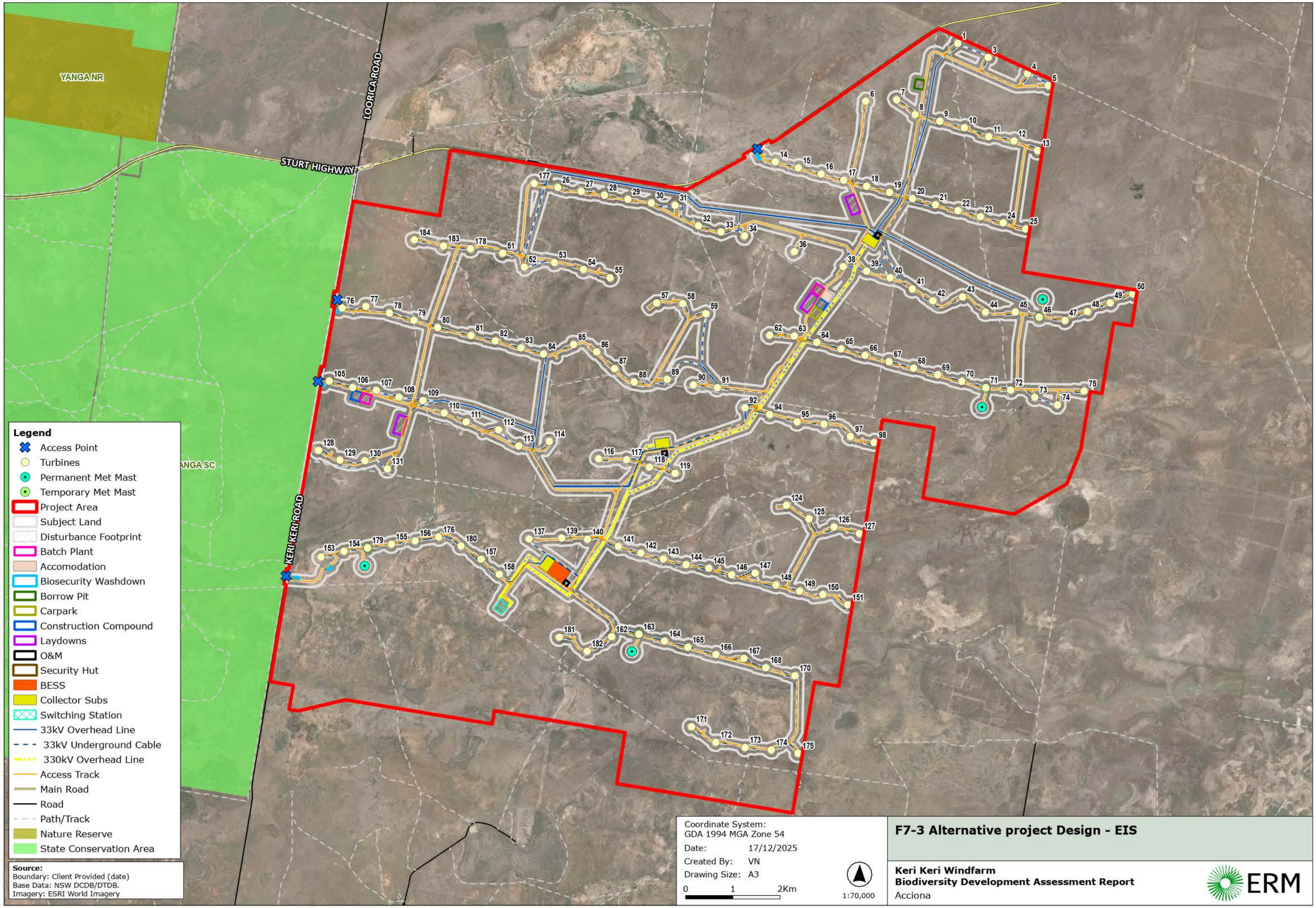
Coordinate System:
GDA 1994 MGA Zone 54
Date: 17/12/2025
Created By: VN
Drawing Size: A3
0 1 2Km
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F7-2 Alternative Project Design - Scoping Report

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

0617753_KKWF_BDAR_R0.aprx



0617753_KKWF_BDAR_R0.aprx

8. IMPACT ASSESSMENT

8.1 DIRECT IMPACTS

The construction and operational phase of the development will result in direct impacts to biodiversity values within the Subject Land which cannot be avoided. Direct impacts include the clearing of vegetation and threatened species' habitat.

The direct impacts of the development will occur to:

- Native vegetation (outlined in Table 8-1); and
- Threatened species and threatened species' habitat (outlined in Table 8-2).

TABLE 8-1 SUMMARY OF DIRECT IMPACTS ON NATIVE VEGETATION

Entity directly impacted	BC Act	EPBC Act	SAII entity	Project phase/timing of impact	Extent (ha)
VZ01_PCT164_Grassy	-	-	No	Construction	197.37
VZ02_PCT164_Open	-	-	No	Construction	138.82
VZ03_PCT164_Degraded	-	-	No	Construction	18.33
VZ04_PCT164_Dense	-	-	No	Construction	223.98
VZ05 _PCT164_Gilgais	-	-	No	Construction	70.92
VZ06_PCT163_Shrubland	-	-	No	Construction	115.47
VZ07_PCT159_Haul Route	-	-	No	Construction	0.17

TABLE 8-2 SUMMARY OF DIRECT IMPACTS ON THREATENED SPECIES

Candidate Species		BC Act	EPBC Act	SAII entity	Project phase/ timing of impact	Extent (ha)
Common Name	Scientific Name					
Mossgiel Daisy	*Brachyscome papillosa*	V	V	No	Construction	162.02
Chariot Wheels	*Maireana cheelii*	V	V	No	Construction	27.97

8.1.1 CHANGE IN VEGETATION INTEGRITY SCORE

Table 8-3 details the change in vegetation integrity score for each vegetation zone. The direct impact of the Project will result in the total clearing of native vegetation within the Subject Land.

TABLE 8-3 CHANGE IN VEGETATION INTEGRITY SCORE

Vegetation zone	Area (ha) in Development Footprint	Before development				Change in VI score
		Composition	Structure	Function	VI score	
VZ01_PCT164_Grassy	197.37	92.6	69.3	…	80.1	-80.1
VZ02_PCT164_Open	138.82	94.9	29.8	…	53.1	-53.1
VZ03_PCT164_Degraded	18.33	72.3	18.4	…	36.5	-36.5
VZ04_PCT164_Dense	223.98	84.3	99.2	…	91.4	-91.4
VZ05 _PCT164_Gilgais	70.92	86.5	53.8	…	68.2	-68.2
VZ06_PCT163_Shrubland	115.47	97.7	98.9	…	98.3	-98.3
VZ07_PCT159_Haul Route	0.17	61.5	47.3	…	53.9	-53.9

8.2 INDIRECT IMPACTS

The BAM (Section 8.2.2) identifies 16 potential indirect impacts that, as a minimum, must be considered as a part of a BDAR. Indirect impacts of the Project, on native vegetation, threatened entities and their habitat beyond the Subject Land have been considered in accordance with the BAM in Table 8-4. Note that assessment of indirect impacts because of the Project on PCTs and/or threatened species and their habitat have been fully considered, however, there may be some unforeseen indirect impacts that have not been predicted.

Mitigation measures to address the indirect impacts described in Table 8-4 are provided in Section 8.4. Despite the likelihood of occurrence of indirect impacts because of the Project, it is considered that the proposed mitigation measures are reliable and capable of limiting the effects of these impacts without causing harm to the adjoining environment.

TABLE 8-4 SUMMARY OF INDIRECT IMPACTS

Indirect impact	Nature	Extent	Impacted entities	Timing and duration of impact	Consequences
(a) Inadvertent impacts on adjacent habitat or vegetation	Construction activities may result in inadvertent impacts on retained vegetation, such as increased sedimentation, disturbance and compaction by construction vehicles, or accidental removal of vegetation external to the approved development area.	Uncertain, but generally in retained native vegetation adjacent to the approved development area.	PCTs, threatened species habitat and adjacent vegetation	Pre-construction, construction and operational phases.	Reduced condition of retained native vegetation and threatened species habitat adjacent to the approved development area, resulting in loss and dispersal of species.
(b) Reduced viability of adjacent habitat due to edge effects	Increase in edge:core habitat ratio, resulting in edge effects such as light and noise pollution, weed invasion and altered moisture, wind and temperature	Uncertain, but generally in retained native vegetation adjacent to the approved development area. The risk of impacts to the viability of adjacent habitat due to edge effects is considered moderate due to the level of soil disturbance and vehicle traffic required for construction.	PCTs, threatened species habitat and adjacent vegetation	Construction and operational phases.	Reduced condition of retained native vegetation adjacent to the approved development area. May reduce habitat quality or affect habitat use or movements of some species.

Indirect impact	Nature	Extent	Impacted entities	Timing and duration of impact	Consequences
(c) Reduced viability of adjacent habitat due to noise, dust or light spill	Construction and operational activities are likely to increase the noise, dust and light above current levels within and beyond the Subject Land.	Uncertain, but generally in retained native vegetation and habitat adjacent to the approved development area.	Threatened fauna species	Construction and operational phases.	Disruption of fauna habitat usage during construction and operation.
(d) Transportation of weeds and pathogens from the Subject Land to adjacent vegetation	High threat weeds and other exotic species may be inadvertently spread to other areas within and beyond the Subject Land. Of particular concern, is the spread of African Boxthorn (*Lycium ferocissimum*) into Plains-wanderer (*Pedionomus torquatus*) habitat and the introduction of the chytrid fungus (*Batrachochytrium dendrobatidis*), particularly near Southern Bell Frog (*Litoria* raniformis) habitat.	Uncertain, but generally in retained native vegetation adjacent to the approved development area.	PCTs, threatened species habitat and adjacent vegetation	Construction, operational and decommissioning phases.	Reduced condition of retained native vegetation adjacent to the approved development area and a change in the composition of foraging resources, which may be detrimental to certain fauna species.

Indirect impact	Nature	Extent	Impacted entities	Timing and duration of impact	Consequences
(e) Increased risk of starvation, exposure and loss of shade or shelter	Construction and operational impacts may cause a decline in habitat suitability, particularly for species with specific habitat requirements. For example, construction could result in a degradation of ground-level vegetation resulting in loss of foraging and nesting habitat for small, threatened birds, e.g. Southern Whiteface (*Aphelocephala leucopsis*).	Uncertain, but generally in retained native vegetation and other habitats adjacent to the approved development area.	Threatened fauna species	Construction phase and potentially ongoing during the operational phase.	Clearing of native vegetation for the construction of the Project will result in reduction of resources available for threatened fauna species that may result in starvation, exposure and loss of shade or shelter. The extent of clearing of native vegetation has been minimised where possible. Reduced function of retained native vegetation and other habitats adjacent to the approved development area may force species to disperse or be detrimental to their survival.

Indirect impact	Nature	Extent	Impacted entities	Timing and duration of impact	Consequences
(f) Loss of breeding habitat due to vegetation clearance	Construction and operational impacts may cause a decline in habitat suitability, particularly for species with specific breeding requirements. For example, indirect impacts to vegetation may cause foliage loss which will affect the amount of cover available to small, threatened birds which nest in low shrubs, e.g. White-fronted Chat (*Epthianura albifrons*).	Uncertain, but generally in retained native vegetation and other habitats adjacent to the approved development area.	Threatened fauna species	Construction phase and potentially ongoing during the operational phase.	Reduced function of retained native vegetation and other breeding habitats adjacent to the approved development area which may force species to disperse or be detrimental to their survival.
(g) Trampling of threatened flora species	Construction and operational activities may result in inadvertent trampling of threatened flora by humans and construction and / or operational vehicles.	Uncertain, but where threatened flora species occur in retained native vegetation adjacent to the approved development area.	Present threatened flora species: Mossgiel Daisy (*Brachyscome papillosa*), Chariot Wheels (*Maireana cheelii*), *Pterostylis pedina*	Construction, operational and decommissioning phases.	Reduction in the number and extent of threatened flora species.
(h) Inhibition of nitrogen fixation, soil microbial function and increased soil salinity	Construction and operational activities may result in disruption to soil microbial activity and processes which occur in the soil due to compaction by heavy vehicles, introduction of chemicals and altered vegetation.	Uncertain, but generally in approved development area and retained native vegetation and other habitats adjacent to the approved development area.	PCTs, threatened species and their habitat	Construction phase and ongoing during the operational phase.	Reduced vegetation function and the subsequent impacts on foraging resources and habitat.

Indirect impact	Nature	Extent	Impacted entities	Timing and duration of impact	Consequences
(i) Fertiliser drift	Construction and operational activities will result in a reduction in vegetation extent which means that fertiliser drift from existing agricultural activities will be able to spread further into the landscape affecting other areas of vegetation and habitat.	Uncertain, but generally in retained native vegetation and other habitats adjacent to the approved development area.	PCTs, threatened species and their habitat	Construction phase and ongoing during the operational phase.	Reduced native vegetation function and the subsequent impacts on foraging resources and habitat. Potential reduction in water quality in waterbodies, including farm dams.
(j) Rubbish dumping due to improper management of waste	Construction and operational activities may result in inadvertent rubbish dumping which can negatively affect vegetation communities and habitat resources.	Uncertain, but generally in retained native vegetation and other habitats adjacent to the approved development area.	Threatened species and their habitats.	Construction phase and ongoing during the operational phase.	Reduced native vegetation function and impacts on suitable habitat. Improper waste disposal, particularly food waste, can contribute to an increase in feral animal populations. This poses a significant threat to threatened fauna, including the Plains-wanderer, particularly if the waste attracts predators such as the European fox (*Vulpes vulpes*), rats (*Rattus* spp.) and the feral cat (*Felis catus*).

Indirect impact	Nature	Extent	Impacted entities	Timing and duration of impact	Consequences
(k) Wood collection	Construction and operational activities will result in a reduction in vegetation extent which means that existing wood collection will need to be undertaken in other areas of vegetation and habitat.	Uncertain, but generally in retained native vegetation and other habitats adjacent to the approved development area. Note that the lack of trees within the Subject Land will mean that wood collection is limited to small sticks from shrubs but, wood collection (for informal campfires) from woodland areas in the PREP area is possible by construction staff, if temporary accommodation camps are set up during the construction phase.	Threatened fauna species. Nesting threatened birds may use sticks to build their nests.	Construction phase.	Reduced native vegetation function and impacts on habitat, particularly for species which use fallen logs for foraging or shelter. Removal of dead wood and dead trees is a key threatening process in schedule 4 of the BC Act. It can result in the loss of important habitat, such hollow logs and decaying wood, for a wide variety of species.

Indirect impact	Nature	Extent	Impacted entities	Timing and duration of impact	Consequences
(m) Increase in predators	Construction and operational activities may result in a disturbance to the natural ecological balance of fauna and vegetation communities which may lead to an increase in predators. For example, disruption to existing fauna corridors may mean prey become exposed to predation and thus predator numbers increase as food becomes more readily available.	Uncertain, but generally in approved development area and retained native vegetation and other habitats adjacent to the approved development area.	Threatened fauna species	Construction phase and ongoing during the operational phase.	Reduction in fauna numbers and the gene pool of populations. Reduction in the number of herbivores in vegetation communities, potentially disrupting the ecological balance. The Plains-wanderer is at risk of predation from feral cats and the European fox, already known to occur in the locality. More details are provided in Section 8.2.1.
(n) Increase in pest animal populations	Construction and operational activities may result in a disturbance to the natural ecological balance of fauna and vegetation communities which may lead to an increase in pest animal populations.	Uncertain, but generally in approved development area and retained native vegetation and other habitats adjacent to the approved development area.	PCTs, threatened species and their habitat	Construction phase and ongoing during the operational phase.	Increase in the number of herbivores, e.g. the European rabbit (*Oryctolagus cuniculus*) in vegetation communities, potentially disrupting the ecological balance.

Indirect impact	Nature	Extent	Impacted entities	Timing and duration of impact	Consequences
					Negative impacts to vegetation communities and habitats by pest animals, such as rooting by the feral pig (*Sus scrofa*), soil erosion and weed incursions. Competition with and predation of native fauna.
(o) Change in fire regimes	Construction and operational activities may result in vegetation community changes which lead to different fuel consumption patterns, increased intensity and severity of fires, increased or altered fire frequency, larger patch size, and changes to the timing of fires.	Uncertain, but generally in approved development area and retained native vegetation and other habitats adjacent to the approved development area.	PCTs, threatened species and their habitat	Construction phase and ongoing during the operational phase.	This risk is considered low due to the lack of trees and tall shrubs within the Subject Land. However, altered vegetation community composition, structure and function as a result of the Project may lead to fires in shrub and grass communities in very dry conditions, following good growth of vegetation in wet conditions (and hence a fuel source). Loss or changes to habitats and resources.

Indirect impact	Nature	Extent	Impacted entities	Timing and duration of impact	Consequences
(p) Disturbance to specialist breeding and foraging habitat	Construction and operational activities may result in loss or alteration to specialist breeding and foraging habitat. For example, changes to patches of remnant vegetation preferred by the Plains-wanderer may become smaller and less desirable.	Uncertain, but generally in retained native vegetation adjacent to the approved development area.	Threatened fauna species	Construction phase and ongoing during the operational phase.	Reduction in fauna numbers, fitness and the gene pool of populations. The Plains-wanderer utilises shrublands and grasslands. These areas within the Subject Land are likely to provide important foraging habitat and a small amount of breeding habitat. Disruption to the specialist habitat preferred by the Plains-wanderer may decrease its fitness.

8.2.1 INCREASED RISK OF PREDATORS

The European fox (*Vulpes vulpes*), the feral cat (*Felis catus*) and native birds of prey, such as the Spotted Harrier (*Circus assimilis*) and Black Falcon (*Falco subniger*), are all potential predators of the Plains-wanderer (*Pedionomus torquatus*). Predation by the European Fox is considered a major threat to the species in NSW and is listed as a Key Threatening Process in Schedule 4 of the BC Act. The European Fox has been recorded within the PREP area, and the feral cat is predicted to occur, and these species are considered likely to traverse and forage across the Subject Land. Owing to the conservation significance of the Plains-wanderer (critically endangered under the EPBC Act, endangered under BC Act) and the high dispersal potential of predatory species, pest management actions are required to be undertaken across the entire PREP area to ensure increase the chance of their successful implementation.

The Project involves the construction of internal roads and tracks which will lead to a larger road network across the site. The European fox and feral cat commonly make use of these cleared areas with easy access, with greater hunting successes recorded for foxes along linear habitats, such as roadsides, when compared to remnant vegetation and open paddocks.

Improper waste disposal can contribute to an increase in feral animal populations, which poses a significant threat to threatened fauna, including the Plains-wanderer. The presence of food waste and rubbish attracts predators such as the European fox, rats and the feral cat, leading to greater predation pressure on native species.

The Project has been designed to maximise use of existing access tracks across the Subject Land where possible, reducing the likelihood of an increase in predatory access and activity. Potential risks will be mitigated further via the preparation and implementation of feral pest management programs to be developed in accordance with guidelines and the relevant code of practice, including but not limited to the following:

- NSW Threat Abatement Plan: Predation by the Red Fox (*Vulpes vulpes*) (NSW OEH, 2010);
- Regional Pest Management Strategy 2012-2017: Western Rivers Region (NSW OEH, 2012); and
- NSW Code of Practice and Standard Operating Procedures for the Effective and Humane Management of Feral Cats (Sharp, et al., 2022).

The Applicant will consider funding control actions for the European Fox and the feral cat in the locality to further support conservation efforts for threatened species. More details are provided in Section 8.4

8.3 PRESCRIBED IMPACTS

The following prescribed impacts are relevant to the Subject Land:

- Impacts on the following habitat of threatened entities:
  - Human-made structures;
  - Non-native vegetation;
- Impacts on areas connecting threatened species habitat and which maintain their lifecycle, such as movement corridors;
- Impacts that affect water quality, water bodies and hydrological processes that sustain threatened entities;
- Impacts on threatened and protected animals from turbine strike and / or barotrauma.
- Impacts on threatened species or fauna that are part of a TEC from vehicle strike.

See Table 8-5 for the nature, extent, frequency, duration, timing and consequences of each impact and for identification of affect threatened entities. It is considered that the most serious of these impacts involve mortality and injury of avian species from turbine strike and / or barotrauma. These are assessed further in Section 8.4 and in the draft BBAMP in Appendix A.

TABLE 8-5 SUMMARY OF PRESCRIBED IMPACTS

Impact	Nature	Extent	Frequency, Timing & Duration	Associated Threatened Entities	Consequences
Removal of human-made structures	Human-made structures within the Subject Land include fences, gates, signs, windmills and water troughs and other agricultural infrastructure. Raptors and other avian species are known to frequently use human-made structures for foraging, perching and nesting. Troughs and drainage / irrigation channels within the Subject Land may be used by fauna species as a water source. Microbats may use human structures, such as culverts for roosting.	Subject Land	Once. Construction phase. Permanent.	<u>All Subject Land ecosystem credits species:</u> • Magpie Goose (*Anseranas semipalmata*) • Southern Whiteface (*Aphelocephala leucopsis*) • Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) • Pied Honeyeater (*Certhionyx variegatus*) • Little Pied Bat (*Chalinolobus picatus*) • Spotted Harrier (*Circus assimilis*) • White-fronted Chat (*Epthianura albifrons*) • Grey Falcon (*Falco hypoleucos*) • Black Falcon (*Falco subniger*) • Brolga (*Grus rubicunda*) • White-bellied Sea-Eagle (Foraging)(*Haliaeetus leucogaster*) • Little Eagle (Foraging) (*Hieraaetus morphnoides*) • Pink Cockatoo (Foraging) (*Lophochroa leadbeateri*) • Blue-winged Parrot (*Neophema chrysostoma*) • Plains-wanderer (Foraging) (*Pedionomus torquatus*) • Redthroat (*Pyrrholaemus brunneus*) <u>EPBC Act threatened / migratory species</u> • Fork-tailed Swift (*Apus pacificus*)	While current human-made structures may be removed during construction of the Project, it is noted that additional fencing and infrastructure will be installed for and by the Project. Therefore, there is no expected limitation to the availability of these features.
Removal or disturbance of non-native vegetation	Removal of non-native vegetation which may provide habitat for nature fauna. Non-native vegetation in the Subject Land consists of exotic shrubs which can provide habitat for small birds and shelter for mammals and reptiles. Exotic grasses and forbs can provide foraging resources for granivorous birds. Exotic species can also support insects which are consumed by reptiles, amphibians, insectivorous birds and Microchiropteran bats. Removal of non-native vegetation may impact the foraging abilities for threatened raptors and reptiles which prey on small animals utilising these areas.	12.25 ha of non-native vegetation in the Subject Land	Once. Construction phase. Permanent	<u>All Subject Land ecosystem credits species:</u> • Magpie Goose (*Anseranas semipalmata*) • Southern Whiteface (*Aphelocephala leucopsis*) • Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) • Pied Honeyeater (*Certhionyx variegatus*) • Little Pied Bat (*Chalinolobus picatus*) • Spotted Harrier (*Circus assimilis*) • White-fronted Chat (*Epthianura albifrons*) • Grey Falcon (*Falco hypoleucos*) • Black Falcon (*Falco subniger*) • Brolga (*Grus rubicunda*) • White-bellied Sea-Eagle (Foraging)(*Haliaeetus leucogaster*) • Little Eagle (Foraging) (*Hieraaetus morphnoides*) • Pink Cockatoo (Foraging) (*Lophochroa leadbeateri*) • Blue-winged Parrot (*Neophema chrysostoma*) • Plains-wanderer (Foraging) (*Pedionomus torquatus*) • Redthroat (*Pyrrholaemus brunneus*) <u>EPBC Act threatened / migratory species</u> • Fork-tailed Swift (*Apus pacificus*)	Reduction in potential shelter and foraging resources.
Increased habitat fragmentation / impacts on habitat connectivity	Reduction in habitat connectivity value, not only from the loss in vegetation, but also from an increase in edge effects (such as light, and noise pollution). The areas of native shrubland and grasslands within the Subject Land may contain some connectivity value, particularly for small and cryptic species.	Loss of 765.06 ha of native vegetation impacted in Subject Land See Table 4-9 for total areas of each PCT and VZ.	Once. Construction phase. Permanent.	<u>All Subject Land ecosystem credits species:</u> • Magpie Goose (*Anseranas semipalmata*) • Southern Whiteface (*Aphelocephala leucopsis*) • Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) • Pied Honeyeater (*Certhionyx variegatus*) • Little Pied Bat (*Chalinolobus picatus*) • Spotted Harrier (*Circus assimilis*) • White-fronted Chat (*Epthianura albifrons*) • Grey Falcon (*Falco hypoleucos*) • Black Falcon (*Falco subniger*)	Some species may avoid edge habitat, increasing competition for resources and disrupting home ranges. Gene flow may be restricted to sub-populations no longer connected by suitable habitat to facilitate dispersal. It is important to note however, that the vegetation removal would not result in complete isolation of any habitat patches due to the narrow, linear nature of the Project.

Impact	Nature	Extent	Frequency, Timing & Duration	Associated Threatened Entities	Consequences
				• Brolga (*Grus rubicunda*) • White-bellied Sea-Eagle (Foraging)(*Haliaeetus leucogaster*) • Little Eagle (Foraging) (*Hieraaetus morphnoides*) • Pink Cockatoo (Foraging) (*Lophochroa leadbeateri*) • Blue-winged Parrot (*Neophema chrysostoma*) • Plains-wanderer (Foraging) (*Pedionomus torquatus*) • Redthroat (*Pyrrholaemus brunneus*) <u>EPBC Act threatened / migratory species</u> • Fork-tailed Swift (*Apus pacificus*)	Habitat connectivity for woodland dependent fauna is considered poor owing to the highly fragmented woodland habitat available within the broader PREP, and no woodland habitat within the Subject Land. Despite this, habitat connectivity for species dependant on grassland and open shrubland is considered moderate to high and species reliant on these habitat values may be impacted by reductions in connectivity. However, fencing, overgrazing, and historical land management practices have previously reduced connectivity values.
Impacts on water quality, water bodies and hydrological processes	During the construction phase direct impacts can cause erosion and sedimentation resulting in the movement of soil to adjacent habitats, particular during rain events. There will also be indirect impacts throughout the operational phase with increased run-off from non-permeable surfaces. The Southern Bell Frog (*Litoria raniformis*) was recorded in several farm dams in the north-west of the Subject Land. The farm dams in this area and the channels and run-off areas the connect them provide habitat for this species. Additionally, all threatened species are expected to utilise waterbodies throughout the Subject Land, including permanent water sources such as farm dams and ephemeral water sources in wetland areas subject to flooding.	Uncertain, although likely to be minor. Standard erosion control methods would be used during construction, and standard stormwater management measures would be implemented during the operational phase.	During rainfall events in the construction phase. Ongoing and permanent during the operational phase.	<u>All Subject Land ecosystem credits species:</u> • Magpie Goose (*Anseranas semipalmata*) • Southern Whiteface (*Aphelocephala leucopsis*) • Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) • Pied Honeyeater (*Certhionyx variegatus*) • Little Pied Bat (*Chalinolobus picatus*) • Spotted Harrier (*Circus assimilis*) • White-fronted Chat (*Epthianura albifrons*) • Grey Falcon (*Falco hypoleucos*) • Black Falcon (*Falco subniger*) • Brolga (*Grus rubicunda*) • White-bellied Sea-Eagle (Foraging)(*Haliaeetus leucogaster*) • Little Eagle (Foraging) (*Hieraaetus morphnoides*) • Pink Cockatoo (Foraging) (*Lophochroa leadbeateri*) • Blue-winged Parrot (*Neophema chrysostoma*) • Plains-wanderer (Foraging) (*Pedionomus torquatus*) • Redthroat (*Pyrrholaemus brunneus*) <u>EPBC Act threatened / migratory species</u> • Fork-tailed Swift (*Apus pacificus*)	May decrease downstream water quality, which would affect pollution-sensitive species, and may impact the quality of drinking water for all threatened entities.
Impacts on threatened and protected animals from turbine strike and / or barotrauma	Turbine strike involves individual birds or bats being killed due to collision with moving rotors. In addition to fatalities caused directly by turbines rotor strikes, Microchiropteran bats are known to be at risk of 'barotrauma'. Barotrauma refers to tissue and lung damage caused by air pressure changes around turbine rotors.	Subject Land The project comprises up to 114 WTG, which would each have an overall maximum height of 291.5 m and maximum RSA of 90 – 291.5 m.	Ongoing and permanent during the operational phase.	<u>All Subject Land ecosystem credits species:</u> • Magpie Goose (*Anseranas semipalmata*) • Southern Whiteface (*Aphelocephala leucopsis*) • Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) • Pied Honeyeater (*Certhionyx variegatus*) • Little Pied Bat (*Chalinolobus picatus*) • Spotted Harrier (*Circus assimilis*) • White-fronted Chat (*Epthianura albifrons*) • Grey Falcon (*Falco hypoleucos*) • Black Falcon (*Falco subniger*) • Brolga (*Grus rubicunda*) • White-bellied Sea-Eagle (Foraging)(*Haliaeetus leucogaster*) • Little Eagle (Foraging) (*Hieraaetus morphnoides*)	Injury to or death of fauna. Collision risk varies with species and behaviour, site specific topography, weather conditions, turbine height and design, and turbine layout. Certain bird, groups such as raptors and waterbirds, are considered at greater risk of collision because of their flight heights, size and behaviour. Microchiropteran bats most at risk from barotrauma include relatively

Impact	Nature	Extent	Frequency, Timing & Duration	Associated Threatened Entities	Consequences
				• Pink Cockatoo (Foraging) (*Lophochroa leadbeateri*) • Blue-winged Parrot (*Neophema chrysostoma*) • Plains-wanderer (Foraging) (*Pedionomus torquatus*) • Redthroat (*Pyrrholaemus brunneus*) <u>EPBC Act threatened / migratory species</u> • Fork-tailed Swift (*Apus pacificus*)	high-flying species that prefer to forage above canopy height.
Mortality and injury of native fauna from vehicle strike	While the Project will endeavour to use existing tracks, it may result in the construction of new internal access tracks to deliver wind farm components and for operational purposes.	Uncertain. Likely be minor due to low-speed limits within Subject Land.	Ongoing and permanent during the construction and operational phases.	<u>All Subject Land ecosystem credits species:</u> • Magpie Goose (*Anseranas semipalmata*) • Southern Whiteface (*Aphelocephala leucopsis*) • Dusky Woodswallow (*Artamus cyanopterus cyanopterus*) • Pied Honeyeater (*Certhionyx variegatus*) • Little Pied Bat (*Chalinolobus picatus*) • Spotted Harrier (*Circus assimilis*) • White-fronted Chat (*Epthianura albifrons*) • Grey Falcon (*Falco hypoleucos*) • Black Falcon (*Falco subniger*) • Brolga (*Grus rubicunda*) • White-bellied Sea-Eagle (Foraging)(*Haliaeetus leucogaster*) • Little Eagle (Foraging) (*Hieraaetus morphnoides*) • Pink Cockatoo (Foraging) (*Lophochroa leadbeateri*) • Blue-winged Parrot (*Neophema chrysostoma*) • Plains-wanderer (Foraging) (*Pedionomus torquatus*) • Redthroat (*Pyrrholaemus brunneus*) <u>EPBC Act threatened / migratory species</u> • Fork-tailed Swift (*Apus pacificus*)	Death or injury to fauna that may cross roads on the ground or low flying avian species.

8.4 MITIGATING RESIDUAL IMPACTS – MANAGEMENT MEASURES AND IMPLEMENTATION

A range of mitigation measures have been developed for the Project to mitigate the impacts to native vegetation and habitat that are unable to be avoided. These include a range of measures to be undertaken before and during construction to limit the impact of the Project. Each mitigation measure is discussed in detail in Table 8-6.

In accordance with Section 8.4 the BAM, adaptive management is to be used to address impacts that are infrequent or difficult to measure, such as indirect or prescribed impacts, or other remaining biodiversity impacts. A key component of the Project's adaptive management to reduce impacts on biodiversity values includes the development and implementation of a BBAMP. The BBAMP aims to address uncertainties around the ongoing impact of collision and barotrauma related mortalities on avian species.

The BBAMP is to outline the monitoring measures, key thresholds for determining permissible impacts and corrective actions that are required to achieve objectives that aim to minimise impacts on birds and bats during the operational phase. Monitoring measures include assessment of monthly mortality rates of avian species and periodic BUS. In addition, appropriate mitigation measures have been identified (such as the regular removal of lamb carcasses during lambing season to decrease the attractiveness of the area to feeding raptors). Refer to the draft BBAMP in Appendix A for more information.

In addition to the BBAMP, the management plans listed below will be prepared and implemented prior to the construction phase of the Project.

- Construction Environmental Management Plan (CEMP);
- Construction Traffic Management Plan (CTMP);
- Soil and Water Management Plan (SWMP); and
- Biodiversity Management Plan (BMP) (see framework in Section 8.4.1).

There is scope to ensure that the principals of adaptive management are included in these management plans, for example, through the monitoring of operational performance and by providing flexibility to adjust management measures where required.

To ensure the efficacy of these management plans, they will include details such as date for commencement and completion of implementation, evidence of suitable qualifications of the author, qualification requirements for implementation of protocols, timelines, budgets and all reporting requirements.

To informing these management plans, 'Environmental Sensitive No-Go Zones' subject to the protocols defined in the management plans includes but is not limited to areas of:

- Native vegetation beyond the Development Footprint
- Threatened flora beyond the Development Footprint
- Threatened fauna habitat beyond the Development Footprint
- Waterways beyond the Development Footprint

These areas are displayed in Figure 8-1.

TABLE 8-6 SUMMARY OF PROPOSED MITIGATION AND MANAGEMENT MEASURES FOR RESIDUAL IMPACTS (DIRECT, INDIRECT AND PRESCRIBED)

Mitigation measure		Method	Timing	Frequency	Responsibility
Removal of native and threatened species habitat and habitat features					
B01	Offsets	Residual impacts on habitat will be offset through the Biodiversity Offset Scheme.	Prior to construction	Once	Applicant
B02	Vegetation Clearing Protocol	Where vegetation is to be removed it will be undertaken in accordance with specifications provided in a vegetation clearing protocol, detailed within the CEMP. A qualified ecologist is to conduct pre-clearance surveys in vegetation and habitat prior to daily construction. If fauna is identified during construction, works must stop. A suitably qualified ecologist or wildlife rescuer is to follow rescue procedures prior to recommencement of construction.	Pre-construction and construction phase	Throughout planning and construction phase	Construction contractor
B03	Fencing Protocol	Fencing will be used to exclude fauna from entering areas under construction where an increased risk of vehicle strike is present. Fencing may also be used to direct fauna between areas of habitat. Plain wire fencing (as opposed to barbed-wire fencing) will be used to avoid potential entrapment of fauna on fences. Regular monitoring and maintenance of fencing to ensure it is fit for purpose is to be conducted and informed by the CEMP.	Construction phase	Ongoing	Construction contractor
B04	Chemical Protocol	'Environmental Sensitive No-Go Zones' will be established around areas of significance including threatened fauna habitat, threatened flora species locations and waterways outside the Development Footprint. These locations are informed by this BDAR and are to be further informed by pre-clearance surveys. Chemicals are not to be stored or prepared within the no-go zones and the use of any chemicals in proximity to a no-go zone must be under strict controls.	Construction phase	Ongoing	Construction contractor
B05	Driving Protocol	Within the Subject Land, speed limits will be signed and enforced and 'Environmental Sensitive No-Go Zone's will be established around threatened fauna habitat and native vegetation to minimise injury or death from construction vehicles and equipment and avoid trampling of native vegetation beyond the Development Footprint. Vehicles are to only enter and exit the Project Area via the designated access points. The driving protocol is to be detailed in the CTMP.	Construction phase	Ongoing	Construction contractor
B06	Unexpected finds protocol	An unexpected finds protocol will be included in the CEMP. Staff would be briefed on what threatened flora and fauna species identified within the Subject Land would constitute a stop works procedures. An unexpected finds protocol and a stop works procedure would be engaged.	Construction phase	Throughout planning and construction phase	Construction contractor
Impact to native vegetation					
B07	Delineation of clearing areas	To avoid unnecessary removal or damage to retained vegetation, the limit of clearing will be clearly demarcated and signed as 'Environmental Sensitive No-Go Zones' prior to the commencement of clearing. This will be detailed within the CEMP, including measures: • Vehicles or machinery will not be permitted to park within or drive through areas of retained vegetation. • Construction materials will not be stockpiled or stored within areas of retained vegetation. • Ancillary facilities, such as site compounds and construction zones, will not be located beyond the limits of clearing. • Temporary fencing and signage will be maintained throughout construction. • Site inductions will be given by the civil contractor to all personnel and visitors to ensure all site workers and visitors are aware of any No-Go Zones.	Pre-construction and construction phase	Throughout planning and construction phase	Construction contractor
Light/noise/dust					
B08	Daily/seasonal timing of construction activities to reduce impact of noise and light spill	The CEMP will include measures to avoid light encroachment on adjacent habitats such as restricting construction works to daylight hours and incorporating sensitive lighting arrays that shield the adjoining native vegetation and habitat from stray light, with low-level lighting installed for all required external lighting. Excess nocturnal noise is to be avoided where practical during breeding season for the Southern Bell Frog (roughly September through March).	Pre-construction and construction phase	Throughout planning and construction phase	Construction contractor
B09	Adaptive dust monitoring programs to control air quality	The Applicant will implement programs to monitor the generation of dust during construction activities. All construction activities will be undertaken with the objective of preventing visible dust emissions from construction activities.	Construction phase	Clearing phase	Construction contractor

Mitigation measure		Method	Timing	Frequency	Responsibility
Invasive flora/pathogens					
B10	Weed Management	A weed management protocol will be described in the CEMP. To minimise the spread of weeds throughout the Subject Land and surrounding patches, appropriate weed control activities will be undertaken in accordance with State and regional weed management plans. The Subject Land is subject to the *Riverina Regional Strategic Weed Management Plan 2023-2027* (LLS, 2022) and management of Weeds of National Significance. The NSW *Biosecurity act 2015* and regulations provide specific legal requirements for state level priority weeds and high-risk activities. To comply with the objectives of the *Riverina Regional Strategic Weed Management Plan 2023-2027* (LLS, 2022), the following measures will be implemented as part of the CEMP for the Subject Land: • Initial weed treatment - Including eliminating woody species and targeting infestations of exotic herbs. In particular High Threat Exotic weed species occurring within the Subject Land will be managed to prevent further spread. Prior to any vegetation clearance, High Threat Exotic weeds should be demarcated for these to be disposed of separately from native material. • Containment – Follow-up monitoring and maintenance will be undertaken in areas of the development site that have received past primary weeding treatments to contain any re-emergence of weed species throughout the construction phase. • Minimisation – Minimisation of weed species that cannot be effectively controlled on the site, such as exotic grasses, will be prevented from further spread through construction and operational phase site hygiene procedures. The use of any chemicals for the purpose of weed management is to be carried out in accordance with the chemical protocol.	Construction and operations phase	Ongoing	Construction and operations contractors
B11	Pathogen Management	A pathogen management protocol will be described in the CEMP. The risk of spreading pathogens and the mitigation measures required on site will be regularly communicated to staff and contractors during inductions and toolbox talks. Wash down stations for vehicles and staff footwear to be implemented to prevent the inadvertent introduction or spread of Chytrid Fungus into the Subject Land. Vehicle hygiene and pathogens are to be further managed by details described in the CTMP and driving protocol to ensure vehicles are only entering and exiting via designated access points so that pathogen management can be monitored.	Construction and operations	Ongoing	Construction and operations contractors
Erosion and sediment					
B12	Soil and Water Management Plan – Erosion and Sediment Control Plan	A site-specific Erosion and Sediment Control Plan will be developed and implemented to minimise erosion and sediment control risks. The Plan will include arrangements for managing wet weather events, and working with high surface water levels, including monitoring of potential high-risk events and specific controls and follow-up measures to be applied in the event of wet weather to avoid adverse impacts to hydrological processes, wetlands and ephemeral creek lines.	Construction phase	Ongoing	Construction contractors

YANGA NR

YANGA SC

LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD

Legend

- Project Area
- Subject Land
- Environmental Sensitive No-Go Zones
- Main Road
- Road
- Path/Track
- Nature Reserve
- State Conservation Area

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 12/01/2026
Created By: VN
Drawing Size: A3
0 1 2Km
1:70,000

F8-1 Environmental Sensitive No-Go Zones within the Project Area

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

0617753_KKWF_BDAR_R1.aprx

8.4.1 BMP FRAMEWORK

A BMP will be prepared and implemented to manage indirect impacts on adjoining vegetation and habitat during the construction and operational phase of the Project. Collectively, the mitigation measures specified in the BMP aim to ensure the Project is carried out responsibly and maintains the ecological integrity of the local environment throughout the life of the Project. The framework of the BMP is outlined in Table 8-7.

TABLE 8-7 BIODIVERSITY MANAGEMENT PLAN FRAMEWORK

BMP Section	Content
Purpose and objects of BMP	• Describes the purpose of the BMP and its objectives, which would be defined by the Projects conditions of consent. • Defines the area to be managed and management timeframe. • Identify persons/entities responsible for implementing the BMP. • Identify interactions with other management plans.
Existing environment	Describes the environment of the management area including any baseline datasets used to measure management efficacy.
Management Actions and Performance targets	• Defines the management actions and how they are to be implemented in terms of method, timing and frequency. • Quantitatively describes the expected outcome of management so that can be measured.
Monitoring	• Describes the monitoring program to be used to measure the efficacy of management activity in terms of method, timing and frequency • Describes analytical framework for evaluating monitoring data against performance targets
Trigger Action Response Plan (TARP)	A process defining the actions to be taken when monitoring data indicates the management actions are either failing to achieve stated performance targets or have already exceeded expected outcomes
Adaptive management	Details the process for adjusting actions based on results to achieve a specified outcome. It is to cater for a response to impacts: • For which mitigation measures/management has not been proposed; • For which mitigation measures have an uncertain likelihood of success; or • That are uncertain.
Reporting and Review	• Defines the content, timing and frequency of reporting. • Defines the process for plan review.

Typically, the BMP will focus on controlling weeds (including high threat weeds) and pest species, managing habitat, revegetation works, protocols for managing pathogens and managing unexpected finds. This document would rely on/integrate with other management plans such as a Soil and Water Management Plan to deliver a whole of environment management process.

8.5 ADAPTIVE MANAGEMENT FOR UNCERTAIN IMPACTS

The Projects direct impact will be remedied by biodiversity credits with minimal indirect impact of consequence assuming adequate implementation of the BMP. Consequently, there is no provision for adaptive management to address these matters.

Prescribed impacts are likely, notably wind turbine strike. Adaptive management principles are to the defined in the BBAMP.

8.6 USE OF BIODIVERSITY CREDITS TO MITIGATE OR OFFSET INDIRECT OR PRESCRIBED IMPACTS

No biodiversity credits are proposed to mitigate or offset indirect impacts. The Project BMP will have sufficient scope to appropriately manage indirect impacts on biodiversity values within an existing highly degraded environment.

Prescribed impacts resulting in mortalities to birds and bats from turbine strike will be managed through the Project BBAMP. The use of biodiversity credits to remedy these impacts at this stage is pre-emptive and not based on actual impacts. It is the purpose of the adaptive management framework of the BBAM to identify suitable remedies to this prescribed impact.

The use of biodiversity credits to mitigate or offset these prescribed impacts will form part of the adaptive management framework along with other mechanisms to manage impacts. No specification for these purposes is presented in this BDAR.

8.7 IMPACTS ON MNES

On 2 May 2022, a delegate of the Federal Minister for the Department of Agriculture, Water and the Environment determined that the Keri Keri Wind Farm project was a controlled action under Section 75 of the EPBC Act. The EPBC Act controlling provisions for the proposed actions restricted to *listed threatened species and communities* (Sections 18 and 18A).

A check list is provided in Appendix E.

8.7.1 TECS AND THREATENED SPECIES

Paragraph 14 of the supplementary SEARs requires specific information is to be provided with respect to each of the determined controlling provisions, as specified by paragraphs 15-18 of the Supplementary SEARs. These are listed as follows:

Threatened Ecological Communities

- Natural Grasslands of the Murray Valley Plains

Threatened Species

- Plains-wanderer (*Pedionomus torquatus*)
- Winged Peppercress (*Lepidium monoplocoides*)
- Chariot Wheels (*Maireana cheelii*)
- Mossgiel Daisy (*Brachyscome papillosa*).

Section 5.3 identifies the Natural Grasslands of the Murray Valley Plains TEC as being absent from the Subject Land. Therefore, the Project is not likely to have a direct or indirect impact on this TEC. Conversely, Section 5.3 identifies the above listed threatened species as occurring within the Subject land and thus will be directly and indirectly impacted. Further assessment is

provided for these MNES within this section for these MNES as required by the Supplementary SEARs, as provided in the following sections.

Additionally, the Supplementary SEARs identified there is some risk that there may be significant impacts on the following matters and further assessment to determine if the communities and species listed below are present in the proposed action area and, if so, the extent to which they may be impacted by the proposed action, is required:

Threatened Ecological Communities

- Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions
- Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions
- Weeping Myall woodlands
- Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of Southeastern Australia.

Threatened Species

- Slender Darling-pea (*Swainsona murrayana*)
- Flathead Galaxias (*Galaxius rostratus*)
- Australian Painted Snipe (*Rostratula australis*)
- Australasian Bittern (*Botaurus poiciloptilus*)
- Corben's Long-eared Bat (*Nyctophilus corbeni*)
- Growling Grass Frog (Southern Bell Frog) (*Litoria raniformis*)
- Grey Falcon (*Falco hypoleucos*)
- Malleefowl (*Leipoa ocellata*)
- Painted Honeyeater (*Grantiella picta*)
- *Austrostipa metatoris.*

None of these MNES have been identified within the Subject Land and are not likely to be directly or indirectly impacted by the Project. Therefore, the extent to which they may be impacted by the proposed action is not required.

8.7.1.1 HABITAT DESCRIPTIONS

A description of the habitat of each MNES that may be adversely impacted by the Project is outlined in the following sections.

Natural Grasslands of the Murray Valley Plains

Natural Grassland of the Murray Valley Plains typically occurs in a landscape of flat alluvial lowland plains with heavy-textured grey, brown and red clays. The vegetation within the community is open with trees and large shrubs being absent or sparse. The grassland has a diversity of native grasses and forbs, with small chenopods mixed between them (TSSC, 2026). Native grass species present on the ground layer may include Wallaby grasses such as white-top (*Rytidosperma* spp), spear grasses such as the plains grass (*Austrostipa* spp.) and windmill grasses (*Chloris* spp. *and Enteropogon spp.*). Native forbs/ herbs present may include lilies (*Arthropodium* spp. *and Bulbine* spp.), burr-daises (*Calotis* spp.), everlastings (*Chrysocephalum* spp.), scaly buttons (*Leptorhynchos* spp.), minnie daisy (*Minuria* spp.),

lambs-tails (*Ptilotus* spp.), paper sunray (*Rhodanthe* spp.), sidas (*Sida* spp) and Swainson or Darling peas (*Swainsona* spp.) (TSSC, 2026). Native small shrubs present on the ground layer include some saltbushed and bluebushes (*Atriplex* spp. and *Maireana* spp.).

Within the Subject Land this community of associated with PCTs 44 and 46, assessment of the Subject Land has determined that the TEC is not present as vegetation does not match the TEC description (see Section 4.2.7.1).

Plains-wanderer (*Pedionomus torquatus*)

The Plains-wanderers are generally limited to small, scattered areas of critical remnant habitat in eastern mainland states. The species live in semi-arid, lowland native grasslands usually on hard red-brown clay soils, supporting a high diversity of plant species (TSSC, 2023). Habitat structure is particularly important compared to floristic diversity with the species having a strong preference for sites with approximately 50% bare ground, 10% fallen litter and 40% herbs, forbs and grasses. The average home range of the Plains-wanderer is approximately 12 ha with breeding pairs overlapping home ranges totally approximately 18 ha (TSSC, 2023). There is a National Recovery Plan available for the Plains-wanderer.

A single individual was observed within the Project Area, however not the Subject Land. The species habitat is associated with PCT 46; however, it was sighted in PCT 44. No Important Habitat Mapping occurs within the Subject Land. Plains-wanderer records occur to the west in Yanga State Conservation Area and east.

Winged Peppercress (*Lepidium monoplocoides*)

The Winged Pepper is a small annual herb endemic to inland south-eastern Australia, occurring in Victoria and NSW. The species occurs on open, sparsely vegetated sites in a range of habitats on heavy clay or clay-loam soils, in arid to semi-arid areas with an average rainfall range of 200-450 mm per year (Mavromihalis, 2010a). The Winged Pepper occurs in grassland, wetlands and floodplain woodland vegetation communities which are dominated by *Eucalyptus coolabah* and *Eucalyptus largiflorens* and chenopod shrublands dominated by *Atriplex, Maireana* and/or *Nitraria* species. The species occurs in association with a wide range of herbs and grasses including *Austrodanthonia* spp., *Austrostipa* spp., *Rumex brownii* and *Spergularia rubra*. There is a National Recovery Plan available for Winged Peppercress (Mavromihalis, 2010a).

The species habitat is associated with PCT 163. Targeted surveys for the species over several years have failed to identify it within the Subject Land. The species is determined to be absent.

Chariot Wheels (*Maireana cheelii*)

The Chariot Wheels inhabits southern NSW and Victoria, where 17 populations containing approximately 700,000 plants. The species are usually found in chenopod shrubland and grassland communties on heavy clay soils, dominated by various native shrubs, grasses and herbs, including Hairy Bluebush (*Maireana pentagona*), Bottle Bluebush (*Maireana excavata*), Nitre-bush (*Nitraria billardierei*), *Austrostipa nodosa, A. scabra, Erodium crinitum, Rhodanthe corymbiflorum, Hyalosperma semisterile and H. glutinosa* (Mavromihalis, 2010b). With NSW, the species favors heavier grey clay soils, occupying sparsely vegetated sites with a high portion of bare ground of low-lying sites that become waterlogged during winter months, which may be slightly saline (Mavromihalis, 2010b). There is a National Recovery Plan available for the Chariot Wheels.

Chariot Wheels is associated with PCT 164 within Subject Land. The species was found extensively through the Subject Land throughout PCTs 160, 163 and 164, in association with grey claypan microhabitats, often in VZs 2 and 6 on scaled surfaces with Hair Bluebush (*Maireana pentagona*).

Mossgiel Daisy (*Brachyscome papillosa*)

The Mossgiel Daisy is endemic to NSW and is known to occur from Mossigel to Urana. The species is recorded primarily to grow in clay soils in Bladder Saltbush (*Atriplex vesicaria*) and Leafless Bluebush (*Maireana aphylla*) plains but also in grasslands and in Inland Grey Box (*Eucalyptus microcarpa*)- Cypress Pine (*Callitris* spp.) woodland. Currently there is no National Recovery Plan available for the Mossgiel Daisy (NSW OEH, 2018).

The Mossgiel Daisy is associated with PCTs 163 and 164 within the Subject Land, the species was found extensively is association with grey soils within *Marieana aphylla* shrubland (PCT 164 VZs 1 and 4).

8.7.1.2 SURVEYS

Natural Grasslands of the Murray Valley Plains

Targeted vegetation surveys for the Natural Grasslands of the Murray Valley Plains were undertaken across the Subject Land as part of the broader flora and vegetation assessment (Section 2.2). Surveys used parallel field traverses in accordance with relevant guidelines and were conducted across multiple seasons between 2020 and 2025, including repeated surveys during recommended survey periods. Survey effort focused on grassland and derived native grassland PCTs associated with the community (including PCTs 163 and 164), allowing assessment of the presence, extent, and condition of the ecological community within the Subject Land.

Plains-wanderer (*Pedionomus torquatus*)

Nocturnal spotlight surveys were conducted along vehicle transects in suitable habitat within the Project Area, including three 1-hour surveys over three nights in Spring 2020, four hours in Spring 2022, and one hour in Spring 2025. Opportunistic habitat assessments were also undertaken during Spring 2021, identifying six areas of potentially suitable habitat. In addition, diurnal transect surveys undertaken in Summer 2022 resulted in the observation of a single Plains-wanderer individual.

Winged Peppercress (*Lepidium monoplocoides*)

Targeted surveys for Winged Peppercress were conducted across the Subject Land in PCT 163 during the recommended period of September to December between 2021 and 2025. Surveys comprised targeted threatened flora surveys, including parallel field traverses within suitable habitat. Survey effort was undertaken in Spring 2021 (5 hours), Spring 2022 (11 hours), Spring 2023 (11 hours), Summer 2023/24 (35 hours), Spring 2024 (520 hours) and Spring 2025 (40 hours). The species was not detected during these surveys.

Chariot Wheels (*Maireana cheelii*)

Chariot Wheels was surveyed in PCT 164 during spring and summer seasons from 2020 to 2025. Surveys involved parallel field traverses and fine-scale assessments in areas of suitable habitat. Survey effort was undertaken in Spring 2020 (8 hours), Spring 2021 (9 hours), Spring

2022 (14 hours), Spring 2023 (39 hours), Summer 2023/24 (50 hours), Spring 2024 (520 hours) and Spring 2025 (40 hours). The species was recorded extensively across the Subject Land, and the cumulative survey effort was sufficient to characterise its distribution and extent of occupied habitat.

Mossgiel Daisy (*Brachyscome papillosa*

Mossgiel Daisy surveys were conducted in PCTs 163 and 164 across multiple spring seasons from 2020 to 2025. Survey methods included systematic parallel traverses and targeted searches in areas of suitable habitat. Survey effort was undertaken in Spring 2020 (8 hours), Spring 2021 (13 hours), Spring 2022 (25 hours), Spring 2023 (50 hours), Spring 2024 (520 hours) and Spring 2025 (40 hours). The cumulative survey effort was sufficient to detect the species and to characterise its distribution and extent of occupied habitat within the Subject Land.

8.7.1.3 DESCRIPTION OF IMPACTS

Natural Grasslands of the Murray Valley Plains

This MNES has not been identified as occurring within the Subject land. Project is not likely to have an adverse impact on this MNES (direct or indirect impact).

Plains-wanderer (*Pedionomus torquatus*)

The Plains-wanderer has been opportunistically recorded within the Project Area (within PCT 44) but not Subject Land as this vegetation does not occur within the impact area (i.e., avoided). The construction and operational phase of the Project have the potential to indirectly impact the Plains-wanderer through vegetation clearance, increased predator presence and disturbance, particularly within shrubland and grasslands utilised by the species. It is worth noting, the Project has been designed to maximize the use of existing tracks and minimize vegetation clearance where possible.

Winged Peppercress (*Lepidium monoplocoides*)

Targeted surveys for this species failed to detect it within the Subject Land. The construction and operational phase of the Project is not expected to have a direct or indirect impact on the species or its associated habitat.

Chariot Wheels (*Maireana cheelii*)

Chariot Wheels have been observed to occur within the Project Area. The construction and operational phase of the Project is expected to cause direct impacts on this threatened species through the removal of vegetation and associated habitat, with an additional risk of individual loss from inadvertent trampling by personnel and construction or operational vehicles during the lifetime of the Project.

Mossgiel Daisy (*Brachyscome papillosa*)

The Mossgiel Daisy has been observed to occur within the Project Area. The construction and operational phase of the Project is expected to cause direct impacts on this threatened species through the removal of vegetation and associated habitat, with an additional risk of individual loss from inadvertent trampling by personnel and construction or operational vehicles during the lifetime of the Project.

8.7.1.4 DESCRIPTION OF PROPOSED AVOIDANCE AND MITIGATION MEASURES

Natural Grasslands of the Murray Valley Plains

This MNES has not been identified as occurring within the Subject land. No avoidance or mitigation measures are required for this MNES.

Plains-wanderer (*Pedionomus torquatus*)

Twenty-one turbines and a site entry point in the south-west of the Project Area have been removed from areas identified as Plains Wanderer habitat. Additionally, the Project has been designed to maximise the use of existing tracks, minimising vegetation clearance and, where possible, limiting an increase in access routes which may be used by predatory species which prey upon the Plains-wanderer. The Project design will also allow for the implementation of plain wire fencing to replace existing barbed wire fencing, hence reducing the risks of entanglement to this species.

Winged Peppercress (*Lepidium monoplocoides*)

Targeted surveys for this species failed to detect it within the Subject Land. The construction and operational phase of the Project is not expected to have a direct or indirect impact on the species or its associated habitat.

Chariot Wheels (*Maireana cheelii*)

Mitigation measures for threatened flora were incorporated through early constraints analysis and project design refinements. Presence of *Maireana cheelii* was assessed across the Subject Land, with areas of moderate to high occurrence identified and turbines assigned sensitivity ratings to inform avoidance.

Mossgiel Daisy (*Brachyscome papillosa*)

Potential impacts to Mossgiel Daisy will be avoided and minimised through the early identification of areas supporting moderate to high densities, which informed turbine siting and resulted in the removal of turbines from higher-risk areas. Remaining infrastructure has been located to preferentially avoid heavier occurrences where practicable. Biodiversity impacts will be further avoided and minimised through mitigation measures designed to protect retained and adjacent vegetation and habitat during the construction, operation and decommissioning phases, as summarised in Section 8.5 of this amended BDAR.

8.7.1.5 IDENTIFICATION OF SIGNIFICANT RESIDUAL IMPACTS

Significant residual adverse impacts are to be identified for MNES affected by the Project (paragraph 16(v) of the supplementary SEARs).

Under the Bilateral agreement, both the NSW and Australian governments have endorsed the NSW BOS to avoid, minimize and offset biodiversity impacts on both NSW and Commonwealth listed threatened species and ecological communities to streamline outcomes. The Australian Government supports the use of the BAM as the underpinning method for calculating credit requirements (offsets).

A significant impact on MNES is defined in the Significance Assessment Guidelines for MNES as follows:

> A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. You should consider all of these factors when determining whether an action is likely to have a significant impact on matters of national environmental significance.

No specific definition exists for identifying a 'significant residual impact'. However, in considering the 'significant impact' definition above and the effect of the bilateral arrangements, it is considered that a reasonable definition of 'significant residual impact' is when both of the following are likely:

- The adverse impacts of a Project are assessed as having a significant impact; and
- The offsetting arrangements under the BOS are insufficient or inadequate to compensate for the residual impacts of the Project following consideration of the avoid, minimize and mitigation measures proposed.

Assessments of Significance have been performed to determine if the Project is likely to have a significant residual impact on MNES. A conclusion is provided, which indicates whether there is a low or high risk for a significant residual impact.

Natural Grasslands of the Murray Valley Plains

An action is likely to have a significant impact on a Critically Endangered Ecological Community if there is a real chance or possibility that it will:
Reduce the extent of an ecological community
The estimated 2010 extent of this TEC across NSW was 120,000 to 190,000 ha (Committee, 2012), representing an decline of 76 to 62% respectively from a pre-European extent of 500,000 ha (Committee, 2012). The current extent of this TEC is likely to be less than the 2010 estimates and the rate of annual loss is unknown. The Project has avoided vegetation that forms part of the Natural Grasslands of the Murray Valley Plains TEC. Therefore, the Project will not reduce the extent of this ecological community as the TEC is absent.
Fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines
Vegetation within the Subject Land does not align with the characteristics of this TEC, therefore, it has been determined that the TEC is absent from the Project Area. Thus, the Project will not fragment or increase fragmentation of this TEC.
Adversely affect habitat critical to the survival of a species
Vegetation within the Subject Land does not align with the characteristics of this TEC, therefore, it has been determined that the TEC is absent from the Project Area. Therefore, the Project is unlikely to adversely impact habitat critical to the survival of any species associated with this TEC.
Modify or destroy abiotic (non-living) factors (such as water, nutrients, or soil) necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns
Vegetation within the Subject Land does not align with the characteristics of this TEC, therefore, it has been determined that the TEC is absent from the Project Area. Thus, the Project is unlikely to modify or destroy abiotic factors necessary for the ecological community's survival.

An action is likely to have a significant impact on a Critically Endangered Ecological Community if there is a real chance or possibility that it will:
Cause a substantial change in the species composition of an occurrence of an ecological community, including causing a decline or loss of functionally important species, for example through regular burning or flora or fauna harvesting
Vegetation within the Subject Land does not align with the characteristics of this TEC, therefore it has been determined that the TEC is absent from the Project Area. Thus, the Project is unlikely to cause a substantial change in the species composition of an occurrence of an ecological community.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: – assisting invasive species, that are harmful to the listed ecological community, to become established, or – causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community, or
The Project is unlikely to introduce or increase the occurrence of invasive, predatory, or pest species within the ecological community, as the TEC has been determined to be absent from the Project Area.
Interfere with the recovery an ecological community
The Project is unlikely to interfere with the recovery of an ecological community as the TEC has been determined to be absent from the Project Area.
Conclusion
The Project will not impact this MNES, as vegetation communities within the Subject Land do not conform to the Natural Grasslands of the Murray Valley Plains TEC. Therefore, it is considered that there is a low likelihood of any significant residual impact occurring.

Plains-wanderer (*Pedionomus torquatus*)

An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:
Lead to a long-term decrease in the size of a population
Population estimates for the Plains-wanderer range between 250 and 1,000 individuals. One individual was recorded during diurnal transects in 2022 within the Project Area (outside the Subject Land) and no breeding habitat has been identified within the Subject Land. The Project has avoided areas of preferred habitat, including breeding and foraging sites, and vegetation mapping confirms no suitable PCTs occur within the Subject Land. Design measures prioritise the use of existing tracks to minimise vegetation clearance and reduce the creation of new access routes that could facilitate predators. Given the absence of important habitat within the Subject Land, the Project is unlikely to result in a long-term decrease in Plains-wanderer population size.
Reduce the area of occupancy of the species
The Species Recovery Plan estimates the Plains-wanderer's extent of occurrence at 930,000 km², while its actual area of occupancy is only about 300 km² and declining. Due to the species' low population size and fragmented distribution, all areas where the Plains-wanderer occurs and any suitable but currently unoccupied habitat within this range are considered critical to its survival. As the Project Area falls within the species likely range, it is automatically classified as habitat critical to survival. However, the Plains-wanderer's preferred habitat, sparse lowland native grasslands, is absent from the Subject Land, and vegetation mapping confirms no important habitat or associated PCTs suitable for foraging or breeding. Project design measures prioritise the use of existing tracks to minimise vegetation clearance and avoid creating new access routes that could increase predator activity. Therefore, the Project is not expected to reduce the species area of occupancy and is unlikely to result in a significant impact on the Plains-wanderer.

An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:
Fragment an existing population into two or more populations
The Plains-wanderer is thought to occur as a single, widely dispersed population rather than multiple distinct populations, although evidence for this is limited. The Project Area falls within a region categorised as likely to support the species, which automatically classifies it as habitat critical to survival. Although one individual was recorded within the Project Area, any potential indirect impacts from construction and operational activities are not expected to fragment an existing important population. It is worth noting, the Project has been designed to minimise habitat clearance where possible for the species.
Adversely affect habitat critical to the survival of a species.
Habitat critical to the survival of the species includes any regions where the species is likely to occur, as defined by the national recovery plan for the Plains-wanderer. The Project falls within this category. Following avoidance efforts to try minimize impacts on this species, no suitable habitat is present within the Subject Land however suitable grasslands are present within the broader Project Area and likely the broader landscape. Vegetation clearing associated with the Project will occur only within PCTs that are not preferred by the Plains-wanderer. Core habitat PCT 46 and areas where the species has been recorded, including PCT 44, will not be impacted and also do not occur within the Subject Land.
Disrupt the breeding cycle of a population,
No populations were identified within the Subject Land during surveys, and The Project has avoided areas of preferred habitat, including breeding and foraging sites, and vegetation mapping confirms no suitable PCTs occur within the Subject Land. Vegetation clearing associated with the Project will occur only within PCTs that are not preferred by the Plains-wanderer. Core habitat PCT 46 and areas where the species has been recorded, including PCT 44, will not be impacted. Direct disturbance to the breeding cycle of a population is not anticipated.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Vegetation clearing associated with the Project will occur only within PCTs that are not preferred by the Plains-wanderer. Core habitat PCT 46 and areas where the species has been recorded, including PCT 44, will not be impacted and are also not present within the Subject Land. It is unlikely the Project will decrease the availability or quality of habitat to the extent that the species is likely to decline.
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat.
The Project Area already contains invasive species harmful to the Plains-wanderer (e.g., European fox, feral cat). A Project BMP is to be implemented which will include the management of invasive species across the Project Area. Biosecurity requirements from the Landholder will form part of this BMP where the Proponent will be required to manage introduction and/or management of invasive species. It is unlikely the Project will decrease the availability or quality of habitat to the extent that the species is likely to decline.
Introduce disease that may cause the species to decline, or
European foxes, feral cats and native birds of prey are all potential predators of the species. Predation by foxes is considered a major threat to the Plains-wanderer in NSW. Improper waste disposal can contribute to an increase in feral animal populations, which poses a significant threat to threatened fauna, including the Plains-wanderer. The presence of food waste and rubbish attracts predators such as the European fox, rats and the feral cat, leading to greater predation pressure on native species. The Project has been designed to maximise use of existing access tracks across the Subject Land where possible, reducing the likelihood of an increase in predatory access and activity. Potential risks will be mitigated further via the preparation and implementation of feral pest management programs to be developed in accordance with guidelines and the relevant code of practice. The Project is not anticipated to introduce disease that may cause the species to decline.

An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:
Interfere with the recovery of the species.
The recovery plan focuses on mitigating key threats to the plains-wanderer and enhancing protection and improving the quality and extent of habitat suitable for the species. The Project is not likely to directly impact the species, however there is potential for indirect impacts such as increased predator activities, vehicle strike and impacts on the viability of vegetation adjacent to the Subject Land, for example light pollution) and introduction of weed species. Therefore, the Project is not expected to interfere with the recovery of the species.
Conclusion
The Project will not result in the loss of habitat likely to be used and relied on by the Plains-wanderer (i.e., avoided impacts). Connectivity important for the movement of individuals will not be interrupted or severed. The Project is not likely to have a significant impact on this MNES. It is concluded that a low likelihood of significant residual impact is predicted to occur. No additional offsets are required.

Winged Peppercress (*Lepidium monoplocoides*)

An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:
Lead to a long-term decrease in the size of a population
Winged Peppercress is an annual herb endemic to inland south-eastern Australia, with approximately 13 known populations in NSW and Victoria and total population size estimated at fewer than 6,000 plants. Populations fluctuate markedly in response to wetting and drying cycles, and the species is cryptic in dry years. Targeted surveys within the Subject Land between 2021 and 2025 did not detect the species. Survey effort included multiple spring and summer surveys within recommended periods. Habitat suitable for Winged Peppercress occurs only in small patches within the Subject Land, which have been avoided where feasible in Project design. Therefore, the Project is considered unlikely to result in a long-term decrease in population size (Mavromihalis, 2010a).
Reduce the area of occupancy of the species
The total area of occupancy of Winged Peppercress is small and fragmented, reflecting the species' patchy distribution and reliance on ephemeral wetland and clay plain habitats. Habitat loss arising from the Project is minor and dispersed across small patches, and no populations are known to occur within the development footprint. As such, the Project is not expected to reduce the area of occupancy of the species.
Fragment an existing population into two or more populations
Winged Peppercress populations are patchily distributed and generally isolated, with dispersal between populations likely limited to seed movement via flooding or other vectors. The Project footprint does not intersect any known populations and will not create barriers that fragment habitat connectivity between populations. Therefore, the Project is not anticipated to fragment existing populations.
Adversely affect habitat critical to the survival of a species.
Critical habitat includes open, sparsely vegetated clay or clay-loam flats that are seasonally flooded or waterlogged, supporting associated chenopod and grassland communities (Mavromihalis, 2010a). Within the Subject Land, areas with potential habitat are small and fragmented. The Project will avoid most of these areas, with minor clearing limited to previously disturbed or edge habitats. Mitigation measures will ensure adjacent areas of suitable habitat are not impacted, and no significant loss of critical habitat is anticipated.
Disrupt the breeding cycle of a population,

An action is likely to have a significant impact on a critically endangered and endangered species if there is a real chance or possibility that it will:
As an annual species, Winged Peppercress reproduces during spring and summer. No populations were detected within the Subject Land during survey, and therefore direct disturbance to the breeding cycle is not anticipated. Habitat outside the Project footprint will remain unaffected.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.
Vegetation removal is limited and dispersed across small patches, and the Project footprint largely comprises cleared or degraded habitat. No known populations will be directly impacted, and the small scale of habitat loss is unlikely to result in species decline.
Result in invasive species that are harmful to an endangered species becoming established in the endangered species' habitat.
The Project will implement standard weed and pest management practices. There is no anticipated increase in invasive species risk to Winged Peppercress as a result of the Project.
Introduce disease that may cause the species to decline, or
No known pathogens are reported to significantly affect Winged Peppercress. The Project is not expected to introduce disease that could cause decline.
Interfere with the recovery of the species.
Recovery actions focus on protecting known populations, controlling grazing and weeds, and maintaining hydrological regimes (Mavromihalis, 2010a). The Project avoids known populations and suitable habitat, and mitigation measures will manage edge and indirect impacts. Therefore, the Project is not expected to interfere with the recovery of the species.
Conclusion
The Project will not directly impact any known Winged Peppercress populations and will only involve minor, dispersed disturbance to potential habitat. The Project is not likely to have a significant impact on Winged Peppercress under the EPBC Act, and no offsets are required. It is concluded that a low likelihood of significant residual impact is predicted to occur. No additional offsets are required.

Chariot Wheels (*Maireana cheelii*)

An action is likely to have a significant impact on a Vulnerable Species if there is a real chance or possibility that it will:
Lead to a long-term decrease in the size of an important population of a species
The Chariot Wheels is known to occur within and surrounding the Subject Land. The species are usually found in chenopod shrubland and grassland communities on heavy clay soils, dominated by various native shrubs, grasses and herbs. There is insufficient data to describe important populations of the species. The species is restricted to approximately 15 populations containing approximately 700,000 plants (Mavromihalis, 2010b). The Chariot Wheels is known to occur within and surrounding the Subject Land. The species are usually found in chenopod shrubland and grassland communities on heavy clay soils, dominated by various native shrubs, grasses and herbs. There is insufficient data to describe important populations of the species. The species is restricted to approximately 15 populations containing approximately 700,000 plants (Mavromihalis, 2010b). Based on ALA and BioNet records, there appears to be a substantial population approximately 15 km north-east of the Subject Land. An important population is defined as necessary for a species' long-term survival and recovery (DoE, 2013). The Project would result in direct impact/removal of individuals. Based on ALA and BioNet records, there appears to be a substantial population approximately 15 km north-east of the Subject Land. An important population is defined as necessary for a

An action is likely to have a significant impact on a Vulnerable Species if there is a real chance or possibility that it will:
species' long-term survival and recovery (DoE, 2013). The Project would result in direct impact/removal of individuals. The Project design has been refined to minimise the extent of habitat within the Disturbance Footprint, minimizing impact on Chariot Wheels. The Project is not expected to lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population
The area of occupancy for the species has not been identified. The Project design has been refined to minimise the extent of habitat within the Disturbance Footprint, minimizing impact on Chariot Wheels. Therefore, the importance of the individual impact is expected to be minor. There would be opportunities for the species to re-establish in and around areas impacted by the Project. The Project is not expected to reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations
Based on ALA and BioNet records, it appears that populations are somewhat well connected. However, the main identified threat to the species is clearing and fragmentation of habitat. As the species is known to occur commonly on private property (particularly agricultural lands) and on roadsides, the species distribution is not limited to reserves or conservation areas unlike many other threatened flora species. While the Project would further fragment known areas, the population is not expected to be important (as no important populations are listed). Further, the Project design has been refined to minimise the extent of habitat within the Disturbance Footprint, minimizing impact on Chariot Wheels. Additionally, the species is known to occur within more than 15 localities. As such, the Project would be unlikely to result in the fragmentation of an existing important population.
Adversely affect habitat critical to the survival of a species
No habitat critical to the survival of the species has been listed. Due to the distribution of the species across the wider landscape, the individuals impacted by the Project are not expected result in an adverse effect to habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population
The collection of seeds for horticulture is a threat to the Chariot Wheel, no further threats to the breeding cycle of the species have been outlined in the National Recovery Plan. Additionally, there are no important populations listed, it is unlikely that the Project's expected level of disturbance would disrupt the breeding cycle of an important population.
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
The Project would result in direct clearing of individuals and would decrease the availability of habitat. However, this impact is not to the extent that the species is expected to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
Domestic stock grazing and the invasion and spread of exotic species (pasture grasses such as *Avena* sp. and *Vulpia* sp.) identified threats to the Chariot Wheel. Biosecurity mitigation measures would be put in place to minimise the spread of invasive species. The residual impacts are not expected to result in a substantial establishment of invasive species.
Introduce disease that may cause the species to decline, or
The National Recovery Plan for the species does not list any disease that may cause the species to decline. The Project is not expected to increase the risk of diseases that may cause the species to decline.
Interfere substantially with the recovery of the species

An action is likely to have a significant impact on a Vulnerable Species if there is a real chance or possibility that it will:
Threats to the species include clearance of habitat, weed invasion, damage from road and utilities installation and maintenance, lack of regeneration, fragmentation and isolation of most remaining stands and disruption of ecological processes necessary for regeneration (Mavromihalis, 2010b). The Project would impact individuals known to occur on private property. These impacts are not expected to be substantial and are unlikely to interfere with the recovery of the species.
Conclusion
The Project is not likely to have a significant impact on this MNES. It is concluded that a low likelihood of significant residual impact is predicted to occur. No additional offsets are required.

Mossgiel Daisy (*Brachyscome papillosa*)

An action is likely to have a significant impact on a Vulnerable Species if there is a real chance or possibility that it will:
Lead to a long-term decrease in the size of an important population of a species
The Mossgiel Daisy is known to occur within and surrounding the Subject Land. The species is endemic to NSW and is known to occur from Mossigel to Urana. The species is recorded primarily to grow in clay soils in Bladder Saltbush (*Atriplex vesicaria*) and Leafless Bluebush (*Maireana aphylla*) plains but also in grasslands and in Inland Grey Box (*Eucalyptus microcarpa*)- Cypress Pine (*Callitris spp.)* woodland. No important populations are listed under the Conservation Advice for the species, though it is noted that all populations of the closely related *Brachyscome brownii* are considered important for the long-term survival and recovery of the species. Based on ALA and BioNet records, there appears to be a substantial population of *B. papillosa* southeast of Balranald, which is approximately 30 km northwest of the Subject Land. An important population is defined as necessary for a species' long-term survival and recovery (DoE, 2013). It is not expected that the individuals within the Subject Land would form part of an important population. Due to the available habitat utilised by the species in surrounding areas, the Project is not expected to lead to a long-term decrease in the size of an important population.
Reduce the area of occupancy of an important population
The area of occupancy for the species has not been identified. No important populations have been listed, and, further, the species' records surrounding the Subject Land are scattered. Therefore, the importance of the individual impacted is expected to be minor. There would be opportunity for the species to re-establish in and around areas impacted by the Project. The Project is not expected to reduce the area of occupancy of an important population.
Fragment an existing important population into two or more populations
Based on ALA and BioNet records, it appears that populations are somewhat well connected. However, the main identified threat to the species is clearing and fragmentation of habitat. As the species is known to occur commonly on private property (particularly agricultural lands) and on roadsides, the species distribution is not limited to reserves or conservation areas unlike many other threatened flora species. While the Project would further fragment known areas, the population is not expected to be important (as no important populations are listed).
Adversely affect habitat critical to the survival of a species
No habitat critical to the survival of the species has been listed. Due to the distribution of the species across the wider landscape, the individuals impacted by the Project are not expected result in an adverse effect to habitat critical to the survival of the species.
Disrupt the breeding cycle of an important population
No specific threats to the breeding cycle of the species have been outlined in the Conservation Advice. No important populations have been listed. It is unlikely that the Project's expected level of disturbance would disrupt the breeding cycle of an important population.

An action is likely to have a significant impact on a Vulnerable Species if there is a real chance or possibility that it will:
Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline
The Project would result in a decrease to the availability of habitat for the mossgiel daisy. However, this impact is not to the extent that the species is expected to decline.
Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat
Domestic stock grazing is an identified threat to the mossgiel daisy. Biosecurity mitigation measures would be put in place to minimise the spread of invasive species. The residual impacts are not expected to result in a substantial establishment of invasive species.
Introduce disease that may cause the species to decline, or
The Conservation Advice for the species does not list any disease that may cause the species to decline. The Project is not expected to increase the risk of diseases that may cause the species to decline.
Interfere substantially with the recovery of the species
The main identified threat to mossgiel daisy is clearing for improved pasture and cropping. Potential threats to this species include changes in agricultural practices, possible habitat disturbance during road maintenance, and grazing by stock as the species is potentially palatable to them The impacts associated with the Project are not expected to substantially interfere with the recovery of the mossgiel daisy. There are no adopted or made Recovery Plans for this species.
Conclusion
The Project is not likely to have a significant impact on this MNES. It is concluded that a low likelihood of significant residual impact is predicted to occur. No additional offsets are required.

8.7.2 MIGRATORY SPECIES

The Supplementary SEARs did not identify any migratory species as likely or at risk of being significant impacted by the Project. Detailed surveys performed as part of the assessment identified one migratory species as occurring within the Subject Land and may be impacted, this being Fork-tailed Swift (*Apus pacificus*). For this reason, this species has been added to the assessment of MNES, which is provided in the following sections.

8.7.2.1 HABITAT DESCRIPTIONS

Fork-tailed Swift (*Apus pacificus*)

In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide; however, a few populations have been found west of the Great Divide. These are widespread but scattered further west of the line joining Bourke and Dareton. Sightings have been recorded at Milparinka, the Bulloo River and Thurloo Downs. The species is aerial, flying over open country, from semi-deserts to coast, islands; sometimes over forests and cities. In Australia, they mostly occur over inland plains but sometimes above foothills or in coastal areas, over cliffs, beaches and over islands and swell out to sea. They also occur over settled areas, including towns, urban areas and cities. The species sometimes occur above rainforests, wet sclerophyll forest or open forest or plantations of pines. They favour dry or open habitats, including riparian woodland and tea-tree swamps, low scrub, heathland or saltmarsh (DEH,

2006). There is a Threat Abatement Plan for predation by feral cats 2024 available for the species. There is no Recovery Plan for this species.

The species has been observed flying over the Subject Land as part of its foraging range.

8.7.2.2 SURVEYS

Fork-tailed Swift (*Apus pacificus*)

Fork-tailed Swift was assessed through extensive Bird Utilisation Surveys undertaken across the Subject Land over multiple years. Surveys were completed across a range of seasons between 2020 and 2024, including autumn (March/April 2020, May 2024), summer (February 2022), winter (August/September 2022, August 2024) and spring (November 2020, October 2023, November 2024). This multi-year and multi-season survey effort provides broad temporal coverage of aerial bird activity and is appropriate for detecting intermittent and migratory species such as Fork-tailed Swift, should they utilise the airspace above the site. During survey effort there were two separate observations of the species with multiple individuals being sited.

8.7.2.3 DESCRIPTION OF IMPACTS

Fork-tailed Swift (*Apus pacificus*)

Adverse impacts on MNES have been evaluated in terms of the Project direct (Section 8.1), indirect (Section 8.2) and prescribed impacts (Section 8.3) for the Fork-tailed Swift. The construction and operational phase of the Project is expected to cause direct and indirect impacts on the Fork-tailed Swift through the removal of vegetation and associated habitat and considered likely to collide with WTGs. Further details on the Projects on the species provided in the Assessment of Significant provided in Section 8.7.2.5, additionally the project has developed a BBAMP (Appendix A).

8.7.2.4 DESCRIPTION OF PROPOSED AVOIDANCE AND MITIGATION MEASURES

Fork-tailed Swift (*Apus pacificus*)

Avoidance and mitigation measures for the Fork-tailed Swift have been considered in this manner as outlined in Section 7. Efforts to mitigate impacts on MNES are outlined in Section 8.4, additionally the Project has developed a BBAMP (Appendix A).

8.7.2.5 IDENTIFICATION OF SIGNIFICANT RESIDUAL IMPACTS

Significant residual adverse impacts are to be identified for MNES affected by the Project (paragraph 16(v) of the supplementary SEARs).

Under the Bilateral agreement, both the NSW and Australian governments have endorsed the NSW BOS to avoid, minimize and offset biodiversity impacts on both NSW and Commonwealth listed threatened species and ecological communities to streamline outcomes. The Australian Government supports the use of the BAM as the underpinning method for calculating credit requirements (offsets).

A significant impact on MNES is defined in the Significance Assessment Guidelines for MNES as follows:

> A 'significant impact' is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts. You should consider all of these factors when determining whether an action is likely to have a significant impact on matters of national environmental significance.

No specific definition exists for identifying a 'significant residual impact'. However, in considering the 'significant impact' definition above and the effect of the bilateral arrangements, it is considered that a reasonable definition of 'significant residual impact' is when both of the following are likely:

- The adverse impacts of a Project are assessed as having a significant impact; and
- The offsetting arrangements under the BOS are insufficient or inadequate to compensate for the residual impacts of the Project following consideration of the avoid, minimize and mitigation measures proposed.

Assessments of Significance have been performed to determine if the Project is likely to have a significant residual impact on MNES. A conclusion is provided, which indicates whether there is a low or high risk for a significant residual impact.

Fork-tailed Swift

An action is likely to have a significant impact on a Migratory Species if there is a real chance or possibility that it will:
Substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles, or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
The area of native vegetation removal required for the Project is very minor in the context of the surrounding landscape and impacts associated with the Project would be more related to wind turbine collision risk. Important habitat for the Fork-tailed Swift includes non-breeding habitat which is found across a range of habitats from inland open plains to wooded areas, where it is exclusively aerial. To address these uncertainties, the Project has developed a BBAMP (Appendix A). The BBAMP will outline monitoring measures, key thresholds for determining permissible impacts and corrective actions that are required to achieve the BBAMP objectives (which are essentially to minimise impacts on birds and bats during the operational phase). This is discussed in **Section 7** of the BDAR. The Project is unlikely to substantially modify (including fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroying or isolating an area of important habitat for the Fork-tailed Swift.
Result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species
For the reasons stated above, the Project is unlikely to result in the introduction of any invasive species that are harmful to the Fork-tailed Swift.
Seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species
For the reasons stated above, the Project is unlikely to seriously disrupt the lifecycle (breeding, feeding, migration or resting behavior) of an ecologically significant proportion of the population of the Fork-tailed Swift.
Conclusion
The Project is not likely to have a significant residual impact on this MNES.

8.7.3 DESCRIPTION OF THE OFFSETS PROPOSED

The 'no net loss' standard applies to the Project, which means that the residual impact of the Project is fully offset through the NSW BOS. As per the BAM, residual impacts are quantified for the purposes of determining the Projects biodiversity offset requirements. This is outlined in Section 9 and Section 10. These offsets include ecosystem and species credit requirements. How they relate to MNES that may be adversely impacted by the Project is outlined below.

Ecosystem Credits

The acquisition and retirement of ecosystem credits for the Project, as specified in Section 10, will produce a 'no net loss' outcome for the following MNES directly impacted by the Project:

- Natural Grasslands of the Murray Valley Plains.

Species Credits

The acquisition and retirement of species credits for the Project, as specified in Section 10, will produce a 'no net loss' outcome for the following MNES:

- Chariot Wheels (*Maireana cheelii*); and
- Mossgiel Daisy (*Brachyscome papillosa*).

The offsets are to be delivered on a 'like for like' basis as specified in Section 10.2. Because of these offsetting obligations, several other MNES will also likely benefit from the compensatory measures undertaken.

Species credits are not applicable to the following MNES as these are not likely to be adversely impacted by the Project (i.e., not directly impacted as not identified as occurring within the impact area):

- Plains-wanderer (*Pedionomus torquatus*); and
- Winged Peppercress (*Lepidium monoplocoides*).

Notwithstanding, it is possible that through the delivery of ecosystem credits for the Project that some of these may end up included in an in-perpetuity conservation area, thus resulting in a conservation outcome for the species.

8.7.4 DETAILS OF HOW THE BAM HAS BEEN APPLIED IN ACCORDANCE WITH THE OBJECTS OF THE EPBC ACT

Among several, the relevant objects of the EBPC Act are:

- To provide for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance; and
- To promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources; and
- To promote the conservation of biodiversity.

The Project has been assessed in accordance with the BAM, which has been endorsed by the Commonwealth Government as a method suitable for assessing and managing the impacts of Projects on MNES.

The outcome of this assessment indicates that the residual impacts can be managed appropriately through conventional compensatory measures (i.e., offsets) after first considering options for avoiding and minimizing impacts.

The conventional application of the BAM in this assessment aligns with the framework of the Bilateral Arrangement between the NSW and Commonwealth Government. Accordingly, it is considered that the objects of the EPBC Act above have been adequately met.

8.7.4.1 DETAILS OF THE OFFSET PACKAGE TO COMPENSATE FOR SIGNIFICANT RESIDUAL IMPACTS

The offset package for MNES is outlined in Section 10.1. This offset is to be delivered on a 'like for like' basis within the regions specified. The offset would comprise a greater extent and future condition state compared to what is impacted by the Project. According to the BAM, the delivery of this compensatory measure would achieve a 'no net loss' outcome for the MNES.

8.8 CUMULATIVE IMPACTS

The Project would contribute to the overall development of the South West REZ. REZs combine wind, solar, hydroelectric and energy storage, and high-voltage transmission lines, to generate and deliver clean, renewable energy. Relevant clean energy proposed, approved, under construction and operational SSDs known at the time of finalisation of this BDAR and within and in the vicinity of the South West REZ have been considered.

Potential, direct, indirect and prescribed biodiversity impacts because of the Project have been assessed, additionally it is acknowledged the Project would contribute to cumulative impacts during construction and operation within the existing environment. Cumulative impacts occur when impacts from a project interact or overlap with impacts from other projects and can potentially result in a larger overall effect on the environment.

8.8.1 Bioregional Context

The Riverina Bioregion ranks 14th out of the 18 NSW bioregions for total woody vegetation clearing between 2009 and 2023, according to the Statewide Landcover and Tree Study (SLATS) Dashboard (SLATS Dashboard | SEED Portal; accessed 28/10/2025). The annual total clearing of woody native vegetation across all NSW bioregions is summarised in Chart 8-1. The SLATS dashboard breakdown for the Riverina Bioregion alone is shown in Chart 8-2 and detailed in Table 8-8 and presents the total woody vegetation cleared per landcover class in the Riverina.

TABLE 8-8 WOODY VEGETATION CLEARED PER LANDCOVER CLASS IN THE RIVERINA BIOREGION (2009 – 2023)

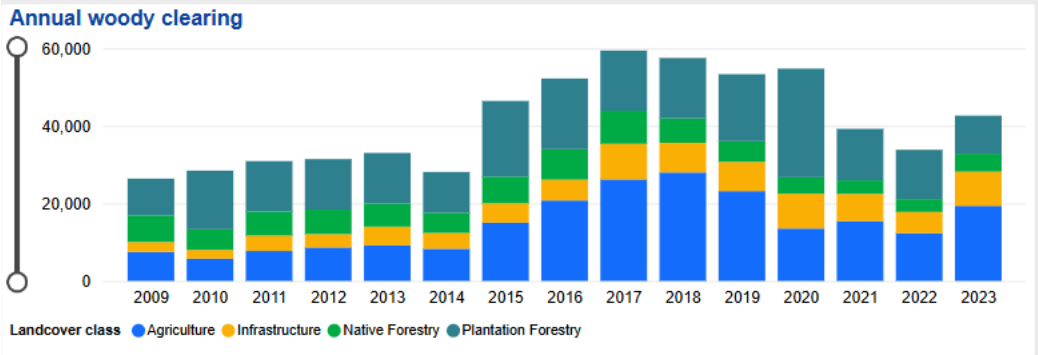
Landcover Class	Total area cleared (ha)	Total area cleared (%)
Agriculture	2,209	40.38
Infrastructure	745	13.62
Native Forestry	2,065	37.74
Plantation Forestry	452	8.26

Source: SLATS Dashboard

The SLATS data reveals some important factors in considering cumulative impacts:

- Agriculture and Native Forestry represent the highest total clearing of the four landcover classes within the Riverina Bioregion; and
- Clearing in the infrastructure landcover class has substantially increased in the years following 2017, which most likely relates to regulatory change (i.e., implementation of BC Act) and development activity associated with renewable energy projects.

A total of 5,470 ha of woody vegetation has been cleared in the Riverina Bioregion between 2009 and 2023, with infrastructure representing approximately 13.62% of the overall clearing extent.



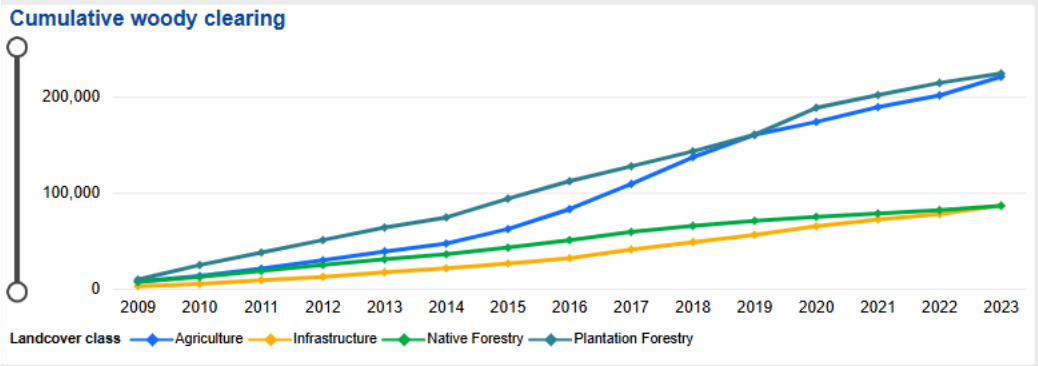


CHART 8-1 ANNUAL WOODY VEGETATION CLEARING IN ALL NSW BIOREGIONS (2009 – 2023)



Source: SLATS Dashboard

CHART 8-2 SLATS DASHBOARD: RIVERINA BIOREGION

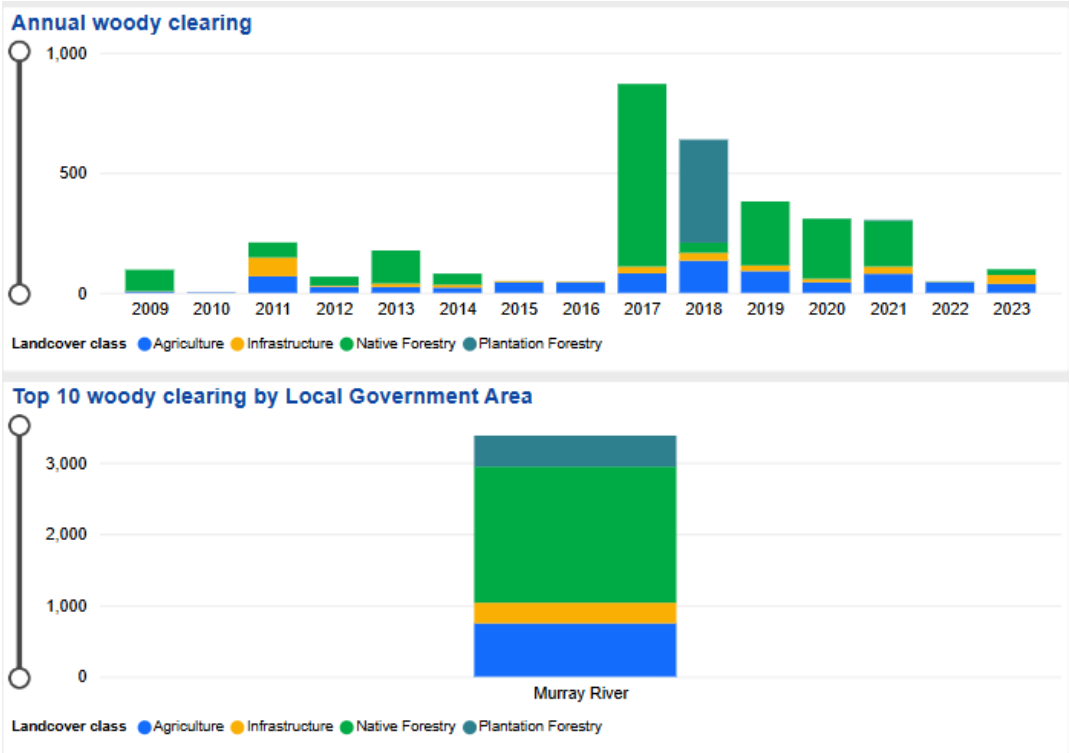
8.8.2 LOCAL GOVERNMENT AREA CONTEXT

The SLATS dashboard also provides statistics for the Murray River Local Government Area Chart 8-3. Table 8-9 shows that 3,378 ha of woody vegetation has been cleared within the 14-year period, with over 70% being attributed to agriculture. Infrastructure accounts for approximately 21.54% of woody vegetation cleared within the LGA.

TABLE 8-9 WOODY VEGETATION CLEARED PER LANDCOVER CLASS IN THE MURRAY RIVER LGA (2009 – 2023)

Landcover Class	Total area cleared (ha)	Total area cleared (%)
Agriculture	747	22.11
Infrastructure	290	8.58
Native Forestry	1,908	56.48
Plantation Forestry	433	12.82

Source: SLATS Dashboard



Source: SLATS Dashboard

CHART 8-3 WOODY VEGETATION CLEARED IN MURRAY RIVER LGA (2009 – 2023)

At the time of the writing of this BDAR, four other SSD energy projects are presented on the NSW Planning Portal (NSW Government, 2025) within the Murray River Local Council Area, one in the Prepare EIS phase (Wilan Wind Farm), two have provided Response to Submissions and more information is required (Baldon Wind Farm and Junction Rivers Wind Farm), and the Limondale Solar Farm is approved and under construction. The Project is estimated to impact 765.06 ha of native vegetation (all of which non-woody) within the Subject Land and therefore would not contribute to the cumulative loss of woody vegetation in the Murray River LGA.

8.8.3 OTHER INFRASTRUCTURE PROJECTS

A review of relevant clean energy proposals at the time of finalisation of this BDAR and within and in the vicinity of the South West REZ has been undertaken, with potential relevance to the Project provided in Table 8-10. Some of these projects are in the planning phase, and as such the level of direct impacts to native vegetation, TECs, and threatened and migratory listed species is unknown. A large portion of these projects are expected to have construction programs that would overlap with the Project. It is considered likely that cumulative impacts would increase the loss of similar native vegetation and threatened species habitat in the region. The following projects are considered the most relevant to potential cumulative impacts in the region:

- The Plains Wind Farm;
- Pottinger Wind Farm;
- Pottinger Solar Farm;
- Tchelery Wind Farm; and
- West Nyangay Solar Farm.

TABLE 8-10 POTENTIAL CUMULATIVE IMPACTS

Project	Description/Status	Distance from Project (km) / LGA	Relevant Future Development
The Plains Wind Farm	• Status: Response to Submissions. • Nominal generating capacity of 1,350 MW. • Up to 188 Wind Turbine Generators (WTGs), electrical reticulation, and ancillary facilities. • Peak construction workforce of up to 700 FTE (Full-time equivalent). • Operational workforce of up to 40 FTE. • Some temporary workers accommodation within the project area. Remaining would be located in Hay. • Construction expected to commence early 2027 for 40 months (subject to change).	55 km east Hay Shire LGA	• The Project proposes to clear native vegetation comprising of: ◦ PCT 17 – 1.02 ha. ◦ PCT 24 – 3.77 ha. ◦ PCT 44 – 54.50 ha. ◦ PCT 153 – 4.67 ha. ◦ PCT 157 – 13.65 ha. ◦ PCT 160 – 27.61 ha. ◦ PCT 163 – 28.82 ha. ◦ PCT 164 – 1,878.08 ha. ◦ PCT 216 – 1.18 ha. ◦ PCT 123 – 0.29 ha (haul route). ◦ PCT 155 – 0.69 ha (haul route). ◦ PCT 158 – 0.22 ha (haul route). • The Project is expected to have an assessable impact on the following species, which will require the acquisition of a comparable offset: ◦ *Austrostipa wakoolica* (1.02 ha, 34 credits). ◦ *Brachyscome papillosa* (662.26 ha, 18,425 credits). ◦ *Calotis moorei* (10.05 ha, 635 credits). ◦ *Convolvulus tedmoorei* (624.06 ha, 26,126 credits). ◦ *Cullen parvum* (18.56 ha, 526 credits). ◦ *Hemiaspis damelii* (32.40 ha, 1,136 credits). ◦ *Lepidium monoplocoides* (26.95 ha, 905 credits). ◦ *Leptorhynchos orientalis* (15.28 ha, 39 credits). ◦ *Litoria raniformis* (8.84 ha, 180 credits). ◦ *Maireana cheelii* (643.09 ha, 17,600 credits). ◦ *Myotis Macropus* (339.18 ha, 8,858 credits). ◦ *Pedionomus torquatus* (0.18 ha, 11 credits). ◦ *Pilularia novae-hollandiae* (18.56 ha, 526 credits). ◦ *Sclerolaena napiformis* (58.76 ha, 138 credits). ◦ *Swainsona murrayana* (685.46 ha, 19,231 credits). ◦ *Swainsona plagiotropis* (14.62 ha, 20 credits). • The Project would be within the Riverina IBRA bioregion and Murrumbidgee sub-region.
Limondale Solar Farm	• Status: Determination • 250MW solar farm and associated infrastructure • The solar farm has been constructed and full commercial operation began in 2021. • The BESS will be constructed as a stand alone project. No staging proposed	33 km west Balranald Shire LGA	• The Project proposes to clear native vegetation comprising of: • PCT 16 – 2.18 ha • PCT 58 – 3.24 ha • Remove 18 hollow bearing paddock trees from development site • Vegetation within the Project Area is unlikely to provide key habitat for listed species due to fragmented and isolated nature
Romani BESS	• Status: Response to Submissions. • BESS with a storage capacity of 200MW/800MWh and associated infrastructure • Peak construction workforce of up to 100 FTE • Operational workforce of up to 5 FTE • Construction expected early 2024 for 20 months	50 km east Edward River LGA	• The Project proposes to clear native vegetation comprising of: ◦ PCT 164 – 17.76 ha ◦ PCT 157 – 0.12 ha ◦ PCT 163 – 0.09 ha • The Project is not expected to have any direct impact to any threatened species or ecological communities

Project	Description/Status	Distance from Project (km) / LGA	Relevant Future Development
Euston Wind Farm	• Status: Prepare EIS • Proposed generation capacity of approximately 700 MW • Indicatively 96 wind turbines • 500MW/2000MWh BESS • Construction expected 2025 for up to 24 months • Peak construction workforce of 250 FTE • Operational workforce of 15 FTE	100 km west Balranald and Wentworth Shire Council LGAs	• Direct impacts as a result of the Project are yet to be determined. Considered entities are provided below. ◦ PCTs: ◦ PCT 13. ◦ PCT 57. ◦ PCT 58. ◦ PCT 170. ◦ PCT 171. ◦ PCT 172. • Potential TECs: ◦ Acacia loderi shrublands. ◦ Acacia melvillei Shrubland in the Riverina and Murray-Darling Depression bioregions. ◦ Mallee Bird Community of the Murray Darling Depression Bioregion. ◦ Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions. • Threatened flora known or considered likely to occur: ◦ A spear-grass (*Austrostipa metatoris*). ◦ Bitter Quandong (*Santalum murrayanum*). ◦ Swamp She-oak (*Casuarina obesa*). ◦ Thyme Rice-Flower (*Pimelea serpyllifolia subsp. serpyllifolia*). ◦ Yellow Gum (*Eucalyptus leucoxylon subsp. pruinosa*). ◦ Yellow Swainson-pea (*Swainsona pyrophila*). • Threatened fauna known or considered likely to occur: ◦ Chestnut Quail-thrush (*Cinclosoma castanotum*). ◦ Spotted Harrier (*Circus assimilis*). ◦ Brown Treecreeper (eastern subspecies) (*Climacteris picumnus victoriae*). ◦ White-fronted Chat (*Epthianura albifrons*). ◦ Black Falcon (*Falco subniger*). ◦ Black-breasted Buzzard (*Hamirostra melanosternon*). ◦ Little Eagle (*Hieraaetus morphnoides*). ◦ Malleefowl (*Leipoa ocellata*). ◦ Major Mitchell's Cockatoo (*Lophochroa leadbeateri*). ◦ South-eastern Hooded Robin (*Melanodryas cucullata cucullata*). ◦ Regent Parrot (eastern subspecies) (*Polytelis anthopeplus monarchoides*). ◦ Western Pygmy Possum (*Cercartetus concinnus*). ◦ Southern Ningaui (*Ningaui yvonneae*). ◦ Yellow-bellied Sheath-tail Bat (*Saccolaimus flaviventris*). ◦ Inland Forest Bat (*Vespadelus baverstocki*). ◦ Mallee Worm-lizard (*Aprasia inaurita*). ◦ Jewelled Gecko (*Strophurus elderi*). • The Project would be within the Murray Darling Depression IBRA bioregion and the South Olary Plain and Robinvale Plains sub-region.
Pottinger Wind Farm	• Status: Determined. • Targeted electricity generation capacity of 1.3 Gigawatt (GW). • Up to 247 WTG, electrical reticulation (including a 500 MW BESS) and ancillary facilities. • Peak construction workforce of up to 900 FTE. • Operational workforce of up to 50 FTE. • Some temporary workers accommodation within the project area. Remaining would be located in Hay. • Construction expected to commence early 2026 for 55 months (subject to change).	74 km east Edward River and Hay Shire LGA	• The Project proposes to clear native vegetation comprising: ◦ PCT 10 – 0.17 ha. ◦ PCT 13 – 104.3 ha. ◦ PCT 16 – 25.18 ha. ◦ PCT 17 – 6.07 ha. ◦ PCT 23 – 0.02 ha. ◦ PCT 26 – 10.82 ha. ◦ PCT 28 – 11.54 ha. ◦ PCT 44 – 105.68 ha. ◦ PCT 45 – 14.41 ha. ◦ PCT 46 – 99.74 ha. ◦ PCT 123 – 0.41 ha. ◦ PCT 155 – 3.18 ha. ◦ PCT 157 – 6.15 ha. ◦ PCT 158 – 0.53 ha. ◦ PCT 159 – 0.14 ha. ◦ PCT 160 – 91.27 ha. ◦ PCT 163 – 14.31 ha. ◦ PCT 164 – 532.35 ha.

Project	Description/Status	Distance from Project (km) / LGA	Relevant Future Development
			• EECs proposed to be cleared: ◦ Myall Woodland – 0.38 ha Development Footprint; 15.47 ha subject land (BC Act). ◦ Sandhill Pine Woodland – 11.66 ha Development Footprint; 1,004.31 ha subject land (BC Act). ◦ *Acacia melvillei* Shrubland – 0.02 ha Development Footprint; 0.19 ha subject land (BC Act). ◦ Weeping Myall Woodland – 0.38 ha Development Footprint; 13.8 ha subject land (EPBC Act). • The Project is expected to have an assessable impact on the following species, which will require the acquisition of a comparable offset: ◦ Chariot Wheels (55.87 ha, 2,520 credits). ◦ Mossgiel Daisy (161.63 ha, 7,068 credits). ◦ Silky Swainson-pea (8.74 ha, 326 credits). ◦ Slender Darling Pea (206.86 ha, 9,303 credits). ◦ Austral Pillwort (8.23 ha, 317 credits). ◦ Grey Snake (319.33 ha, 11,507 credits). ◦ Pink Cockatoo (18.46 ha, 345 credits). ◦ Plains-Wanderer (2.67 ha, 170 credits). ◦ Southern Bell Frog (5.85 ha, 204 credits). ◦ *Atriplex infrequens* (0.98 ha, 22 credits). ◦ Barrier Range Dragon (3.59 ha, 72 credits). ◦ Crowned Gecko (0.41 ha, 10 credits). ◦ Eastern Fat-tailed Gecko (0.95 ha, 22 credits). ◦ Stimson's Python (0.95 ha, 22 credits). • The Project would be within the Riverina and Broken Hill Complex IBRA bioregions and Murrumbidgee and Barrier Range sub-regions.
Pottinger Solar Farm	• Status: Prepare EIS. • Nominal generating capacity of 300 MW with 750,000 solar panels. • 500 MW/2GWh BESS and ancillary facilities. • Peak construction workforce up to 220 FTE. • Operational workforce of up to 4 FTE. • Construction expected to commence in 2026 for 24 months (subject to change).	74 km east Hay Shire LGA	• Direct impacts as a result of the Project are yet to be determined. Considered entities are provided below. • TECs: ◦ Myall Woodlands (EPBC Act). ◦ Natural Grasslands of the Murray Valley Plains (EPBC Act). ◦ Sandhill Pine Woodland (BC Act). • Threatened species known or considered highly likely to occur: ◦ *Brachyscome papillosa.* ◦ *Lepidium monoplocoides.* ◦ *Maireana cheelii.* ◦ *Pilularia novae-hollandiae.* ◦ Swainsona murrayana.
Bullawah Wind Farm	• Status: Assessment. • Targeted electricity generating capacity of 815 MW. • Up to 143 WTG, electrical reticulation (including a 359 MW/718 MWh BESS) and ancillary facilities. • Peak construction workforce of up to 350 FTE. • Operational workforce of up to 40 FTE. • Temporary worker accommodation within the project area. • Construction expected to commence late 2025 for 44 months (subject to change).	100 km east Edward River, Hay Shire, Murrumbidgee LGA	• The Project proposes to clear up to 638.01 ha of native vegetation. • CEEC proposed to be cleared (87.42 ha): ◦ 22.80 ha of Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregion. ◦ 4.92 ha of Weeping Myall Woodland. ◦ 59.70 ha of Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregion. • Direct impacts to five threatened flora species: ◦ Chariot Wheels (4.67 ha, 116 credits). ◦ Silky Swainson-pea (9.78 ha, 282 credits). ◦ Slender Darling Pea (123.09 ha, 3,531 credits). ◦ Winged Pepper-cress (3.52 ha, 88 credits). ◦ Spike-rush (7.31 ha, 193 credits). • Direct impacts to four threatened fauna species: ◦ Barking owl (2.80 ha, 49 credits). ◦ Little Eagle (34.63 ha, 643 credits). ◦ Southern Bell Frog (52.16 ha, 1,426 credits). ◦ Plains-wanderer (20.89 ha, 733 credits). • The Project would be within the Riverina IBRA bioregion and Murrumbidgee sub-region.
Tchelery Wind Farm	• Status: Prepare EIS. • Targeted electricity generating capacity of up to 800 MW.	7 km east Edward River LGA	• The Project could potentially involve the clearing of native vegetation comprising of: ◦ PCT 16 – 1.82 ha. ◦ PCT 17 – 2.75 ha.

Project	Description/Status	Distance from Project (km) / LGA	Relevant Future Development
	• Up to 120 WTG and ancillary facilities. • Peak construction workforce of up to 500 jobs. • Construction expected to commence early 2026 for 24-30 months (subject to change).		◦ PCT 22 – 0.16 ha. ◦ PCT 23 – 47.15 ha. ◦ PCT 24 – 2.32 ha. ◦ PCT 26 – 1.52 ha. ◦ PCT 28 – 9.03 ha. ◦ PCT 58 – 3.67 ha. ◦ PCT 153 – 36.14 ha. ◦ PCT 157 – 154.22 ha. ◦ PCT 159 – 2.87 ha. ◦ PCT 160 – 7.16 ha. ◦ PCT 163 – 166.78 ha. ◦ PCT 164 – 162.75 ha. ◦ PCT 166 – 0.20 ha. ◦ PCT 236 – 13.11 ha. • Potential TECs include: ◦ *Acacia melvillei* Shrubland in the Riverina and Murray-Darling Depression bioregions. ◦ *Allocasuarina luehmannii* Woodland in the Riverina and Murray-Darling Depression bioregions. ◦ Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions. ◦ Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions. ◦ Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions. ◦ Weeping Myall Woodlands. • Threatened flora species identified within the Project site include: ◦ *Brachyscome papillosa* (Mossgiel Daisy). ◦ *Calotis moorei* (A Burr-daisy). ◦ *Eleocharis obicis* (A Spike-rush). ◦ *Lepidium monoplocoides* (Winged Peppercress). ◦ *Maireana cheelii* (Chariot Wheels) ◦ *Pilularia novae-hollandiae* (Austral Pillwort). ◦ *Swainsona murrayana* (Slender Darling Pea). • Threatened fauna species identified within the Project site include: ◦ *Circus assimilis* (Spotted Harrier). ◦ *Epthianura albifrons* (White-fronted Chat). ◦ *Falco subniger* (Black Falcon). ◦ *Lophochroa leadbeateri* (Major Mitchell's Cockatoo). ◦ *Petroica phoenicea* (Flame Robin). • The Project would be within the Riverina IBRA bioregion and Murrumbidgee sub-region.
Baldon Wind Farm	• Status: Assessment. • Electricity generating capacity of up to approximately 1.4 GW. • Up to 180 WTG, electrical reticulation (including a 200 MW / 400 MWh BESS) and ancillary facilities. • Peak construction workforce of up to 400 FTE • Operational workforce of up to 35 FTE. • Temporary worker accommodation within the project area. • Construction expected to commence late 2025 for 42 months (subject to change).	Adjacent to the eastern boundary Edward River, Hay Shire, Murray River LGA	• The Project proposes to clear up to 769.35 ha of native vegetation, comprising of: ◦ PCT 15 – 10.29 ha. ◦ PCT 17 – 0.57 ha. ◦ PCT 28 – 6.17 ha. ◦ PCT 46 – 43.09 ha. ◦ PCT 57 – 0.28 ha. ◦ PCT 153 – 69.45 ha. ◦ PCT 159 – 7.0 ha. ◦ PCT 160 – 27.82 ha. ◦ PCT 163 – 8.88 ha. ◦ PCT 164 – 595.8 ha. • CEEC proposed to be cleared: ◦ PCT 46 (1.12 ha, 47 credits) • The Project is expected to have an assessable impact on the following species, which will require the acquisition of a comparable offset: ◦ Mossgiel Daisy (295.41 ha, 13,532 credits). ◦ Chariot Wheels (62.66 ha, 2,881 credits). ◦ Slender Darling Pea (0.38 ha, 18 credits). ◦ Spike-Rush (53.73 ha, 1,741 credits). ◦ Little Eagle (0.74 ha, 23 credits). ◦ Southern Myotis (33.11 ha, 1,484 credits). ◦ Southern Bell Frog (37.05 ha, 1,609 credits).

Project	Description/Status	Distance from Project (km) / LGA	Relevant Future Development
Wilan Wind Farm	• Status: Prepare EIS. • Electricity generating capacity of up to 800 MW. • Up to 138 WTG, electrical reticulation (including a 200 MW / 800 MWh BESS) and ancillary facilities. • Peak construction workforce of approximately 400 jobs. • Operational workforce of approximately 10-15 jobs. • Temporary worker accommodation within the project area. • Construction expected to commence in early 2025 for 24 to 30 months (subject to change).	Adjacent to the northern boundary Hay Shire, Murray River LGA	• The Project could potentially involve the clearing of native vegetation comprising of: ◦ PCT 13. ◦ PCT 15. ◦ PCT 17. ◦ PCT 153 – 70.9 ha. ◦ PCT 157 – 7.1 ha. ◦ PCT 159 – 13.6 ha. ◦ PCT 160 – 39.2 ha. ◦ PCT 163 – 99.8 ha. ◦ PCT 164 – 266.6 ha. ◦ PCT 165. ◦ PCT 166 – 24.3 ha. ◦ PCT 216 – 2.3 ha. ◦ PCT 236 – 84.2 ha. • The Project has the potential to impact on the following species which would require the acquisition of a comparable offset: ◦ Mossgiel Daisy. ◦ Chariot Wheels. ◦ Southern Bell Frog. ◦ Australasian Bittern. ◦ Corben's Long-eared Bat. • The Project would be within the Riverina IBRA bioregion and Murrumbidgee sub-region.
Hay Solar Farm, MOD 1-Site Access Upgrades and MOD 2-Battery Storage Facility	• Status: Determination. • Nominal electricity generating capacity estimate of 110 MW with 430,000 solar panels and associated infrastructure. • Modification to include a 29 MW / 29 MWh Battery Storage System. • Average construction workforce of 100 FTE. • Operational workforce of up to five FTE. • Project was approved in December 2017. Construction commenced October 2024 and expected to be completed in early 2025.	78 km east Hay Shire LGA	• The Project would remove 4.79 ha of native vegetation, comprising of: ◦ PCT 12 – 0.07 ha. ◦ PCT 15 – 3.88 ha. ◦ PCT 16 – 0.5 ha. ◦ PCT 44 – 0.34 ha. • Three isolated hollow bearing trees would be removed. • No CEECs present. • No threatened flora or fauna species requiring offset. • The Project would be within the Riverina IBRA bioregion and Murrumbidgee sub-region.
Dinawan Solar Farm	• Status: Assessment. • Nominal generating capacity of 800 MW with 2 million solar panels. • 300 MW / 600 MWh BESS and ancillary facilities. • Peak construction workforce of up to 400 FTE • Operational workforce of up to 10 FTE. • Temporary worker accommodation within the project area. • Construction expected to commence in 2025 for approximately 18-36 months (subject to change).	160 km east Murrumbidgee LGA	• The Project would remove 1,782.81 ha of native vegetation, comprising of: ◦ PCT 13 – 0.12 ha. ◦ PCT 15 – 0.16 ha. ◦ PCT 17 – 1.14 ha. ◦ PCT 26 – 1,779.65 ha. ◦ PCT 45 – 0.05 ha. ◦ PCT 46 – 1.68 ha. • Two TECs to be impacted by the Project include: ◦ Weeping Myall TEC – 919.62 ha (BC Act); 0.48 ha (EPBC Act). ◦ Natural Grasslands Murray Valley TEC – 1.73 ha (EPBC Act). • The Project has the potential to impact on the following species which would require the acquisition of a comparable offset: ◦ *Swainsona murrayana* (5.5 ha, 76 credits). ◦ *Swainsona sericea* (5.5 ha, 76 credits). ◦ Southern Bell Frog (122.15 ha, 1,647 credits). • The Project would be within the Riverina IBRA bioregion and Murrumbidgee sub-region.
Dinawan Wind Farm	• Status: Response to Submissions. • Electricity generating capacity of up to 1.2 GW. • Up to 200 WTG and ancillary facilities.	160 km east Edward River, Murrumbidgee LGA	• The Project would remove native vegetation comprising of: ◦ PCT 10 – 0.33 ha. ◦ PCT 13 – 13.97 ha. ◦ PCT 15 – 7.81 ha. ◦ PCT 17 – 2.93 ha.

Project	Description/Status	Distance from Project (km) / LGA	Relevant Future Development
	• Peak Construction workforce of up to 600 FTE. • Operational workforce of up to 50 FTE • Temporary worker accommodation within the project area. • Construction expected to commence in 2025 for approximately 60 months (subject to change).		◦ PCT 24 – 0.23 ha. ◦ PCT 26 – 945.67 ha. ◦ PCT 28 – 54.98 ha. ◦ PCT 45 – 8.83 ha. ◦ PCT 46 – 105.59 ha. ◦ PCT 160 – 4.91 ha. • The Project has the potential to impact on the following species which would require the acquisition of a comparable offset: ◦ *Swainsona murrayana* (11.49 ha, 344 credits). ◦ *Swainsona sericea* (11.49 ha, 344 credits). ◦ *Austrostipa wakoolica* (0.98 ha, 37 credits). ◦ *Brachyscome papillosa* (10.93 ha, 383 credits). ◦ *Convolvulus tedmoorei* (3.13 ha, 135 credits). ◦ *Eucalyptus leucoxylon* subsp. *pruinosa* (4 individuals, 8 credits). ◦ *Lepidium monoplocoides* (10.93 ha, 383 credits). ◦ *Leptorhynchos orientalis* (0.23 ha, 3 credits). ◦ *Pilularia novae-hollandiae* (8.78 ha, 464 credits). ◦ Barking Owl (28.31 ha, 910 credits). ◦ Masked Owl (28.31 ha, 910 credits). ◦ Plains Wanderer (4.02 ha, 199 credits). ◦ Superb Parrot (40.01 ha, 1,146 credits). ◦ Southern Bell Frog (95.06 ha, 2,066 credits). • The Project would lie within the Riverina IBRA bioregion and Murrumbidgee sub-region.
Yanco Delta Wind Farm	• Status: Determination. • Electricity generating up to 1.5 GW. • Up to 208 WTG, electricity reticulation (including a 800 MW / 800 MWh BESS) and ancillary facilities. • Peak construction workforce of approximately 300 FTE. • Operational workforce of up to 30 FTE. • Project was approved in December 2023. Construction expected to commence in 2026 for approximately 36 months (subject to change).	150 km east Edward River, Murrumbidgee LGA	• The Project proposes to clear 174.21 ha of native vegetation, 170.95 ha of which comprises of the following TECs: ◦ Natural Grasslands of the Murray Valley Plains – 129.43 ha (EPBC Act). ◦ Weeping Myall Woodlands – 5.17 ha (EPBC and BC Act). ◦ Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions – 31.25 ha (BC Act). ◦ Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions – 10.28 ha (BC Act). • The Project has the potential to impact on the following species which would require the acquisition of a comparable offset: ◦ *Austrostipa wakoolica* (19.57 ha). ◦ *Cullen parvum* (35.29 ha). ◦ *Pilularia novae-hollandiae* (14.43 ha). ◦ *Swainsona murrayana* (2.18 ha). ◦ Southern Myotis (0.9 ha). ◦ Plains-Wanderer (0.03 ha). • The Project would be located within the Riverina IBRA bioregion and Murrumbidgee sub-region.
Currawarra Solar Farm	• Status: Determination. • Nominal generating capacity of 195 MW with 654,200 solar panels and ancillary facilities. • Potentially an energy storage facility. • 200 direct jobs during construction. • Four direct jobs during operation. • Project was approved in May 2018. Construction expected to commence in 2024 to 2025 for approximately 18 to 24 months (subject to change).	130 km south-east Edward River LGA	• The Project proposes to clear 7.06 ha of native vegetation, including: ◦ PCT 15. ◦ PCT 16. ◦ PCT 80. • One EEC proposed to be cleared: ◦ Inland Grey Box Woodland in the Riverina, NSW South Western Slopes, Cobar Peneplain, Nandewar and Brigalow Belt South Bioregions. • No species identified that would require offsetting. • The Project would be located within the Riverina IBRA bioregion and Murray Fans sub-region.

Project	Description/Status	Distance from Project (km) / LGA	Relevant Future Development
Project EnergyConnect (NSW – Eastern Section)	• Status: Determination • 375 km of new 330kV double circuit transmission line and associated infrastructure. • Construction workforce of 500 FTE created (of which 100 are local/regional). • Project was approved in September 2022 and construction is expected to take 24 months (subject to change). • MOD 1 -Extension of Offset Timing approved 2024.	Intersects the Subject Land.	• The Project proposes to clear 1,554.88 ha of native vegetation, comprising of the following TECs: ◦ Myall Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain, Murray-Darling Depression, Riverina and NSW South Western Slopes bioregions – 101.21 ha (BC Act). ◦ Sandhill Pine Woodland in the Riverina, Murray-Darling Depression and NSW South Western Slopes bioregions – 31.99 ha (BC Act). • Threatened flora: ◦ *Brachyscome papillosa* (71.17 ha). ◦ *Cullen parvum* (50.31 ha). ◦ *Lepidium monoplocoides* (7 ha). ◦ *Leptorhynchos orientalis* (15.32 ha). ◦ *Maireana cheelii* (109.68 ha). ◦ *Pilularia novae-hollandiae* (8.62 ha). ◦ *Swainsona murrayana* (232.35 ha). ◦ *Swainsona sericea* (109.17 ha). • Threatened fauna: ◦ Plains-Wanderer (0.41 ha). ◦ Southern Myotis (4.77 ha).
Tarleigh Park Solar Farm	• Status: Determination. • Nominal generating capacity of 90 MW with 243,200 solar panels and ancillary facilities. • Potentially an energy storage facility. • Construction workforce would involve 150 direct jobs. • Operational workforce would involve 3 direct jobs. • Project was approved in May 2018 and construction was expected to commence in late 2018 for approximately 12 months (subject to change).	140 km south-east Edward River LGA	• Direct impacts relating to the clearing of 3.37 ha of native vegetation. • No threatened entities were assessed as being impacted by the development.
Junction Rivers Wind Farm (formerly Burrawong Wind Farm)	• Status: Response to Submissions. • Electricity generating up to 750 MW. • Up to 96 WTG and ancillary facilities. • BESS or Static synchronous compensator (STATCOM). • Peak Construction workforce of 400 FTE. • Operational workforce of 40 FTE. • No temporary worker accommodation. • Construction expected to take approximately 48 months.	25 km west Murray River LGA	• The Project proses to clear 75.68 ha of native vegetation comprising of: ◦ PCT 16. ◦ PCT 21. ◦ PCT 23. ◦ PCT 57. ◦ PCT 58. ◦ PCT 163. ◦ PCT 170. • Two TECs to be impacted by the Project include: ◦ *Acacia melvillei* Shrubland – 2.03 ha. ◦ Sandhill Pine Woodland – 1.17 ha. • Threatened flora: ◦ *Brachyscome papillosa (*3.91 ha). ◦ *Lepidium monoplocoides* (3.66 ha). ◦ *Solanum karsense* (2.34 ha). • Threatened Fauna. ◦ Major Mitchells Cockatoo (37.40 ha).
Abercrombie Wind Farm	• Status: Prepare EIS. • Electricity generating up to 2.5 GW. • Up to 348 WTGs, a 500 MW / 200 MWh BESS and ancillary facilities. • Peak Construction workforce of up to 600 FTE. • Operational workforce of up to 35 FTE.	Adjacent to the northern boundary Edward River, Hay Shire LGA	• Direct impacts as a result of the Project are yet to be determined. Considered entities are provided below. • TECs: ◦ Sandhill Pine Woodlands. ◦ Natural Grasslands of the Murray Valley Plains. • EECs: ◦ Sandhill Pine Woodland. ◦ *Acacia melvillei* Shrubland. • Threatened species known or considered highly likely to occur: ◦ *Brachyscome papillosa.* ◦ *Marieana cheelii.*

Project	Description/Status	Distance from Project (km) / LGA	Relevant Future Development
	• Temporary worker accommodation within the project area. • Construction expected to commence early 2028 for 60 months.		◦ *Botaurus poiciloptilus.* ◦ *Circus assimilis.* ◦ *Epthianura albifrons.* ◦ *Falco subniger.* ◦ *Haliaeetus leucogaster.* ◦ *Hieraaetus morphnoides.* ◦ *Lophochroa leadbeateri leadbeateri.* ◦ *Neophema chrysostoma.* ◦ *Oxyura australis.* ◦ *Rostratula australis.* ◦ *Stictonetta naevosa.* ◦ *Bidyanus bidyanus.* ◦ *Litoria raniformis.* ◦ *Hemiaspis damelii.* ◦ *Calidris acuminata.* ◦ *Gelochelidon nilotica.* • The Project would be located within the Riverina IBRA bioregion and Murrumbidgee sub-region.
West Nyangay Solar Farm	• Status: Prepare EIS. • Nominal generating capacity of 800 MW. • 500 MW / 2000 MWh BESS and ancillary facilities. • Construction workforce of around 300 staff. • Operational workforce of around 20 staff. • Temporary worker accommodation is likely to be within the project area. • Construction expected to take approximately 12-18 months (subject to change).	88 km north-east Edward River LGA	• Direct impacts as a result of the Project are yet to be determined. Considered entities are provided below. • TECs: ◦ Sandhill Pine Woodlands • EECs: ◦ Sandhill Pine Woodlands • Threated species known or considered highly likely to occur: ◦ *Maireana cheelii.* ◦ *Brachyscome papillosa.* ◦ *Lepidium monoplocoides.* ◦ *Swainsona murrayana.* ◦ *Aphelocephala leucopsis.* ◦ *Artamus cyanopterus cyanopterus.* ◦ *Burhinus grallarius.* ◦ *Circus assimilis.* ◦ *Climacteris picumnus victoriae.* ◦ *Epthianura albifrons.* ◦ *Falco subniger.* ◦ *Neophema chrysostoma.* ◦ *Pedionomus torquatus.* ◦ *Polytelis swainsonii.* ◦ *Pomatostomus temporalis temporalis.* ◦ *Stagonopleura guttata.* • The Project would be located within the Murrumbidgee IBRA sub-region.
Deniliquin BESS	• Status: Response to Submissions. • 120 MW / 480 MWh BESS. • Construction workforce of around 80-90 jobs. • Construction is expected to commence in mid 2027 for approximately 12 months (subject to change).	122 km south-east Edward River LGA	• The Project would remove 3.43 ha of native vegetation, comprising of: ◦ PCT 20 – 3.27 ha. ◦ PCT 237 – 0.16 ha. • Southern Myotis was assumed present within the subject land (associated with PCT 237). • The Project would be located within the Riverina IBRA bioregion and Murray Fans sub-region.
Deniliquin East BESS	• Status: Response to Submissions. • 100 MW / 200 MWh BESS. • Peak construction workforce of approximately 40 staff. • Operation workforce of around two employees. • Construction was expected to commence in early 2024 for approximately 10-12 months.	120 km south-east Edward River LGA	• The Project would not remove any native vegetation. • No Biodiversity Offset Scheme triggers met due to minimal amount of vegetation to be removed (two small trees with VIS 14.9). • The Project would be located within the Riverina IBRA bioregion and Murray Fans sub-region.

Project	Description/Status	Distance from Project (km) / LGA	Relevant Future Development
Wanganella Wind Farm	• Status: Prepare EIS. • Electricity generating up to 840 MW. • Up to 105 WTGs, a 600 MW /2400 MWh BESS and ancillary facilities. • Peak Construction workforce of up to 420 FTE. • Operational workforce of up to 19 FTE. • Temporary worker accommodation within the project area. • Construction expected to commence in 2027 and commissioned in 2029.	84 km south-east Edward River LGA	• Direct impacts because of the Project are yet to be determined. Considered entities are provided below. • TECs: ◦ Weeping Myall Woodlands. ◦ Natural Grasslands of the Murray Valley Plains. ◦ Artesian Springs Ecological Community in the Great Artesian Basin (BC ACT). • Threatened species known or considered highly likely to occur: ◦ *Falco subniger.* ◦ *Haliaeetus leucogaster.* ◦ *Pedionomus torquatus.* ◦ *Certhionyx variegatus.* ◦ *Circus assimilis.* ◦ *Epthianura albifrons.* ◦ *Aphelocephala leucopsis.* ◦ *Rostratula australis.* ◦ *Neophema chrysostoma.* • The Project would be located within the Riverina IBRA bioregion and Murrumbidgee and Murray Catchment sub-region.
Conargo Wind Farm	• Status: Prepare EIS. • Electricity generating up to 300 MW. • Up to 53 WTGs, a 150 MW / 1,200 MWh BESS and ancillary facilities. • Temporary constructionn and ongoing operation jobs would be created. • Need for temporary worker accommodation will be investigated during the preparation of the EIS. • Construction expected to commence in 2026 and completed in 2028.	120 km south-east Edward River LGA	• Direct impacts as a result of the Project are yet to be determined. Considered entities are provided below. • PCTs: ◦ PCT 2. ◦ PCT 7. ◦ PCT 9. ◦ PCT 10. ◦ PCT 13. ◦ PCT 26. ◦ PCT 28. ◦ PCT 44. ◦ PCT 46. ◦ PCT 70. ◦ PCT 163. • TECs (moderate to high likelihood): ◦ Weeping Myall Woodlands (High). ◦ Myall Woodland (High). ◦ Artesian Springs Ecological Community in the Great Artesian Basin (Moderate). ◦ Sandhill Pine Woodland (Moderate). ◦ *Acacia melvillei* Shrubland (Moderate). ◦ Natural Grasslands of the Murray Valley Plains (High). • Threatened species considered likely or known to occur: ◦ *Aphelocephala leucopsis.* ◦ *Botaurus poiciloptilus.* ◦ *Climacteris picumnus victoriae.* ◦ *Falco hypoleucos.* ◦ *Gallinago hardwickii.* ◦ *Grantiella picta.* ◦ *Leipoa ocellata.* ◦ *Lophochroa leadbeateri leadbeateri.* ◦ *Melanodryas cucullata cucullata.* ◦ *Neophema chrysostoma.* ◦ *Polytelis swainsonii.* ◦ *Rostratula australis.* ◦ *Stagonopleura guttata.* ◦ *Phasolarctos cinereus.* ◦ *Hemiaspis damelii.* ◦ *Galaxias rostratus.* ◦ *Maccullochella peelii.* ◦ *Litoria raniformis.* ◦ *Austrostipa wakoolica.* ◦ *Lepidium monoplocoides.* ◦ *Marieana cheelii.* ◦ *Sclerolaena napiformis.* ◦ *Swainsona murrayana.* ◦ *Swainsona plagiotropis.*

Project	Description/Status	Distance from Project (km) / LGA	Relevant Future Development
			• The Project would be located within the Riverina IBRA bioregion and Murray Fans sub-region.
Booroorban (Saltbush) Wind Farm	• Status: Prepare EIS. • Electricity generating up to 400 MW. • Up to 70 WTGs, a 600 MW / 1,200 MWh BESS and ancillary facilities. • Construction workforce of approximately 280 FTE. • Operational workforce of approximately 28 FTE. • Worker accommodation will be investigated during the preparation of the EIS. • Construction expected to commence in 2028 and commissioned in mid-2030.	70 km east Edward River LGA	• Direct impacts as a result of the Project are yet to be determined. Considered entities are provided below. • PCTs: ◦ PCT 15. ◦ PCT 17. ◦ PCT 28. ◦ PCT 46. ◦ PCT 160. ◦ PCT 163. ◦ PCT 164. • TECs (potential to likely): ◦ Sandhill Pine Woodland (likely) ◦ Natural Grasslands of the Murray Valley Plains (potential). • Listed flora and fauna species recorded during field surveys: ◦ *Epthianura albifrons.* ◦ *Maireana cheelii.* ◦ *Swainsona murrayana.* ◦ *Litoria raniformis.* ◦ *Hieraaetus morphinoides.* ◦ *Lophochroa leadbeateria leadbeateri.* ◦ *Pomatostomus temporalis temporalis.* ◦ *Climacteris picumnus victoriae.* ◦ *Aphelocephala leucopsis.* ◦ *Apus pacificus.* ◦ *Circus assimilis.* • Potential candidate species considered likely to occur: ◦ *Brachyscome papillosa.* ◦ *Lepidium monoplocoides.* ◦ *Burhinus grallarius.* ◦ *Haliaeetus leucogaster.* ◦ *Lophoictinia isura.* ◦ *Ninox connivens.* ◦ *Pedionomus torquatus.* ◦ *Polytelis swainsonii.* • The Project would be located within the Riverina IBRA bioregion and Murrumbidgee sub-region.

8.8.4 SUMMARY

Current proposed and approved infrastructure projects of the region are predicted to result in the removal of 11,000 ha+ of native vegetation and habitat for threatened species. Most of these impacts are on chenopod shrublands, notably PCT 164. This is a degraded native vegetation that generally comprises low biodiversity value.

This Project would not clear any woody vegetation which is rare in the region and likely to contain some of the highest biodiversity values found in the Murrumbidgee IBRA subregion. Project impacts are small, representing ~0.1% of approved/proposed clearing for infrastructure across the region. The habitat of threatened species has been avoided, by locating the development within the highly degraded PCT 164, rather than in other vegetation types that comprise higher biodiversity values. It is concluded that the Project is not likely to make any substantive cumulative impact on biodiversity values within the region.

9. THRESHOLDS FOR ASSESSING AND OFFSETTING IMPACTS

9.1 SERIOUS AND IRREVERSIBLE IMPACTS

A SAII entity is listed under the BC Act as an impact that is likely to contribute significantly to the risk of extinction of a threatened entity.

An impact is to be regarded as serious and irreversible if it is likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct through one or more of the following principles:

1. It will cause a further decline of a species or ecological community that is currently observed, estimated, inferred or reasonably suspected to be in a rapid rate of decline;
2. It will further reduce the population size of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very small population size;
3. It is an impact on the habitat of the species or ecological community that is currently observed, estimated, inferred or reasonably suspected to have a very limited geographic distribution; or
4. The impacted species or ecological community is unlikely to respond to measures to improve its habitat and vegetation integrity and therefore its members are not replaceable.

The assessment of entities identified at risk of a SAII, where impacted by an SSD project, the Minister for Planning is required to:

- Take those impacts into consideration; and
- Determine whether there are any additional and appropriate measures that will minimise those impacts if consent or approval is to be granted.

In accordance with Section 9.1 of the BAM, potential SAII have been addressed in the following sections.

9.1.2 ASSESSMENT FOR SERIOUS AND IRREVERSIBLE IMPACTS ON BIODIVERSITY VALUES

There are no SAII entities impacted by the Project. However, at the request of CPHR, an assessment has been provided for the Plains-wanderer (*Pedionomus torquatus*). The Plains-wanderer is listed under SAII Principle 1: Population reduction of ≥ 80% in 10 years or three generations.

TABLE 9-1 PLAINS-WANDERER (*PEDIONOMUS TORQUATUS*) SAII ASSESSMENT

Additional Impact Assessment in accordance with BAM Section 9.1.2
1. **What action and measures taken to avoid the direct and indirect impact on the potential entity for an SAII?**
Avoidance: A review of Important Mapped Areas and additional mapping of suitable habitat for the Plains-wanderer has been completed across the Subject Land (refer to Section 5.2.5.3). The Subject Land does not intersect with the Important Mapped Area for the Plains-wanderer.

Additional Impact Assessment in accordance with BAM Section 9.1.2

The Project has been designed to avoid habitat suited to the species (e.g. sparse grassy herbaceous vegetation with few shrub species such as PCTs 44 and 46). No area of habitat associated with the Plains-wanderer is to be impacted by the Project.

Mitigation:

A BMP is to be prepared and implemented in the construction and operational phases of the Project. Several mitigation measures will be implemented through this BAMP to manage impacts on the species and habitat, which has considered measures specified in the *National Recovery Plan for the Plains-wanderer* (*Pedionomus torquatus*) (Cwth DoE, 2016):

- Clearing is to not occur during the main breeding period (August to November). Pre-clearance surveys will be undertaken during construction, flushing ground-dwelling avian species from the clearance path, to minimise the incidence of harm to individuals. If a second breeding event is detected in the summer/autumn period (rain induced) then additional protections will be included to manage impacts (i.e., identify and exclude identified breeding individuals).
- The potential risks of predation will be mitigated through pest management actions, to be developed in accordance with guidelines and relevant codes of practice. A particular focus will be placed on feral cat (*Felis catus*) and European fox (*Vulpes vulpes*).
- The CEMP and BMP will include retained vegetation and weed management actions, including provisions for elevated non-native vegetation, e.g. African Boxthorn (*Lycium ferocissimum*), which can provide perches for known predators of the species.
- Protocols for chemical spraying exclusion zones around Plains-wanderer habitat will be implemented, including limiting spraying to only occur in low wind conditions.
- The Project design will also allow for the implementation of plain wire fencing to be used as perimeter fencing in place of barbed wire fencing, to reduce the risk of entanglement.

2. **The assessor must consult the TBDC and/or other sources to report on the current population of the species including:**

a) evidence of rapid decline (Principle 1, clause 6.7(2)(a) BC Regulation) presented by an estimate of the:

i. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer), or

ii. decline in population of the species in NSW in the past 10 years or three generations (whichever is longer) as indicated by: an index of abundance appropriate to the species; decline in geographic distribution and/or habitat quality; exploitation; effect of introduced species, hybridisation, pathogens, pollutants, competitors, or parasites

1. The Plains-wanderer occurs in a single widely-dispersed population; however, the evidence for this is not strong (Cwth DoE, 2016). The population has experienced significant declines in number in core locations, with monitoring of the species across the Riverina region reporting an overall decline of 84% between 2010 and 2014. This decline was preceded by significant fluctuations in numbers across the region from 2001 onwards, with an overall decline of 93% over the period from 2001 to 2014 (Wilson, et al., 2014).

i. The Plains-wanderer has declined to a record low, with 250 to 1,000 birds estimated to be extant as of 2015 (NSW OEH, 2015; Baker-Gabb, 2015). The distribution of the Plains-wanderer was formerly widespread, however, it is now locally-extinct or near extinct in coastal and sub-coastal areas in all four states (NSW, Queensland, Victoria and South Australia) in

Additional Impact Assessment in accordance with BAM Section 9.1.2

which it is known to occur, and is mainly confined to small inland areas that are subject to grazing (Cwth DoE, 2016). Historically, the major factor contributing to the decline of the Plains-wanderer was habitat loss due to the widespread conversion of lowland native grasslands to crops and dense, introduced pastures.
Currently recognised threatening processes for the Plains-wanderer include habitat loss, inappropriate grazing, small population size, predation by feral species, pesticide use, planting and natural recruitment of trees in or near native grasslands, lack of appropriate fire regimes, quail hunting and climate change (Cwth DoE, 2016).

b) evidence of small population size (Principle 2, clause 6.7(2)(b) BC Regulation) presented by:

i. an estimate of the species' current population size in NSW, and

ii. an estimate of the decline in the species' population size in NSW in three years or one generation (whichever is longer), and

iii. where such data is available, an estimate of the number of mature individuals in each subpopulation, or the percentage of mature individuals in each subpopulation, or whether the species is likely to undergo extreme fluctuations

i. Not applicable to Plains-wanderer

ii. Not applicable to Plains-wanderer

iii. Not applicable to Plains-wanderer

c) Evidence of limited geographic range for the threatened species (Principle 3, clause 6.7(2) BC Regulation) presented by:

i. Extent of occurrence

ii. Area of occupancy

iii. Number of threats defined locations (geographically or ecologically distinct areas in which a single threatening event may rapidly affect all species occurrences), and

iv. Whether the species' populations likely to undergo extreme fluctuations

i. Not applicable to Plains-wanderer

ii. Not applicable to Plains-wanderer

iii. Not applicable to Plains-wanderer

iv. Not applicable to Plains-wanderer

Additional Impact Assessment in accordance with BAM Section 9.1.2

d) Evidence that the species is unlikely to respond to management (Principle 4, clause 6.7(2)(d) BC Regulation) because:

1) known reproductive characteristics severely limit the ability to increase the existing population on, or occupy new habitat (e.g. species is clonal) on, a biodiversity stewardship site

2) the species is reliant on abiotic habitats which cannot be restored or replaced (e.g. karst systems) on a biodiversity stewardship site, or

3) life history traits and/or ecology is known but the ability to control key threatening processes at a biodiversity stewardship site is currently negligible (e.g. frogs severely impacted by chytrid fungus)

i. Not applicable to Plains-wanderer

ii. Not applicable to Plains-wanderer

iii. Not applicable to Plains-wanderer

3. Where the TBDC indicates data is 'unknown' or 'data deficient' for a species for a criterion listed in Subsection 9.1.2(2.), the assessor must record this in the BDAR or BCAR.

NSW BioNet (NSW DCCEEW, 2025b) does not indicate data are 'unknown' or 'data deficient' for this species.

4. In relation to the impacts from the proposal on the species at risk of an SAII, the assessor must include data and information on:

a) the impact on the species' population (Principles 1 and 2) presented by:

i. an estimate of the number of individuals (mature and immature) present in the subpopulation on the subject land (the site may intersect or encompass the subpopulation) and as a percentage of the total NSW population, and

ii. an estimate of the number of individuals (mature and immature) to be impacted by the proposal and as a percentage of the total NSW population, or

iii. if the species' unit of measure is area, provide data on the number of individuals on the site, and the estimated number that will be impacted, along with the area of habitat to be impacted by the proposal.

i. Targeted survey effort has identified one individual of the species within the Project Area, with the nearest record situated approximately 980 m from the Subject Land boundary. No area of preferred/core habitat occurs within the Subject Land (e.g., PCTs 44 and 46). Despite countless investigations across the Subject Land, no additional observations of the species have been recorded.

The Plains-wanderer occupies home ranges averaging 12 ha; those of males and females overlap by 50% to give 18 ha per pair, but those of the same sex do not overlap (NSW Scientific Committee, 2009). The size of the present subpopulation is unknown, however based on the absence of suitable habitat and the species' home range (12 ha), the Subject Land is not likely to support individuals of the species.

Additional Impact Assessment in accordance with BAM Section 9.1.2

The most recent population estimates are 125 - 500 mature individuals for NSW. The Project has avoided preferred/core habitat (e.g., PCTs 44 and 46). Based on one individual, the Project may impact <1% of the NSW population.

ii. The Subject Land does not contain any Important Mapped Areas or preferred/core habitat (e.g., PCT 44 and 46). The size of the Subject Land subpopulation is unknown, however, based on the total number of individuals (1) observed over four years of survey effort and absence of preferred habitat, the maximum impact on individuals will be <1% of the NSW population with no loss of preferred habitat.

iii. Refer to Answer 4.a.ii. above.

b) Impact on geographic range (Principles 1 and 3) presented by:

i. the area of the species' geographic range to be impacted by the proposal in hectares, and a percentage of the total AOO, or EOO within NSW

ii. the impact on the subpopulation as either: all individuals will be impacted (subpopulation eliminated); OR impact will affect some individuals and habitat; OR impact will affect some habitat, but no individuals of the species will be directly impacted

iv. to determine if the persisting subpopulation that is fragmented will remain viable, estimate (based on published and unpublished sources such as scientific publications, technical reports, databases or documented field observations) the habitat area required to support the remaining population, and habitat available within dispersal distance, and distance over which genetic exchange can occur (e.g. seed dispersal) and pollination distance for the species to determine changes in threats affecting remaining subpopulations and habitat if the proposed impact proceeds, estimate changes in environmental factors including changes to fire regimes (frequency, severity); hydrology, pollutants; species interactions (increased competition and effects on pollinators or dispersal); fragmentation, increased edge effects, likelihood of disturbance; and disease, pathogens and parasites. Where these factors have been considered elsewhere in relation to the target species, the assessor may refer to the relevant sections of the BDAR or BCAR

Additional Impact Assessment in accordance with BAM Section 9.1.2

i. The Subject Land does not contain any Important Mapped Areas or preferred/core habitat (e.g., PCT 44 and 46). Neither the AOO (330 km^2) or EOO of the species (930,000 km^2) will be affected by the Project.

ii. The Project is unlikely to directly impact Plains-wanderer individuals as pre-clearance surveys, involving flushing ground-dwelling avian species from the clearance path.

iii. The Project is not likely to directly impact the species or hits preferred/core habitat (e.g., PCT 44 and 46). Therefore, the Project is not considered likely to reduce habitat to a level that would impact the subpopulation's viability.

iv. The Project is not likely to directly impact the species or hits preferred/core habitat (e.g., PCT 44 and 46). Other impacts include the potential for increased predator activities, vehicle strike, impacts on the viability of vegetation adjacent to the Subject Land (e.g. from light spill) and introduction of weed species. A BMP is to be implemented to manage these impacts.

9.2 IMPACT SUMMARY

9.2.1 IMPACTS THAT REQUIRE AN OFFSET

In accordance with Section 9.2.1 of the BAM (NSW DPIE, 2020a), all impacts of proposals on PCTs that are associated with a vegetation zone that have vegetation integrity scores of:

- ≥15, where the PCT is representative of an EEC or a CEEC;
- ≥17, where the PCT is associated with threatened species habitat (as represented by ecosystem credits) or represents a vulnerable ecological community; or
- ≥20, where the PCT does not represent a TEC and is not associated with threatened species habitat.

Note that the there are no TECs mapped within the Subject Land. All PCTs mapped within the Subject Land have a VIS of greater than or equal to 20 refer to

Table 8-3 and thus direct impacts to all VZs require an offset. Impacts requiring an offset are shown in Figure 9-1.

9.2.1.1 SPECIES CREDIT SPECIES

Section 9.2.2 (2) of the BAM (NSW DPIE, 2020a) stipulates that the assessor must determine an offset for the impacts of proposals on threatened species that require species credits. All species for which species' polygons have been created will require an offset (see Section 5.2.5.2).

9.2.1.2 PRESCRIBED IMPACTS

Section 8.6 of the BAM (NSW DPIE, 2020a) states that if mitigation and management measures described in adaptive management plans (e.g., the draft BBAMP in Appendix A) are considered at high risk of failure, measures to secure offsets can be proposed and justified in the BDAR. These measures may include the retirement of credits and / or other conservation measures that benefit a threatened entity. The consent authority will assess the proposed mitigation measures and determine whether additional biodiversity credits will need to be retired, or alternative measures undertaken to offset high risk impacts. Conservation measures to offset indirect and prescribed impacts are not proposed for the Project.

9.2.2 IMPACTS THAT DO NOT REQUIRE FURTHER ASSESSMENT

Impacts that do not require an offset is shown in Figure 9-1 as outlined below.

Project Area

The Subject Land contains 12.25 ha of non-native vegetation that does not require further assessment for ecosystem credits. This area is dominated by no vegetation or exotic species, in a disturbed state, with the native vegetation having been historically cleared for agriculture or infrastructure.

Transport Route

The transport route contains areas of non-native vegetation that does not require further assessment for ecosystem credits. This area is dominated by bare ground, or exotic species, or species not native to NSW within degraded roadside environments with the native vegetation having been historically cleared.

9.2.3 IMPACTS ON MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

The Commonwealth Government's Bilateral Assessment Requirements stipulate that an EIS (through the BDAR) must include the identification of any MNES that have not been offset using the BAM and details of how impacts requiring offset correlate to the MNES impacts. These details are provided in Table 9-2. The species detailed in Table 9-2 are those provided in the Supplementary SEARs and other EPBC Act threatened species which may be impacted by the Project as listed ecosystem species, known candidate species or species known to occur within the Subject Land.

TABLE 9-2 MNES ENTITIES IMPACTED BY THE PROJECT

MNES	EPBC Act	Comments	Impacts (ha)	Offset and / or Mitigation Measures	Credit Liability
Threatened species listed in the Supplementary SEARs					
Mossgiel Daisy *Brachyscome papillosa*	V	Species surveyed for and detected Extent of occupied habitat defined to determine loss	162.02	Retirement of credits Mitigation of indirect impacts detailed in Table 8-6.	6,444
Chariot Wheels *Maireana cheelii*	V	Species surveyed for and detected Extent of occupied habitat defined to determine loss	27.97	Retirement of credits Mitigation of indirect impacts detailed in Table 8-6.	1,217
Plains-wanderer *Pedionomus torquatus*	CE	Species surveyed for and detected beyond the Subject Land	No impact	Manually added for ecosystem credits. Mitigation of indirect impacts detailed in Table 8-6.	N/A
Winged Peppercress *Lepidium monoplocoides*	E	Species not detected	No impact	No offset or mitigation measures required	N/A
Flathead Galaxias *Galaxias rostratus*	CE	Determined as unlikely to occur	No impact	No offset or mitigation measures required	N/A
Australian Painted Snipe *Rostratula australis*	E	Species not detected	No impact	Mitigation of prescribed impacts detailed in the BBAMP. Compensatory offset measures may be undertaken.	N/A
Australasian Bittern *Botaurus poiciloptilus*	E	Species not detected	No impact	Mitigation of prescribed impacts detailed in the BBAMP. Compensatory offset measures may be undertaken.	N/A
Corben's Long-eared Bat *Nyctophilus corbeni*	V	Species not detected	No impact	Mitigation of prescribed impacts detailed in the BBAMP. Compensatory offset measures may be undertaken.	N/A
Growling Grass Frog *Litoria raniformis*	V	Species not detected	No impact	Mitigation of indirect impacts detailed in Table 8-6.	N/A
Grey Falcon *Falco hypoleucos*	V	Species associated with PCTs 159, 163 and 164	Habitat loss of	Retirement of credits	22,703 ecosyste m credits

MNES	EPBC Act	Comments	Impacts (ha)	Offset and / or Mitigation Measures	Credit Liability
			765.06 ha	Mitigation of prescribed impacts detailed in the BBAMP.	
Malleefowl *Leipoa ocellata*	V	Species not detected	No impact	Mitigation of prescribed impacts detailed in the BBAMP. Compensatory offset measures may be undertaken.	N/A
Painted Honeyeater *Grantiella picta*	V	Species not detected	No impact	Mitigation of prescribed impacts detailed in the BBAMP. Compensatory offset measures may be undertaken.	N/A
Austrostipa metatoris	V	Determined as unlikely to occur	No impact	No offset or mitigation measures required	N/A
Slender Darling-pea *Swainsona murrayana*	V	Species surveyed for and detected beyond the Subject Land	No impact	Mitigation of indirect impacts detailed in Table 8-6.	N/A
Threatened ecological communities listed in the Supplementary SEARs					
Natural Grasslands of the Murray Valley Plains	CE	Not present within the Subject Land	No impact	N/A	N/A
Plains mallee box woodlands of the Murray Darling Depression, Riverina and Naracoorte Coastal Plain Bioregions	CE	Not present within the Subject Land	No impact	N/A	N/A
Buloke Woodlands of the Riverina and Murray-Darling Depression Bioregions	E	Not present within the Subject Land	No impact	N/A	N/A
Weeping Myall woodlands	E	Not present within the Subject Land	No impact	N/A	N/A
Grey Box (*Eucalyptus microcarpa*) Grassy Woodlands and Derived Native Grasslands of Southeastern Australia	E	Not present within the Subject Land	No impact	N/A	N/A
EPBC Act listed ecosystem species (not listed in the Supplementary SEARs)					
Southern Whiteface *Aphelocephala leucopsis*	V	Species associated with PCTs 163 and 164	Habitat loss of	Retirement of credits	22,697 ecosyste m credits

MNES	EPBC Act	Comments	Impacts (ha)	Offset and / or Mitigation Measures	Credit Liability
			764.89 ha	Mitigation of prescribed impacts detailed in the BBAMP.	
Pink Cockatoo *Lophochroa leadbeateri*	E	Species associated with PCTs 159 and 163	Habitat loss of 115.65 ha	Retirement of credits Mitigation of prescribed impacts detailed in the BBAMP.	4,262 ecosystem credits
Blue-winged Parrot *Neophema chrysostoma*	V	Species associated with PCTs 163 and 164	Habitat loss of 764.89 ha	Retirement of credits Mitigation of prescribed impacts detailed in the BBAMP.	22,697 ecosystem credits
EPBC Act listed candidate species (not listed in the Supplementary SEARs)					
Pink-tailed Legless Lizard *Aprasia parapulchella*	V	Determined as unlikely to occur	No impact	No offset or mitigation measures required	N/A
EPBC Act listed species (not listed in the Supplementary SEARs nor under the BC Act)					
Fork-tailed Swift *Apus pacificus*	Mi	Species present	Collision risk	Mitigation of prescribed impacts detailed in the BBAMP. Compensatory offset measures may be undertaken.	N/A

LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD

1

2

Legend

- Project Area
- Subject Land
- Impacts not Requiring Offset
- Impacts Requiring Offset
- Main Road
- Road
- Path/Track

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54

Date: 09/01/2026
Created By: VN
Drawing Size: A3

0 1 2Km

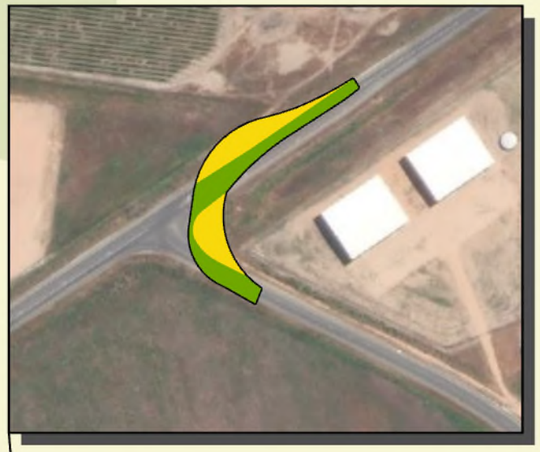
1:70,000

F9-1 Impacts Requiring Offset and Impacts not Requiring Offset (Project Area)

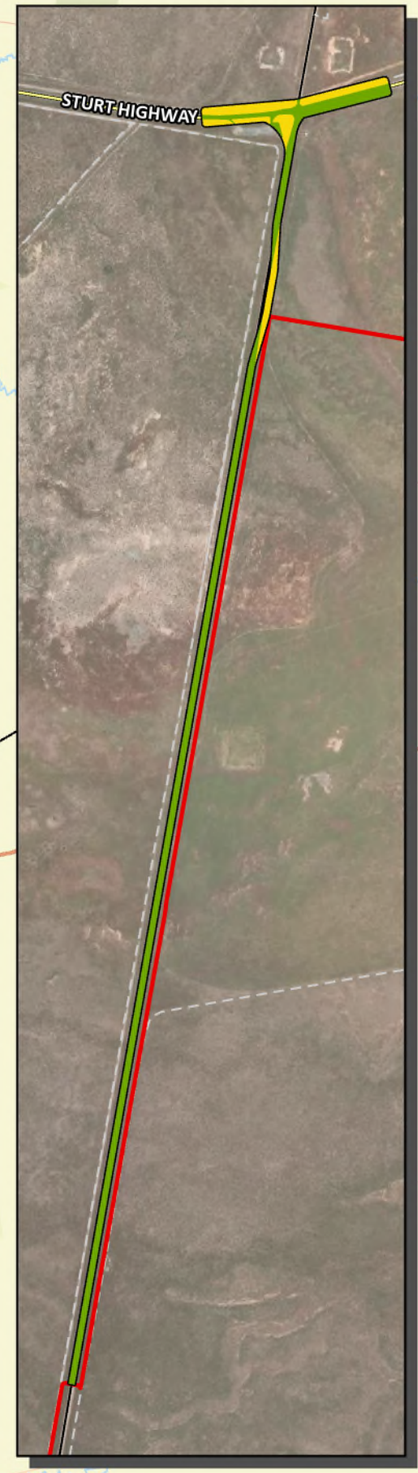
Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

0617753_KKWF_BDAR_R1.aprx









Euston
Robinvale
Tol Tol
Belsar Island State Forest
Balranald
Yanga
Yanga
Yanga
B400
C251
B12
Tooleybuc
A20

Legend
- Project Area
- Subject Land
- Haul Route

PCT
- Impacts not Requiring Offset
- Impacts Requiring Offset

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 15/01/2026
Created By: VN
Drawing Size: A3
0 5 10Km
1:400,000

F9-2 Impacts Requiring Offset and Impacts not Requiring Offset (Haul Route)

Keri Keri Windfarm
Biodiversity Development Assessment Report
Acciona

ERM

0617753_KKWF_BDAR_R2.aprx

10. APPLYING THE NO NET LOSS STANDARD

The offset liability for the Project is calculated in the following sections. The Credit Summary Report for the Subject Land is provided in Appendix D.

10.1 OFFSET REQUIREMENTS FOR DIRECT IMPACTS

10.1.1 ECOSYSTEM CREDITS

Table 10-1 identifies the ecosystem credits required to offset the Project as per BAM Subsection 9.2.1(1.). There are no vegetation zones that are assessed as not requiring offsets as per BAM Subsection 9.2.1(3.).

The Project's residual impacts correspond to 22,703 ecosystem credits. The Project's direct impact on biodiversity values by PCT is outlined in Table 10-1.

TABLE 10-1 IMPACTS THAT REQUIRE AN OFFSET – ECOSYSTEM CREDITS

Vegetation Zone	PCT	Condition	TEC	Change in VIS	Biodiversity Risk Weighting	Impact area (ha)	Ecosystem credits required
Subject Land							
VZ01	164	Grassy	No	-80.1	1.5	197.37	5,929
VZ02	164	Open	No	-53.1	1.5	138.82	2,766
VZ03	164	Degraded	No	-36.5	1.5	18.33	251
VZ04	164	Dense	No	-91.4	1.5	223.98	7,680
VZ05	164	Gilgais	No	-68.2	1.5	70.92	1,815
VZ06	163	Shrubland	No	-98.3	1.5	115.47	4,256
Haul Route							
VZ07	159	Transport Route	No	-53.9	2.5	0.17	6

Like for like trading options apply to the Ecosystem credit classes as outlined in Table 10-2.

TABLE 10-2 ECOSYSTEM CREDIT CLASS AND MATCHING CREDIT PROFILE

PCT Name	PCT Vegetation Class	Associated TEC	Offset Trading Group	Hollow Bearing Trees	Credits
PCT 159 - Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	Riverine Chenopod Shrublands	Not a TEC		No	6

PCT Name	PCT Vegetation Class	Associated TEC	Offset Trading Group	Hollow Bearing Trees	Credits
PCT 163 - Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	Riverine Chenopod Shrublands	Not a TEC	Riverine Chenopod Shrublands - < 50% cleared group (including Tier 4 or higher threat status).	No	4,256
PCT 164 - Cotton Bush open shrubland of the semi-arid (warm) zone	Riverine Chenopod Shrublands	Not a TEC	Riverine Chenopod Shrublands - < 50% cleared group (including Tier 4 or higher threat status).	No	18,441

IBRA subregions from where biodiversity credits can be sourced are:

- Murrumbidgee;
- Darling Depression;
- Lachlan;
- Lachlan Plains;
- Lower Slopes;
- Murray Fans;
- Robinvale Plains; and
- South Olary Plain.

Or any IBRA subregion that is within 100 km of the outer edge of the impacted site (no additional IBRA subregions are within this radius).

10.1.2 SPECIES CREDITS

Candidate species requiring an offset for impacts within the Subject Land are presented in Table 10-3. The Credit Summary Report is provided in Appendix D.

TABLE 10-3 IMPACTS THAT REQUIRE AN OFFSET – SPECIES CREDITS

Common Name	Scientific Name	BC Act Status	EPBC Act Status	Biodiversity Risk Weighting	Loss of habitat (ha)	Number of species credits required
Mossgiel Daisy	*Brachyscome papillosa*	V	V	2.00	162.02	6,444
Chariot Wheels	*Maireana cheelii*	V	V	2.00	27.97	1,217

10.2 OFFSET STRATEGY

The No Net Loss standard involves the retirement of ecosystem and species credits for Project related impacts in accordance with the BAM. This includes calculation of residual impacts for:

- Direct impacts: calculated using the BAM-C, which provides an output determining the final Species credit and Ecosystem credit obligations for the Project. These have been calculated for the Project and are tabulated in Section 10.1;

- Indirect impacts: these offset calculations, which may be specified in ecosystem and/or species credits, are estimated using guidance provided in the BAM Operational Manual – Stage 2. No biodiversity credits for indirect impacts have been estimated for the Project; and
- Prescribed impacts: these offset calculations, which may be specified in ecosystem and/or species credits, are estimated using guidance provided in the BAM Operational Manual – Stage 2. No biodiversity credits for prescribed impacts have been estimated for the Project, rather, such estimates should be evidence based and form part of the finalised BBAMP.

Typically, the final credit obligations are to be 'retired' prior to construction or in accordance with an approved staged approach as per any conditions of consent issued by the determining authority.

The Applicant is developing a biodiversity offset strategy in parallel with the BDAR. This strategy would detail the offset approach to be undertaken to retire credit obligations and would be achieved by one or more of the following options:

- Retiring 'like for like' credits; and/or

The No Net Loss standard involves the retirement of ecosystem and species credits for Project related direct impacts in accordance with the BOS. The BOS requires all biodiversity impacts to be calculated using the BAM-C, which provides an output determining the final ecosystem and species credit obligations for the Project. Typically, the final credit obligations are to be 'retired' prior to construction or in accordance with an approved staged approach.

The Applicant has developed a biodiversity offset strategy. This strategy details the offset approach to be undertaken to retire credit obligations and will be achieved by:

- Retiring 'like for like' credits, as specified in Sections 10.1.1 and 0, to the amount and from the regions indicated (refer to the Biodiversity Credit Report in Appendix D).
- Funding a biodiversity conservation action instead of, or in combination with, the retirement of species credits; and/or
- Entering into a Strategic Offset Delivery Agreement (SODA) with the Environment Agency Head to meet the biodiversity offset obligations; and/or
- Payment into the Biodiversity Conservation Trust (BCT).Fund in lieu of satisfying the offset liability specified in Sections 10.1.1 and 0.

The following sections outline the way the Project may resolve its offset liability.

10.2.1 'LIKE FOR LIKE' CREDITS

'Like for like' biodiversity credits are specified in Section 10.1. The proponent may elect to find and retire these credits in part of full, which would depend on availability. The offset liability may be reduced if appropriately timed targeted survey verify species credit species that are assumed to occur are in fact absent and are not directly impacted by the Project.

10.2.2 FUNDING A BIODIVERSITY CONSERVATION ACTION

Ancillary rules are available to SSD projects which permit allows a person with an obligation to retire biodiversity credits to fund biodiversity conservation actions to offset impacts (State of NSW and Department of Climate Change, Energy, the Environment and Water;, 2025) (NSW OEH, 2017a). To use a biodiversity conservation action as a measure to offset or compensate for impacts on biodiversity values, the action must:

- benefit the threatened species or ecological community impacted by the development or clearing of native vegetation;
- be selected from the list in the ancillary rules;
- be delivered through the NSW Government Saving our Species program to ensure biodiversity benefits are achieved, including the management of funding and implementation of the action;
- be of an equivalent value to the number of credits calculated by the BAM-Calculator.

The extent to which these ancillary rules are applied and how they form part of the offset strategy is to be determined through consultation with the consent authority (NSW OEH, 2017a).

There are no like for like eligible species listed in the ancillary rules that are relevant to the Project.

10.2.3 SODA

A SODA is not currently proposed for the Project.

10.2.4 BIODIVERSITY CONSERVATION TRUST FUND

The use of this mechanism for resolving the biodiversity credit liability will be determined in connection with the 'like for like' credit retirement approach and would depend on credit availability at the time of offset liability retirement.

11. CONCLUSION

11.1 BIODIVERSITY MATTERS REQUIRING ASSESSMENT

The Development Footprint comprises 765.06 ha of assessable vegetation comprising three PCTs as listed below:

- PCT 164 - Cotton Bush open shrubland of the semi-arid (warm) zone;
- PCT 163 - Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones; and
- PCT 159 - Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW).

Seven vegetation zones of varying conditions states have been used to refine the calculation of direct impacts on PCTs. Other important findings are listed below:

- TECs have been avoided thus do occur within the Subject Land;
- No impact on the habitat of a potential SAII entity;
- Impacts on threatened flora species have been determined and limited to:
  - Mossgiel Daisy (*Brachyscome papillosa*);
  - Chariot Wheels (*Maireana cheelii*);
- Direct impacts on species credit threatened fauna species have been avoided.
- Prescribed impacts are likely for birds and bats following turbine strike.

11.2 AVOID, MINIMISE AND MITIGATE

The amended Project design has been informed by detailed biodiversity investigations and identification of other environmental limitations, constructability requirements, and consideration of the outcomes of agency, landowner, and community consultations. Where possible, the project has been refined to avoid and minimise impacts on biodiversity values such as:

- Habitat features used by raptors (i.e., stick nests) by using buffers;
- Indirect impacts on the adjoining conservation reserve by removing WTGs located in proximity to that reserve;
- Removing development from areas with a high incidence of threatened flora;
- Removing development from areas comprising vegetation described as PCT 46 (i.e., core habitat for the Plains-wanderer);
- Avoiding the occurrence of the recently listed *Pterostylis pedina* (endangered);
- Avoidance of any crossing of Abercrombie Creek and use of lands south of Abercrombie Creek where potential habitat for additional threatened flora species occurs;
- Where possible, removing WTGs located nearby the existing transmission line easement (i.e., potential perching habitat for raptors), to reduce the risk of prescribed impacts;
- Avoidance of semi-permanent and permanent water sources, with no such water resources being within 200 m of the Subject Land (i.e., avoiding the potential for impacts on threatened species such as the Southern Myotis and Growling Grass Frog)
- The use of existing public and internal access tracks across the Subject Land where possible, to minimise vegetation clearance.

A suite of mitigation measures to avoid and further minimise direct, indirect and prescribed impacts will be implemented, such as the draft BBAMP and BMP.

11.3 DIRECT IMPACTS ON ASSESSABLE BIODIVERSITY MATTERS

The Project will have a direct impact on native vegetation and the habitat of known and assumed candidate threatened species. Direct impacts on PCTs are unavoidable and have been subject to residual impact calculations.

Species polygons have been established for two threatened species that cannot be avoided by the Project. None of the species are identified as SAII entities.

The Project has avoided an impact on potential SAII entities.

11.4 INDIRECT IMPACTS ON ASSESSABLE BIODIVERSITY MATTERS

Indirect and prescribed impacts are expected because of the Project and are associated with the following:

- Impacts to hydrological processes;
- Increase risk of mammal predatory species access;
- Increase risk of vehicle strike; and
- Risk of turbine strike.

Mitigation measures will be implemented to mitigate against these indirect impacts and are inclusive of the implementation of a CEMP, BBAMP and BMP.

11.5 SUMMARY

The Project's impacts, assessed in accordance with the BAM, have demonstrated an avoid, minimize and mitigate approach to reducing the impacts on high biodiversity values. Most of the Project's impacts are on native vegetation and habitat associated with degraded vegetation (i.e., PCTs 163 and 164).

Mitigation during the construction and operation phase of the Project will continue to safeguard impacts on biodiversity values. The like-for-like offsetting of residual impacts through the BOS will ensure a no net loss outcome, thus maintaining compliance with the 'no net loss' standard established by the BAM.

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APPENDIX A DRAFT BIRD AND BAT ADAPTIVE MANAGEMENT PLAN (ERM, 2025)

Keri Keri Wind Farm

Draft Bird and Bat Adaptive Management Plan

PREPARED FOR

Acciona Energy Australia Global Pty Ltd

DATE
15 January 2026

REFERENCE
0617753



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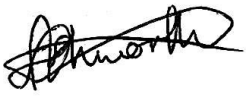
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Keri Keri Wind Farm

Draft Bird and Bat Adaptive Management Plan

0617753



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CONTENTS

1.	INTRODUCTION	1
1.1	THE PROJECT	1
1.2	BBAMP PURPOSE	1
1.3	OBJECTIVES	3
1.4	MANAGEMENT PLAN STRUCTURE	3
2.	EXISTING ENVIRONMENT	5
2.1	BIRDS	5
2.1.1	Threatened Species	5
2.1.2	Raptors	5
2.2	BATS	6
3.	BASELINE DATA	8
3.1	BIRD UTILISATION	8
3.1.1	Bat activity	8
4.	BIRD AND BAT COLLISION RISK	9
4.1	TURBINE RISK	9
4.2	SPECIES RISK	9
4.3	COLLISION RISK MODELLING	10
5.	MONITORING	12
5.1	DESIGN	12
5.2	METHODS	14
5.2.1	Bird Utilisation Survey (BUS)	14
5.2.2	Bats Surveys	14
5.2.3	Carcass Searchs	14
5.2.4	Monitoring Frequency, timing, replication and Duration	18
5.2.5	Weather Conditions	20
6.	ANALYSIS	21
6.1	BIRD AND BAT ACTIVITY	21
6.2	MORTALITY	21
7.	TRIGGER ACTION RESPONSE PLAN	23
7.1	TRIGGER THRESHOLDS	23
7.1.1	High Risk Species	23
7.1.2	Low to Moderate Risk Species	24
7.1.3	Species not previously risk assessed	25
7.2	ACTION	25

7.3	RESPONSE	26
7.3.1	Interim Impact Trigger	26
7.3.2	Significant Impact Trigger	26
7.4	BBAMP MONITORING AND IMPLEMENTATION RISKS	26
8.	ADAPTIVE MANAGEMENT FRAMEWORK	28
9.	REPORTS AND REGISTERS	29
9.1	ANNUAL REPORTS	29
9.2	INVESTIGATION: INTERIM IMPACT TRIGGER REPORT	29
9.3	INVESTIGATION: SIGNIFICANT IMPACT TRIGGER REPORT	30
9.4	IMPACT TRIGGER REGISTER	31
9.5	BBAMP AMENDMENT REGISTER	31
10.	BBAMP REVIEW	32
11.	COMPENSATORY MEASURES	33
12.	REFERENCES	34

LIST OF TABLES

TABLE 1-1	BBAMP STRUCTURE	4
TABLE 2-1	BAT CALL ANALYSIS RESULTS	6
TABLE 2-2	BAT SPECIES ACTIVITY BY HEIGHT (2 M, 30 M AND 95 M)	7
TABLE 4-1	ESTIMATED COLLISION RISK MORTALITIES	10
TABLE 7-1	ANNUAL TRIGGER THRESHOLDS FOR HIGH RISK SPECIES	23
TABLE 7-2	TRIGGER THRESHOLDS FOR SPECIES NOT PREVISOULY RISK ASSESSED	25

LIST OF FIGURES

FIGURE 1-1	PROJECT LAYOUT	2
FIGURE 5-1	BUS SURVEY LOCATIONS	13

ACRONYMS AND ABBREVIATIONS

Acronyms	Description
ALA	Atlas of Living Australia
BACI	Before-After-Control-Impact
BBAMP	Bird and Bat Adaptive Management Plan
CRM	Collision Risk Modelling
BAM	Biodiversity Assessment Method
BC Act	*Biodiversity Conservation Act 2016* (NSW)
BCS	NSW Biodiversity, Conservation and Science Directorate
BDAR	Biodiversity Development Assessment Report
BUS	Bird Utilisation Survey
^{o}C	Degrees Celsius
CASA	Civil Aviation Safety Authority
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cwth	Commonwealth
Cwth DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
Cwth DEWHA	Commonwealth Department of the Environment, Water, Heritage and the Arts
Cwth DoE	Commonwealth Department of the Environment
Cwth DSEWPC	Commonwealth Department of Sustainability, Environment, Water, Population and Communities
EAAF	East Asian-Australasian Flyway
EP&A Act	*Environmental Planning & Assessment Act 1979* (NSW)
EPBC Act	*Environmental Protection and Biodiversity Conservation Act 1999* (Cwth)
Ha	Hectare
IBRA	Interim Biogeographic Regionalisation for Australia
Km	Kilometre
kV	Kilovolt
LGA	Local Government Area
m	Metre
Met mast	Meteorological mast

Acronyms	Description
mm	Millimetre
MNES	Matters of National Environmental Significance
MW	Megawatt
NSW	New South Wales
NSW DCCEEW	NSW Department of Climate Change, Energy, the Environment and Water
NSW DEC	NSW Department of Environment and Conservation
PCT	Plant Community Type
PMST	Protected Matters Search Tool (Cwth)
PVA	Population viability analysis
RFI	Request for Information
RSA	Rotor Swept Area
SPRAT	Species Profile and Threats Database (Cwth)
SSD	State Significant Development
TEC	Threatened Ecological Community
TSSC	Threatened Species Scientific Committee
WTG	Wind Turbine Generator

1. INTRODUCTION

Acciona Energy Australia Global Pty Ltd ('Acciona' or the 'Applicant') proposes to construct, operate, maintain, and decommission the Keri Keri Wind Farm (the 'Project') within the rural locality of Keri Keri, New South Wales (NSW). The area subject to this Project is presented in **Figure 1-1**.

The Applicant is seeking development approval under Part 4 of the *Environmental Planning & Assessment Act 1979* (EP&A Act) as a State Significant Development (SSD) requiring preparation of a Biodiversity Development Assessment Report (BDAR) as the Project has potential to have a significant impact on biodiversity values (s7.9 of the *Biodiversity Conservation Act 2016* (BC Act)).

This draft Bird and Bat Adaptive Management Plan (BBAMP) is provided as part of the Amended Biodiversity Development Assessment Report (BDAR) to inform the approvals process for the Project. The draft BBAMP would progress to a final BBAMP following Project approval and to the satisfaction of the consent authority.

1.1 THE PROJECT

The Project involves the construction, operation, maintenance and, where relevant, decommissioning of:

- Up to 114 Wind Turbine Generators (WTG) with a hub height of 200 metres (m) and maximum height tip height of 291.5 m (vertical tip);
- Battery energy storage system (BESS) with capacity of approximately 200 megawatt (MW) / 800 MW hours (MWh);
- Electrical reticulation, on-site substations and switchyard; and
- Other ancillary infrastructure including (but not limited to) internal access tracks, road upgrades, meteorological masts, and operation and maintenance (O&M) buildings.

The Project is a linear development covering a total area of 4,228.7 hectares (ha), which comprises a Disturbance Footprint of ~777 ha (i.e., area of maximum direct impacts) enveloped by a 'Micro-siting Corridor' of 3,091.7 ha (i.e., area where direct impact may occur if project infrastructure is micro-sited). Collectively this is referred to as the 'Subject Land' (4,228.7 ha) as presented in **Figure 1-1**.

1.2 BBAMP PURPOSE

Once finalised, the purpose of the BBAMP is to provide a management framework for minimising and/or mitigating the impact of wind turbine generators (WTGs) on birds and bats. Specifically, it aims to provide a:

- Monitoring program for the timely identification of turbine collisions and collection and analysis of data;
- Framework to implement a successful adaptive management plan informed by monitoring results and use of emerging techniques for minimising and mitigating impacts; and
- Framework for developing management and corrective actions to minimise the risk of turbine collision and other impacts on threatened bird and bat species.

YANGA NR

LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD

Legend

- Turbine
- Permanent Met Mast
- Temporary Met Mast
- Access Point
- Project Area
- Disturbance Footprint
- Micrositing Corridor
- Batch Plant
- Accommodation
- Biosecurity Wash
- Security Hut
- Carpark
- Construction Compound
- Laydowns
- O&M
- BESS
- Substation
- Switching Station
- Access Track
- 33kV reticulation
- 220kV Connection Overhead Line
- 330kV Overhead Line
- Main Road
- Road
- Path/Track
- Nature Reserve
- State Conservation Area

Source:
Boundary: Client Provided (date)
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54

Date: 17/12/2025
Created By: VN
Drawing Size: A3

0 1 2Km

1:70,000

F1-1 Proposed Development Layout

Keri Keri Windfarm
Draft Bird and Bat AdaptiveManagement Plan
Acciona

ERM

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BBAMP outcomes may also include:

- An improved understanding of the risk of turbine collision and barotrauma impacts on bird and bat species;
- An improved understanding of whether and how bird and bats communities change because of wind farm construction and operation; and
- Validation of or updates to the Collision Risk Modelling informed by monitoring data.

In line with the *Onshore Wind Farm Guidance* (Cwth DCCEEW, 2024d), specific mortality thresholds for individual species are outlined. Mitigation measures will ensure thresholds are not exceeded, corrective actions will be implemented if they are. An adaptive management response process is provided, which is to be used to avert/manage significant impacts on avian and bat species from WTG collisions.

Once finalised, the BBAMP will be implemented for the life of the Project (i.e., planning, construction, operation and decommissioning), commensurate to the level of potential risk to birds and bats resulting from these stages of the Project.

1.3 OBJECTIVES

The objectives of this BBAMP are to minimise and manage the impact of WTGs on birds and bats. Specifically, this BBAMP:

- Details potential mitigation measures and implementation strategies to minimise impacts to birds and bats;
- Establishes an adaptive management framework for managing and mitigating impacts on birds and bats;
- Outlines a monitoring program to understand the impact of the Project on at-risk birds and bats;
- Documents an agreed decision-making framework that identifies operational-phase impact triggers leading to a management response;
- Identifies any additional measures that can be used to manage impacts based on the outcomes of ongoing monitoring; and
- Aims to offset mortality impacts to listed threatened species, where applicable, as further described in Section 11.

This BBAMP provides a long-term approach to the mitigation and management of potential impacts that the Project may inflict on resident aerial threatened and migratory species, as well as nomadic species, raptors and other aerial protected species. Monitoring will be specified to identify any potential changes to the species' utilisation of the Subject Land and the surrounding landscape over time.

1.4 MANAGEMENT PLAN STRUCTURE

The section structure of this draft BBAMP is outlined in Table 1-1

TABLE 1-1 BBAMP STRUCTURE

Section	Content
1 Introduction	Outlines the purpose, objectives of the BBAMP and describes the Project
2 Existing Environment	Describes the existing environment in terms of bird and bat activity within the Project Area using bird utilisation survey and meteorological mast bat survey data
3 Baseline Data	Quantifies the species diversity of the Project Area in a manner suitable for analysis
4 Bird and Bat Collision Risk	Summarises the findings of the risk assessments presented in the Project assessment reporting (i.e., Biodiversity Development Assessment Report or BDAR)
5 Monitoring	Describes the monitoring methods to be employed as part of the BBAMP
6 Analysis	Describes the analytical process that may be used to evaluate monitoring data
7 Trigger Action Response Plan	Describes the process for determining when a response is required to investigate and manage an impact
8 Adaptive Management Framework	Describes the framework for considering alternatives to prescribed management actions
9 Reporting	Describes the kinds of reports required as part of this BBAMP
10 BBAMP Review	Outlines the review process for the BBAMP
11 Offsets and Compensatory Measures	Describes the potential avenues for remedying significant impacts not already managed through the approval process
12 References	Literature used in preparing this BBAMP

2. EXISTING ENVIRONMENT

2.1 BIRDS

Habitat homogeneity throughout the Subject Land supports bird diversity and utilisation with limited spatial and temporal variation.

A total of 72 bird species were identified through BUS and opportunistic sightings. Observations included ten threatened bird species and one migratory species (Fork-tailed Swift (*Apus pacificus*)).

The Subject Land supports generalist species and open grassland specialists, such as the Brown Songlark (*Cincloramphus cruralis*), White-winged Fairy-Wren (*Malurus leucopterus*) and the Nankeen Kestrel (*Falco cenchroides*).

Open woodland of black box (*Eucalyptus largiflorens*) or river red gum (*Eucalyptus camaldulensis*) does occur in the locality (but not the Subject Land), and these habitats are associated with a greater species diversity and an abundance of woodland and hollow-dependent fauna.

Ephemeral wetlands, waterways and floodplains are present throughout the Project Area and offer variable habitat quality driven by seasonal rainfall and episodic inundation. Artificial dams and irrigation / drainage channels are also present throughout the Project Area and offer water sources for all birds and temporary and non-breeding habitat for water birds.

2.1.1 THREATENED SPECIES

Ten threatened bird species were observed during field surveys including:

- Black Falcon (*Falco subniger*) – listed as Vulnerable under the BC Act;
- Dusky Woodswallow (*Artamus cyanopterus* – listed as Vulnerable under the BC Act;
- Fork-tailed Swift (*Apus pacificus*) – listed as Migratory under the EPBC Act;
- Little Eagle (*Hieraaetus morphnoides*) - listed as Vulnerable under the BC Act;
- Pink Cockatoo (*Lophochroa leadbeateri*) - listed as Endangered under the EPBC Act and Vulnerable under the BC Act;
- Plains-wanderer (*Pedionomus torquatus*) – listed as Critically Endangered under the EPBC Act and Endangered under the BC Act;
- Rufous Fieldwren (*Calamanthus campestris*), listed as Vulnerable under the BC Act;
- Southern Whiteface (*Aphelocephala leucopsis*) – listed as Vulnerable under the EPBC and BC Act;
- Spotted harrier (*Circus assimilis*) – listed as Vulnerable under the BC Act; and
- White-fronted Chat (*Epthianura albifrons*) – listed as Vulnerable under the BC Act.

2.1.2 RAPTORS

Thirteen raptor species were observed during surveys in the Project area, including:

- Australian Hobby (*Falco longipennis*);
- Black Falcon (*Falco subniger*) – listed as Vulnerable under the BC Act;

- Black Kite (*Milvus migrans*);
- Black-shouldered Kite (*Elanus axillaris*);
- Brown Falcon (*Falco berigora*);
- Little Eagle (*Hieraaetus morphnoides*);
- Letter-winged Kite (*Elanus scriptus*);
- Nankeen kestrel (*Falco cenchroides*);
- Spotted harrier (*Circus assimilis*);
- Swamp harrier (*Circus approximans*);
- Wedge-tailed eagle (*Aquila audax*); and
- Whistling kite (*Haliastur sphenurus*).

Raptor presence and site utilisation was detected across the Project Area with raptors being observed in most BUS points across most seasons. The Black Kite, Nankeen Kestrel and Wedge-tailed Eagle were observed the most within the Project area. Of these raptors, the Nankeen Kestrel was the most observed, with 30% of all raptor observations. Observations of the Wedge-tailed Eagle comprised 20% of all raptor observations and the Black Kite comprised 17% of all raptor observations.

Various raptor species were observed to fly or hover at heights within the RSA. The Wedge-tailed Eagle was the most observed species flying within the RSA (44 individuals), followed by the Black Kite (8 individuals). Wedge-tailed Eagles are known to fly at extreme heights, using air thermals to soar through the air to look for prey. They were most frequently observed soaring at heights between 100-110 m.

Of the remaining raptor species, the Black Falcon (1 individual), Black-shouldered Kite, (1 individual), Brown Falcon (5 individuals), Letter-winged Kite (1 individual), Nankeen Kestrel (5 individuals) and Spotted Harrier (2 individuals) were observed flying within the RSA.

2.2 BATS

Fourteen bat species or species groups were identified through acoustic detection. Confidence in species identification was ranked as either 'definite', 'probable' or 'possible'. The result of the analyses is provided in **Table 2-1**.

TABLE 2-1 BAT CALL ANALYSIS RESULTS

Scientific Name	Common Name	BC Act	EPBC Act	Targeted methods	Met Mast Survey
Austronomus australis	White-striped Freetail Bat	-	-	Definite	Definite
Chalinolobus gouldii	Gould's Wattled Bat	-	-	Definite	Definite
Chalinolobus morio	Chocolate Wattled Bat	-	-	Definite	Definite
Myotis macropus	Southern Myotis	V	-	Possible	**Absent**
Nyctophilus geoffroyi	Lesser Long-eared Bat	-	-	Possible	Possible
Nyctophilus gouldi	Gould's Long-eared Bat	-	-	Possible	Possible

Scientific Name	Common Name	BC Act	EPBC Act	Targeted methods	Met Mast Survey
Ozimops planiceps	South-eastern Freetail Bat	-	-	Definite	Probable
Ozimops ridei	Ride's Free-Tailed Bat	-	-	Definite	Definite
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	V	-	Definite	**Absent**
Scotorepens balstoni	Inland Broad-nosed Bat	-	-	Definite	Definite
Scotorepens greyii	Little Broad-nosed Bat	-	-	Definite	**Absent**
Vespadelus darlingtoni	Large Forest Bat	-	-	Probable	**Absent**
Vespadelus regulus	Southern Forest Bat	-	-	Possible	**Absent**
Vespadelus vulturnus	Little Forest Bat	-	-	Possible	Definite

Acoustic detection results for the three heights surveyed are provided in **Table 2-2**. Species diversity was greatest at 2 m with all species detected/identified at this height. Bat species activity and diversity reduced substantially at 30 m, while diversity and activity at heights of 95 m were an order of magnitude less than those at 2 m height, driven largely by three species/species groups (*Austronomus australis, Ozimops planiceps* and *Ozimops ridei*).

TABLE 2-2 BAT SPECIES ACTIVITY BY HEIGHT (2 M, 30 M AND 95 M)

Species	Feeding Guild*	2 m	30 m	70 m	Nights Recorded	Species Total
Austronomus australis	High-flying	57	191	130	48	378
Chalinolobus gouldii	Canopy-foraging	1	18	1	11	20
Chalinolobus morio	Canopy-foraging	10	1	0	8	11
Nyctophilus spp.	Canopy-foraging	29	6	0	20	35
Ozimops planiceps	High-flying	6,143	1,673	317	74	8,133
Ozimops ridei	High-flying	1,499	953	43	77	2,495
Scotorepens balstoni	Canopy-foraging	1	1	0	2	2
Scotorepens greyii	Canopy-foraging	13	8	0	8	21
Vespadelus regulus	Canopy-foraging	1	0	0	1	1
Vespadelus vulturnus	Canopy-foraging	10	0	0	8	10
Total calls all species		**7,764**	**2,851**	**491**	**-**	**11,106**

*Foraging guilds have been determined based on known behaviours sourced from the following citations: (Churchill S. , 2008; Menkhorst & Knight, 2011; Strahan, 2023)

3. BASELINE DATA

A full baseline dataset will be compiled and finalized as part of the final BBAMP. The dataset provided in **Appendix A** provides the results of baseline surveys. A description of the baseline surveys is provided in the following section.

3.1 BIRD UTILISATION

BUS have remained constant since 2021 and included the following methods:

- Bird surveys are in a fixed point, run for a set duration (this has varied between 20 or 30 minutes for the Project), are undertaken at different times of day and at different times in the year to capture variations in diurnal and seasonal bird activity;
- The data collected during a BUS includes the bird species present, their flying height and their direction of flight, as stipulated by the Band Model (Band, 2000);
- The search radius from the fixed observation point is at least 100 m for small birds and up to 800 m for large birds, using range finders to determine distances; and
- Fixed point observations (and opportunistic species observations undertaken during all survey periods) focused on birds most likely to be affected by wind turbines, such as raptors and birds flying within the rotor swept area (RSA).

The baseline surveys include data from several years and seasons since 2020 as outlined below:

- 2020: March/April (Autumn), November (Spring);
- 2022: February (Summer), Aug/Sept (Winter);
- 2023: October (Spring); and
- 2024: May (Autumn), August (Winter), November (Spring).

3.1.1 BAT ACTIVITY

Bat echolocation detection was undertaken using Ranger detectors (Titley Electronics) on the Meteorological Mast present within the Project Area. Acoustic detectors were pre-programmed to commence recording 60 minutes before dusk and cease recording 60 minutes after sunrise.

Three Ranger detectors were affixed to the Meteorological Mast at the following heights:

- 2 m (i.e., surface activity);
- 30 m (i.e., 'supra canopy height' activity below the lower tip of a WTG blade); and
- 95 m (i.e., within the RSA.

Sampling occurred on every second weekdays (i.e., Monday, Wednesday and Friday) through each of the seasons to ensure collection of a representative temporal sample.

The current extent of baseline data available is from November 2024 to April 2025. Surveys are ongoing.

4. BIRD AND BAT COLLISION RISK

Risk assessments were prepared in the impact assessment for the Project (ERM 2026), which have served to focus the operation of this BBAMP. A summary of this risk is outlined in the following sections.

4.1 TURBINE RISK

A turbine risk assessment was initially prepared (ERM 2026) to identify WTGs that may pose the greatest threat to bird and bat species. This risk assessment considered factors such as:

- Places for perching and nesting/roosting (e.g., locations from which bird and bat activity may emanate):
  - Woodland vegetation; and
  - Transmission lines
- Places of foraging:
  - Water sources and wetlands; and
  - Sealed high-traffic roads (i.e., raptor scavenging activity).

A risk ratings for each turbine was quantified and reviewed. Turbines with high risk were preferentially considered for removal from the Project. This contributed to the removal of 41 WTGs from the Project (i.e., reduction of 155 to 114 WTGs). Of the remaining 114 turbines, six were identified as having a moderate risk (i.e., WTGs 26, 28, 140, 177, 181 and 183) with the remaining 108 turbines having a low risk. The following variables were influential in the risk ratings:

- Proximity to water (i.e., WTGs 26, 140, 177 and 181);
- Proximity to national parks (i.e., 26, 28 and 177);
- Proximity to transmission lines (i.e., 181);
- Proximity to woody vegetation (i.e., 183); and
- Proximity to main roads (i.e., 140).

4.2 SPECIES RISK

A detailed bird and bat risk assessment of resident threatened, migratory and nomadic avian species is included in the Amended BDAR (ERM 2026). This risk assessment identified 17 species potentially at high risk of collision, including:

- Black Falcon (*Falco subniger*);
- Little Eagle (*Hieraaetus morphnoides*);
- Curlew Sandpiper (*Calidris ferruginea*);
- Grey Falcon (*Falco hypoleucos*);
- Pink Cockatoo (*Lophochroa leadbeateri*);
- Regent Parrot (eastern subspecies) (*Polytelis anthopeplus monarchoides*);
- Sharp-tailed Sandpiper (*Calidris acuminata*);
- Spotted Harrier (*Circus assimilis*);
- White-throated Needletail (*Hirundapus caudacutus*);

- Australian Pelican (*Pelicanus conspicillatus*);
- Black Kite (*Milvus migrans*);
- Brown Falcon (*Falco berigora*);
- Nankeen Kestrel (*Falco cenchroides*);
- Australian Magpie (*Gymnorhina tibicen*);
- Straw-necked Ibis (*Threskiornis spinicollis*);
- Wedge-tailed Eagle (*Aquila audax*); and
- Fork-tailed Swift (*Apus pacificus*).

107 species were identified as having moderate risk of collision and 27 species were identified with a low risk of collision.

4.3 COLLISION RISK MODELLING

The collision risk modelling (CRM) included bird species assessed as having a moderate and high collision risk, with inclusion in the CRM requiring data demonstrating presence within the RSA. Species included in the model are listed below:

- Australian Magpie
- Australian Raven
- Black Falcon
- Black Kite
- Brown Falcon
- Fork-tailed Swift
- Great Cormorant
- Little Black Cormorant
- Nankeen Kestrel
- Spotted Harrier
- Wedge-tailed Eagle

A summary of the CRM outputs is presented in Table 4-1.

TABLE 4-1 ESTIMATED COLLISION RISK MORTALITIES

Species	Estimated annual number of collisions (based on RSA)			Modelled collisions over a 30-year operational lifetime relative to avoidance rates		
	98%	99%	99.5%	98%	99%	99.5%
Australian Magpie	0.2	0.1	0.1	6	3	3
Australian Raven	0.9	0.4	0.2	27	12	6
Black Falcon	0.1	0.1	0.1	3	3	3
Black Kite	0.7	0.4	0.2	21	12	6

Species	Estimated annual number of collisions (based on RSA)			Modelled collisions over a 30-year operational lifetime relative to avoidance rates		
	98%	99%	99.5%	98%	99%	99.5%
Brown Falcon	0.4	0.2	0.1	12	6	3
Fork-tailed Swift	5.1	2.5	1.3	153	75	39
Great Cormorant	0.8	0.4	0.2	24	12	6
Little Black Cormorant	1.7	0.8	0.4	51	24	12
Nankeen Kestrel	0.5	0.2	0.1	15	6	3
Spotted Harrier	0.1	0	0	3	0	0
Wedge-tailed Eagle	2.8	1.4	0.7	84	42	21
Total	**13.3**	**6.5**	**3.4**	**399**	**195**	**102**

5. MONITORING

Monitoring data is used to describe bird and bat species utilisation/activity within the Project Area and is the basis for evaluating change in response to impacts. Monitoring will comprise:

- Seasonal BUS and bat surveys; and
- Carcass searches.

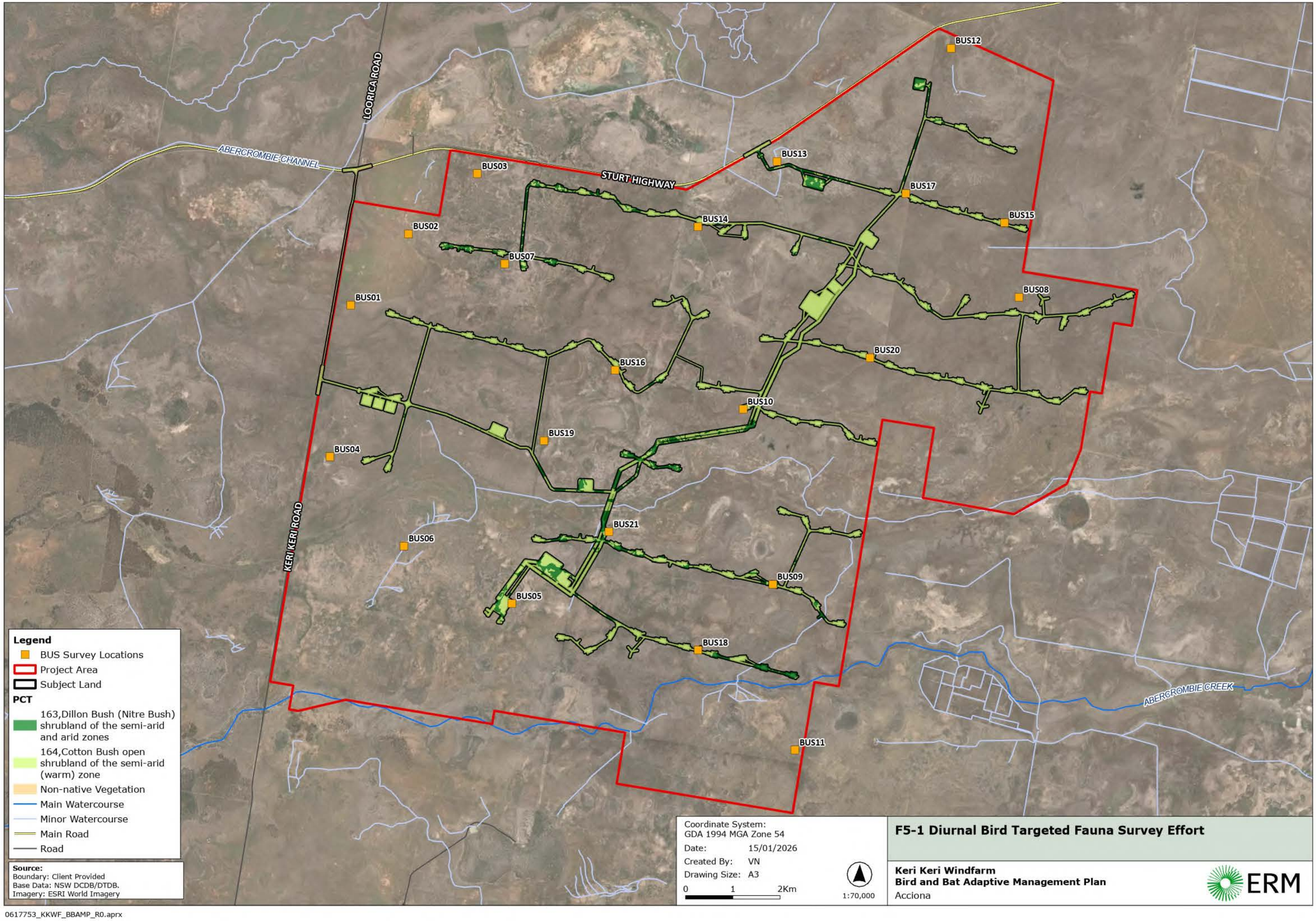
The monitoring design, methods and duration is outlined in the following sections.

5.1 DESIGN

The monitoring program design is to be consistent with that described in the Amended BDAR (ERM 2026). This was developed from the following guidance documents:

- NSW Department of Planning Industry and Environment's (DPIE) *Biodiversity Assessment Method* (NSW DPIE, 2020);
- *Wind Farms – turbine strike assessment and adaptive impact management. Biodiversity Assessment Method Guide* (working draft) (NSW DCCEEW, 2024a);
- Commonwealth Department of the Environment's (Cwth DoE) *Draft referral guidelines for 14 birds listed as migratory under the EPBC Act* (Cwth DoE, 2015a);
- *Onshore Wind Farm Guidance – Best practice approaches when seeking approval under Australia's national environmental law* (draft) (Cwth DCCEEW, 2024d);
- *Survey guidelines for Australia's threatened birds* (Cwth DEWHA, 2010b);
- NSW Department of Planning, Industry and Environment's (NSW DPIE) *'Species credit' threatened bats and their habitats* (NSW DPIE, 2021);
- Commonwealth Department of the Environment, Water, Heritage and the Arts' (Cwth DEWHA) *Survey guidelines for Australia's threatened bats* (Cwth DEWHA, 2010a);
- *Wind Farms and Birds: Interim Standards for Risk Assessment* (Brett Lane & Associates, 2005);
- *Best Practice Guidelines – For Implementation of Wind Energy Projects in Australia* (Clean Energy Council, 2018); and
- *National Wind Farm Development Guidelines* - Draft (Environment Protection and Heritage Council, 2010).

The BUS points are shown in Figure 5-1. Bat survey locations are to align with Met Towers and a selected WTGs, noting that the current Met Tower location is to change following construction of the Project.



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5.2 METHODS

5.2.1 BIRD UTILISATION SURVEY (BUS)

A repeated measures approach will be taken in the monitoring of bird communities within the Project Area. The monitoring methods and design will replicate that used in the Project assessment ERM (2026) to allow for direct comparison with baseline data. These are:

- Bird surveys are in a fixed point (i.e., repeated observation point year on year and season after season), run for a set duration (20 minutes), are undertaken at different times of day (i.e., morning (6am to 10am), midday (10am to 2pm), afternoon (2pm to 6pm) and at different times in the year (i.e., summer, autumn, winter, spring) to capture variations in diurnal and seasonal bird activity;
- The data collected during a BUS includes the bird species present, their flying height, direction of flight and duration of observation, as stipulated by the Band Model (Band W. , 2000); and
- The search radius from the fixed observation point is at least 100 m for small birds and up to 800 m for large birds, using range finders to determine distances.

5.2.2 BATS SURVEYS

Pre-programmed acoustic detectors (Rangers) will be installed on permanent met masts, programmed to record from 60 minutes before dusk through to 60 minutes after sunrise. This corresponds to the period of increased bat activity. Detectors are to be placed at three heights on met masts as follows:

- 2m (i.e., ground surface to measure supra-chenopod shrubland bat activity)
- 30m (i.e., sub-RSA space); and
- 95 m (i.e., within the RSA to identify species and activity that may interact with WTGs).

The detectors are to be programmed to consistently record data across the survey period (i.e., recordings on Monday, Wednesday and Friday each week). This programmed approach is designed to minimise the likelihood for poor weather conditions having an adverse effect on results and to obtain a representative temporal sample to understand seasonal variation.

Recordings are to use full spectrum to improve species identification.

5.2.3 CARCASS SEARCHS

Carcass monitoring will be undertaken to determine the actual impact of the proposed development on birds and bats. The results of the carcass monitoring will be used to review the avian risk assessment, thus identify and determine if further monitoring of avian species is required and to update mitigation measures or adaptive management approaches.

5.2.3.1 SEARCH AREA

All carcass searches will be undertaken by suitably qualified personnel with appropriate skills in avian identification and handling of deceased species. Searches are to occur within 120 m of WTGs for bat species and up to 170 m for bird species, which approximates the Hull and Muir Model (Hull & Muir, 2010). The model suggests that 95% of bat carcasses should be present within 74 m of a WTG and the carcasses for birds of medium to large size would be distributed up to 122 m. Some species (larger birds) may be found further out; however, 95% are

expected to occur within an approximate 122 m search area from WTGs (Hull & Muir, 2010). The wider search area for the Project aligns with the size of the WTGs.

Based on the principles adopted in Hull and Muir (2010), the following search areas have been designed for avian species for the Project, with its approximate rotor tip height of up to 270 m and turbine rotor diameter of up to 183 m:

- Bats: 120 m radius around the WTG. Transects will be spaced every 6 m from the WTG;
- Small to medium sized birds: 140 m radius around the WTG. Transects will be spaced every 6 m from the WTG; and
- Medium to large sized birds (and some larger bats): 170 m radius around the WTG. Transects between 120 and 170 m from the WTG will be 12 m apart.

It should be noted that exceptions may be made as to where transects are conducted in search areas of WTGs that are difficult to access due to dense vegetation or other factors. This will include searching within access tracks and hard-stand areas only. Any exceptions should be noted for reporting purposes.

5.2.3.2 INFORMATION RECORDING

The following information is to be recorded if a carcass is detected during the carcass searches:

- Position of the carcass in relation to the WTG;
- Method of detection (ecologist or dog searcher);
- Vegetation type and area where the carcass was located, including if the species was found on an access path or on the WTG hard-stand area;
- Details of the species, including age, sex, number of individuals, the injury, estimated time of death. If the carcass is unable to be identified, it should be taken to an appropriate facility for DNA testing;
- Photos of the location and of the species. Photos can be used for identification purposes by an appropriately qualified ecologist; and
- Record date, time, current and preceding weather conditions, including wind speed, temperature, relative humidity and rainfall.

All injured or deceased wildlife found during the carcass searches will be reported to Keri Keri's Wind Farm's Responsible Officer. Once reported, it will be the responsibility of the Responsible Officer to organise for the retrieval and/or treatment of the individual. Such a protocol will involve defining the correct handling procedures, personal protective equipment, transportation and wildlife hospital treatment arrangements (if not deceased).

5.2.3.3 NOTIFICATION

The discovery of a bird or bat carcass or injury must be immediately reported to the Project's Responsible Officer (i.e., within 24 hrs), including information on the species type, the area where the species was found and any factors that may have contributed to a mortality or injury that are relevant. Photos must be taken of the carcass or injured species so that correct identification can be carried out.

5.2.3.4 HANDLING PROCEDURE

Operational personnel involved in the search for wildlife will be appropriately trained in handling and assisting with injured or deceased wildlife. The carcass will need to be handled in accordance with the following procedures:

1. Carcass is to be safely removed from the site to prevent double counting and reduce feral fauna scavenger activity using appropriate personal safety equipment to be worn by personnel. This personal safety equipment includes thick rubber gloves, a long-sleeved shirt, a face mask and appropriate eye wear. The carcass should be placed in a plastic bag, then wrapped in newspaper and placed into a second plastic bag.
2. Labelling of the plastic bag to ensure that the carcass is easily identifiable. Labelling includes placing a completed data sheet into the outer plastic bag with the information listed in Section 5.2.3.2.
3. The carcass bag should be placed into an appropriate freezer compartment until it can be examined and identified. The carcass should be kept for future examination. Frozen specimens may be retained and used for detectability trials.

It is noted that scientific licences are required for animal handling and research. The appropriate licences must be obtained to remove the carcasses from the Subject Land.

5.2.3.5 HEALTH AND SAFETY

Bats can carry many forms of diseases including Hendra virus and Australian Bat Lyssavirus. Extra precaution and care will need to be taken when handling bat species and professionals should be called to handle injured bat species. Information sources to contact in case of an injured bat include the RSPCA ((02) 9770 7555) and the Wildlife Information, Rescue and Education Service (WIRES) (1300 094 737). Appropriate and contemporary advice on the best practice for movement of bat individuals will be provided by these organisations.

5.2.3.6 CARCASS PERSISTENCE TRIALS

The carcass persistence trial is adopted to ascertain at what rate naturally occurring scavengers remove carcasses from the Subject Land. These trials will be undertaken twice annually within the first two years of operation of the Project, with each trial undertaken across 30 days at different times of year. This will ensure that differences in vegetation condition are accounted for, for example, dense groundcover vegetation following wet and warm weather conditions and sparse, groundcover vegetation following dry, cold conditions. Different seasons may also be associated with different stocking levels of livestock across the year. Carcass trials conducted across different seasons also accounts for different rates of seasonal scavenging (Catling, 1988; Molsher, Gifford, & McIIroy, 2000). The results of the trials can be used to determine more accurate estimations of fatality rates from WTG strike and/or barotrauma.

Carcass Persistence Trial Methodology

Carcass persistence trials will be undertaken in the inner search area of the WTGs selected for carcass search trials (120 m radius from the WTG). Ten or fewer carcasses will be distributed randomly within the inner search area to avoid biasing the results through scavenger swamping (Smallwood, Bell, Snyder, & Didonato, 2010).

Three different categories of carcasses will be used for the carcass persistence trials, ideally, carcasses found during mortality trials, but mice can be used in place of microbats. The different categories will help to ascertain the different scavenger rates in the search area.

The three categories and the number of replicates that will be used for each trial are:

- Micro-bats and small birds: maximum of five replicates/trial;
- Medium-sized birds: maximum of three replicates/trial; and
- Large sized birds/raptors: maximum of two replicates/trial.

Randomly selected turbines will be used for the trials and carcasses will be randomly placed under the turbines. The carcasses will be checked as follows:

- Each day for the first five days;
- Every two days from day six to 10;
- Every three days from day 11 to 19; then
- Every four days from day 20 until the carcass disappears or until the end of the 30-day trial period.

Project operational staff can be trained to undertake the carcass persistence trials by a suitably qualified ecologist.

Additional Considerations

Additional considerations for the carcass persistence trials are detailed below:

- Carcass persistence trials at other wind farms show almost all carcasses have been scavenged within a period of 5 - 10 days;
- GPS coordinates should be taken for all carcasses placed during the carcass persistence trials to avoid confusion with any naturally occurring carcasses in the search area(s);
- A mixture of carcass sizes of bird and bats (small, medium, large) should be obtained to use in carcass persistence trials from prior searches of the Subject Land. At-risk avian species should be selected, if possible, or a substitute of the same colour and size should be used in its place;
- Thick gloves must be always worn when handling bird and bat carcasses. This will ensure the safety of the involved personnel but also that human scent will not replace the scent of the carcass; the latter will alter scavenger behaviour;
- Carcasses should be placed at random within the search area. The carcass should be thrown in the air to recreate the natural landing of a carcass from impact with a wind turbine. For example, feathers or fur may become dislodged or ruffled from the impact of the simulated fall;
- Detailed observations will be taken at the search areas where carcasses have been scavenged, including the composition of the carcass and different types of scavenging behaviour (for example, feather removal, bones dispersal, pecking, tearing, partial removal of carcasses, scats and tracks); and
- The final state of the carcass will be recorded at the end of the survey period.

Alternative Method

An alternative to the method used above is to use motion sensor cameras that monitor scavenger activity. In this case a star picket (approximately 1 m high) will be placed in the ground approximately 4 m away from the carcass, with a camera attached. This camera will record any scavenging activity over the course of 30 days from placement. This method gathers the exact time and method of scavenging and thus eliminates any uncertainties in the

results analysis. The carcass persistence trials will be conducted at the same locations as those identified for carcass search trials as identified in Section 5.2.3.

5.2.3.7 SEARCHER EFFICIENCY TRIALS

Searcher efficiency trials can be conducted at the same time as carcass persistence trials, during the first day of placing carcasses. Searcher efficiency trials aim to test the efficiency of searchers in finding the carcasses within the Subject Land. The efficiency trials will be conducted four times in the first year of operation, sampling across all four seasons. This sampling effort will represent the greatest change in vegetation cover. Efficiency trials will be conducted for handlers and dogs, if they are to be used for the Project, and by personnel who have been involved in the monthly carcass searches.

The detection efficiency determined from the efficiency trials will be incorporated into the mortality rate analysis to account for human (and canine) detection error. This detectability analysis will be documented in the report at the end of the first and second year of the monitoring period.

Carcasses will be randomly placed in the inner search area of a turbine (120 m zone) and their location noted by a suitably qualified ecologist. The efficiency will be recorded as the number of successful finds by a searcher against the actual carcasses placed by the suitably qualified ecologist.

The three categories of carcass and the number of replicates that will be used for each trial can replicate the carcass persistence trials, and are:

- Micro-bats and small birds: maximum of five replicates/trial;
- Medium-sized birds: maximum of three replicates/trial; and
- Large sized birds/raptors: maximum of two replicates/trial.

If there are shortages for bird and bat carcasses for the efficiency trials, appropriate substitute species should be used to represent specific target carcass categories.

5.2.4 MONITORING FREQUENCY, TIMING, REPLICATION AND DURATION

5.2.4.1 FREQUENCY

Monitoring survey timing should ideally be consistent from year to year to minimise the potential temporal variance. Monitoring frequency is defined by relevant policy guidance.

BUS

BUSs are to include seasonal samples ideally obtained with a two-month separation between surveys. An example of seasonal monitoring is as follows:

- Spring: November (start of seasonal migratory bird activity);
- Summer: February (end of seasonal migratory bird activity);
- Autumn: May (resident and nomadic species); and
- Winter: August (resident and nomadic species).

Bat Surveys

Seasonal samples are to be obtained. At least five samples per month is recommended, pooled by season, to characterise seasonal variation. The suitability of a sample must consider the prevailing weather conditions.

Carcass searches

As a minimum, carcass searches should align with BUS sampling frequency (i.e., season). Monthly surveys may be associated with increased monitoring activity during high risk periods (e.g., migratory bird period).

5.2.4.2 REPLICATION AND TIMING

BUS

Within any season, a BUS is to be performed at each of the prescribed monitoring points during the following diurnal sessions:

- Morning (sunrise +2 hrs);
- Midday (11am to 2 pm); and
- Afternoon (2 pm to 1 hr prior to sunset).

Sample independence on a temporal scale is to be achieved by not resampling the same BUS point on any given day (i.e., each BUS point requires three separate days to sample the three diurnal sessions). This reduces the potential for counting the same individual. For the same reason, adjoining BUS points should not be surveyed within the same diurnal session.

Bat Surveys

A programmed approach that sets daily start and end recording times and replication (i.e., number of sample nights) is to be performed.

The recording of bat calls is to be performed for the entire night, starting 1hr before sunset and ending 1hr after sunrise.

Several samples per season are required to describe variance in seasonal bat activity. A recording cycle involving every second day is recommended (e.g., Monday, Wednesday and Friday). Sample suitability must consider the effect of weather conditions.

Carcass searches

The recommended minimum number of carcass searches is as follows:

- All high to very high risk turbines; and
- A third of moderate risk turbines.

Searches should be performed early in the morning (i.e., prior to predatory bird activity) and late in the day (i.e., prior to nocturnal scavenging activity). Preferentially, searches should be performed immediately after the completion of a BUS monitoring season as this may improve the evaluation of any mortality observations.

5.2.4.3 DURATION

Monitoring frequency is defined by relevant policy guidance. The BAM states that monitoring should occur in the first two years of the operation phase and for another two years at the 10

year mark. Supplementary guidance approved by the regulator may alter monitoring duration, which is to be determined as part of finalising this BBAMP.

5.2.5 WEATHER CONDITIONS

BUS and bat surveys should be undertaken during weather conditions that are generally consistent with those experienced during the baseline data collection period. This approach will reduce the effect of weather induce variance on data analysis.

6. ANALYSIS

6.1 BIRD AND BAT ACTIVITY

Baseline data obtained prior to construction and operation will be used to quantitatively characterise the bird and bat communities present across the Project Area. This dataset is the 'before' data and represents the non-impacted environment.

Data obtained through the construction and operational period is the 'impact' dataset. This data is to be compared to the baseline data to determine if there has been change in the bird and bat communities of the Project Area.

Quantitative statistical methods will be used to determine if any change of significance has occurred. Several kinds of analysis may be used for this purpose. Though not exhaustive, tests suitable for this analysis are listed below:

- Friedman Test (non-parametric statistical tool used to detect differences among three or more related (dependent) samples);
- PERMANOVA (non-parametric statistical test used to see if groups of samples differ significantly in their overall composition, based on a chosen distance/dissimilarity measure); and
- CAP (statistical method, that finds axes (canonical axes) through multivariate data to best separate predefined groups (discriminant analysis) or correlate with other variables, using any distance measure).

Where a significant difference is detected, effort will then focus on determining causation. Causation can be complicated as it can involve several factors that may, or may not, include the project impact. Careful consideration of the data is required to evaluate the potential for interaction effects (i.e., two or more factors contributing to change). Where possible, control datasets should be obtained to aid in determining causation (i.e., control datasets obtained from independent sites where the impacts of the Project are not occurring).

6.2 MORTALITY

Data analyses will estimate the mortality rates of avian species within the Subject Land, considering standard error and variation. Appropriate software packages will be used to inform the variables required for the carcass searches, detectability and carcass persistence trials which will subsequently inform the survey design.

At this stage, prior to knowledge of the detailed Project design, the following software packages and statistical principles are proposed, with specific variables to be determined for the final monitoring design:

- Logistical regression (general linear modelling) to be used to determine searcher efficiency;
- The proportion of the area searched to be estimated using the Monte-Carlo Simulation method as described in Hull and Muir (2010);
- Mortality will be estimated using the Hortvitz-Thompson style estimator from Huso (Huso, 2011);

- Survival analysis (survival regression to account for interval censoring) to be calculated using Generalised Estimator (GenEst) (or similar). GenEst is used to estimate the total number of individuals that are present within an area in a given time period, when their detection probability may not be known. This program is used as counts of carcasses alone is not an accurate way to measure the true number of avian fatalities from WTG collision and / or barotrauma. This method also allows for comparisons across locations and years, taking into account the rate of detection.
  - GenEst includes tools for estimating searcher efficiency, carcass persistence, and other detection probability parameters from experimental field trials. GenEst is not an evidence of absence-type estimator and is not going to be used in circumstances where only a few carcasses are found.
  - Evidence of Absence (EoA). This program can be used to determine potential fatalities which may have occurred, with respect to the survey effort, even in the absence of a carcass being located.

Statistical analyses will assist in determining potential significant differences across different species' sizes, vegetation composition or across seasons.

7. TRIGGER ACTION RESPONSE PLAN

This section describes the process for evaluating impacts on bird and bat species identified through the monitoring program and associated actions and responses. Hierarchically, the process is generally as follows:

- 'Interim Impact Trigger' threshold breach but not the 'Significant Impact Trigger' threshold. This trigger instigates an internal investigation into the cause of the event, thus determine the scope of any management response (if required); and
- 'Significant Impact Trigger' threshold breach where these mortalities are attributed to WTG blade strike. This trigger instigates an investigation that will ultimately involve the regulator to determine the most appropriate management response and, if required, determine the need for adaptive management and/or compensatory measures.

The Applicant is responsible for ensuring implementation of the BBAMP and the adaptive management approach. A suitably qualified ecologist is to be engaged to prepare any investigation reports and provide advice in relation to the impact significance and where consultation with government (State and Commonwealth) is required. A BAM Accredited Assessor is to be engaged should a 'Significant Impact Trigger' occur (i.e., likely to be required to define any compensatory measures arising from the impact).

7.1 TRIGGER THRESHOLDS

7.1.1 HIGH RISK SPECIES

Table 7-1 outlines the trigger thresholds for species classed as being at high risk of WTG impacts.

TABLE 7-1 ANNUAL TRIGGER THRESHOLDS FOR HIGH RISK SPECIES

Species	Consequence of Event	Australian Population Estimate	Impact Trigger Threshold	
			Interim Impact Trigger	Significant Impact Trigger[1]
Black falcon (*Falco subniger*)	Moderate	4,000	1 individual	4 individuals
Curlew sandpiper (*Calidris ferruginea*)	Severe	40,100	2 individuals	40 individuals
Little eagle (*Hieraaetus morphnoides*)	Moderate	Unknown	1 individual	2 individuals
Australasian bittern (*Botaurus poiciloptilus*)	Major	1,000	1 individual	1 individual
Common greenshank (*Tringa nebularia*)	Major	23,700	2 individuals	23 individual

[1] Calculated as 0.1% of the estimated Australian population

Species	Consequence of Event	Australian Population Estimate	Impact Trigger Threshold	
			Interim Impact Trigger	Significant Impact Trigger[1]
Fork-tailed swift (*Apus pacificus*)	Moderate	Unknown	10 individuals	100 individuals
Grey falcon (*Falco hypoleucos*)	Moderate	1,000	1 individual	2 individuals
Pink cockatoo (*Lophochroa leadbeateri*)	Major	15,000	2 individuals	15 individuals
Sharp-tailed sandpiper (*Calidris acuminata*)	Moderate	71,000	10 individuals	71 individuals
Spotted harrier (*Circus assimilis*)	Moderate	Unknown	1 individual	2 individuals
Swift parrot (*Lathamus discolor*)	Severe	750	1 individual	1 individual
White-throated needletail (*Hirundapus caudacutus*)	Moderate	41,000	10 individuals	41 individuals
Southern myotis (*Myotis macropus*)	Moderate	Unknown	1 individual	2 individuals
Yellow-bellied sheath-tailed bat (*Saccolaimus flaviventris*)	Moderate	Unknown	1 individual	2 individuals
Wedge-tailed eagle (*Aquila audax*)	Very Likely	Unknown	1 individual	3 individuals

A conservative trigger threshold has been applied to species with unknown population estimates. If population estimates for a species become available, the threshold proposed by this BBAMP will be updated accordingly. Note, these trigger thresholds do not consider cumulative impacts on the species beyond that of a rolling 12-month period.

7.1.2 LOW TO MODERATE RISK SPECIES

The interim trigger thresholds applicable to low to moderate risk species is outlined below:

- Raptor species, the impact trigger will be a total of three or more carcasses of the same species across the entire Project Area during a rolling 12-month period; and
- For all other species, the impact trigger will be a total of three or more carcasses of the same species at an individual WTG during a rolling 12-month period.

These interim trigger events instigate an investigation process to firstly determine causation. A management response, if required, is to be defined as part of this investigation.

7.1.3 SPECIES NOT PREVIOUSLY RISK ASSESSED

It is inherent in a risk assessment framework that some native bird and bat species may not be considered with respect to WTGs impacts. In these circumstances, there won't be any specific applicable trigger thresholds to evaluate the magnitude of an impact and its consequence. In these circumstances, a generic interim impact tigger threshold is provided in Table 7-2.

TABLE 7-2 TRIGGER THRESHOLDS FOR SPECIES NOT PREVISOULY RISK ASSESSED

Bird or Bat Type	Interim Impact Trigger
Critically endangered species	• One mortality or injury at anytime, anywhere within the Project Area
Endangered species	
Vulnerable species (raptor)	• One mortality or injury within a rolling 12 month period, anywhere within the Project Area
Vulnerable species (non-raptor)	
Non-threatened migratory species	• Five mortalities to a single species within a rolling 12 month period, anywhere within the Project Area
All other species (raptor)	• Three mortalities within a rolling 12 month period, anywhere within the Project Area; OR • Two mortalities within a rolling 12 month period, at one WTG
All other species (non-raptor)	• 20 mortalities within a rolling 12 month period, anywhere within the Project Area; OR • Five mortalities within a rolling 12 month period, at one WTG

The investigation process for these species will examine causation and, if WTG related, any applicable management measures to address the impact. Also, this investigation will include a risk assessment for the species with recommendations for BBAMP amendment.

7.2 ACTION

Monitoring results that identify bird or bat mortality/injury generate an action initially involving a review of trigger thresholds to determine the next course of action. The actions described below apply immediately after the discovery of a deceased or injured bird or bat within the search area of a WTG:

- Within five days of a carcass or injured species being found, a suitably qualified ecologist is to conduct additional mortality surveys within a larger search area, which is to include all WTGs within 1 km of the incident;
- Pending the outcome of the wider search, add results to the Impact Trigger Register (see Section 7.3); and
- Review Impact Trigger Register against the Trigger Thresholds to determine likely event status (i.e.,).

If, following review of the Impact Trigger Register and Trigger Thresholds, that the event meets the definition of an Interim Impact Trigger then proceed with the investigation outlined in

Section 7.3.1. If the event, inclusive of past events, is likely to exceed the Significant Impact Trigger specified in Section 7.1, then proceed with the investigation outlined in Section 7.3.2.

7.3 RESPONSE

7.3.1 INTERIM IMPACT TRIGGER

The response described below applies in the event of an Interim Impact Trigger exceedance:

- Perform an investigation to determine likely causation of mortality or injury; and
- Review management procedures and evaluate the need for additional/amended action.

If WTG causation is determined:

- Evaluate the significance of the impact and make recommendation as to whether the investigation should be escalated; and
- Identify, if appropriate, any additional mitigation/management measures that could benefit the affected species or reduce the risk of mortality generally.

Irrespective of causation, update Impact Trigger Register to maintain knowledge of events and their causation.

The investigation report is to be retained by the Applicant for compliance and auditing purposes. A summary of each investigation is to be provided in the Annual Monitoring Report submitted to the regulator. Recommendations for consideration during any future BBAM review process are to be documented in an 'BBAMP Amendment Register'.

7.3.2 SIGNIFICANT IMPACT TRIGGER

The response described below applies in the event of an Interim Impact Trigger exceedance:

- Confirm that the likely causation of mortality or injury is related to WTGs;
- Review management procedures and evaluate the need for additional/amended action;
- Quantify the significance of the impact, which may involve the preparation of a species-specific Population Viability Analysis if reasonable and feasible;
- Identify, if appropriate, any additional mitigation/management measures that could benefit the affected species or reduce the risk of mortality generally; and
- Determine the need for compensatory measures (e.g., offsets; see Section 11).

Once finalised, the Investigation Report is to be provided to the NSW CPHR within 20 business days to initiate consultation and ensure the best course of action is applied for the Project and species. Outcomes will also be stated in the annual report.

7.4 BBAMP MONITORING AND IMPLEMENTATION RISKS

There are certain factors that may affect carcass and injury searches and bird and bat monitoring. Such factors include weather events that restrict access to search areas, including significant flooding, storms (electrical activity), heatwaves and bushfires. Other factors may include WTG malfunction which poses a health and safety risk, biosecurity control measures and access issues due to agricultural management, livestock control and vegetation growth.

If these or other unforeseen factors arise and surveys, monitoring and reporting as per the requirements of the BBAMP cannot proceed, limitations or amendments to the BBAMP are to be recorded in the respective reports. Recommendations for the BBAMP review are to be detailed on the BBAMP Amendment Register.

8. ADAPTIVE MANAGEMENT FRAMEWORK

The Proponent is committed to an adaptive management framework designed to avoid or minimise the repetition of adverse impacts on bird and bat species, including uncertain impacts and/or environmental consequences arising from WTG operation. This approach will include the consideration of:

- Monitoring and periodic evaluation of environmental consequences against the impact trigger thresholds (Section 7.1);
- Findings and recommendations presented in impact trigger investigation reports (Sections 9.2 and 9.3);
- Findings and recommendations presented in an annual report (Section 9.1); and
- A mandatory or voluntary review of this BBAMP (Section 10).

Consultation with the regulator will be made to ensure proposed adaptive management responses are acceptable prior to action. All adaptive management responses are to be documented in the Annual report.

9. REPORTS AND REGISTERS

This BBAMP identifies the requirement to prepare the following reports:

- Annual report;
- Investigation: Interim Impact Trigger report; and
- Investigation: Significant Impact Trigger report.

Two registers will also be maintained, these being:

- Impact Trigger Register; and
- BBAMP Amendment Register.

The following sections outline the minimum requirements for these reports.

9.1 ANNUAL REPORTS

Annual reports are to be generated on a financial year cycle and provide all monitoring activities and summary of any investigations (finalised or pending) undertaken during the reporting period. Information to be included is listed below:

- Description of monitoring works undertaken (i.e., methods, frequency, timing (dates and time of day), replication);
- Record of weather conditions and associated limitations on monitoring;
- Raw monitoring data (as an appendix);
- Summary of monitoring data within the body of the report including simple statistics and/or charts where appropriate;
- Maps to show/display important observations;
- Data analysis to evaluate for data trends and utility of trigger thresholds;
- Review of interim impact/significant impact trigger thresholds, or any species or risk levels that may need adjustment;
- Analysis of the effectiveness of the mitigation measures in place and whether changes or adjustments could be made. This will include an analysis of the impact trigger framework to ensure that all impacts are being appropriately considered and accounted for in a reasonable manner;
- Summary of investigation reports finalised during the reporting period;
- Details of any adaptive management measures proposed and actioned; and
- Record of Impact Trigger and BBAM Review registers.

Finalised annual reports are to be supplied to the regulator no later than 31 August of any given year. These reports do not need to include the results or findings of any pending investigations that were closed after end of financial year and before 31 August.

9.2 INVESTIGATION: INTERIM IMPACT TRIGGER REPORT

An investigation report prepared for an Interim Impact Trigger event is an internal report not requiring ‘ad hoc’ submission to the regulator (unless deemed otherwise by the Proponent). This report is to contain the following information as a minimum:

- Monitoring methods and data used to identify the trigger exceedance, including any subsequent monitoring activity to support the investigation process;

- Statement verifying the status of the trigger exceedance, thus confirming it is not a significant impact trigger;
- An evaluation of event significance;
- Identify any existing management process that may be amended or adjusted to minimise the likelihood of a future event;
- Identify, if appropriate, any additional mitigation/management measures that could benefit the affected species or reduce the risk of mortality generally;
- Make a recommendation for the implementation of management actions that are to have immediate effect; and
- Prepare a conclusion statement as the effectiveness of the BBAMP and identify any potential improvements of the BBAMP, which could be considered in a mandatory review process.

Impact Trigger and BBAMP Amendment Registers are to be updated following completion of the investigation report.

9.3 INVESTIGATION: SIGNIFICANT IMPACT TRIGGER REPORT

An investigation report prepared for a Significant Impact Trigger event is an external report requiring 'ad hoc' submission to the regulator immediate after completion. This report is to contain the following information as a minimum:

- Monitoring methods and data used to identify the trigger exceedance, including any subsequent monitoring activity to support the investigation process;
- Statement verifying the status of the trigger exceedance, thus confirming the occurrence of a significant impact trigger;
- An evaluation of event significance;
- Identify any existing management process that may be amended or adjusted to minimise the likelihood of a future event;
- Identify, if appropriate, any additional mitigation/management measures that could benefit the affected species or reduce the risk of mortality generally;
- Make a recommendation for the implementation of management actions that are to have immediate effect;
- Identify any compensatory measures that may be used to address any significant residual impacts arising from the event; and
- Prepare a conclusion statement as the effectiveness of the BBAMP and identify any potential improvements of the BBAMP, which could be considered in a mandatory review process.

Impact Trigger and BBAMP Amendment Registers are to be updated following completion of the investigation report.

All finalised Investigation: Significant Impact Trigger Reports are to be supplied to the regulator within 20 days of its finalisation. In addition, a summary of these reports is to be provided in the corresponding Annual Report.

9.4 IMPACT TRIGGER REGISTER

The findings presented in all Investigation Reports are to be used to update the mortality/ injury register with the following information (as a minimum):

- Species;
- Event type (injury/mortality);
- WTG reference(s);
- Number of individuals by WTG;
- Date;
- Observer;
- Cause ('WTG related' or 'not Project related');
- Action; and
- Status (i.e., pending investigation/Investigation Report reference)

Interim updates to the Impact Trigger Register should be made as soon as is possible to ensure its utility in any investigation process.

9.5 BBAMP AMENDMENT REGISTER

A centralised repository of BBAMP amendments recommended through investigation reporting and/or during BBAMP implementation is to be established and maintained to support/catalyse review and amendment processes, as outlined in Section 10. The register is to contain the following information:

- Description of recommended amendment;
- Recommendation source;
- Date;
- Responsible Officer name; and
- Priority (i.e., low, medium or high).

10. BBAMP REVIEW

A BBAMP review process is necessary to ensure it is 'fit for purpose' through the course of the Projects operational period. As a minimum, this process would involve consideration of monitoring and investigation reporting to:

- Review and update risk assessments, involving the inclusion of any new species;
- Evaluate the suitability of trigger thresholds;
- Review TARP process to ensure it is an effective framework for managing impacts;
- Evaluate the suitability of standard management measures;
- Consider the adoption of new management measures; and
- Any specific recommendations specified BBAMP Amendment Register.

A mandatory review process is to occur every five years from BBAMP inception with the review process taking no longer than six months inclusive of regulator involvement. The review scope is to be detailed in the fifth annual report and is to start immediately after the submission of this report to the regulator. This will initiate the consultation process.

A voluntary review process may be initiated should the BBAMP Amendment Register indicated a need for such a review. Such a review may be precipitated by several high priority amendment recommendations that seek to improve the function of the BBAMP. The regulator is to be advised, in writing, of any intention to undertake a voluntary BBAMP update including reasons for the need to make these updated.

Suitable document control and archiving is to be maintained through the life of the BBAMP to allow for retrospective review and evaluation of BBAMP performance.

11. COMPENSATORY MEASURES

The use of compensatory measures is a last resort measure when remedying impacts on a protected species. Prescribed impacts, such as impacts caused by collision with turbines and / or barotrauma, may require the use offsetting but only if justified through a detailed evaluation of the Projects impacts during the operational period and (i.e., other mitigation and minimisation measures have been exhausted).

Proposed compensatory measures may include one or more of the following:

- Payment into the Biodiversity Conservation Fund;
- Securing and retiring additional biodiversity credits;
- Funding conservation actions which improve biodiversity values for at-risk species (due to Project operation);
- Funding academic research into the impacts of wind farms on avian species; and
- Funding of threat management programs where it can be demonstrated that a conservation benefit to native bird and bat species can be achieved.

Consultation will be undertaken with NSW DCCEEW to determine appropriate compensatory measures to be undertaken.

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APPENDIX B BIRD UTILISATION SURVEY DATA

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS02		30/03/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	16	1	N/A		N/A	
BUS01		30/03/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	13	1				
BUS19		30/03/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	15	1				
BUS11		30/03/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	11	1				
BUS16		30/03/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	11	1				
BUS16		30/03/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	11	1				
BUS15		30/03/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	13	1				
BUS12		30/03/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	7	1				
BUS05		30/03/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	7	1				
BUS20		30/03/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	14	1				
BUS19		30/03/2020	N/A	BUS	N/A	Australian Magpie	*Gymnorhina tibicen*	5	17				
BUS05		30/03/2020	N/A	BUS	N/A	Australian Magpie	*Gymnorhina tibicen*	2	17				
BUS02		30/03/2020	N/A	BUS	N/A	Australian Raven	*Corvus coronoides*	5	23				
BUS19		30/03/2020	N/A	BUS	N/A	Australian Raven	*Corvus coronoides*	3	23				
BUS11		30/03/2020	N/A	BUS	N/A	Australian Raven	*Corvus coronoides*	1	23				
BUS10		30/03/2020	N/A	BUS	N/A	Australian Raven	*Corvus coronoides*	9	23				
BUS20		30/03/2020	N/A	BUS	N/A	Australian Raven	*Corvus coronoides*	3	23				
BUS02		30/03/2020	N/A	BUS	N/A	Black Falcon	*Falco subniger*	1	100				
BUS20		30/03/2020	N/A	BUS	N/A	Black Kite	*Milvus migrans*	1	38				
BUS16		30/03/2020	N/A	BUS	N/A	Brown Falcon	*Falco berigora*	1	65				
BUS02		30/03/2020	N/A	BUS	N/A	Common Starling	*Sturnus vulgaris*	31	35				
BUS10		30/03/2020	N/A	BUS	N/A	Common Starling	*Sturnus vulgaris*	13	35				
BUS12		30/03/2020	N/A	BUS	N/A	Common Starling	*Sturnus vulgaris*	1	35				
BUS11		30/03/2020	N/A	BUS	N/A	Nankeen Kestrel	*Falco cenchroides*	1	43				
BUS12		30/03/2020	N/A	BUS	N/A	Nankeen Kestrel	*Falco cenchroides*	1	43				
BUS05		30/03/2020	N/A	BUS	N/A	Nankeen Kestrel	*Falco cenchroides*	1	43				
BUS19		30/03/2020	N/A	BUS	N/A	Pied Butcherbird	*Cracticus nigrogularis*	1	1				
BUS05		30/03/2020	N/A	BUS	N/A	Pink Cockatoo	Cacatua leadbeateri	15	N/A	N/A		N/A	
BUS10		30/03/2020	N/A	BUS	N/A	Southern whiteface	*Aphelocephala leucopsis*	3	N/A	N/A		N/A	
BUS02		30/03/2020	N/A	BUS	N/A	Wedge-tailed Eagle	*Aquila audax*	1	110				
BUS05		30/03/2020	N/A	BUS	N/A	Wedge-tailed Eagle	*Aquila audax*	4	110				
BUS10		30/03/2020	N/A	BUS	N/A	Welcome Swallow	*Hirundo neoxena*	2	10				
BUS01		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	5	3				
BUS19		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	3	2				
BUS16		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	2	3				
BUS05		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	2	3				
BUS12		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	6	3				
BUS05		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	2	3				
BUS20		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	3	3				
BUS01		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	1	N/A	N/A		N/A	
BUS19		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	1	N/A	N/A		N/A	
BUS11		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	2	N/A	N/A		N/A	
BUS05		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	1	N/A	N/A		N/A	
BUS10		30/03/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	3	N/A	N/A		N/A	
BUS11		23/11/2020	N/A	BUS	N/A	-	-	-					
BUS02		23/11/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	2	1				
BUS01		23/11/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	4	1				
BUS10		23/11/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	1	1				
BUS15		23/11/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	1	1				
BUS12		23/11/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	1	1				
BUS05		23/11/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	1	1				
BUS20		23/11/2020	N/A	BUS	N/A	Australasian Pipit	*Anthus novaeseelandiae*	2	1				
BUS05		23/11/2020	N/A	BUS	N/A	Australian Magpie	*Gymnorhina tibicen*	1	17				
BUS19		23/11/2020	N/A	BUS	N/A	Black Kite	*Milvus migrans*	1	38				
BUS10		23/11/2020	N/A	BUS	N/A	Black Kite	*Milvus migrans*	1	38				
BUS01		23/11/2020	N/A	BUS	N/A	Brown Songlark	*Cincloramphus cruralis*	4	15				
BUS19		23/11/2020	N/A	BUS	N/A	Brown Songlark	*Cincloramphus cruralis*	2	15				
BUS12		23/11/2020	N/A	BUS	N/A	Brown Songlark	*Cincloramphus cruralis*	1	15				
BUS20		23/11/2020	N/A	BUS	N/A	Crested Pigeon	*Ocyphaps lophotes*	2	2				
BUS02		23/11/2020	N/A	BUS	N/A	Galah	*Eolophus roseicapillus*	12	24				
BUS01		23/11/2020	N/A	BUS	N/A	Horsfield's Bush Lark	*Mirafra javanica*	3	13				
BUS15		23/11/2020	N/A	BUS	N/A	Horsfield's Bush Lark	*Mirafra javanica*	2	13				
BUS12		23/11/2020	N/A	BUS	N/A	Nankeen Kestrel	*Falco cenchroides*	1	43				
BUS12		23/11/2020	N/A	BUS	N/A	Straw-necked Ibis	*Threskiornis spinicollis*	2	158				
BUS10		23/11/2020	N/A	BUS	N/A	Wedge-tailed Eagle	*Aquila audax*	2	110				
BUS15		23/11/2020	N/A	BUS	N/A	Wedge-tailed Eagle	*Aquila audax*	1	110				
BUS20		23/11/2020	N/A	BUS	N/A	Wedge-tailed Eagle	*Aquila audax*	4	110				
BUS01		23/11/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	2	3				
BUS16		23/11/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	1	3				
BUS05		23/11/2020	N/A	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	2	3				
BUS10		23/11/2020	N/A	BUS	N/A	White-winged Fairywren	*Malurus leucopterus*	5	2				
BUS23		14/02/2022	3:00:00 PM	BUS	N/A	Australasian pipit	*Anthus novaeseelandiae*	1	1	20		27 degrees, sunny, strong wind	
BUS04		14/02/2022	11:46:00 AM	BUS	N/A	Australian magpie	*Gymnorhina tibicen*	2	15	5			
BUS01		14/02/2022	11:46:00 AM	BUS	N/A	Black-faced Cuckoo-shrike	Coracina novaehollandiae	1	10	25			
BUS06		14/02/2022	3:00:00 PM	BUS	N/A	Common starling	Sturnus vulgaris	40	10	40			
opportunistic 17		14/02/2022	11:46:00 AM	BUS	N/A	Nankeen kestrel	*Falco cenchroides*	1	150	150		Harassing WTE, flying south	
BUS09		14/02/2022	12:36:00 PM	BUS	N/A	Nankeen kestrel	*Falco cenchroides*	1	3	10			
BUS06		14/02/2022	3:00:00 PM	BUS	N/A	Orange chat	Epthianura aurifrons	1	1	10			
opportunistic 10		14/02/2022		BUS	N/A	Pink Cockatoo	Cacatua leadbeateri	7	10	3			
BUS06		14/02/2022	3:00:00 PM	BUS	N/A	Rufous songlark	Cincloramphus mathewsi	1	2	30			
BUS01		14/02/2022	11:46:00 AM	BUS	N/A	Southern whiteface	Aphelocephala leucopsis	5	2	15			
BUS06		14/02/2022	3:00:00 PM	BUS	N/A	Straw-necked Ibis	*Threskiornis spinicollis*	3	150	100		Flying southwest from dam	
BUS01		14/02/2022	11:46:00 AM	BUS	N/A	Variegated fairywren	*Malurus lamberti*	5	2	15		36 degrees, strong wind	
BUS17		14/02/2022	7:40:00 AM	BUS	N/A	Wedge-tailed eagle	*Aquila audax*	1	50	100		Moving NW	
BUS28		14/02/2022	12:36:00 PM	BUS	N/A	Wedge-tailed eagle	*Aquila audax*	1	50	50		29 degrees, sunny, no wind -WTE circling 50 m up	
BUS06		14/02/2022	3:00:00 PM	BUS	N/A	White-backed Swallow	Cheramoeca leucosternus	3	20	20			
BUS06		14/02/2022	3:00:00 PM	BUS	N/A	White-breasted Woodswallow	Artamus leucorynchus	2	4	10			
opportunistic 20		14/02/2022	3:00:00 PM	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	3	3	15			
BUS14		14/02/2022	2:13:00 PM	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	1	2	20			
BUS15		14/02/2022	3:00:00 PM	BUS	N/A	White-winged Fairywren	*Malurus leucopterus*	1	1	30			
BUS00		14/02/2022	1:15:00 PM	BUS	N/A	Southern whiteface	Aphelocephala leucopsis	2	1	4			
BUS28		14/02/2022	1:45:00 PM	BUS	N/A	Australian magpie	*Gymnorhina tibicen*	1	15	50			
BUS29		14/02/2022	1:45:00 PM	BUS	N/A	Nankeen kestrel	*Falco cenchroides*	2	50	500		hovering while hunting	
BUS10		14/02/2022	1:45:00 PM	BUS	N/A	Variegated fairywren	*Malurus lamberti*	2	1	30			

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS14		14/02/2022	2:28:00 PM	BUS	N/A	Variegated fairywren	*Malurus lamberti*	1	1	10		19 degrees, sunny, moderate wind	
BUS16		14/02/2022	2:28:00 PM	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	2	3	45		22 degrees, sunny, strong wind	
BUS00		14/02/2022	8:53:00 AM	BUS	N/A	Australian magpie	*Gymnorhina tibicen*	1	10	25		21 degrees, slight breeze, sunny	
BUS00		14/02/2022	8:53:00 AM	BUS	N/A	Bluebonnet	Northiella haematogaster	14	7	15			
opportunistic 1		14/02/2022	8:53:00 AM	BUS	N/A	Pink Cockatoo	Cacatua leadbeateri	5	25	30		flying southwest	
BUS03		14/02/2022	8:53:00 AM	BUS	N/A	Southern whiteface	Aphelocephala leucopsis	2	0	10		37 degrees, sunny	
BUS02		14/02/2022	12:40:00 PM	BUS	N/A	Null	Null						
BUS06		15/02/2022	9:54:00 AM	BUS	N/A	Australasian pipit	*Anthus novaeseelandiae*	2	1	10			
BUS00		15/02/2022	6:15:00 PM	BUS	N/A	Australian magpie	*Gymnorhina tibicen*	3	5	30			
BUS11		15/02/2022	6:43:00 PM	BUS	N/A	Australian magpie	*Gymnorhina tibicen*	1	5	50		16 degrees, sunny, slight wind	
BUS17		15/02/2022	6:43:00 PM	BUS	N/A	Australian raven	Corvus coronoides	3	15	100		22 Sunny, moderate wind	
BUS10		15/02/2022	6:43:00 PM	BUS	N/A	Brown falcon	*Falco berigora*	1	3	100			
opportunistic 5		15/02/2022	9:54:00 AM	BUS	N/A	Fork-tailed swift	Apus pacificus	30	200	10		group circling, flying from 25-200m high	
opportunistic 4		15/02/2022	8:43:00 AM	BUS	N/A	Fork-tailed swift	Apus pacificus	13	100	0		Directly above, from 25-100m,flying NW	
BUS08		15/02/2022	10:43:00 AM	BUS	N/A	Fork-tailed swift	Apus pacificus	5	40	0		27 degree, sunny, slight breeze - FTS flying south from point	
BUS07		15/02/2022	7:11:00 AM	BUS	N/A	Galah	*Eolophus roseicapillus*	35	25	100			
BUS07		15/02/2022	7:11:00 AM	BUS	N/A	Masked woodswallow	Artamus leucorynchus	8	55	40			
BUS12		15/02/2022	6:15:00 PM	BUS	N/A	Nankeen kestrel	*Falco cenchroides*	1	12	150			
opportunistic 8		15/02/2022		BUS	N/A	Pink Cockatoo	Cacatua leadbeateri	5	4	30			
opportunistic 9		15/02/2022	6:15:00 PM	BUS	N/A	Pink Cockatoo	Cacatua leadbeateri	3	3	5			
BUS07		15/02/2022	7:11:00 AM	BUS	N/A	Superb Fairywren	*Malurus cyaneus*	10	3	20		24 degrees, sunrise, slight wind	
BUS36		15/02/2022	6:43:00 PM	BUS	N/A	Variegated fairywren	*Malurus lamberti*	3	1	25		26 degrees, sunny, moderate wind	
BUS27		15/02/2022	6:15:00 PM	BUS	N/A	Wedge-tailed eagle	*Aquila audax*	1	150	1000		Southwest of BUS point, circling, then heading NW	
BUS09		15/02/2022	10:20:00 AM	BUS	N/A	Wedge-tailed eagle	*Aquila audax*	1	0	20		Juvenile on ground, nest nearby	
BUS12		16/02/2022	10:47:00 AM	BUS	N/A	Australasian pipit	*Anthus novaeseelandiae*	1	1	30		36 degrees, moderate wind, sunny	
BUS01		16/02/2022	10:47:00 AM	BUS	N/A	Nankeen kestrel	*Falco cenchroides*	1	10	30			
BUS11		16/02/2022	8:15:00 AM	BUS	N/A	Pink Cockatoo	Cacatua leadbeateri	1	1	50			
BUS27		16/02/2022	8:30:00 AM	BUS	N/A	Pink Cockatoo	Cacatua leadbeateri	4	1	125			
opportunistic 2		16/02/2022	9:56:00 AM	BUS	N/A	Pink Cockatoo	Cacatua leadbeateri	29	1	10		foraging and drinking from water trough	
opportunistic 15		16/02/2022	4:34:00 PM	BUS	N/A	Wedge-tailed eagle	*Aquila audax*	1	25	10		Circling, not flying anywhere	
BUS06		16/02/2022	10:47:00 AM	BUS	N/A	White-winged Fairywren	*Malurus leucopterus*	10	1	20			
BUS11		16/02/2022	10:22:00 AM	BUS	N/A	Australian raven	Corvus coronoides	1	10	100			
BUS08		17/02/2022	10:35:00 AM	BUS	N/A	Australasian pipit	*Anthus novaeseelandiae*	2	0	25			
BUS18		17/02/2022	5:47:00 PM	BUS	N/A	Australasian pipit	*Anthus novaeseelandiae*	1	0	25		22 degrees, sunny, strong wind	
BUS13		17/02/2022	7:40:00 AM	BUS	N/A	Australian raven	Corvus coronoides	9	5	30		19 degrees, sunny	
BUS11		17/02/2022	9:59:00 AM	BUS	N/A	Australian raven	Corvus coronoides	2	1	75		36 degrees, sunny, slight breeze	
BUS11		17/02/2022	5:07:00 PM	BUS	N/A	Brown songlark	*Cincloramphus cruralis*	1	1	75			
BUS15		17/02/2022	8:38:00 AM	BUS	N/A	Crested Pigeon	*Ocyphaps lophotes*	4	0	25		20 degrees, sunny	
BUS20		17/02/2022	3:44:00 PM	BUS	N/A	Crested Pigeon	*Ocyphaps lophotes*	2	0	20		31 degrees, sunny, strong wind	
BUS21		17/02/2022	4:40:00 PM	BUS	N/A	Null	Null						
BUS04		17/02/2022	8:11:00 AM	BUS	N/A	Variegated fairywren	*Malurus lamberti*	20	0	20			
BUS06		17/02/2022	3:17:00 PM	BUS	N/A	Variegated fairywren	*Malurus lamberti*	1	0	20			
opportunistic 12		17/02/2022	9:59:00 AM	BUS	N/A	Wedge-tailed eagle	*Aquila audax*	1	150	150			
BUS34		17/02/2022	8:11:00 AM	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	3	3	50		30 degrees, cloudy, strong wind	
BUS33		17/02/2022	11:21:00 AM	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	1	1	40		32 degrees, cloudy, strong wind	
BUS12		17/02/2022	8:38:00 AM	BUS	N/A	White-winged Fairywren	*Malurus leucopterus*	2	1	50			
BUS25		18/02/2022	1:07:00 PM	BUS	N/A	Null	Null					26 degrees, sunny, strong wind	
BUS05		18/02/2022	8:27:00 AM	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	1	1	60			
opportunistic 19		18/02/2022	8:27:00 AM	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	1	1	10			
BUS26		18/02/2022	1:34:00 PM	BUS	N/A	White-winged Fairywren	*Malurus leucopterus*	1	0	50		28 degrees, sunny, strong wind	
BUS00		18/02/2022	10:23:00 AM	BUS	N/A	Pink Cockatoo	Cacatua leadbeateri	5	15	30			
BUS29		19/02/2022	11:25:00 AM	BUS	N/A	Australian magpie	*Gymnorhina tibicen*	1	3	50		31 degrees, sunny, strong wind	
BUS06		19/02/2022	7:19:00 AM	BUS	N/A	Common starling	Sturnus vulgaris	33	10	40			
BUS06		19/02/2022	7:19:00 AM	BUS	N/A	Masked woodswallow	Artamus leucorynchus	11	3	15			
BUS28		19/02/2022	11:25:00 AM	BUS	N/A	Southern whiteface	Aphelocephala leucopsis	1	0	10			
BUS05		19/02/2022	7:19:00 AM	BUS	N/A	Variegated fairywren	*Malurus lamberti*	4	0	15			
BUS19		19/02/2022	11:25:00 AM	BUS	N/A	Variegated fairywren	*Malurus lamberti*	2	0	30		31 degrees, sunny, strong wind	
opportunistic 18		19/02/2022	11:25:00 AM	BUS	N/A	Wedge-tailed eagle	*Aquila audax*	1	75	40		Flying west, circling lazily before soaring	
BUS27		19/02/2022	10:55:00 AM	BUS	N/A	Australasian pipit	*Anthus novaeseelandiae*	2	0	30		27 degrees, sunny, no wind	
BUS27		19/02/2022	10:55:00 AM	BUS	N/A	Galah	*Eolophus roseicapillus*	4	5	10			
BUS24		19/02/2022	10:55:00 AM	BUS	N/A	Pink Cockatoo	Cacatua leadbeateri	2	15	150		24 degrees, sunny, strong wind	
oportunistic 21		19/02/2022	10:55:00 AM	BUS	N/A	Wedge-tailed eagle	*Aquila audax*	3	75	40		Three circling, before flying north	
BUS09		20/02/2022	4:12:00 PM	BUS	N/A	Australian magpie	*Gymnorhina tibicen*	1	1	10		34 degrees, sunny, slight breeze	
BUS22		20/02/2022	6:01:00 PM	BUS	N/A	Brown songlark	*Cincloramphus cruralis*	1	1	10		31 degrees, sunny	
BUS32		20/02/2022	4:12:00 PM	BUS	N/A	Nankeen kestrel	*Falco cenchroides*	1	7	100		31 degrees, strong wind, cloudy	
BUS00		20/02/2022	6:21:00 PM	BUS	N/A	Nankeen kestrel	*Falco cenchroides*	2	5	10			
BUS34		20/02/2022	7:10:00 PM	BUS	N/A	Straw-necked Ibis	*Threskiornis spinicollis*	2	25	150			
opportunistic 7		20/02/2022	6:52:00 PM	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	5	3	5			
BUS06		20/02/2022	7:10:00 PM	BUS	N/A	White-fronted Chat	*Epthianura albifrons*	2	2	20		37 degrees, sunny, slight wind	
BUS30		20/02/2022	4:36:00 PM	BUS	N/A	Null	Null					31 degrees, sunny, strong winds	
BUS01		21/02/2022	10:55:00 AM	BUS	N/A	Australian magpie	*Gymnorhina tibicen*	3	10	15			
BUS10		21/02/2022	7:30:00 AM	BUS	N/A	Australian magpie	*Gymnorhina tibicen*	2	3	15			
BUS10		21/02/2022	7:30:00 AM	BUS	N/A	Australian raven	Corvus coronoides	2	5	50		31 degrees, sunny, slight wind	
BUS31		21/02/2022	7:30:00 AM	BUS	N/A	Brown songlark	*Cincloramphus cruralis*	1	2	30		34 degrees, strong wind, overcast	
BUS20		21/02/2022	10:55:00 AM	BUS	N/A	Nankeen kestrel	*Falco cenchroides*	1	15	50			
BUS12		21/02/2022	10:00:00 AM	BUS	N/A	Null	Null					21 degrees, cloudy, moderate wind	
opportunistic 6		21/02/2022	7:30:00 AM	BUS	N/A	Pink Cockatoo	Cacatua leadbeateri	4	20	3			
opportunistic 16		21/02/2022	10:45:00 AM	BUS	N/A	Plains Wanderer	Pedionomus torquatus	1	0	1		plains wandered seen 21/02 10:45am on road. stopped to confirm ID 1M away. female	
opportunistic 13		21/02/2022	4:43:00 PM	BUS	N/A	Wedge-tailed eagle	*Aquila audax*						
opportunistic 14		23/02/2022	11:28:00 AM	BUS	N/A	Wedge-tailed eagle	*Aquila audax*	1	15	150		flying west, stick nest nearby	
BUS36		23/02/2022		BUS	N/A	Black kite	*Milvus migrans*	1	20	15		Flying north	
BUS28		23/02/2022		BUS	N/A	Variegated fairywren	*Malurus lamberti*	2	0	20			
Opportunistic		Aug-22	-	-	-	Stubble Quail	*Coturnix pectoralis*	2	-	-	-	-	-
BUS02		26/08/2022	13:20	BUS	cloudy, still	Australian Magpie	*Gymnorhina tibicen*	1	0	120			perched
Opportunistic		26/08/2022	-	-	-	Australian Owlet-Nightjar	*Aegotheles cristatus*	1	-	-	-	-	1 observed during spotlighting 26/08 in Black Box
Opportunistic		26/08/2022	Midday	-	-	Australian Pelican	*Pelecanus conspicillatus*	15	-	-	-	-	-
BUS02		26/08/2022	13:20	BUS	cloudy, still	Australian Raven	*Corvus coronoides*	1	100	150			flying with Starlings
BUS01		26/08/2022	10:40	BUS	sunny, fine	Australian Raven	*Corvus coronoides*	1	30	180			
BUS01		26/08/2022	10:40	BUS	sunny, fine	Australian Raven	*Corvus coronoides*	2	30	150			
Opportunistic		26/08/2022	-	-	-	Banded Lapwing	*Vanellus tricolor*	2	-	-	-	-	-
BUS03		26/08/2022	14:20	BUS	cloudy, still	Brown Falcon	*Falco berigora*	1	500	10			
BUS01		26/08/2022	10:40	BUS	sunny, fine	Brown Songlark	*Cincloramphus cruralis*	2	25	75			Female resting on ground
BUS02		26/08/2022	13:20	BUS	cloudy, still	Brown Songlark	*Cincloramphus cruralis*	> 1					heard only
BUS02		26/08/2022	13:20	BUS	cloudy, still	Common Starling	*Sturnus vulgaris*	2	100	150			flying with Raven

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS01		26/08/2022	10:40	BUS	sunny, fine	Galah	*Eolophus roseicapillus*	12	75	150			
BUS03		26/08/2022	14:20	BUS	cloudy, still	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	2	20	100			
Opportunistic		26/08/2022	-	-	-	Inland Dotterel	*Charadruis australis*	2	-	-	-	-	-
BUS03		26/08/2022	14:20	BUS	cloudy, still	Superb Fairywren	*Malurus cyaneus*	4	3	120			1x male, 3x female
BUS02		26/08/2022	13:20	BUS	cloudy, still	Superb Fairywren	*Malurus cyaneus*	1	2	20			female
BUS01		26/08/2022	10:40	BUS	sunny, fine	Superb Fairywren	*Malurus cyaneus*	2	0.5	150			2x females
BUS01		26/08/2022	10:40	BUS	sunny, fine	Whistling Kite	*Haliastur sphenurus*	1	40	150			Slight fringing of wings - medium sized
BUS03		26/08/2022	14:20	BUS	cloudy, still	White-winged Triller	*Lalage sueurii*	1	1	40			unconfirmed ID
BUS06		27/08/2022	10:20	BUS	partly cloudy, light breeze, sunny	Australasian Pipit	*Anthus novaeseelandiae*	2	0	200			perched in tree
BUS04		27/08/2022	6:30	BUS	clear, chilly, still, sunrise	Australian Magpie	*Gymnorhina tibicen*	> 1					heard only
BUS06		27/08/2022	10:20	BUS	partly cloudy, light breeze, sunny	Australian Raven	*Corvus coronoides*	1	150	150			
BUS06		27/08/2022	10:20	BUS	partly cloudy, light breeze, sunny	Australian Raven	*Corvus coronoides*	1	100	100			
BUS04		27/08/2022	6:30	BUS	clear, chilly, still, sunrise	Australian Raven	*Corvus coronoides*	4	50	200			
BUS04		27/08/2022	6:30	BUS	clear, chilly, still, sunrise	Australian Raven	*Corvus coronoides*	2	15	100			
Opportunistic		27/08/2022	-	-	-	Black Falcon	*Falco subniger*	1	-	-	-	-	-
Opportunistic		27/08/2022	Midday	-	-	Black-faced Woodswallow	*Artamus cinereus*	1	-	-	-	-	1 observed midday, perched on fence 27/08
BUS05		27/08/2022	9:23	BUS	partly cloudy, light breeze, cool	Brown Songlark	*Cincloramphus cruralis*	1	30	40			male
BUS05		27/08/2022	9:23	BUS	partly cloudy, light breeze, cool	Brown Songlark	*Cincloramphus cruralis*	2	20	100			
BUS06		27/08/2022	10:20	BUS	partly cloudy, light breeze, sunny	Brown Songlark	*Cincloramphus cruralis*	1	20	200			male
BUS05		27/08/2022	9:23	BUS	partly cloudy, light breeze, cool	Brown Songlark	*Cincloramphus cruralis*	1	15	200			female
BUS05		27/08/2022	9:23	BUS	partly cloudy, light breeze, cool	Brown Songlark	*Cincloramphus cruralis*	1	5	30			female
BUS04		27/08/2022	6:30	BUS	clear, chilly, still, sunrise	Brown Songlark	*Cincloramphus cruralis*	2	2	150			
BUS06		27/08/2022	10:20	BUS	partly cloudy, light breeze, sunny	Brown Songlark	*Cincloramphus cruralis*	1	0	75			perched on branch
BUS04		27/08/2022	6:30	BUS	clear, chilly, still, sunrise	Brown Songlark	*Cincloramphus cruralis*	2					heard only
BUS05		27/08/2022	9:23	BUS	partly cloudy, light breeze, cool	Brown Songlark	*Cincloramphus cruralis*	2					heard only
BUS06		27/08/2022	10:20	BUS	partly cloudy, light breeze, sunny	Brown Songlark	*Cincloramphus cruralis*	2		20			heard only
BUS05		27/08/2022	9:23	BUS	partly cloudy, light breeze, cool	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1					heard only
BUS06		27/08/2022	10:20	BUS	partly cloudy, light breeze, sunny	Superb Fairywren	*Malurus cyaneus*	1	2	180			female
BUS04		27/08/2022	6:30	BUS	clear, chilly, still, sunrise	Superb Fairywren	*Malurus cyaneus*	> 1					heard only
BUS05		27/08/2022	9:23	BUS	partly cloudy, light breeze, cool	White-fronted Chat	*Epthianura albifrons*	2	5	200			1x female, 1x male
BUS06		27/08/2022	10:20	BUS	partly cloudy, light breeze, sunny	White-fronted Honeyeater	*Purnella albifrons*	3	0	200			perched in tree
BUS06		27/08/2022	10:20	BUS	partly cloudy, light breeze, sunny	Willie Wagtail	*Rhipidura leucophrys*	1	0	200			perched in tree
BUS04		27/08/2022	6:30	BUS	clear, chilly, still, sunrise	Willie Wagtail	*Rhipidura leucophrys*	1					heard only
BUS08		28/08/2022	9:05	BUS	sunny, light breeze	Australasian Pipit	*Anthus novaeseelandiae*	1	5	200			
BUS08		28/08/2022	9:05	BUS	sunny, light breeze	Australasian Pipit	*Anthus novaeseelandiae*	2	1	200			unconfirmed ID
BUS08		28/08/2022	9:05	BUS	sunny, light breeze	Australasian Pipit	*Anthus novaeseelandiae*	1	0.5	200			unconfirmed ID
BUS08		28/08/2022	9:25	BUS	sunny, clear, moderate wind	Australian Magpie	*Gymnorhina tibicen*	1	100	200			
Opportunistic		28/08/2022	Midday	-	-	Black-earred Cuckoo	*Chrysococcys osculans*	1	-	-	-	-	-
BUS08		28/08/2022	9:25	BUS	sunny, clear, moderate wind	Brown Songlark	*Cincloramphus cruralis*	2	50	75			
BUS08		28/08/2022	9:25	BUS	sunny, clear, moderate wind	Brown Songlark	*Cincloramphus cruralis*	2	50	120			
BUS08		28/08/2022	9:05	BUS	sunny, light breeze	Brown Songlark	*Cincloramphus cruralis*	1	25	200			male
BUS07		28/08/2022	8:10	BUS	sunny, light breeze	Brown Songlark	*Cincloramphus cruralis*	1	20	200			male
BUS10		28/08/2022	12:16	BUS	sunny, clear, moderate wind	Brown Songlark	*Cincloramphus cruralis*	1	20	180			
BUS08		28/08/2022	9:05	BUS	sunny, light breeze	Brown Songlark	*Cincloramphus cruralis*	2	10	100			1x female, 1x male
BUS09		28/08/2022	11:21	BUS	sunny, clear, moderate wind	Brown Songlark	*Cincloramphus cruralis*	1		20			heard only
BUS09		28/08/2022	11:21	BUS	sunny, clear, moderate wind	Brown Songlark	*Cincloramphus cruralis*	1		50			heard only
BUS09		28/08/2022	11:38	BUS	sunny, clear, moderate wind	Brown Songlark	*Cincloramphus cruralis*	2		100			heard only
BUS09		28/08/2022	11:21	BUS	sunny, clear, moderate wind	Common Starling	*Sturnus vulgaris*	7	50	200			
BUS10		28/08/2022	12:16	BUS	sunny, clear, moderate wind	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1	0	200			perched
BUS09		28/08/2022	11:21	BUS	sunny, clear, moderate wind	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1		100			heard only
BUS09		28/08/2022	11:38	BUS	sunny, clear, moderate wind	Common Starling	*Sturnus vulgaris*	2		100			heard only
BUS10		28/08/2022	12:16	BUS	sunny, clear, moderate wind	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1	0	200			perched
BUS09		28/08/2022	11:38	BUS	sunny, clear, moderate wind	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1		70			heard only
BUS10		28/08/2022	12:16	BUS	sunny, clear, moderate wind	Horsfield's Bush Lark	*Mirafra javanica*	1	25	80			
Opportunistic		28/08/2022	MIdday	-	-	Little Eagle	*Hieraaetus morphonoides*	1	-	-	-	-	1 observed around midday 28/08 - torpedo movement during
BUS09		28/08/2022	11:21	BUS	sunny, clear, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	75	200			
Opportunistic		28/08/2022	Midday	-	-	Southern Whiteface	*Aphelocephala leucopsis*	1	-	-	-	-	-
BUS09		28/08/2022	11:38	BUS	sunny, clear, moderate wind	Straw-necked Ibis	*Threskiornis spinicollis*	~ 500	300	200			quantity estimate only
BUS07		28/08/2022	8:10	BUS	sunny, light breeze	Superb Fairywren	*Malurus cyaneus*	1					heard only
BUS09		28/08/2022	11:21	BUS	sunny, clear, moderate wind	Superb Fairywren	*Malurus cyaneus*	1		75			heard only
BUS09		28/08/2022	11:38	BUS	sunny, clear, moderate wind	Superb Fairywren	*Malurus cyaneus*	> 1		40			heard only
BUS07		28/08/2022	8:10	BUS	sunny, light breeze	White-fronted Chat	*Epthianura albifrons*	1	1	50			male
BUS07		28/08/2022	8:10	BUS	sunny, light breeze	White-fronted Chat	*Epthianura albifrons*	2	1	170			1x female, 1x male
BUS07		28/08/2022	8:10	BUS	sunny, light breeze	White-fronted Chat	*Epthianura albifrons*	2	1	70			1x female, 1x male
BUS09		28/08/2022	11:21	BUS	sunny, clear, moderate wind	White-fronted Chat	*Epthianura albifrons*	1		75			heard only
Opportunistic		28/08/2022	-	-	-	White-winged Fairywren	*Malurus leucopterus*	2	-	-	-	-	-
BUS09		28/08/2022	11:21	BUS	sunny, clear, moderate wind	Willie Wagtail	*Rhipidura leucophrys*	1		50			heard only
BUS04		31/08/2022	8:25	BUS	cloudy, chilly, still	Australian Magpie	*Gymnorhina tibicen*	1	0	150			perched 1m up
BUS04		31/08/2022	7:26	BUS	cloudy, chilly, still	Australian Raven	*Corvus coronoides*	2	50	200			
BUS04		31/08/2022	7:26	BUS	cloudy, chilly, still	Australian Raven	*Corvus coronoides*	6	30	200			
BUS04		31/08/2022	7:26	BUS	cloudy, chilly, still	Australian Raven	*Corvus coronoides*	1	5	200			
BUS04		31/08/2022	7:26	BUS	cloudy, chilly, still	Australian Raven	*Corvus coronoides*	1	4	200			
BUS04		31/08/2022	8:25	BUS	cloudy, chilly, still	Australian Raven	*Corvus coronoides*	2	2	200			
BUS04		31/08/2022	7:26	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	1	75	100			male
BUS01		31/08/2022	16:50	BUS	sunny, fine	Brown Songlark	*Cincloramphus cruralis*	1	50	150			male
BUS04		31/08/2022	8:25	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	1	50	100			male
BUS04		31/08/2022	7:26	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	1	30	50			male
BUS04		31/08/2022	7:26	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	1	30	50			male
BUS01		31/08/2022	16:34	BUS	sunny, fine	Brown Songlark	*Cincloramphus cruralis*	1	20	20			male
BUS04		31/08/2022	8:25	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	1	10	100			male
BUS04		31/08/2022	8:25	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	1	10	150			
BUS04		31/08/2022	8:25	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	1	7	120			male
BUS04		31/08/2022	7:26	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	1	5	200			
BUS04		31/08/2022	8:25	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	2	5	200			
BUS01		31/08/2022	16:50	BUS	sunny, fine	Brown Songlark	*Cincloramphus cruralis*	1	2	50			male
BUS04		31/08/2022	8:25	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	1	2	200			male
BUS01		31/08/2022	16:50	BUS	sunny, fine	Brown Songlark	*Cincloramphus cruralis*	1	1	100			male
BUS01		31/08/2022	16:34	BUS	sunny, fine	Brown Songlark	*Cincloramphus cruralis*	1	0	100			perched
BUS04		31/08/2022	7:26	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	1	0	75			female - perched
BUS04		31/08/2022	8:25	BUS	cloudy, chilly, still	Brown Songlark	*Cincloramphus cruralis*	1	0	100			male - perched
BUS01		31/08/2022	16:50	BUS	sunny, fine	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1	1	100			
BUS01		31/08/2022	16:34	BUS	sunny, fine	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1	0	20			perched
BUS04		31/08/2022	8:25	BUS	cloudy, chilly, still	Nankeen Kestrel	*Falco cenchroides*	1	0	200			perched 3m up
BUS01		31/08/2022	16:34	BUS	sunny, fine	Superb Fairywren	*Malurus cyaneus*						heard only
BUS01		31/08/2022	16:50	BUS	sunny, fine	Variegated Fairywren	*Malurus lamberti*	3	0	150			perched
BUS01		31/08/2022	16:34	BUS	sunny, fine	White-fronted Chat	*Epthianura albifrons*	2	1	150			1x female, 1x male

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS04		31/08/2022	8:25	BUS	cloudy, chilly, still	White-fronted Chat	*Epthianura albifrons*	1	0	150			female - perched
BUS01		31/08/2022	16:50	BUS	sunny, fine	White-winged Fairywren	*Malurus leucopterus*	1	1	200			female
BUS02		1/09/2022	10:15	BUS	sunny, light breeze	Australian Magpie	*Gymnorhina tibicen*	5	7	200			using tree in distance
BUS02		1/09/2022	10:33	BUS	sunny, light breeze	Australian Magpie	*Gymnorhina tibicen*	1	2	200			
BUS02		1/09/2022	10:15	BUS	sunny, light breeze	Australian Raven	*Corvus coronoides*	2	200	30			
BUS02		1/09/2022	10:15	BUS	sunny, light breeze	Australian Raven	*Corvus coronoides*	5	50	200			
BUS03		1/09/2022	12:09	BUS	sunny, cloudy, light wind	Australian Raven	*Corvus coronoides*	5	25	200			circling small fire on roadside
BUS03		1/09/2022	11:51	BUS	sunny, cloudy, light wind	Australian Raven	*Corvus coronoides*	3	3	150			
BUS03		1/09/2022	11:51	BUS	sunny, cloudy, light wind	Black Kite	*Milvus migrans*	4	60	200			
BUS03		1/09/2022	12:09	BUS	sunny, cloudy, light wind	Black Kite	*Milvus migrans*	7	40	200			circling small fire on roadside
BUS02		1/09/2022	10:15	BUS	sunny, light breeze	Brown Falcon	*Falco berigora*	1	0	150			perched on gate
BUS02		1/09/2022	10:33	BUS	sunny, light breeze	Brown Falcon	*Falco berigora*	1	0	150			perched
BUS03		1/09/2022	12:09	BUS	sunny, cloudy, light wind	Brown Songlark	*Cincloramphus cruralis*	1	40	100			
BUS10		1/09/2022	17:40	BUS	cool, light wind, sunset	Brown Songlark	*Cincloramphus cruralis*	1	20	120			
BUS03		1/09/2022	12:09	BUS	sunny, cloudy, light wind	Brown Songlark	*Cincloramphus cruralis*	1	0.5	20			female
BUS02		1/09/2022	10:33	BUS	sunny, light breeze	Emu	*Dromaius novaehollandia*	1		200			
BUS03		1/09/2022	11:51	BUS	sunny, cloudy, light wind	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1	1	100			
BUS03		1/09/2022	12:09	BUS	sunny, cloudy, light wind	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1					heard only
BUS02		1/09/2022	10:33	BUS	sunny, light breeze	Horsfield's Bush Lark	*Mirafra javanica*	1	50	100			flying then landed
BUS03		1/09/2022	11:51	BUS	sunny, cloudy, light wind	Nankeen Kestrel	*Falco cenchroides*	1	40	200			
BUS03		1/09/2022	12:09	BUS	sunny, cloudy, light wind	Nankeen Kestrel	*Falco cenchroides*	1	40	150			hovering
BUS10		1/09/2022	17:40	BUS	cool, light wind, sunset	Southern Whiteface	Aphelocephala leucopsis	2	0.1	100			
BUS10		1/09/2022	17:56	BUS	cool, light wind, sunset	Southern Whiteface	Aphelocephala leucopsis	1	0.1	120			
BUS10		1/09/2022	17:56	BUS	cool, light wind, sunset	Superb Fairywren	*Malurus cyaneus*	1	0.2	50			
BUS10		1/09/2022	17:40	BUS	cool, light wind, sunset	Superb Fairywren	*Malurus cyaneus*						heard only
BUS02		1/09/2022	10:15	BUS	sunny, light breeze	Variegated Fairywren	*Malurus lamberti*	2	2	25			2x females
BUS02		1/09/2022	10:15	BUS	sunny, light breeze	Variegated Fairywren	*Malurus lamberti*	1	1	40			female
BUS02		1/09/2022	10:33	BUS	sunny, light breeze	Variegated Fairywren	*Malurus lamberti*	1	1	30			female
BUS10		1/09/2022	17:56	BUS	cool, light wind, sunset	Variegated Fairywren	*Malurus lamberti*	1	0.1	75			
BUS03		1/09/2022	12:09	BUS	sunny, cloudy, light wind	Wedge-tailed Eagle	*Aquila audax*	1	100	200			
BUS10		1/09/2022	17:40	BUS	cool, light wind, sunset	White-fronted Chat	*Epthianura albifrons*	1	1	150			female
BUS10		1/09/2022	17:56	BUS	cool, light wind, sunset	White-fronted Chat	*Epthianura albifrons*	1	0.1	30			
BUS03		1/09/2022	11:51	BUS	sunny, cloudy, light wind	White-winged Fairywren	*Malurus leucopterus*	1	1	30			male
BUS03		1/09/2022	12:09	BUS	sunny, cloudy, light wind	White-winged Fairywren	*Malurus leucopterus*	1	1	35			male
BUS03		1/09/2022	12:09	BUS	sunny, cloudy, light wind	White-winged Fairywren	*Malurus leucopterus*	1	1	100			female
BUS10		1/09/2022	17:56	BUS	cool, light wind, sunset	White-winged Fairywren	*Malurus leucopterus*	1	0.5	100			male
BUS08		2/09/2022	14:31	BUS	sunny, windy	Australasian Pipit	*Anthus novaeseelandiae*	1	2	180			
BUS07		2/09/2022	16:15	BUS	sunny, windy	Australasian Pipit	*Anthus novaeseelandiae*	1	0.5	30			
Opportunistic		2/09/2022	-	-	-	Australian Hobby	*Falco longipennis*	1	-	-	-	-	1 observed feeding on prey on fence post 02/09
BUS08		2/09/2022	14:50	BUS	sunny, windy	Australian Raven	*Corvus coronoides*	1	5	200			
BUS08		2/09/2022	14:31	BUS	sunny, windy	Australian Raven	*Corvus coronoides*	1	0	200			perched
BUS07		2/09/2022	16:32	BUS	sunny, windy	Black-shouldered Kite	*Elanus axillaris*	1	0	180			perched
BUS08		2/09/2022	14:31	BUS	sunny, windy	Brown Songlark	*Cincloramphus cruralis*	1	30	80			
BUS08		2/09/2022	14:50	BUS	sunny, windy	Brown Songlark	*Cincloramphus cruralis*	2	30	30			2x males
BUS08		2/09/2022	14:50	BUS	sunny, windy	Brown Songlark	*Cincloramphus cruralis*	1	30	150			
BUS08		2/09/2022	14:31	BUS	sunny, windy	Brown Songlark	*Cincloramphus cruralis*	1	25	100			
BUS07		2/09/2022	16:32	BUS	sunny, windy	Brown Songlark	*Cincloramphus cruralis*	1	10	15			male
BUS07		2/09/2022	16:15	BUS	sunny, windy	Brown Songlark	*Cincloramphus cruralis*	1	3	40			
BUS07		2/09/2022	16:15	BUS	sunny, windy	Horsfield's Bush Lark	*Mirafra javanica*	1	2	20			
BUS08		2/09/2022	14:50	BUS	sunny, windy	Inland Dotterel	*Charadruis australis*	1	0	180			female
BUS08		2/09/2022	14:31	BUS	sunny, windy	Little Eagle	*Hieraaetus morphonoides*	1	10	200			landing
BUS07		2/09/2022	16:32	BUS	sunny, windy	Nankeen Kestrel	*Falco cenchroides*	1	40	200			
BUS07		2/09/2022	16:32	BUS	sunny, windy	Nankeen Kestrel	*Falco cenchroides*	1	30	180			
BUS07		2/09/2022	16:15	BUS	sunny, windy	Rufous Songlark	*Cincloramphus mathewsi*	1	0	50			perched
BUS08		2/09/2022	14:50	BUS	sunny, windy	Variegated Fairywren	*Malurus lamberti*	2	2	80			female
BUS08		2/09/2022	14:31	BUS	sunny, windy	Variegated Fairywren	*Malurus lamberti*	2	1	25			
BUS07		2/09/2022	16:15	BUS	sunny, windy	White-fronted Chat	*Epthianura albifrons*	1	1	30			
BUS07		2/09/2022	16:32	BUS	sunny, windy	White-fronted Chat	*Epthianura albifrons*	1	1	75			female
BUS07		2/09/2022	16:32	BUS	sunny, windy	White-fronted Chat	*Epthianura albifrons*	1	1	180			male
BUS09		3/09/2022	10:49	BUS	sunny, windy	Australian Raven	*Corvus coronoides*	2	3	80			
BUS09		3/09/2022	11:05	BUS	sunny, windy	Brown Songlark	*Cincloramphus cruralis*	1	30	40			male
BUS09		3/09/2022	10:49	BUS	sunny, windy	Brown Songlark	*Cincloramphus cruralis*	1	20	20			male
BUS09		3/09/2022	11:05	BUS	sunny, windy	Brown Songlark	*Cincloramphus cruralis*	1	10	30			male
BUS09		3/09/2022	10:49	BUS	sunny, windy	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1	3	40			
BUS09		3/09/2022	11:05	BUS	sunny, windy	Horsfield's Bush Lark	*Mirafra javanica*	1	0.5	35			
BUS09		3/09/2022	11:05	BUS	sunny, windy	Horsfield's Bush Lark	*Mirafra javanica*	1	0	40			perched
BUS09		3/09/2022	11:05	BUS	sunny, windy	Nankeen Kestrel	*Falco cenchroides*	1	40	100			hovering
BUS09		3/09/2022	10:49	BUS	sunny, windy	Variegated Fairywren	*Malurus lamberti*	1	0.5	80			
BUS09		3/09/2022	11:05	BUS	sunny, windy	Variegated Fairywren	*Malurus lamberti*	1	0.5	20			
BUS09		3/09/2022	10:49	BUS	sunny, windy	White-fronted Chat	*Epthianura albifrons*	2	3	10			2x females
BUS09		3/09/2022	11:05	BUS	sunny, windy	White-fronted Chat	*Epthianura albifrons*	1	0	50			perched
BUS09		3/09/2022	11:05	BUS	sunny, windy	White-fronted Chat	*Epthianura albifrons*	1	0	20			perched
BUS09		3/09/2022	10:49	BUS	sunny, windy	White-winged Fairywren	*Malurus leucopterus*	1	0.2	25			female
BUS06		4/09/2022	13:25	BUS	sunny, light breeze	Australasian Pipit	*Anthus novaeseelandiae*	1					heard only
BUS05		4/09/2022	14:53	BUS	sunny, still	Australian Raven	*Corvus coronoides*	2	60	200			
BUS06		4/09/2022	13:25	BUS	sunny, light breeze	Australian Raven	*Corvus coronoides*	1	2	200			landing
BUS06		4/09/2022	13:07	BUS	sunny, light breeze	Brown Songlark	*Cincloramphus cruralis*	1	50	120			male
BUS06		4/09/2022	13:25	BUS	sunny, light breeze	Brown Songlark	*Cincloramphus cruralis*	1	40	80			
BUS05		4/09/2022	14:53	BUS	sunny, still	Brown Songlark	*Cincloramphus cruralis*	1	20	50			
BUS05		4/09/2022	15:10	BUS	sunny, light breeze	Brown Songlark	*Cincloramphus cruralis*	1	20	50			
BUS06		4/09/2022	13:07	BUS	sunny, light breeze	Brown Songlark	*Cincloramphus cruralis*	1	20	40			male
BUS05		4/09/2022	15:10	BUS	sunny, light breeze	Brown Songlark	*Cincloramphus cruralis*	1	1	40			
BUS06		4/09/2022	13:25	BUS	sunny, light breeze	Brown Songlark	*Cincloramphus cruralis*	1					heard only
BUS06		4/09/2022	13:07	BUS	sunny, light breeze	Galah	*Eolophus roseicapillus*	1	70	100			
BUS06		4/09/2022	13:07	BUS	sunny, light breeze	Galah	*Eolophus roseicapillus*	2	60	100			
BUS05		4/09/2022	15:10	BUS	sunny, light breeze	Horsfield's Bush Lark	*Mirafra javanica*	1	1	30			
BUS05		4/09/2022	14:53	BUS	sunny, still	Nankeen Kestrel	*Falco cenchroides*	1	70	200			
BUS06		4/09/2022	13:07	BUS	sunny, light breeze	Nankeen Kestrel	*Falco cenchroides*	1	70	200			
BUS05		4/09/2022	15:10	BUS	sunny, light breeze	Rufous Fieldwren	*Calamanthus campestris*	2	1	30			
BUS06		4/09/2022	13:07	BUS	sunny, light breeze	Variegated Fairywren	*Malurus lamberti*						heard only
BUS06		4/09/2022	13:25	BUS	sunny, light breeze	Variegated Fairywren	*Malurus lamberti*						heard only
BUS06		4/09/2022	13:25	BUS	sunny, light breeze	White-winged Fairywren	*Malurus leucopterus*	1	1	70			
BUS05		4/09/2022	15:10	BUS	sunny, light breeze	White-winged Fairywren	*Malurus leucopterus*	2					heard only
BUS01		4/09/2023	1540	BUS		Australasian Pipit	*Anthus novaeseelandiae*	2	1	20			

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS01		4/09/2023	1540	BUS		Australian Raven	*Corvus coronoides*	1	15	100		W	Flying
BUS01		4/09/2023	1610	BUS		Australian Raven	*Corvus coronoides*	2	15	25		NW	Flying
BUS01		4/09/2023	1610	BUS		Australian Raven	*Corvus coronoides*	1	15	50			Perched on fence
BUS01		4/09/2023	1610	BUS		Australian Raven	*Corvus coronoides*	1	1	75			Above ground
BUS01		4/09/2023	1540	BUS		Black-shouldered Kite	*Elanus axillaris*	2	30	25			Hunting
BUS01		4/09/2023	1610	BUS		Black-shouldered Kite	*Elanus axillaris*	1	30	50			Hunting
BUS01		4/09/2023	1610	BUS		Black-shouldered Kite	*Elanus axillaris*	1	50	2000		N	Hunting
BUS01		4/09/2023	1610	BUS		Black-shouldered Kite	*Elanus axillaris*	1	1	50			Perched on fence
BUS01		4/09/2023	1540	BUS		Brown Songlark	*Cincloramphus cruralis*	3		30		NW/ SW	Heard
BUS01		4/09/2023	1610	BUS		Brown Songlark	*Cincloramphus cruralis*	2	1	20			
BUS01		4/09/2023	1610	BUS		Brown Songlark	*Cincloramphus cruralis*	1	15	15		N	Flying
BUS01		4/09/2023	1540	BUS		Dusky Woodswallow	*Artamus cyanopterus*	4	5	30			Perched on fence
BUS01		4/09/2023	1540	BUS		Pallid Cuckoo	Cacomantis pallidus	1	1	50			Perched on fence
BUS01		4/09/2023	1610	BUS		Pallid Cuckoo	Cacomantis pallidus	1	1	50			Perched on fence
BUS01		4/09/2023	1540	BUS		Spotted Harrier	*Circus assimilis*	1	10	50			Flying and landing
BUS01		4/09/2023	1610	BUS		Stubble Quail	*Coturnix pectoralis*	5	1	30			Roost on ground
BUS02		4/09/2023	1650	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	2	50			Flying from bush to bush
BUS02		4/09/2023	1650	BUS		Australian Raven	*Corvus coronoides*	1	10	500			Flying and landed on ground
BUS02		4/09/2023	1720	BUS		Australian Raven	*Corvus coronoides*	2	15	1000			Flying
BUS02		4/09/2023	1720	BUS		Black-shouldered Kite	*Elanus axillaris*	2	30	1000			Flying and hunting
BUS02		4/09/2023	1720	BUS		Black-shouldered Kite	*Elanus axillaris*	2	30	1500			Flying, hunting, and hovering
BUS02		4/09/2023	1720	BUS		Black-shouldered Kite	*Elanus axillaris*	1	15	400			Flying high from the ground and then flew West
BUS02		4/09/2023	1650	BUS		Brown Songlark	*Cincloramphus cruralis*	1		300			Heard songs
BUS02		4/09/2023	1650	BUS		Brown Songlark	*Cincloramphus cruralis*	1	3	200			Flying low
BUS02		4/09/2023	1720	BUS		Brown Songlark	*Cincloramphus cruralis*	2		300			Heard song calls
BUS02		4/09/2023	1650	BUS		Dusky Woodswallow	*Artamus cyanopterus*	3		200			Heard song/ call
BUS02		4/09/2023	1720	BUS		Fairywren spp.	*Malurus spp.*	3	1	20			Female. Flying around bushes, perched.
BUS02		4/09/2023	1650	BUS		Fairywren spp.	*Malurus spp.*	5		50			Heard calling. Female
BUS03		4/09/2023	1645	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	1	80			
BUS03		4/09/2023	1645	BUS		Australian Raven	*Corvus coronoides*	4	20	200			Perched in shrubs
BUS03		4/09/2023	1645	BUS		Australian Raven	*Corvus coronoides*	2	1	350			Perched on fence
BUS03		4/09/2023	1645	BUS		Black-shouldered Kite	*Elanus axillaris*	1	30	350			Hunting
BUS03		4/09/2023	1715	BUS		Black-shouldered Kite	*Elanus axillaris*	2	35	40			
BUS03		4/09/2023	1715	BUS		Black-shouldered Kite	*Elanus axillaris*	1	30	350			
BUS03		4/09/2023	1645	BUS		Brown Songlark	*Cincloramphus cruralis*	3		30		S/ E	Heard
BUS03		4/09/2023	1715	BUS		Brown Songlark	*Cincloramphus cruralis*	2		25		S	Heard
BUS03		4/09/2023	1715	BUS		Brown Songlark	*Cincloramphus cruralis*	1	15	50			
BUS03		4/09/2023	1645	BUS		Nankeen Kestrel	*Falco cenchroides*	1	40	250			Hovering
BUS03		4/09/2023	1645	BUS		White-fronted Chat	*Epthianura albifrons*	15	1	15			Flying between shrubs
BUS03		4/09/2023	1715	BUS		White-fronted Chat	*Epthianura albifrons*	4	1	25			Flying between shrubs
BUS01		5/09/2023	730	BUS		Australian Raven	*Corvus coronoides*	6	5	350		W	Seen and heard above the canopy flying North
BUS01		5/09/2023	1220	BUS		Australian Raven	*Corvus coronoides*	1	5	350		W	Seen above the canopy diving into the grass
BUS01		5/09/2023	800	BUS		Black-shouldered Kite	*Elanus axillaris*	1	15	80		SW	Seen above the canopy hovering
BUS01		5/09/2023	730	BUS		Brown Songlark	*Cincloramphus cruralis*	5	3	50		N	Seen and heard from the ground
BUS01		5/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	5	15	50		N	Seen and heard calls in the grass
BUS01		5/09/2023	1250	BUS		Brown Songlark	*Cincloramphus cruralis*	3	1	30		SE	Seen and heard making calls in the grass
BUS01		5/09/2023	730	BUS		Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1	1	100		SW	Heard calls from the ground
BUS01		5/09/2023	730	BUS		Little Black Cormorant		5	15	50		W	Seen above the canopy a small flock flying South
BUS01		5/09/2023	730	BUS		Nankeen Kestrel	*Falco cenchroides*	1	12	400		NW	Seen and heard above the canopy hovering
BUS01		5/09/2023	730	BUS		Spotted Harrier	*Circus assimilis*	1	3	70		SW	Seen juvenile flying above canopy towards the West
BUS01		5/09/2023	800	BUS		Spotted Harrier	*Circus assimilis*	1	12	500		SW	Seen above the canopy flying South
BUS02		5/09/2023	1300	BUS		Australasian Pipit	*Anthus novaeseelandiae*	2	1	10			
BUS02		5/09/2023	740	BUS		Australian Raven	*Corvus coronoides*	2	20	150		S	Flying South
BUS02		5/09/2023	810	BUS		Australian Raven	*Corvus coronoides*	2	7	50		N	Flying North
BUS02		5/09/2023	1300	BUS		Australian Raven	*Corvus coronoides*	1	30	100			
BUS02		5/09/2023	740	BUS		Black Kite	*Milvus migrans*	2	40	25			Hunting
BUS02		5/09/2023	810	BUS		Black Kite	*Milvus migrans*	2	30	50			Hunting
BUS02		5/09/2023	1300	BUS		Black-shouldered Kite	*Elanus axillaris*	1	30	50			
BUS02		5/09/2023	1300	BUS		Black-shouldered Kite	*Elanus axillaris*	1	20	50			Was perched then took off flying
BUS02		5/09/2023	740	BUS		Black-shouldered Kite	*Elanus axillaris*	1	30	100		N	Hunting
BUS02		5/09/2023	810	BUS		Black-shouldered Kite	*Elanus axillaris*	3	25	1000			
BUS02		5/09/2023	1300	BUS		Brown Falcon	*Falco berigora*	1	150	20			
BUS02		5/09/2023	740	BUS		Brown Songlark	*Cincloramphus cruralis*	3	10	25			
BUS02		5/09/2023	740	BUS		Brown Songlark	*Cincloramphus cruralis*	1	30	100			
BUS02		5/09/2023	740	BUS		Brown Songlark	*Cincloramphus cruralis*	1	25	50			
BUS02		5/09/2023	810	BUS		Brown Songlark	*Cincloramphus cruralis*	2	0	30			Heard
BUS02		5/09/2023	810	BUS		Brown Songlark	*Cincloramphus cruralis*	1	17	40		E	Flying East
BUS02		5/09/2023	1200	BUS		Brown Songlark	*Cincloramphus cruralis*	1	1	5			Perched
BUS02		5/09/2023	1200	BUS		Brown Songlark	*Cincloramphus cruralis*	1	30	50			
BUS02		5/09/2023	1300	BUS		Brown Songlark	*Cincloramphus cruralis*	1	7	30			
BUS02		5/09/2023	1300	BUS		Brown Songlark	*Cincloramphus cruralis*	1	1	15			
BUS02		5/09/2023	1300	BUS		Brown Songlark	*Cincloramphus cruralis*	2	30	50			
BUS02		5/09/2023	810	BUS		Duck spp.,		6	75	100		W	Flying Wester
BUS02		5/09/2023	810	BUS		Fairywren spp.	*Malurus spp.*	7	0.3	75			Perched in shrub
BUS02		5/09/2023	810	BUS		Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1		50		E	Heard
BUS02		5/09/2023	1300	BUS		Nankeen Kestrel	*Falco cenchroides*	1	30	75			
BUS02		5/09/2023	740	BUS		Red-capped Robin	*Petroica goodenovii*	2	1	30			Perched
BUS02		5/09/2023	810	BUS		Red-capped Robin	*Petroica goodenovii*	1	0.5	30			Perched
BUS02		5/09/2023	1200	BUS		Spotted Harrier	*Circus assimilis*	1	2	50			
BUS02		5/09/2023	1300	BUS		Stubble Quail	*Coturnix pectoralis*	2	60	36			
BUS02		5/09/2023	1300	BUS		White-fronted Chat	*Epthianura albifrons*	2	1	75			
BUS03		5/09/2023	1120	BUS		Australian Magpie	*Gymnorhina tibicen*	4	30	50		N	Flying North
BUS03		5/09/2023	855	BUS		Australian Raven	*Corvus coronoides*	1	15	100			
BUS03		5/09/2023	925	BUS		Australian Raven	*Corvus coronoides*	1	10	300			
BUS03		5/09/2023	925	BUS		Australian Raven	*Corvus coronoides*	10	50	400			
BUS03		5/09/2023	1024	BUS		Australian Raven	*Corvus coronoides*	1	10	50			
BUS03		5/09/2023	1120	BUS		Australian Raven	*Corvus coronoides*	1	1	75			
BUS03		5/09/2023	1120	BUS		Australian Raven	*Corvus coronoides*	1	20	200			
BUS03		5/09/2023	855	BUS		Black-shouldered Kite	*Elanus axillaris*	1	40	350			
BUS03		5/09/2023	925	BUS		Black-shouldered Kite	*Elanus axillaris*	1	13	50			
BUS03		5/09/2023	1120	BUS		Black-shouldered Kite	*Elanus axillaris*	1	5	300			Hovering
BUS03		5/09/2023	855	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	15			
BUS03		5/09/2023	855	BUS		Brown Songlark	*Cincloramphus cruralis*	2	0	50			Heard
BUS03		5/09/2023	925	BUS		Brown Songlark	*Cincloramphus cruralis*	1	3	50			

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS03		5/09/2023	925	BUS		Brown Songlark	*Cincloramphus cruralis*	1	25	50			Flying
BUS03		5/09/2023	1024	BUS		Brown Songlark	*Cincloramphus cruralis*	3	0	50			Heard
BUS03		5/09/2023	1120	BUS		Brown Songlark	*Cincloramphus cruralis*	1	20	50		E	Flying East
BUS03		5/09/2023	1120	BUS		Brown Songlark	*Cincloramphus cruralis*	1		25			Heard
BUS03		5/09/2023	1120	BUS		Galah	*Eolophus roseicapillus*	8	2	300		W	Flying West
BUS03		5/09/2023	1024	BUS		Nankeen Kestrel	*Falco cenchroides*	2	30	50			Hovering
BUS03		5/09/2023	1120	BUS		Nankeen Kestrel	*Falco cenchroides*	2	60	50			
BUS03		5/09/2023	855	BUS		Spotted Harrier	*Circus assimilis*	3	6	360		N	
BUS03		5/09/2023	1120	BUS		Stubble Quail	*Coturnix pectoralis*	1	1	150			
BUS03		5/09/2023	925	BUS		Wedge-tailed Eagle	*Aquila audax*	1	75	200			Circling
BUS03		5/09/2023	1024	BUS		Wedge-tailed Eagle	*Aquila audax*	2	150	200		E	
BUS03		5/09/2023	1120	BUS		Wedge-tailed Eagle	*Aquila audax*	1	120	1000			
BUS03		5/09/2023	925	BUS		Welcome Swallow	*Hirundo neoxena*	2	10	15			
BUS03		5/09/2023	1024	BUS		Welcome Swallow	*Hirundo neoxena*	1	10	50			
BUS03		5/09/2023	1024	BUS		White-fronted Chat	*Epthianura albifrons*	2	20	25			
BUS03		5/09/2023	1120	BUS		White-fronted Chat	*Epthianura albifrons*	1		30			Heard
BUS03		5/09/2023	1024	BUS		White-winged Fairywren	*Malurus leucopterus*	7	1	30			Flying inbetween shrubs
BUS03		5/09/2023	1120	BUS		White-winged Fairywren	*Malurus leucopterus*	3	1	20			Flying between shrubs
BUS04		5/09/2023	1525	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	1	60		S	Heard calls from the shrub
BUS04		5/09/2023	1455	BUS		Australian Magpie	*Gymnorhina tibicen*	1	18	500		S	Seen perched on the crown of the tree
BUS04		5/09/2023	1525	BUS		Australian Magpie	*Gymnorhina tibicen*	4	15	500		S	Heard calls from the tree
BUS04		5/09/2023	1525	BUS		Australian Raven	*Corvus coronoides*	3	20	200		N	Seen in the tree flying North
BUS04		5/09/2023	1455	BUS		Black-shouldered Kite	*Elanus axillaris*	1	18	500		S	Seen perched in the crown of the tree
BUS04		5/09/2023	1455	BUS		Brown Songlark	*Cincloramphus cruralis*	4	12	50		N	Heard making calls on the ground
BUS04		5/09/2023	1525	BUS		Brown Songlark	*Cincloramphus cruralis*	6	1	30		S	Heard calls from the shrub
BUS04		5/09/2023	1525	BUS		Crested Pigeon	*Ocyphaps lophotes*	6	8	350		E	Seen and heard above the canopy flying East
BUS04		5/09/2023	1525	BUS		Nankeen Kestrel	*Falco cenchroides*	3	18	500		S	Seen perched in the crown of the tree
BUS04		5/09/2023	1455	BUS		Pallid Cuckoo	Cacomantis pallidus	1	4	350		W	Seen perching in a shrub
BUS04		5/09/2023	1455	BUS		Spotted Harrier	*Circus assimilis*	1	20	400		W	Seen adult above the canopy flying South
BUS04		5/09/2023	1455	BUS		Stubble Quail	*Coturnix pectoralis*	2	3	2		W	Seen and heard from the ground then flew South
BUS04		5/09/2023	1525	BUS		Stubble Quail	*Coturnix pectoralis*	1	4	10		S	Seen flying South from the ground
BUS04		5/09/2023	1455	BUS		Superb Fairywren	*Malurus cyaneus*	4	1	60		W	Heard calls from the shrub
BUS04		5/09/2023	1525	BUS		Superb Fairywren	*Malurus cyaneus*	2	1	30		W	Heard calls from the shrub
BUS04		5/09/2023	1455	BUS		White-fronted Chat	*Epthianura albifrons*	3	5	50		S	Seen and heard calls from the shrub
BUS04		5/09/2023	1455	BUS		White-winged Fairywren	*Malurus leucopterus*	1	1	10		W	Seen and heard female flying South
BUS04		5/09/2023	1525	BUS		White-winged Fairywren	*Malurus leucopterus*	3	1	10		N	Seen male and female flying North from the shrub
BUS07		5/09/2023	900	BUS		Black Kite	*Milvus migrans*	1	30	50		W	Seen above the canopy attacking the eagle
BUS07		5/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	2	1	50		N	Heard calls from shrubs
BUS07		5/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	3	5	80		N	Seen and heard diving into the shrub
BUS07		5/09/2023	900	BUS		Emu	*Dromaius novaehollandia*	6	0	30		S	Seen on the ground running North
BUS07		5/09/2023	930	BUS		Emu	*Dromaius novaehollandia*	3	0	80		W	Seen on the ground running West
BUS07		5/09/2023	900	BUS		Nankeen Kestrel	*Falco cenchroides*	1	15	150		N	Seen above the canopy flying North
BUS07		5/09/2023	900	BUS		Wedge-tailed Eagle	*Aquila audax*	2	30	50		S	Seen above the canopy flying East and attacked by Black Kite
BUS07		5/09/2023	900	BUS		White-fronted Chat	*Epthianura albifrons*	4	15	40		W	Seen on the shrub flying South as a small group of females
BUS08		5/09/2023	1000	BUS		Brown Songlark	*Cincloramphus cruralis*	2	1	80		S	Heard calls from the ground
BUS09		5/09/2023	1100	BUS		Stubble Quail	*Coturnix pectoralis*	1	4	15		S	Seen flushed out from the ground
BUS09		5/09/2023	1100	BUS		Superb Fairywren	*Malurus cyaneus*	2	1	50		SW	Heard calls from shrubs
BUS14		5/09/2023	1515	BUS		Australian Raven	*Corvus coronoides*	2	1	50		W	Flying
BUS14		5/09/2023	1545	BUS		Australian Raven	*Corvus coronoides*	1	15	100		SW	Flying
BUS14		5/09/2023	1515	BUS		Black-faced Woodswallow	*Artamus cinereus*	5	25	20			
BUS14		5/09/2023	1515	BUS		Brown Songlark	*Cincloramphus cruralis*	1	30	100			
BUS14		5/09/2023	1515	BUS		Brown Songlark	*Cincloramphus cruralis*	1	25	50			
BUS14		5/09/2023	1545	BUS		Brown Songlark	*Cincloramphus cruralis*	4	15	75			
BUS14		5/09/2023	1515	BUS		Stubble Quail	*Coturnix pectoralis*	1	0	5			
BUS14		5/09/2023	1515	BUS		White-fronted Chat	*Epthianura albifrons*	1		220			Heard
BUS14		5/09/2023	1545	BUS		White-fronted Chat	*Epthianura albifrons*	1		40			Heard
BUS14		5/09/2023	1515	BUS		White-necked Heron	*Ardea pacifica*	1	40	10		NE	Flying
BUS16		5/09/2023	1120	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1		40			Perched on shrub
BUS16		5/09/2023	900	BUS		Australian Raven	*Corvus coronoides*	3	10	300			
BUS16		5/09/2023	930	BUS		Australian Raven	*Corvus coronoides*	1	30	150			
BUS16		5/09/2023	1120	BUS		Australian Raven	*Corvus coronoides*	1	30	5			Flying
BUS16		5/09/2023	930	BUS		Black Kite	*Milvus migrans*	1	10	200			Hovering over prey
BUS16		5/09/2023	900	BUS		Black-shouldered Kite	*Elanus axillaris*	1	30	80			Diving
BUS16		5/09/2023	1050	BUS		Black-shouldered Kite	*Elanus axillaris*	1	50	300			Soaring
BUS16		5/09/2023	1050	BUS		Brown Falcon	*Falco berigora*	1	20	50			Hovering
BUS16		5/09/2023	1120	BUS		Brown Falcon	*Falco berigora*	1	10	1			Flying/ hunting
BUS16		5/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	5		30			In tree
BUS16		5/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	2	10	60			Hovering in wind
BUS16		5/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	1		50			Flew into bush
BUS16		5/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	2		15			Call heard
BUS16		5/09/2023	1050	BUS		Brown Songlark	*Cincloramphus cruralis*	3		30			Heard calling
BUS16		5/09/2023	1050	BUS		Brown Songlark	*Cincloramphus cruralis*	2	5	10			Flying
BUS16		5/09/2023	1120	BUS		Brown Songlark	*Cincloramphus cruralis*	1	15	50			Flying
BUS16		5/09/2023	1120	BUS		Brown Songlark	*Cincloramphus cruralis*	2	5	70			Flying and perched
BUS16		5/09/2023	900	BUS		UNIDENTIFIED RAPTOR		1	20	500			
BUS16		5/09/2023	930	BUS		UNIDENTIFIED RAPTOR		1	25	150			
BUS19		5/09/2023	830	BUS		Australian Magpie	*Gymnorhina tibicen*	1		1000			Heard calls
BUS19		5/09/2023	1230	BUS		Australian Magpie	*Gymnorhina tibicen*	4	300	300			Flying
BUS19		5/09/2023	800	BUS		Australian Raven	*Corvus coronoides*	1	30	50			Going north
BUS19		5/09/2023	800	BUS		Australian Raven	*Corvus coronoides*	1	15	300			Flying low
BUS19		5/09/2023	830	BUS		Australian Raven	*Corvus coronoides*	1	5	600			
BUS19		5/09/2023	1230	BUS		Australian Raven	*Corvus coronoides*	3	10	50			Flying
BUS19		5/09/2023	1230	BUS		Australian Raven	*Corvus coronoides*	1	20	5			Flying
BUS19		5/09/2023	1400	BUS		Australian Raven	*Corvus coronoides*	3	10	1000			Flying low
BUS19		5/09/2023	1400	BUS		Australian Raven	*Corvus coronoides*	2	20	150			Flying
BUS19		5/09/2023	800	BUS		Black Kite	*Milvus migrans*	2	30	70			Circling
BUS19		5/09/2023	830	BUS		Black Kite	*Milvus migrans*	2	30	500			Circling
BUS19		5/09/2023	800	BUS		Black-shouldered Kite	*Elanus axillaris*	5	30	10			Hovering
BUS19		5/09/2023	830	BUS		Black-shouldered Kite	*Elanus axillaris*	5	15	20			Hovering
BUS19		5/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	2		20			Heard call
BUS19		5/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	4		15			Heard calls
BUS19		5/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	1	15	200			Flying south
BUS19		5/09/2023	1230	BUS		Brown Songlark	*Cincloramphus cruralis*	2		30			Heard Call
BUS19		5/09/2023	1300	BUS		Brown Songlark	*Cincloramphus cruralis*	1		30			Heard song

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS19		5/09/2023	1300	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	30			Flying
BUS19		5/09/2023	1300	BUS		Brown Songlark	*Cincloramphus cruralis*	1	15	70			Hovering
BUS19		5/09/2023	1300	BUS		Brown Songlark	*Cincloramphus cruralis*	1	5	10			Flying
BUS19		5/09/2023	1400	BUS		Brown Songlark	*Cincloramphus cruralis*	3		50			Heard calling
BUS19		5/09/2023	1400	BUS		Brown Songlark	*Cincloramphus cruralis*	1	20	30			Flying
BUS19		5/09/2023	1430	BUS		Brown Songlark	*Cincloramphus cruralis*	1		30			Heard call
BUS19		5/09/2023	1430	BUS		Brown Songlark	*Cincloramphus cruralis*	2	5	40			Flying
BUS19		5/09/2023	1400	BUS		Fairywren spp.	*Malurus spp.*	1		20			Female perched on bush
BUS19		5/09/2023	1430	BUS		Fairywren spp.	*Malurus spp.*	1	2	30			Flying then perched
BUS19		5/09/2023	830	BUS		Fairywren spp.	*Malurus spp.*	1		30			Heard calls
BUS19		5/09/2023	1230	BUS		Fairywren spp.	*Malurus spp.*	5		40			Heard Call
BUS19		5/09/2023	1400	BUS		Pallid Cuckoo	Cacomantis pallidus	1	0	60			Perched in bush
BUS19		5/09/2023	830	BUS		Stubble Quail	*Coturnix pectoralis*	1		300			On bush
BUS19		5/09/2023	800	BUS		UNIDENTIFIED FLOCK		7	40	300			Flying in flock
BUS19		5/09/2023	800	BUS		UNIDENTIFIED FLOCK		20+	50+	2000			Flying high together
BUS19		5/09/2023	800	BUS		UNIDENTIFIED RAPTOR		1	30	200			Flying
BUS19		5/09/2023	1230	BUS		UNIDENTIFIED RAPTOR		1	50	1200			Flying
BUS19		5/09/2023	1400	BUS		Wedge-tailed Eagle	*Aquila audax*	1	60	100			Flying
BUS19		5/09/2023	1400	BUS		Wedge-tailed Eagle	*Aquila audax*	1	100	400			Flying high on thermals
BUS19		5/09/2023	830	BUS		Welcome Swallow	*Hirundo neoxena*	2	10	150			
BUS19		5/09/2023	1430	BUS		White-winged Fairywren	*Malurus leucopterus*	3	1	40			Perched, flying
BUS19		5/09/2023	1400	BUS		Willie Wagtail	*Rhipidura leucophrys*	1	2	30			Flying
BUS19		5/09/2023	1430	BUS		Willie Wagtail	*Rhipidura leucophrys*	1		60			Heard call
BUS19		5/09/2023	1300	BUS		Willie Wagtail	*Rhipidura leucophrys*	1		2			On a bush
BUS08		6/09/2023	830	BUS		Black Kite	*Milvus migrans*	3	100	50		W	Seen and heard above the canopy flying South
BUS08		6/09/2023	1300	BUS		Brown Falcon	*Falco berigora*	1	60	60		N	Seen above the canopy flying South
BUS08		6/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	6	10	30		S	Seen and heard calls from the shrub
BUS08		6/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	6	10	30		NE	Heard calls from the shrub
BUS08		6/09/2023	1200	BUS		Brown Songlark	*Cincloramphus cruralis*	4	1	10		S	Seen from the shrub flying south
BUS08		6/09/2023	1300	BUS		Brown Songlark	*Cincloramphus cruralis*	3	1	20		W	Seen and heard calls from the shrub
BUS08		6/09/2023	1400	BUS		Brown Songlark	*Cincloramphus cruralis*	3	12	10		N	Seen and heard flying South from the shrub
BUS08		6/09/2023	1430	BUS		Brown Songlark	*Cincloramphus cruralis*	2	15	20		NE	Seen and heard above the canopy flying South
BUS08		6/09/2023	800	BUS		Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1	1	50		NE	Heard calls from the shrub
BUS08		6/09/2023	1400	BUS		Superb Fairywren	*Malurus cyaneus*	2	1	30		SW	Seen and heard calls from a female in a shrub
BUS08		6/09/2023	1430	BUS		Superb Fairywren	*Malurus cyaneus*	2	2	10		NE	Seen and heard calls from the shrub
BUS08		6/09/2023	830	BUS		Wedge-tailed Eagle	*Aquila audax*	1	120	500		S	Seen above the canopy soaring
BUS08		6/09/2023	1300	BUS		Wedge-tailed Eagle	*Aquila audax*	1	300	1500		S	Seen above the canopy flying towards the East
BUS08		6/09/2023	1400	BUS		White-fronted Chat	*Epthianura albifrons*	2	15	20		SW	Seen and heard male and female above the canopy flying No
BUS08		6/09/2023	1300	BUS		White-winged Fairywren	*Malurus leucopterus*	1	1	20		N	Heard calls from the shrub
BUS08		6/09/2023	1400	BUS		White-winged Fairywren	*Malurus leucopterus*	2	1	30		SW	Heard calls from the shrub
BUS08		6/09/2023	1430	BUS		White-winged Fairywren	*Malurus leucopterus*	2	1	30		N	Heard calls from the shrub
BUS12		6/09/2023	1530	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1		40			Perched on shrub
BUS12		6/09/2023	1530	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1		10			On a bush
BUS12		6/09/2023	900	BUS		Australian Raven	*Corvus coronoides*	1	30	400		S	Flying South
BUS12		6/09/2023	900	BUS		Australian Raven	*Corvus coronoides*	3	20	400			Flying
BUS12		6/09/2023	930	BUS		Australian Raven	*Corvus coronoides*	1	15	150			Flying
BUS12		6/09/2023	1045	BUS		Australian Raven	*Corvus coronoides*	5	200	50			Flying
BUS12		6/09/2023	1600	BUS		Australian Raven	*Corvus coronoides*	1	40	300			
BUS12		6/09/2023	1600	BUS		Black Kite	*Milvus migrans*	1	100	250			Hovering
BUS12		6/09/2023	1045	BUS		Australian Raven	*Corvus coronoides*	5	200	50			Flying
BUS12		6/09/2023	900	BUS		Black Kite	*Milvus migrans*	1	100	250			Hovering
BUS12		6/09/2023	900	BUS		Black Kite	*Milvus migrans*	1	50	300			Soaring
BUS12		6/09/2023	930	BUS		Black Kite	*Milvus migrans*	1	40	400			Flying/ soaring
BUS12		6/09/2023	900	BUS		Black-Shouldered Kite	*Elanus axillaris*	1	150	500			Hovering/ soaring
BUS12		6/09/2023	900	BUS		Black-Shouldered Kite	*Elanus axillaris*	1	80	30			
BUS12		6/09/2023	900	BUS		Black-Shouldered Kite	*Elanus axillaris*	1	40	500			Flying/ soaring
BUS12		6/09/2023	1530	BUS		Black-shouldered Kite	*Elanus axillaris*	1	5	100			Flying/ hovering
BUS12		6/09/2023	1600	BUS		Black-shouldered Kite	*Elanus axillaris*	1	30	150			
BUS12		6/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	150			
BUS12		6/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	1		30			Heard calling
BUS12		6/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	1		40			Perched on bush
BUS12		6/09/2023	1045	BUS		Brown Songlark	*Cincloramphus cruralis*	1	20	30			Flying
BUS12		6/09/2023	1115	BUS		Brown Songlark	*Cincloramphus cruralis*	1	8	50			Flying / heard calling
BUS12		6/09/2023	1115	BUS		Brown Songlark	*Cincloramphus cruralis*	1		60			Heard calling
BUS12		6/09/2023	1530	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	1			Flying
BUS12		6/09/2023	1600	BUS		Brown Songlark	*Cincloramphus cruralis*	1		30			Heard clalling
BUS12		6/09/2023	1600	BUS		Brown-headed Honeyeater	*Melithreptus brevirostris*	2		25			On a shrub
BUS12		6/09/2023	900	BUS		Emu	*Dromaius novaehollandia*	7		300			Adults. Running away
BUS12		6/09/2023	900	BUS		Emu	*Dromaius novaehollandia*	20		300			Chicks, Running away with adults
BUS12		6/09/2023	1530	BUS		Fairywren spp.	*Malurus spp.*	2		50			Heard calling
BUS12		6/09/2023	1600	BUS		Fairywren spp.	*Malurus spp.*	2		40			Heard calling
BUS12		6/09/2023	930	BUS		Horsfield's Bronze-Cuckoo	*Chalcites basalis*	2	5	5			Flying/ pearched
BUS12		6/09/2023	1600	BUS		Horsfield's Bronze-Cuckoo	*Chalcites basalis*	2	0.5	10			On shrubs
BUS12		6/09/2023	900	BUS		Stubble Quail	*Coturnix pectoralis*	1	0.3	50			Flushed
BUS12		6/09/2023	1530	BUS		Stubble Quail	*Coturnix pectoralis*	2	0.5	1			Flying/ flushed
BUS12		6/09/2023	1045	BUS		Welcome Swallow	*Hirundo neoxena*	3	10	5			Flying and drinking from puddle
BUS12		6/09/2023	1530	BUS		White-fronted Chat	*Epthianura albifrons*	2		20			On a shrub
BUS12		6/09/2023	1600	BUS		White-fronted Chat	*Epthianura albifrons*	1		30			Heard calls
BUS12		6/09/2023	1600	BUS		White-winged Fairywren	*Malurus leucopterus*	5		40			In a shrub. Female
BUS12		6/09/2023	1600	BUS		White-winged Fairywren	*Malurus leucopterus*	1	0.5	40			Perched in shrub. Male
BUS12		6/09/2023	900	BUS		Willie Wagtail	*Rhipidura leucophrys*	1	10	200			Flying
BUS13		6/09/2023	1522	BUS		Australasian Pipit	*Anthus novaeseelandiae*	4	1	75			
BUS13		6/09/2023	930	BUS		Black Kite	*Milvus migrans*	2	150	20			
BUS13		6/09/2023	1042	BUS		Black-shouldered Kite	*Elanus axillaris*	1	40	100			
BUS13		6/09/2023	1522	BUS		Black-shouldered Kite	*Elanus axillaris*	1	45	50			
BUS13		6/09/2023	930	BUS		Brown Falcon	*Falco berigora*	1	150	20			
BUS13		6/09/2023	1140	BUS		Brown Falcon	*Falco berigora*	1	40	100		E	
BUS13		6/09/2023	1522	BUS		Brown Falcon	*Falco berigora*	1	30	30			
BUS13		6/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	1		20			Heard
BUS13		6/09/2023	1042	BUS		Brown Songlark	*Cincloramphus cruralis*	1		50			Heard
BUS13		6/09/2023	1140	BUS		Brown Songlark	*Cincloramphus cruralis*	1	2	75			
BUS13		6/09/2023	1422	BUS		Brown Songlark	*Cincloramphus cruralis*	2		20			Heard
BUS13		6/09/2023	1522	BUS		Brown Songlark	*Cincloramphus cruralis*	2	20	20			
BUS13		6/09/2023	1522	BUS		Galah	*Eolophus roseicapillus*	15	35	50		SW	Flying South-west
BUS13		6/09/2023	1042	BUS		Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1	1	20			Perched on the fence
BUS13		6/09/2023	1140	BUS		Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1		100		E	Heard

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS13		6/09/2023	1422	BUS		Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1		70			Heard
BUS13		6/09/2023	1522	BUS		Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1		100		E	Heard
BUS13		6/09/2023	930	BUS		Letter-winged Kite		1	150	20			
BUS13		6/09/2023	930	BUS		Red-capped Robin	*Petroica goodenovii*	6	0.5	20			
BUS13		6/09/2023	1042	BUS		Red-capped Robin	*Petroica goodenovii*	4	1	30			
BUS13		6/09/2023	1140	BUS		Red-capped Robin	*Petroica goodenovii*	12	1	50			
BUS13		6/09/2023	1422	BUS		Red-capped Robin	*Petroica goodenovii*	4	1	20			
BUS13		6/09/2023	1422	BUS		Red-capped Robin	*Petroica goodenovii*	2	2	20			
BUS13		6/09/2023	1422	BUS		Red-capped Robin	*Petroica goodenovii*	2	3	10			
BUS13		6/09/2023	1522	BUS		Red-capped Robin	*Petroica goodenovii*	2	1	30			
BUS13		6/09/2023	930	BUS		Spotted Harrier	*Circus assimilis*	2	150	20			
BUS13		6/09/2023	1522	BUS		Welcome Swallow	*Hirundo neoxena*	4	17	10			
BUS13		6/09/2023	930	BUS		White-fronted Chat	*Epthianura albifrons*	6	12	30			
BUS13		6/09/2023	1042	BUS		White-fronted Chat	*Epthianura albifrons*	3	1	30			
BUS13		6/09/2023	1042	BUS		White-fronted Chat	*Epthianura albifrons*	5	3	30			
BUS13		6/09/2023	1042	BUS		White-fronted Chat	*Epthianura albifrons*	2	2	70			
BUS13		6/09/2023	1140	BUS		White-fronted Chat	*Epthianura albifrons*	4	1	25			
BUS13		6/09/2023	1422	BUS		White-fronted Chat	*Epthianura albifrons*	2	2	20			
BUS13		6/09/2023	1422	BUS		White-fronted Chat	*Epthianura albifrons*	4	2	20			
BUS13		6/09/2023	1042	BUS		White-winged Fairywren	*Malurus leucopterus*	2	1	30			
BUS13		6/09/2023	1422	BUS		White-winged Fairywren	*Malurus leucopterus*	3	1	40			Perched
BUS13		6/09/2023	1522	BUS		White-winged Fairywren	*Malurus leucopterus*	3	1	20			Heard
BUS14		6/09/2023	1320	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	1	30			Perched in shrub
BUS14		6/09/2023	820	BUS		Australian Raven	*Corvus coronoides*	2	17	50		W	Flying
BUS14		6/09/2023	820	BUS		Australian Raven	*Corvus coronoides*	2	5	800			On the road
BUS14		6/09/2023	850	BUS		Australian Raven	*Corvus coronoides*	1	20	500			
BUS14		6/09/2023	1222	BUS		Australian Raven	*Corvus coronoides*	7	2	75		W	Flying
BUS14		6/09/2023	1320	BUS		Australian Raven	*Corvus coronoides*	1	10	150		SW	Flying
BUS14		6/09/2023	1320	BUS		Australian Raven	*Corvus coronoides*	5	5	200			
BUS14		6/09/2023	850	BUS		Black Kite	*Milvus migrans*	1	100	50			
BUS14		6/09/2023	820	BUS		Brown Songlark	*Cincloramphus cruralis*	3	15	40			
BUS14		6/09/2023	820	BUS		Brown Songlark	*Cincloramphus cruralis*	1	30	30			
BUS14		6/09/2023	850	BUS		Brown Songlark	*Cincloramphus cruralis*	1	15	40			
BUS14		6/09/2023	850	BUS		Brown Songlark	*Cincloramphus cruralis*	1	15	40			
BUS14		6/09/2023	850	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	50			
BUS14		6/09/2023	1222	BUS		Brown Songlark	*Cincloramphus cruralis*	1		20			Heard
BUS14		6/09/2023	1222	BUS		Brown Songlark	*Cincloramphus cruralis*	1	7	75			
BUS14		6/09/2023	1222	BUS		Brown Songlark	*Cincloramphus cruralis*	1	12	100			
BUS14		6/09/2023	1320	BUS		Brown Songlark	*Cincloramphus cruralis*	2	10	40			
BUS14		6/09/2023	1320	BUS		Brown Songlark	*Cincloramphus cruralis*	1	20	50			
BUS14		6/09/2023	1222	BUS		Emu	*Dromaius novaehollandia*	4	0	30			
BUS14		6/09/2023	850	BUS		Fairywren spp.	*Malurus spp.*	1	0	40			Perched
BUS14		6/09/2023	1320	BUS		Fairywren spp.	*Malurus spp.*	2	1	20		W	Heard
BUS14		6/09/2023	820	BUS		White-fronted Chat	*Epthianura albifrons*	2	10	15		N	Flying
BUS14		6/09/2023	1320	BUS		White-fronted Chat	*Epthianura albifrons*	1		50			
BUS15		6/09/2023	1400	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	2	15			Flying into a bush
BUS15		6/09/2023	830	BUS		Black Kite	*Milvus migrans*	3	30	600			Flying/ circling, hovering
BUS15		6/09/2023	830	BUS		Black-shouldered Kite	*Elanus axillaris*	1	20	1000			Flying/ hovering
BUS15		6/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	2	15	100			Flying and calling
BUS15		6/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	1	20	80			Flying and calling
BUS15		6/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	1		30			Heard calling
BUS15		6/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	40			Flying and calling
BUS15		6/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	1	15	10			Flying
BUS15		6/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	4	30	100			Flying and calling
BUS15		6/09/2023	1210	BUS		Brown Songlark	*Cincloramphus cruralis*	3		20			Heard calling
BUS15		6/09/2023	1210	BUS		Brown Songlark	*Cincloramphus cruralis*	1	20	50			Flying
BUS15		6/09/2023	1240	BUS		Brown Songlark	*Cincloramphus cruralis*	4	10	25			Flying
BUS15		6/09/2023	1400	BUS		Brown Songlark	*Cincloramphus cruralis*	2		40			Heard calling
BUS15		6/09/2023	1400	BUS		Brown Songlark	*Cincloramphus cruralis*	3	5	10			
BUS15		6/09/2023	1430	BUS		Brown Songlark	*Cincloramphus cruralis*	2		15			Perched
BUS15		6/09/2023	800	BUS		Fairywren spp.	*Malurus spp.*	3	2	100			Flying between bushes
BUS15		6/09/2023	1210	BUS		Nankeen Kestrel	*Falco cenchroides*	1	80	150			Flying
BUS15		6/09/2023	1400	BUS		Spotted Harrier	*Circus assimilis*	1	5	15			Flying around to flush prey
BUS15		6/09/2023	830	BUS		Stubble Quail	*Coturnix pectoralis*	1	0.5	30			Flying and flushed
BUS15		6/09/2023	830	BUS		Stubble Quail	*Coturnix pectoralis*	3	1	30			Flying away/ flushed
BUS15		6/09/2023	1400	BUS		Stubble Quail	*Coturnix pectoralis*	1	0.5	30			Flushed
BUS15		6/09/2023	1210	BUS		Wedge-tailed Eagle	*Aquila audax*	1	250	100			In thermals, hovering
BUS15		6/09/2023	1400	BUS		White-winged Fairywren	*Malurus leucopterus*	3	0.5	50			
BUS20		6/09/2023	900	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	5	20		S	Seen flying South from the grass
BUS20		6/09/2023	1000	BUS		Australasian Pipit	*Anthus novaeseelandiae*	3	1	30		NW	Heard calls from the grass
BUS20		6/09/2023	1030	BUS		Australasian Pipit	*Anthus novaeseelandiae*	3	1	30		W	Heard calls from the grass
BUS20		6/09/2023	1530	BUS		Australasian Pipit	*Anthus novaeseelandiae*	2	5	80		E	Seen flying to a post from a shrub
BUS20		6/09/2023	1030	BUS		Australian Raven	*Corvus coronoides*	2	10	1500		S	Seen flying within to the tree
BUS20		6/09/2023	930	BUS		Black Kite	*Milvus migrans*	1	80	1000		E	Seen above the canopy flying North
BUS20		6/09/2023	1000	BUS		Black Kite	*Milvus migrans*	2	80	1000		E	Seen above the canopy soaring
BUS20		6/09/2023	900	BUS		Brown Falcon	*Falco berigora*	1	2	150		S	Seen perched on the fence
BUS20		6/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	6	15	20		W	Seen and heard calls from the grass
BUS20		6/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	4	10	40		S	Seen and heard calls from the grass
BUS20		6/09/2023	1000	BUS		Brown Songlark	*Cincloramphus cruralis*	1	15	20		W	Seen and heard calls from the grass
BUS20		6/09/2023	1030	BUS		Brown Songlark	*Cincloramphus cruralis*	4	1	30		W	Seen and heard calls from the grass
BUS20		6/09/2023	1500	BUS		Brown Songlark	*Cincloramphus cruralis*	4	1	30		N	Seen and heard calls from the grass
BUS20		6/09/2023	1530	BUS		Brown Songlark	*Cincloramphus cruralis*	4	7	30		W	Seen and heard calls from the grass
BUS20		6/09/2023	1030	BUS		Nankeen Kestrel	*Falco cenchroides*	1	25	50		SE	Seen above the canopy flying East
BUS20		6/09/2023	1530	BUS		Nankeen Kestrel	*Falco cenchroides*	5	25	400		E	Seen above the canopy hovering
BUS20		6/09/2023	1000	BUS		Stubble Quail	*Coturnix pectoralis*	1	3	5		W	Seen flying north from the grass
BUS20		6/09/2023	1030	BUS		Stubble Quail	*Coturnix pectoralis*	3	2	5		W	Seen and heard flying West from the grass
BUS20		6/09/2023	1500	BUS		Stubble Quail	*Coturnix pectoralis*	1	2	10		W	Seen flying South from the grass
BUS20		6/09/2023	1530	BUS		Superb Fairywren	*Malurus cyaneus*	3	1	40		SW	Heard calls from the shrub
BUS20		6/09/2023	930	BUS		Wedge-tailed Eagle	*Aquila audax*	1	5	2000		SE	Seen flying low and to the South above the canopy
BUS20		6/09/2023	1000	BUS		Wedge-tailed Eagle	*Aquila audax*	1	10	2000		SE	Seen above the canopy flying North
BUS20		6/09/2023	1030	BUS		Wedge-tailed Eagle	*Aquila audax*	1	20	2500		E	Seen above the canopy flying North
BUS20		6/09/2023	1500	BUS		Wedge-tailed Eagle	*Aquila audax*	2	250	1500		S	Seen above the canopy soaring
BUS03		7/09/2023	1440	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	0	30			
BUS03		7/09/2023	1245	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	0	20			

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS03		7/09/2023	1215	BUS		Australian Magpie	*Gymnorhina tibicen*	1	40	200			
BUS03		7/09/2023	1400	BUS		Australian Magpie	*Gymnorhina tibicen*	2	20	1000			
BUS03		7/09/2023	1245	BUS		Australian Magpie	*Gymnorhina tibicen*	1	1	150			
BUS03		7/09/2023	1400	BUS		Australian Raven	*Corvus coronoides*	1	50	1000			
BUS03		7/09/2023	1245	BUS		Black Kite	*Milvus migrans*	1	35	100			
BUS03		7/09/2023	1215	BUS		Black-shouldered Kite	*Elanus axillaris*	2	40	250			
BUS03		7/09/2023	1400	BUS		Brown Falcon	*Falco berigora*	1	1	40			
BUS03		7/09/2023	1400	BUS		Brown Songlark	*Cincloramphus cruralis*	2	1	50			
BUS03		7/09/2023	1440	BUS		Brown Songlark	*Cincloramphus cruralis*	3	1	50			Heard
BUS03		7/09/2023	1245	BUS		Brown Songlark	*Cincloramphus cruralis*	2		50			Heard
BUS03		7/09/2023	1245	BUS		Nankeen Kestrel	*Falco cenchroides*	1	40	20			
BUS03		7/09/2023	1400	BUS		Wedge-tailed Eagle	*Aquila audax*	1	50	1000			
BUS03		7/09/2023	1400	BUS		White-fronted Chat	*Epthianura albifrons*	2	1	25			
BUS03		7/09/2023	1440	BUS		White-fronted Chat	*Epthianura albifrons*	3	1	50			Heard
BUS03		7/09/2023	1245	BUS		White-fronted Chat	*Epthianura albifrons*	1	1	25			
BUS03		7/09/2023	1245	BUS		White-fronted Chat	*Epthianura albifrons*	2	1	30			
BUS03		7/09/2023	1215	BUS		White-winged Fairywren	*Malurus leucopterus*	1	1	20			
BUS03		7/09/2023	1400	BUS		White-winged Fairywren	*Malurus leucopterus*	4	1	40			
BUS03		7/09/2023	1440	BUS		White-winged Fairywren	*Malurus leucopterus*	3	1	50			Heard
BUS03		7/09/2023	1245	BUS		White-winged Fairywren	*Malurus leucopterus*	2					
BUS03		7/09/2023	1440	BUS		Willie Wagtail	*Rhipidura leucophrys*	1		50			Heard
BUS04		7/09/2023	900	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	1	20			
BUS04		7/09/2023	1035	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	0	25			
BUS04		7/09/2023	900	BUS		Australian Magpie	*Gymnorhina tibicen*	1	3	10			
BUS04		7/09/2023	900	BUS		Australian Magpie	*Gymnorhina tibicen*	1	15	50		W	Flying West
BUS04		7/09/2023	900	BUS		Australian Magpie	*Gymnorhina tibicen*	2	5	100		N	Flying North
BUS04		7/09/2023	930	BUS		Australian Magpie	*Gymnorhina tibicen*	1	1	50			
BUS04		7/09/2023	930	BUS		Australian Magpie	*Gymnorhina tibicen*	1	1	150			Perched
BUS04		7/09/2023	900	BUS		Australian Raven	*Corvus coronoides*	3	2	150			
BUS04		7/09/2023	900	BUS		Australian Raven	*Corvus coronoides*	4	10	2000			
BUS04		7/09/2023	930	BUS		Australian Raven	*Corvus coronoides*	1	3	150			
BUS04		7/09/2023	1035	BUS		Australian Raven	*Corvus coronoides*	3	20	100		W	Flying West
BUS04		7/09/2023	1120	BUS		Australian Raven	*Corvus coronoides*	1	20	250			
BUS04		7/09/2023	1120	BUS		Australian Raven	*Corvus coronoides*	1	1	100			
BUS04		7/09/2023	1035	BUS		Black Kite	*Milvus migrans*	1	100	500			
BUS04		7/09/2023	1120	BUS		Black-shouldered Kite	*Elanus axillaris*	1	30	300			
BUS04		7/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	2		100		N	Heard
BUS04		7/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	1		50		W	Heard
BUS04		7/09/2023	1035	BUS		Brown Songlark	*Cincloramphus cruralis*	1	25	25			
BUS04		7/09/2023	1035	BUS		Brown Songlark	*Cincloramphus cruralis*	1	3	30			
BUS04		7/09/2023	1035	BUS		Brown Songlark	*Cincloramphus cruralis*	1	17	20			
BUS04		7/09/2023	900	BUS		Emu	*Dromaius novaehollandia*	2	0	10			
BUS04		7/09/2023	900	BUS		Galah	*Eolophus roseicapillus*	2	15	5		W	Flying West
BUS04		7/09/2023	900	BUS		Galah	*Eolophus roseicapillus*	2	15	50		W	Flying West
BUS04		7/09/2023	900	BUS		Galah	*Eolophus roseicapillus*	5	5	30			
BUS04		7/09/2023	930	BUS		Galah	*Eolophus roseicapillus*	2	1	100			
BUS04		7/09/2023	900	BUS		Horsfield's Bronze-Cuckoo	*Chalcites basalis*	1		200		N	Heard
BUS04		7/09/2023	930	BUS		Nankeen Kestrel		1	50	250			
BUS04		7/09/2023	1035	BUS		Nankeen Kestrel	*Falco cenchroides*	1	20	200			
BUS04		7/09/2023	1120	BUS		Nankeen Kestrel	*Falco cenchroides*	1	25	100			
BUS04		7/09/2023	930	BUS		Stubble Quail	*Coturnix pectoralis*	1	1	30			
BUS04		7/09/2023	1120	BUS		Stubble Quail	*Coturnix pectoralis*	1	1	30			
BUS04		7/09/2023	930	BUS		Wedge-tailed Eagle	*Aquila audax*	2	100	2000			
BUS04		7/09/2023	900	BUS		Welcome Swallow	*Hirundo neoxena*	1	13	20			
BUS04		7/09/2023	930	BUS		White-fronted Chat	*Epthianura albifrons*	1	1	20			
BUS05		7/09/2023	830	BUS		Australian Raven	*Corvus coronoides*	2	12	300		SE	Seen above the canopy flying West
BUS05		7/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	1	1	30		E	Heard calls from the grass
BUS05		7/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	4	5	40		S	Heard calls from the grass
BUS05		7/09/2023	800	BUS		Emu	*Dromaius novaehollandia*	1	0	20		N	Seen running North on the ground
BUS05		7/09/2023	830	BUS		Welcome Swallow	*Hirundo neoxena*	15	12	300		S	Seen above the canopy flying West
BUS06		7/09/2023	800	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	3	15			
BUS06		7/09/2023	800	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	3	50			
BUS06		7/09/2023	830	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	10	25			
BUS06		7/09/2023	830	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	0	30			
BUS06		7/09/2023	800	BUS		Australian Raven	*Corvus coronoides*	1	30	150		N	Flying North
BUS06		7/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	2	30	75			
BUS06		7/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	1	7	20			
BUS06		7/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	2	10	20			
BUS06		7/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	1	0	50			
BUS06		7/09/2023	830	BUS		Nankeen Kestrel	*Falco cenchroides*	2	50	1000			
BUS06		7/09/2023	830	BUS		White-fronted Chat	*Epthianura albifrons*	2	10	50			
BUS06		7/09/2023	830	BUS		White-winged Fairywren	*Malurus leucopterus*	8	1	100			
BUS09		7/09/2023	1130	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	3	20		S	Seen flying North from the grass
BUS09		7/09/2023	1430	BUS		Australasian Pipit	*Anthus novaeseelandiae*	2	2	20		W	Seen flying North from the grass
BUS09		7/09/2023	1400	BUS		Black Kite	*Milvus migrans*	2	35	30		N	Seen above the canopy flying East
BUS09		7/09/2023	1430	BUS		Black-shouldered Kite	*Elanus axillaris*	1	12	40		W	Seen above the canopy flying North
BUS09		7/09/2023	1130	BUS		Brown Songlark	*Cincloramphus cruralis*	1	12	30		NW	Seen and heard above the canopy flying overhead West
BUS09		7/09/2023	1230	BUS		Brown Songlark	*Cincloramphus cruralis*	2	5	30		E	Seen and heard diving back into the grass
BUS09		7/09/2023	1400	BUS		Brown Songlark	*Cincloramphus cruralis*	3	1	30		S	Heard calls from the grass
BUS09		7/09/2023	1430	BUS		Brown Songlark	*Cincloramphus cruralis*	1	1	50		E	Heard calls from in the grass
BUS09		7/09/2023	1130	BUS		Nankeen Kestrel	*Falco cenchroides*	1	15	400		NE	Seen above the canopy flying North
BUS09		7/09/2023	1130	BUS		Stubble Quail	*Coturnix pectoralis*	3	3	5		N	Seen flying North from the grass
BUS09		7/09/2023	1400	BUS		Stubble Quail	*Coturnix pectoralis*	1	3	10		E	Seen flying East from the grass
BUS09		7/09/2023	1400	BUS		Wedge-tailed Eagle	*Aquila audax*	1	20	200		N	Seen above the canopy flying low towards the North
BUS09		7/09/2023	1230	BUS		Welcome Swallow	*Hirundo neoxena*	8	15	50		N	Seen above the canopy as a flock flying North
BUS10		7/09/2023	900	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	0.5	30			Low flying, walking along ground
BUS10		7/09/2023	1105	BUS		Australian Raven	*Corvus coronoides*	4		2000			Flying
BUS10		7/09/2023	1515	BUS		Black Kite	*Milvus migrans*	2	10	30		SW	Seen above the canopy flying North
BUS10		7/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	1		30			Walking along the ground
BUS10		7/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	60			Flying up and then down
BUS10		7/09/2023	1030	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	60			Flying up and then down
BUS10		7/09/2023	1105	BUS		Brown Songlark	*Cincloramphus cruralis*			30			Flying
BUS10		7/09/2023	1515	BUS		Brown Songlark	*Cincloramphus cruralis*	3	8	40		W	Seen and heard flying South-West from the shrub
BUS10		7/09/2023	900	BUS		Fairywren spp.	*Malurus spp.*	2		50			Heard calling

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS10		7/09/2023	1030	BUS		Fairywren spp.	*Malurus spp.*	2		30			Heard calls
BUS10		7/09/2023	900	BUS		Little Black Cormorant		40	250	500			Flying in flock
BUS10		7/09/2023	900	BUS		Stubble Quail	*Coturnix pectoralis*	1	0.5	30			Low flying
BUS10		7/09/2023	1515	BUS		Stubble Quail	*Coturnix pectoralis*	1	0	5		N	Seen on the access track within the grass
BUS10		7/09/2023	1545	BUS		Stubble Quail	*Coturnix pectoralis*	1	2	10		S	Seen flying South from the grass
BUS10		7/09/2023	1515	BUS		Superb Fairywren	*Malurus cyaneus*	2	1	20		N	Heard calls from the shrub
BUS10		7/09/2023	1545	BUS		Superb Fairywren	*Malurus cyaneus*	1	1	30		E	Heard calls from the shrub
BUS10		7/09/2023	1515	BUS		Weebill		3	1	20		W	Heard calls from the shrub
BUS10		7/09/2023	1545	BUS		White-winged Fairywren	*Malurus leucopterus*	3	1	20		S	Seen male and female flying East from the shrub
BUS18		7/09/2023	900	BUS		Australasian Pipit	*Anthus novaeseelandiae*	5	2	10		N	Seen perched on the fence as a group
BUS18		7/09/2023	1030	BUS		Australian Raven	*Corvus coronoides*	1	15	400		S	Seen above the canopy flying East
BUS18		7/09/2023	1000	BUS		Black Kite	*Milvus migrans*	1	40	200		W	Seen above the canopy flying south
BUS18		7/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	3	12	30		S	Seen flying South from the shrub
BUS18		7/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	3	10	20		W	Seen and heard flying West from the shrub
BUS18		7/09/2023	1000	BUS		Brown Songlark	*Cincloramphus cruralis*	3	1	40		S	Heard calls from the shrub
BUS18		7/09/2023	1030	BUS		Brown Songlark	*Cincloramphus cruralis*	2	12	50		N	Heard calls from the shrub
BUS18		7/09/2023	1030	BUS		Nankeen Kestrel	*Falco cenchroides*	1	10	40		SE	Seen above the canopy flying East
BUS18		7/09/2023	900	BUS		Stubble Quail	*Coturnix pectoralis*	3	3	10		W	Seen flying West from the grass
BUS18		7/09/2023	930	BUS		Superb Fairywren	*Malurus cyaneus*	3	1	25		NE	Heard calls from the shrub
BUS18		7/09/2023	1030	BUS		Superb Fairywren	*Malurus cyaneus*	2	1	25		N	Seen and heard females flying East from the shrub
BUS18		7/09/2023	930	BUS		Wedge-tailed Eagle	*Aquila audax*	1	80	400		S	Seen above the canopy soaring
BUS18		7/09/2023	1030	BUS		Wedge-tailed Eagle	*Aquila audax*	1	10	500		NW	Seen above the canopy flying low/ hunting
BUS18		7/09/2023	930	BUS		White-fronted Chat	*Epthianura albifrons*	8	4	20		N	Seen flying west as a group from the shrub
BUS21		7/09/2023	800	BUS		Australian Magpie	*Gymnorhina tibicen*	3	2	1200			Flying
BUS21		7/09/2023	830	BUS		Australian Magpie	*Gymnorhina tibicen*	1	20	1000			Flying
BUS21		7/09/2023	830	BUS		Australian Magpie	*Gymnorhina tibicen*	5	2	800			Flying
BUS21		7/09/2023	830	BUS		Australian Raven	*Corvus coronoides*	2	15	300			Chasing each other
BUS21		7/09/2023	1215	BUS		Australian Raven	*Corvus coronoides*	1	10	250			Flying
BUS21		7/09/2023	830	BUS		Black Kite	*Milvus migrans*	1	20	100			Flying
BUS21		7/09/2023	1520	BUS		Black Kite	*Milvus migrans*	1	50	10			Flying/ soaring
BUS21		7/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	1		130			Heard calling, flying
BUS21		7/09/2023	800	BUS		Brown Songlark	*Cincloramphus cruralis*	2	15	20			Flying
BUS21		7/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	1	8	40			Flying
BUS21		7/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	2		30			Heard calling
BUS21		7/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	1	20	800			Flying up then dropped
BUS21		7/09/2023	1330	BUS		Brown Songlark	*Cincloramphus cruralis*	1		50			Heard Call
BUS21		7/09/2023	1400	BUS		Brown Songlark	*Cincloramphus cruralis*	1		100			Heard Call
BUS21		7/09/2023	1520	BUS		Brown Songlark	*Cincloramphus cruralis*	2		50			Heard call
BUS21		7/09/2023	800	BUS		Fairywren spp.	*Malurus spp.*	2		30			Heard calling
BUS21		7/09/2023	800	BUS		Fairywren spp.	*Malurus spp.*	2	5	40			Flying in around bushes
BUS21		7/09/2023	1330	BUS		Fairywren spp.	*Malurus spp.*	2		30			Heard Call
BUS21		7/09/2023	1400	BUS		Fairywren spp.	*Malurus spp.*	2		50			Heard Call
BUS21		7/09/2023	800	BUS		Galah	*Eolophus roseicapillus*	15	3	1500			Flying low together
BUS21		7/09/2023	1215	BUS		Galah	*Eolophus roseicapillus*	8	15	300			Flying
BUS21		7/09/2023	1520	BUS		Galah	*Eolophus roseicapillus*	10	10	350			Flying in a group
BUS21		7/09/2023	1520	BUS		Nankeen Kestrel	*Falco cenchroides*	1	1.5	130			Flying low along fence
BUS21		7/09/2023	1520	BUS		UNIDENTIFIED RAPTOR		1	4	300			Landed in stick nest
BUS21		7/09/2023	830	BUS		UNKNOWN SPECIES		3	1.5	200			Flying amongst bushes
BUS05		8/09/2023	1050	BUS		Australian Raven	*Corvus coronoides*	2	15	200			
BUS05		8/09/2023	1136	BUS		Australian Raven	*Corvus coronoides*	2	33	200			
BUS05		8/09/2023	1050	BUS		Brown Songlark	*Cincloramphus cruralis*	2	15	20			
BUS05		8/09/2023	1136	BUS		Brown Songlark	*Cincloramphus cruralis*	2		50			Heard
BUS05		8/09/2023	1400	BUS		Brown Songlark	*Cincloramphus cruralis*	1	7	50			
BUS05		8/09/2023	1430	BUS		Brown Songlark	*Cincloramphus cruralis*	1		50			Heard
BUS05		8/09/2023	1430	BUS		Brown Songlark	*Cincloramphus cruralis*	1	15	300			
BUS05		8/09/2023	1136	BUS		Nankeen Kestrel	*Falco cenchroides*	2	25	400			
BUS05		8/09/2023	1430	BUS		Nankeen Kestrel	*Falco cenchroides*	1	30	300			
BUS05		8/09/2023	1430	BUS		Nankeen Kestrel	*Falco cenchroides*	2	25	500			
BUS05		8/09/2023	1050	BUS		Stubble Quail	*Coturnix pectoralis*	2	1	100			
BUS05		8/09/2023	1050	BUS		White-fronted Chat	*Epthianura albifrons*	5	7	10			
BUS05		8/09/2023	1136	BUS		White-fronted Chat	*Epthianura albifrons*	3	1	0			
BUS05		8/09/2023	1400	BUS		White-fronted Chat	*Epthianura albifrons*	2	1	50			
BUS05		8/09/2023	1430	BUS		White-fronted Chat	*Epthianura albifrons*	1	4	75			
BUS09		8/09/2023	830	BUS		Australian Raven	*Corvus coronoides*	4	12	200			Flying
BUS09		8/09/2023	830	BUS		Australian Raven	*Corvus coronoides*	1	3	150			
BUS09		8/09/2023	900	BUS		Australian Raven	*Corvus coronoides*	1	40	30		E	Flying East
BUS09		8/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	2	30	30			
BUS09		8/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	1		30			Heard
BUS09		8/09/2023	830	BUS		Brown Songlark	*Cincloramphus cruralis*	1	25	25			
BUS09		8/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	2	20	50			
BUS09		8/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	1	50	50			
BUS09		8/09/2023	900	BUS		Nankeen Kestrel	*Falco cenchroides*	1	2	250			
BUS09		8/09/2023	900	BUS		White-fronted Chat	*Epthianura albifrons*	2	1	50			
BUS09		8/09/2023	830	BUS		White-winged Fairywren	*Malurus leucopterus*	5	1	50			
BUS09		8/09/2023	900	BUS		White-winged Fairywren	*Malurus leucopterus*	3	1	50			
BUS09		8/09/2023	900	BUS		Willie Wagtail	*Rhipidura leucophrys*	1		30			Heard
BUS11		8/09/2023	1430	BUS		Australasian Pipit	*Anthus novaeseelandiae*	1	15	20		SW	Seen and head above the canopy flying North into the shrubs
BUS11		8/09/2023	1400	BUS		Australian Magpie	*Gymnorhina tibicen*	1	5	300		NW	Seen above the canopy flying East
BUS11		8/09/2023	900	BUS		Black Kite	*Milvus migrans*	1	12	30		S	Seen above the canopy flying West
BUS11		8/09/2023	1000	BUS		Black Kite	*Milvus migrans*	1	20	50		E	Seen above the canopy flying North
BUS11		8/09/2023	1400	BUS		Black Kite	*Milvus migrans*	2	15	40		E	Seen above the canopy flying low towards the North
BUS11		8/09/2023	1430	BUS		Black Kite	*Milvus migrans*	1	7	400		N	Seen above the canopy flying East with prey
BUS11		8/09/2023	1400	BUS		Brown Falcon	*Falco berigora*	3	20	100		W	Seen above the canopy flying North/ hunting
BUS11		8/09/2023	1430	BUS		Brown Falcon	*Falco berigora*	2	40	300		W	Seen above the canopy hunting, flying South, and fighting ea
BUS11		8/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	2	8	30		N	Seen gliding into the shrub
BUS11		8/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	1	8	30		N	Seen gliding into the shrub
BUS11		8/09/2023	1000	BUS		Brown Songlark	*Cincloramphus cruralis*	1	1	25		N	Heard calls from the shrub
BUS11		8/09/2023	1130	BUS		Brown Songlark	*Cincloramphus cruralis*	1	2	25		W	Seen and heard making calls as it flew into the shrub
BUS11		8/09/2023	1400	BUS		Brown Songlark	*Cincloramphus cruralis*	1	1	30		E	Heard calls from the shrub
BUS11		8/09/2023	1430	BUS		Brown Songlark	*Cincloramphus cruralis*	2	1	40		E	Heard calls from the shrub
BUS11		8/09/2023	1130	BUS		Nankeen Kestrel	*Falco cenchroides*	1	8	1000		W	Seen diving into the grass
BUS11		8/09/2023	1430	BUS		Superb Fairywren	*Malurus cyaneus*	2	1	50		N	Heard calls from the shrub
BUS11		8/09/2023	930	BUS		White-fronted Chat	*Epthianura albifrons*	2	4	20		N	Seen flying West from the shrub
BUS11		8/09/2023	1000	BUS		White-fronted Chat	*Epthianura albifrons*	1	2	10		E	Seen and heard flying between shrubs

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS11		8/09/2023	1130	BUS		White-fronted Chat	*Epthianura albifrons*	2	6	30		W	Seen above the canopy flying North into the shrub
BUS11		8/09/2023	1400	BUS		White-fronted Chat	*Epthianura albifrons*	2	3	30		N	Seen flying North from the shrub
BUS17		8/09/2023	930	BUS		Australian Raven	*Corvus coronoides*	1	15	50			Flying
BUS17		8/09/2023	930	BUS		Black Kite	*Milvus migrans*	1	20	150			Flying to and from ground
BUS17		8/09/2023	930	BUS		Brown Falcon	*Falco berigora*	1	70	70			Flying/ hovering
BUS17		8/09/2023	1400	BUS		Brown Falcon	*Falco berigora*	1	60	200			Flying/ hovering
BUS17		8/09/2023	1400	BUS		Brown Falcon	*Falco berigora*	1	60	500			Flying/ hovering
BUS17		8/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	1		20			Heard calling
BUS17		8/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	20			Flying up and down
BUS17		8/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	2	10	50			Flying up and down
BUS17		8/09/2023	900	BUS		Brown Songlark	*Cincloramphus cruralis*	1	20	150			Flying up and down
BUS17		8/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	1	20	300			Flying up and down
BUS17		8/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	1		30			Heard calling
BUS17		8/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	30			Flying up and down
BUS17		8/09/2023	930	BUS		Brown Songlark	*Cincloramphus cruralis*	1		20			Heard calling
BUS17		8/09/2023	1115	BUS		Brown Songlark	*Cincloramphus cruralis*	1	20	30			Flying up and down
BUS17		8/09/2023	1115	BUS		Brown Songlark	*Cincloramphus cruralis*	1	15	60			Flying up and down
BUS17		8/09/2023	1115	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	5			Flying up and down
BUS17		8/09/2023	1145	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	20			Flew to bush
BUS17		8/09/2023	1400	BUS		Brown Songlark	*Cincloramphus cruralis*	1	20	30			Heard calling, flying up then down
BUS17		8/09/2023	1400	BUS		Nankeen Kestrel	*Falco cenchroides*	1	50	800			Flying/ hovering
BUS17		8/09/2023	930	BUS		Swamp Harrier	*Circus approximans*	1	15	300			Flying down to ground
BUS17		8/09/2023	1400	BUS		UNIDENTIFIED RAPTOR		1	70	700			Flying/ hovering
BUS18		8/09/2023	1500	BUS		Australian Raven	*Corvus coronoides*	2	2	50		W	Seen perched within the shrub
BUS18		8/09/2023	1530	BUS		Australian Raven	*Corvus coronoides*	1	2	30		E	Seen perched within the shrub
BUS18		8/09/2023	1530	BUS		Brown Songlark	*Cincloramphus cruralis*	1	10	30		E	Seen above the canopy gliding into the shrub
BUS18		8/09/2023	1500	BUS		Nankeen Kestrel	*Falco cenchroides*	2	8	50		S	Seen above the canopy flying East
BUS18		8/09/2023	1530	BUS		Nankeen Kestrel	*Falco cenchroides*	2	8	80		E	Seen above the canopy flying South
BUS18		8/09/2023	1530	BUS		Superb Fairywren	*Malurus cyaneus*	1	1	50		W	Heard calls (faintly) from the shrubs
BUS02		9/10/2023	07:45am	BUS	patchy cloud, light wind	Australasian Pipit	*Anthus novaeseelandiae*	5	4	30			
BUS02		9/10/2023	07:45am	BUS	patchy cloud, light wind	Australian Magpie	*Gymnorhina tibicen*	1	10	60		heard only	
BUS02		9/10/2023	07:45am	BUS	patchy cloud, light wind	Australian Raven	*Corvus coronoides*	1	30	40		flying north-east	
BUS02		9/10/2023	07:45am	BUS	patchy cloud, light wind	Black-shouldered Kite	*Elanus axillaris*	1	2	10		perched	
BUS02		9/10/2023	08:16am	BUS	patchy cloud, light wind	Black-shouldered Kite	*Elanus axillaris*	1	2	25		perched	
BUS02		9/10/2023	08:16am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	10	8	10			
BUS02		9/10/2023	07:45am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	10	6	15			
BUS02		9/10/2023	08:16am	BUS	patchy cloud, light wind	Pink Cockatoo	*Lophochroa leadbeateri*	1	15	20		flying south - calling	
BUS02		9/10/2023	08:16am	BUS	patchy cloud, light wind	Stubble Quail	*Coturnix pectoralis*	4	0	10			
BUS02		9/10/2023	07:45am	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	6	2	5			
BUS02		9/10/2023	08:16am	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	6	2	5			
BUS03		9/10/2023	12:08pm	BUS	patchy cloud, light wind	Australasian Pipit	*Anthus novaeseelandiae*	4	6	10			
BUS03		9/10/2023	04:35pm	BUS	patchy cloud, light wind	Australian Raven	*Corvus coronoides*	5	20	200		flying south	
BUS03		9/10/2023	04:35pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	6	8	20			
BUS03		9/10/2023	03:55pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	4	6	20			
BUS03		9/10/2023	12:08pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	8	6	40			
BUS03		9/10/2023	12:38pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	7	5	5			
BUS03		9/10/2023	09:10am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	4	4	8			
BUS03		9/10/2023	03:55pm	BUS	patchy cloud, light wind	Galah	*Eolophus roseicapillus*	2	20	100		flying north	
BUS03		9/10/2023	03:55pm	BUS	patchy cloud, light wind	Nankeen Kestrel	*Falco cenchroides*	1	100	30		flying south-east	
BUS03		9/10/2023	04:35pm	BUS	patchy cloud, light wind	Stubble Quail	*Coturnix pectoralis*	6	0	5		calling	
BUS03		9/10/2023	03:55pm	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	1	15	20		flying west	
BUS03		9/10/2023	04:35pm	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	4	4	40		flying west	
BUS03		9/10/2023	09:10am	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	4	4	20			
BUS03		9/10/2023	03:55pm	BUS	patchy cloud, light wind	White-necked Heron	*Ardea pacifica*	1	40	50		flying north-east	
BUS03		9/10/2023	09:10am	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	7	3	5			
BUS03		9/10/2023	03:55pm	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	6	2	15			
BUS03		9/10/2023	04:35pm	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	4	2	10			
BUS03		9/10/2023	12:08pm	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	6	1	4			
BUS03		9/10/2023	12:38pm	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	8	1	5			
BUS07		9/10/2023	10:15am	BUS	patchy cloud, light wind	Australian Magpie	*Gymnorhina tibicen*	1	20	10		heard only	
BUS07		9/10/2023	02:37pm	BUS	patchy cloud, light wind	Australian Raven	*Corvus coronoides*	2	40	300		flying north	
BUS07		9/10/2023	10:45am	BUS	patchy cloud, light wind	Australian Raven	*Corvus coronoides*	2	30	150		flying north	
BUS07		9/10/2023	10:15am	BUS	patchy cloud, light wind	Australian Raven	*Corvus coronoides*	2	15	40		flying east	
BUS07		9/10/2023	10:15am	BUS	patchy cloud, light wind	Black Kite	*Milvus migrans*	1	50	0		circling/hunting - flew north	
BUS07		9/10/2023	10:15am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	6	8	10			
BUS07		9/10/2023	02:37pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	4	6	6			
BUS07		9/10/2023	03:02pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	3	4	10			
BUS07		9/10/2023	10:45am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	8	4	10			
BUS07		9/10/2023	02:37pm	BUS	patchy cloud, light wind	Galah	*Eolophus roseicapillus*	2	80	40		flying east	
BUS07		9/10/2023	02:37pm	BUS	patchy cloud, light wind	Galah	*Eolophus roseicapillus*	3	60	200		flying east	
BUS07		9/10/2023	10:15am	BUS	patchy cloud, light wind	Galah	*Eolophus roseicapillus*	8	20	100		flying east and landed - foraging	
BUS07		9/10/2023	02:37pm	BUS	patchy cloud, light wind	Galah	*Eolophus roseicapillus*	2	5	10		flying east	
BUS07		9/10/2023	10:45am	BUS	patchy cloud, light wind	Grey Butcherbird	*Cracticus torquatus*	1	10	500		perched	
BUS07		9/10/2023	02:37pm	BUS	patchy cloud, light wind	Magpie-lark	*Grallina cyanoleuca*	1	10	50		flying north	
BUS07		9/10/2023	02:37pm	BUS	patchy cloud, light wind	Nankeen Kestrel	*Falco cenchroides*	1	200	60		flying north	
BUS07		9/10/2023	10:45am	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	2	8	10		flying south	
BUS07		9/10/2023	10:15am	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	1	3	10		flying north	
BUS07		9/10/2023	02:37pm	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	2	2	20		flying south	
BUS07		9/10/2023	03:02pm	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	2	2	20		flying east	
BUS07		9/10/2023	10:45am	BUS	patchy cloud, light wind	White-necked Heron	*Ardea pacifica*	1	150	20		flying north	
BUS07		9/10/2023	03:02pm	BUS	patchy cloud, light wind	White-necked Heron	*Ardea pacifica*	1	40	100		flying north-west	
BUS07		9/10/2023	02:37pm	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	4	2	10			
BUS07		9/10/2023	10:15am	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	4	2	15			
BUS07		9/10/2023	10:45am	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	6	2	10			
BUS13		9/10/2023	03:52pm	BUS	patchy cloud, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1	2	25			
BUS13		9/10/2023	03:22pm	BUS	patchy cloud, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1	1	50			
BUS13		9/10/2023	11:37am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	5	30	20			
BUS13		9/10/2023	03:22pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	4	20	20			
BUS13		9/10/2023	03:52pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	5	20	50			
BUS13		9/10/2023	11:07am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	6	17	10			
BUS13		9/10/2023	09:04am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	6	15	50			
BUS13		9/10/2023	09:34am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	7	15	75			
BUS13		9/10/2023	09:04am	BUS	patchy cloud, light wind	Cockatiel	*Nymphicus hollandicus*	4		50		heard only	
BUS13		9/10/2023	11:37am	BUS	patchy cloud, light wind	Nankeen Kestrel	*Falco cenchroides*	1	40	40			

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS13		9/10/2023	11:07am	BUS	patchy cloud, light wind	Nankeen Kestrel	*Falco cenchroides*	1	20	100		flying east and hovering	
BUS13		9/10/2023	09:34am	BUS	patchy cloud, light wind	Wedge-tailed Eagle	*Aquila audax*	1	75	2000			
BUS13		9/10/2023	03:22pm	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	5	1	25		flying between shrubs	
BUS13		9/10/2023	03:52pm	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	3	1	15			
BUS13		9/10/2023	09:04am	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	3		60		heard only	
BUS13		9/10/2023	11:07am	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	2		100		heard only	
BUS13		9/10/2023	11:37am	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	2		100		heard only	
BUS13		9/10/2023	11:07am	BUS	patchy cloud, light wind	White-necked Heron	*Ardea pacifica*	1	30	300		circled and landed	
BUS13		9/10/2023	03:22pm	BUS	patchy cloud, light wind	White-necked Heron	*Ardea pacifica*	1	2	100			
BUS13		9/10/2023	03:52pm	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	4	1	30			
BUS13		9/10/2023	09:04am	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	5	1	30			
BUS13		9/10/2023	09:34am	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	4	1	60			
BUS13		9/10/2023	11:07am	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	6	1	40			
BUS13		9/10/2023	11:37am	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	3	1	50			
BUS13		9/10/2023	03:22pm	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	2		50		heard only	
BUS14		9/10/2023	02:08pm	BUS	patchy cloud, light wind	Australasian Pipit	*Anthus novaeseelandiae*	2	4	50		flew off track	
BUS14		9/10/2023	12:28pm	BUS	patchy cloud, light wind	Australasian Pipit	*Anthus novaeseelandiae*	2	2	200		flew over dam	
BUS14		9/10/2023	08:13am	BUS	patchy cloud, light wind	Australasian Pipit	*Anthus novaeseelandiae*	2		10		heard only	
BUS14		9/10/2023	08:13am	BUS	patchy cloud, light wind	Black Kite	*Milvus migrans*	1	30	1000		flying over treeline	
BUS14		9/10/2023	02:38pm	BUS	patchy cloud, light wind	Black Kite	*Milvus migrans*	1	3	250		flying along ground	
BUS14		9/10/2023	07:43am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	4	20	20			
BUS14		9/10/2023	12:58pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	3	18	25			
BUS14		9/10/2023	02:08pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	5	17	50			
BUS14		9/10/2023	02:38pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	4	15	15			
BUS14		9/10/2023	08:13am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	10	10	50			
BUS14		9/10/2023	12:28pm	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	3	10	50			
BUS14		9/10/2023	07:43am	BUS	patchy cloud, light wind	Brown Songlark	*Cincloramphus cruralis*	6		100		heard only	
BUS14		9/10/2023	02:38pm	BUS	patchy cloud, light wind	Galah	*Eolophus roseicapillus*	4	10	15		flew overhead - flying south	
BUS14		9/10/2023	08:13am	BUS	patchy cloud, light wind	Grey Butcherbird	*Cracticus torquatus*	1	1	40			
BUS14		9/10/2023	07:43am	BUS	patchy cloud, light wind	Grey Butcherbird	*Cracticus torquatus*	1		200		heard only	
BUS14		9/10/2023	08:13am	BUS	patchy cloud, light wind	Pied Butcherbird	*Cracticus nigrogularis*	1	1	50		perched on fallen branch	
BUS14		9/10/2023	07:43am	BUS	patchy cloud, light wind	Stubble Quail	*Coturnix pectoralis*	1	1	20		on ground and flew off	
BUS14		9/10/2023	02:38pm	BUS	patchy cloud, light wind	Wedge-tailed Eagle	*Aquila audax*	1	150	1000			
BUS14		9/10/2023	02:08pm	BUS	patchy cloud, light wind	Wedge-tailed Eagle	*Aquila audax*	1	50	1000		circling - north	
BUS14		9/10/2023	02:38pm	BUS	patchy cloud, light wind	Welcome Swallow	*Hirundo neoxena*	2	30	20		flying north	
BUS14		9/10/2023	12:58pm	BUS	patchy cloud, light wind	Welcome Swallow	*Hirundo neoxena*	1	5	10		flew overhead to dam	
BUS14		9/10/2023	02:08pm	BUS	patchy cloud, light wind	Welcome Swallow	*Hirundo neoxena*	3	3	0		flew overhead to dam	
BUS14		9/10/2023	12:28pm	BUS	patchy cloud, light wind	Welcome Swallow	*Hirundo neoxena*	2	1	200		flew over dam	
BUS14		9/10/2023	08:13am	BUS	patchy cloud, light wind	White-fronted Chat	*Epthianura albifrons*	3	5	25			
BUS14		9/10/2023	08:13am	BUS	patchy cloud, light wind	White-necked Heron	*Ardea pacifica*	1	20	20			
BUS14		9/10/2023	08:13am	BUS	patchy cloud, light wind	White-necked Heron	*Ardea pacifica*	18	15	0		flew overhead - flying south	
BUS14		9/10/2023	12:58pm	BUS	patchy cloud, light wind	White-necked Heron	*Ardea pacifica*	1	0	300		on dam	
BUS14		9/10/2023	08:13am	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	6	1	10		flying between shrubs	
BUS14		9/10/2023	12:28pm	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	2	1	100			
BUS14		9/10/2023	12:58pm	BUS	patchy cloud, light wind	White-winged Fairywren	*Malurus leucopterus*	1	1	25			
BUS01		10/10/2023	09:30am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1	5	10			
BUS01		10/10/2023	09:30am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	20	30		flying north-west	
BUS01		10/10/2023	09:00am	BUS	clear, light wind	Black Kite	*Milvus migrans*	1	50	200			
BUS01		10/10/2023	01:30pm	BUS	clear, light wind	Brown Falcon	*Falco berigora*	1	80	1000			
BUS01		10/10/2023	09:00am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	10	15	20			
BUS01		10/10/2023	03:00pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	2	10	20			
BUS01		10/10/2023	03:30pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	5	10	50			
BUS01		10/10/2023	09:00am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	6	40	200		flying west	
BUS01		10/10/2023	09:30am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	1				heard only	
BUS01		10/10/2023	03:30pm	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	50	1000			
BUS01		10/10/2023	09:30am	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	50	20			
BUS01		10/10/2023	09:00am	BUS	clear, light wind	Stubble Quail	*Coturnix pectoralis*	1	2	10			
BUS01		10/10/2023	01:00pm	BUS	clear, light wind	Stubble Quail	*Coturnix pectoralis*	2	1	50			
BUS01		10/10/2023	09:00am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	3				heard only	
BUS01		10/10/2023	01:30pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	2	5	10			
BUS02		10/10/2023	02:30pm	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	5				heard only	
BUS02		10/10/2023	02:00pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	2				heard only	
BUS02		10/10/2023	02:00pm	BUS	clear, light wind	Stubble Quail	*Coturnix pectoralis*	2	1	1			
BUS02		10/10/2023	02:00pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	5				heard only	
BUS02		10/10/2023	02:30pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	3				heard only	
BUS10		10/10/2023	01:08pm	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1	2	50			
BUS10		10/10/2023	02:39pm	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1	1	200			
BUS10		10/10/2023	12:37pm	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	3	1	25		flying between shrubs	
BUS10		10/10/2023	01:08pm	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	2		150		heard only	
BUS10		10/10/2023	01:08pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	4	17	75			
BUS10		10/10/2023	02:08pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	8	15	200			
BUS10		10/10/2023	02:39pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	5	12	150			
BUS10		10/10/2023	12:37pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	7	10	100			
BUS10		10/10/2023	12:37pm	BUS	clear, light wind	Emu	*Dromaius novaehollandia*	8	0	50		ran west	
BUS10		10/10/2023	01:08pm	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	80	300		circling	
BUS10		10/10/2023	02:08pm	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	30	2000		hovering	
BUS10		10/10/2023	02:39pm	BUS	clear, light wind	Stubble Quail	*Coturnix pectoralis*	1	1	50			
BUS10		10/10/2023	01:08pm	BUS	clear, light wind	Wedge-tailed Eagle	*Aquila audax*	1	150	3000			
BUS16		10/10/2023	10:01am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	4	4	10			
BUS16		10/10/2023	03:45pm	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1	3	20		flying west	
BUS16		10/10/2023	10:31am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	4	3	6			
BUS16		10/10/2023	10:31am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	40	50		flying east	
BUS16		10/10/2023	03:13pm	BUS	clear, light wind	Black-shouldered Kite	*Elanus axillaris*	1	20	60		hunting - flying south	
BUS16		10/10/2023	03:13pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	2	40	10			
BUS16		10/10/2023	10:31am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	8	5	5			
BUS16		10/10/2023	10:01am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	4	4	30			
BUS16		10/10/2023	03:45pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	1	2	20		perched	
BUS16		10/10/2023	10:01am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	100	30	400		flying south and landed to forage	
BUS16		10/10/2023	03:45pm	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	2	20	30		flying north	
BUS16		10/10/2023	03:13pm	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	12	50		hunting - flying west	
BUS16		10/10/2023	10:31am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	6	4	8			
BUS16		10/10/2023	10:01am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	4	3	5			
BUS19		10/10/2023	09:00am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	6	6	10			
BUS19		10/10/2023	02:32pm	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1	4	15			

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS19		10/10/2023	08:30am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1	2	30		flying east	
BUS19		10/10/2023	02:05pm	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	4	60	200		flying west	
BUS19		10/10/2023	09:00am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	4	25	150			
BUS19		10/10/2023	02:32pm	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	6	500		perched	
BUS19		10/10/2023	08:30am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	4	200		flying east	
BUS19		10/10/2023	08:30am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	1	30	50			
BUS19		10/10/2023	02:05pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	1	15	30			
BUS19		10/10/2023	02:05pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	6	10	10			
BUS19		10/10/2023	08:30am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	6	8	10			
BUS19		10/10/2023	02:32pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	4	7	6			
BUS19		10/10/2023	09:00am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	8	6	10			
BUS19		10/10/2023	12:55pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	4	6	10			
BUS19		10/10/2023	01:30pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	4	4	15			
BUS19		10/10/2023	02:05pm	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	8	80	300		flying north-west	
BUS19		10/10/2023	08:30am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	4	30	500		flying south	
BUS19		10/10/2023	02:32pm	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	2	20	0		flying north	
BUS19		10/10/2023	08:30am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	25	20	100		flying east	
BUS19		10/10/2023	02:32pm	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	8	15	0		flying north	
BUS19		10/10/2023	08:30am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	30	10	800		flying west	
BUS19		10/10/2023	02:05pm	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	30	50		hunting - flying east	
BUS19		10/10/2023	01:30pm	BUS	clear, light wind	Stubble Quail	*Coturnix pectoralis*	2	0	10		calling	
BUS19		10/10/2023	02:05pm	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	2	6	5			
BUS19		10/10/2023	08:30am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	2	6	20		flying north	
BUS19		10/10/2023	12:55pm	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	2	5	20			
BUS19		10/10/2023	01:30pm	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	2	2	80			
BUS19		10/10/2023	02:05pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	5	3	8			
BUS19		10/10/2023	09:00am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	10	3	15			
BUS19		10/10/2023	12:55pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	4	3	15			
BUS19		10/10/2023	01:30pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	3	2	10			
BUS19		10/10/2023	02:32pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	6	2	10			
BUS19		10/10/2023	08:30am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	6	2	10			
BUS21		10/10/2023	03:30pm	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	3	2	200			
BUS21		10/10/2023	11:46am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	2	1	75			
BUS21		10/10/2023	08:43am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	3	0	50			
BUS21		10/10/2023	09:30am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	3	0	100			
BUS21		10/10/2023	11:15am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	2	0	20			
BUS21		10/10/2023	09:30am	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	1	1	200		perched on fence	
BUS21		10/10/2023	08:43am	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	1		500		heard only	
BUS21		10/10/2023	11:15am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	3	100	100		flying south-east	
BUS21		10/10/2023	11:46am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	1	50	500		flying north	
BUS21		10/10/2023	11:15am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	1	10	500		landed on windmill above nest	
BUS21		10/10/2023	08:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	5	500		landed and perched on fence	
BUS21		10/10/2023	11:46am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	1	5	600		at nest	
BUS21		10/10/2023	08:43am	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	1	50	150		flying east	
BUS21		10/10/2023	09:30am	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	1	15	350			
BUS21		10/10/2023	08:43am	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	2	7	200		flying west	
BUS21		10/10/2023	08:43am	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	13	5	200		on ground and flew off	
BUS21		10/10/2023	11:46am	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	4	2	150			
BUS21		10/10/2023	11:15am	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	10	1	100			
BUS21		10/10/2023	03:30pm	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	4	0	50			
BUS21		10/10/2023	08:43am	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	13	5	200		on ground and flew off	
BUS21		10/10/2023	11:46am	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	4	2	150			
BUS21		10/10/2023	11:15am	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	10	1	100			
BUS21		10/10/2023	03:30pm	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	4	0	50			
BUS21		10/10/2023	04:01pm	BUS	clear, light wind	Banded Lapwing	*Vanellus tricolor*	2	0	50			
BUS21		10/10/2023	04:01pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	2	50	120			
BUS21		10/10/2023	08:43am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	8	20	100			
BUS21		10/10/2023	09:30am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	10	17	100			
BUS21		10/10/2023	11:15am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	7	15	50			
BUS21		10/10/2023	03:30pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	4	12	50			
BUS21		10/10/2023	11:46am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	5	12	50			
BUS21		10/10/2023	03:30pm	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	25	2000		hovering	
BUS21		10/10/2023	08:43am	BUS	clear, light wind	Stubble Quail	*Coturnix pectoralis*	1	1	100		on ground and flew off	
BUS21		10/10/2023	09:30am	BUS	clear, light wind	Stubble Quail	*Coturnix pectoralis*	2	1	200			
BUS21		10/10/2023	11:46am	BUS	clear, light wind	Wedge-tailed Eagle	*Aquila audax*	1	150	3000		circling	
BUS21		10/10/2023	09:30am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	3	2	50			
BUS21		10/10/2023	03:30pm	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	2	1	200		perched in shrub	
BUS21		10/10/2023	08:43am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	2	1	50		flying between shrubs	
BUS21		10/10/2023	03:30pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	2	1	30			
BUS21		10/10/2023	04:01pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	3	1	25			
BUS21		10/10/2023	09:30am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	3	1	200			
BUS21		10/10/2023	11:15am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	3	1	50			
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1	3	6			
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	4	2	5			
BUS04		11/10/2023	03:00pm	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	1	20	200			
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	2	12	50		flying south	
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	1	10	250		calling	
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	30	300		flying north	
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	10	100		flying north	
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	4	10	100		flying north	
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	1	6	50		flying east	
BUS04		11/10/2023	03:00pm	BUS	clear, light wind	Black Kite	*Milvus migrans*	1	60	60			
BUS04		11/10/2023	03:30pm	BUS	clear, light wind	Black-shouldered Kite	*Elanus axillaris*	1	20	200			
BUS04		11/10/2023	03:30pm	BUS	clear, light wind	Bluebonnet	*Northiella haematogaster*	5	15	100			
BUS04		11/10/2023	03:00pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	2	30	150			
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	6	20	5			
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	8	5	10			
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Common Starling	*Sturnus vulgaris*	6	6	100		landing to forage	
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Crested Pigeon	*Ocyphaps lophotes*	2	5	8		flying north	
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	20	20	200		flying north-west	
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	5	20	15		flying east	
BUS04		11/10/2023	03:30pm	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	60	15	20			
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	4	10	40		flying east	
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	4	8	30		flying east	
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	4	8	10		flying east	
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	6	6	500		flying west	
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	25	6	10		flying north - foraging	
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	22	5	200		flying west	

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	9	5	100		flying east	
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	24	3	300		flying east	
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Great Cormorant	*Phalacrocorax carbo*	12	100	20		flock flying south	
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Great Cormorant	*Phalacrocorax carbo*	1	25	300		flying north-east	
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	50	200		hovering	
BUS04		11/10/2023	03:00pm	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	30	30			
BUS04		11/10/2023	07:12am	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	2	30	200		flying north	
BUS04		11/10/2023	07:42am	BUS	clear, light wind	Stubble Quail	*Coturnix pectoralis*	6	0	20			
BUS04		11/10/2023	03:00pm	BUS	clear, light wind	Wedge-tailed Eagle	*Aquila audax*	1	20	500			
BUS04		11/10/2023	07:42am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	6	2	5			
BUS05		11/10/2023	09:05am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	2	1	20			
BUS05		11/10/2023	02:47pm	BUS	clear, still	Australasian Pipit	*Anthus novaeseelandiae*	2	0	10		calling	
BUS05		11/10/2023	03:20pm	BUS	clear, still	Australasian Pipit	*Anthus novaeseelandiae*	1	0	20			
BUS05		11/10/2023	02:47pm	BUS	clear, still	Australian Magpie	*Gymnorhina tibicen*	1	12	100		flying north	
BUS05		11/10/2023	08:32am	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	2	6	40			
BUS05		11/10/2023	11:35am	BUS	clear, still	Australian Raven	*Corvus coronoides*	1	20	100		flying south	
BUS05		11/10/2023	09:05am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	12	30		flying south-east	
BUS05		11/10/2023	03:20pm	BUS	clear, still	Australian Raven	*Corvus coronoides*	2	10	100		flying north	
BUS05		11/10/2023	03:20pm	BUS	clear, still	Brown Falcon	*Falco berigora*	1	10	500		flying west	
BUS05		11/10/2023	08:32am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	4	10	5			
BUS05		11/10/2023	09:05am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	4	10	20			
BUS05		11/10/2023	03:20pm	BUS	clear, still	Brown Songlark	*Cincloramphus cruralis*	4	8	50			
BUS05		11/10/2023	12:05pm	BUS	clear, still	Brown Songlark	*Cincloramphus cruralis*	3	8	15			
BUS05		11/10/2023	02:47pm	BUS	clear, still	Brown Songlark	*Cincloramphus cruralis*	4	6	30			
BUS05		11/10/2023	11:35am	BUS	clear, still	Brown Songlark	*Cincloramphus cruralis*	2	6	20			
BUS05		11/10/2023	03:20pm	BUS	clear, still	Galah	*Eolophus roseicapillus*	12	6	60		flying north	
BUS05		11/10/2023	08:32am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	40	6	800		foraging	
BUS05		11/10/2023	09:05am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	27	5	200		flying south - foraging	
BUS05		11/10/2023	02:47pm	BUS	clear, still	Wedge-tailed Eagle	*Aquila audax*	1	40	2500		flying south	
BUS05		11/10/2023	02:47pm	BUS	clear, still	White-winged Fairywren	*Malurus leucopterus*	4	2	30			
BUS05		11/10/2023	03:20pm	BUS	clear, still	White-winged Fairywren	*Malurus leucopterus*	6	2	40			
BUS05		11/10/2023	09:05am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	2	2	15			
BUS05		11/10/2023	11:35am	BUS	clear, still	White-winged Fairywren	*Malurus leucopterus*	2	2	4			
BUS05		11/10/2023	08:32am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	8	1	20			
BUS05		11/10/2023	08:32am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	6	1	10			
BUS05		11/10/2023	12:05pm	BUS	clear, still	White-winged Fairywren	*Malurus leucopterus*	4	1	8			
BUS06		11/10/2023	09:00am	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	1	20	20			
BUS06		11/10/2023	09:00am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	3	20	250			
BUS06		11/10/2023	09:00am	BUS	clear, light wind	Black-shouldered Kite	*Elanus axillaris*	1	50	500			
BUS06		11/10/2023	09:30am	BUS	clear, light wind	none							
BUS06		11/10/2023	09:00am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	1	15	20			
BUS06		11/10/2023	09:00am	BUS	clear, light wind	White-necked Heron	*Ardea pacifica*	1	8	5			
BUS06		11/10/2023	09:00am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	4	-	-		heard only	
BUS11		11/10/2023	10:15am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	2	5	100			
BUS11		11/10/2023	10:45am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	6	4	25			
BUS11		11/10/2023	02:02pm	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1	3	20			
BUS11		11/10/2023	09:29am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	4	1	30			
BUS11		11/10/2023	08:59am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1		20		heard only	
BUS11		11/10/2023	10:15am	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	1	50	200		perched on powerline	
BUS11		11/10/2023	10:45am	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	1	50	500		perched on powerline	
BUS11		11/10/2023	10:45am	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	1	50	1000		perched on powerline	
BUS11		11/10/2023	02:02pm	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	3	25	500		perched in transmission tower	
BUS11		11/10/2023	08:59am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	50	2000		flying south	
BUS11		11/10/2023	10:45am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	1	40	750		perched on powerline	
BUS11		11/10/2023	09:29am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	1	10	1000		flying east	
BUS11		11/10/2023	09:29am	BUS	clear, light wind	Black Kite	*Milvus migrans*	1	60	1000		circling - east	
BUS11		11/10/2023	02:02pm	BUS	clear, light wind	Black Kite	*Milvus migrans*	1	40	150		circling - east	
BUS11		11/10/2023	08:59am	BUS	clear, light wind	Black-shouldered Kite	*Elanus axillaris*	1	30	70		hovering - west	
BUS11		11/10/2023	02:02pm	BUS	clear, light wind	Brown Falcon	*Falco berigora*	1	40	250		perched on powerline	
BUS11		11/10/2023	08:59am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	12	22	30			
BUS11		11/10/2023	10:15am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	12	18	25			
BUS11		11/10/2023	10:45am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	14	18	40			
BUS11		11/10/2023	09:29am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	9	15	25			
BUS11		11/10/2023	02:32pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	1	10	25			
BUS11		11/10/2023	02:02pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	3	0	30		calling	
BUS11		11/10/2023	02:32pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	3		50		calling	
BUS11		11/10/2023	08:59am	BUS	clear, light wind	Cormorant sp.	*Phalacrocorax sp.*	50	250	5000		flying south	
BUS11		11/10/2023	09:29am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	9	70	300		flying south	
BUS11		11/10/2023	08:59am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	5	60	500		flying south-west	
BUS11		11/10/2023	09:29am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	8	50	750		flying south	
BUS11		11/10/2023	10:15am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	4	40	1000		flying west	
BUS11		11/10/2023	09:29am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	7	30	500		flying south	
BUS11		11/10/2023	10:45am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	8	17	20		flying north-west	
BUS11		11/10/2023	10:15am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	50	15	500		flying south	
BUS11		11/10/2023	09:29am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	1	12	50		flying west	
BUS11		11/10/2023	09:29am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	17	12	750		flying south	
BUS11		11/10/2023	10:45am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	2	3	1000		flying north	
BUS11		11/10/2023	08:59am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	1		300		heard only	
BUS11		11/10/2023	10:45am	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	60	5000		hovering - south-east	
BUS11		11/10/2023	10:45am	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	30	1000		flying north	
BUS11		11/10/2023	02:32pm	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	20	500		landed	
BUS11		11/10/2023	10:45am	BUS	clear, light wind	Wedge-tailed Eagle	*Aquila audax*	2	500	5000		circling - north-east	
BUS11		11/10/2023	10:15am	BUS	clear, light wind	Wedge-tailed Eagle	*Aquila audax*	2	300	3000		circling - south	
BUS11		11/10/2023	10:15am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	1	7	40		perched and flew north	
BUS11		11/10/2023	02:02pm	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	1	1	50		perched in shrub	
BUS11		11/10/2023	08:59am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	2	1	20			
BUS11		11/10/2023	10:15am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	4	1	200		flying between shrubs	
BUS11		11/10/2023	10:45am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	4	1	30		perched in shrubs	
BUS11		11/10/2023	02:32pm	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	2		100		calling	
BUS11		11/10/2023	09:29am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	1		100		heard only	
BUS11		11/10/2023	10:15am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	3	1	150		flying between shrubs	
BUS11		11/10/2023	10:45am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	3	1	50		perched in shrubs	
BUS11		11/10/2023	08:59am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	3	0	50		calling	
BUS11		11/10/2023	02:32pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	3		100		heard only	

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS11		11/10/2023	09:29am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	2		100		calling	
BUS16		11/10/2023	07:30am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	3	20	50			
BUS16		11/10/2023	07:30am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	11	10	15			
BUS16		11/10/2023	08:00am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	3	20	500			
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	4	0	20		calling	
BUS18		11/10/2023	08:13am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	3	0	50		calling	
BUS18		11/10/2023	12:28pm	BUS	clear, still	Australian Raven	*Corvus coronoides*	2	12	100		flying south	
BUS18		11/10/2023	03:37pm	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	1	10	100		flying south-east	
BUS18		11/10/2023	08:13am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	1	10	300		flying north	
BUS18		11/10/2023	08:13am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	10	150		flying west	
BUS18		11/10/2023	12:28pm	BUS	clear, still	Australian Raven	*Corvus coronoides*	5	10	300		flying west	
BUS18		11/10/2023	03:07pm	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	5	7	200		flying west	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	4	7	100		flying east	
BUS18		11/10/2023	03:37pm	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	1	5	50		flying south	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	5	75		flying south	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	8	5	50		flying east	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	30	5	2000		flying north	
BUS18		11/10/2023	12:28pm	BUS	clear, still	Australian Raven	*Corvus coronoides*	7	5	350		flying north	
BUS18		11/10/2023	12:58pm	BUS	clear, still	Australian Raven	*Corvus coronoides*	8	4	750		perched on/by water tank	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	6	3	50		flying east	
BUS18		11/10/2023	12:58pm	BUS	clear, still	Australian Raven	*Corvus coronoides*	3	3	500		flying north-east	
BUS18		11/10/2023	03:07pm	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	1	1	150		flying east	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	6	1	200		flying west	
BUS18		11/10/2023	08:13am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	8	1	250		flying along ground	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	0	75		on ground	
BUS18		11/10/2023	03:37pm	BUS	clear, light wind	Black Kite	*Milvus migrans*	1	20	100		circling - south	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Brown Falcon	*Falco berigora*	1	60	100		flying south-east	
BUS18		11/10/2023	03:37pm	BUS	clear, light wind	Brown Falcon	*Falco berigora*	1	40	150		flying south-west	
BUS18		11/10/2023	03:07pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	3	22	50			
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	20	20	25			
BUS18		11/10/2023	08:13am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	17	18	25			
BUS18		11/10/2023	03:37pm	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	4	15	50			
BUS18		11/10/2023	12:28pm	BUS	clear, still	Brown Songlark	*Cincloramphus cruralis*	4	15	50			
BUS18		11/10/2023	12:58pm	BUS	clear, still	Brown Songlark	*Cincloramphus cruralis*	5	12	40			
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	1	10	250		flying north-west	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	2	3	50		flying north-east	
BUS18		11/10/2023	08:13am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	2	3	750		flying east	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	5	2	50		flying east	
BUS18		11/10/2023	12:28pm	BUS	clear, still	Nankeen Kestrel	*Falco cenchroides*	1	100	50		circling	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	2	40	2000		hovering - east	
BUS18		11/10/2023	08:13am	BUS	clear, light wind	Nankeen Kestrel	*Falco cenchroides*	1	30	500		hovering - north	
BUS18		11/10/2023	03:07pm	BUS	clear, light wind	Stubble Quail	*Coturnix pectoralis*	1	0	50		calling	
BUS18		11/10/2023	12:28pm	BUS	clear, still	Stubble Quail	*Coturnix pectoralis*	1	0	75		calling	
BUS18		11/10/2023	08:13am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	2	4	20		flying east	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	2	1	75		flying between shrubs	
BUS18		11/10/2023	12:58pm	BUS	clear, still	White-winged Fairywren	*Malurus leucopterus*	2	1	30		perched in shrubs	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	4	0	50		calling	
BUS18		11/10/2023	08:13am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	3	0	75		calling	
BUS18		11/10/2023	03:07pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	1		150		calling	
BUS18		11/10/2023	03:37pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	2		50		heard only	
BUS18		11/10/2023	07:43am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	4	0	50		calling	
BUS18		11/10/2023	08:13am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	3	0	75		calling	
BUS18		11/10/2023	03:07pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	1		150		calling	
BUS18		11/10/2023	03:37pm	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	2		50		heard only	
BUS18		11/10/2023	12:28pm	BUS	clear, still	White-winged Fairywren	*Malurus leucopterus*	2		100		heard only	
BUS09		12/10/2023	10:00am	BUS	rain clearing, high wind, sunny	Australian Magpie	*Gymnorhina tibicen*	2	10	80			
BUS09		12/10/2023	09:30am	BUS	rain clearing, high wind	Brown Falcon	*Falco berigora*	1	20	90		flying east	
BUS09		12/10/2023	02:40pm	BUS	drizzling, high wind	Brown Songlark	*Cincloramphus cruralis*	4	15	10			
BUS09		12/10/2023	03:10pm	BUS	overcast, high wind	Brown Songlark	*Cincloramphus cruralis*	5	15	10			
BUS09		12/10/2023	12:18pm	BUS	overcast, high wind	Brown Songlark	*Cincloramphus cruralis*	2	15	20			
BUS09		12/10/2023	09:30am	BUS	rain clearing, high wind	Brown Songlark	*Cincloramphus cruralis*	8	10	20			
BUS09		12/10/2023	10:00am	BUS	rain clearing, high wind, sunny	Brown Songlark	*Cincloramphus cruralis*	4	10	20			
BUS09		12/10/2023	02:40pm	BUS	drizzling, high wind	Nankeen Kestrel	*Falco cenchroides*	1	25	25			
BUS09		12/10/2023	09:30am	BUS	rain clearing, high wind	Spotted Harrier	*Circus assimilis*	1	30	80		flying east	
BUS09		12/10/2023	09:30am	BUS	rain clearing, high wind	Stubble Quail	*Coturnix pectoralis*	2	1	5			
BUS09		12/10/2023	03:10pm	BUS	overcast, high wind	Stubble Quail	*Coturnix pectoralis*					heard only	
BUS09		12/10/2023	10:00am	BUS	rain clearing, high wind, sunny	Stubble Quail	*Coturnix pectoralis*					heard only	
BUS09		12/10/2023	03:10pm	BUS	overcast, high wind	White-winged Fairywren	*Malurus leucopterus*					heard only	
BUS09		12/10/2023	09:30am	BUS	rain clearing, high wind	White-winged Fairywren	*Malurus leucopterus*					heard only	
BUS10		12/10/2023	08:10am	BUS	rainy, high wind	Brown Songlark	*Cincloramphus cruralis*	6	10	15			
BUS10		12/10/2023	08:40am	BUS	rainy, high wind	Brown Songlark	*Cincloramphus cruralis*	7	10	20			
BUS10		12/10/2023	08:10am	BUS	rainy, high wind	Stubble Quail	*Coturnix pectoralis*	4	0	20			
BUS10		12/10/2023	08:40am	BUS	rainy, high wind	Stubble Quail	*Coturnix pectoralis*	1				heard only	
BUS10		12/10/2023	08:10am	BUS	rainy, high wind	White-winged Fairywren	*Malurus leucopterus*	2	0	10			
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1		30		heard only	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Australian Magpie	*Gymnorhina tibicen*	3	30	400		at road	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	25	150		flying north	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	25	250		flying east	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	15	400		at road	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	1	10	250		flying north-west	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	2	8	200		flying south-east	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Australian Raven	*Corvus coronoides*	4	7	150		flying east	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Black Kite	*Milvus migrans*	1	35	100		circling - north	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Black-shouldered Kite	*Elanus axillaris*	1	20	75		hovering - east to south	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Black-shouldered Kite	*Elanus axillaris*	1	12	75		hovering - north	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Brown Songlark	*Cincloramphus cruralis*	12	20	15			
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Galah	*Eolophus roseicapillus*	12	30	20		flying east and south-east	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	Stubble Quail	*Coturnix pectoralis*	1	0	30		calling	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	White-fronted Chat	*Epthianura albifrons*	1		50		heard only	
BUS03		13/10/2023	07:43am	BUS	clear, light wind	White-winged Fairywren	*Malurus leucopterus*	5	1	50		flying between shrubs	
BUS08		13/10/2023	01:02pm	BUS	heavy cloud, moderate wind	Australasian Pipit	*Anthus novaeseelandiae*	1	3	30			
BUS08		13/10/2023	12:30pm	BUS	heavy cloud, moderate wind	Australian Raven	*Corvus coronoides*	2	30	100		flying south	
BUS08		13/10/2023	08:25am	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	4	10	4			
BUS08		13/10/2023	02:33pm	BUS	patchy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	2	6	10			
BUS08		13/10/2023	12:30pm	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	3	6	30			
BUS08		13/10/2023	01:02pm	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	5	4	25			
BUS08		13/10/2023	02:01pm	BUS	patchy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	3	4	20			
BUS08		13/10/2023	08:25am	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	10	8	0		calling	

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS08		13/10/2023	01:02pm	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	4	0	10		calling	
BUS08		13/10/2023	02:01pm	BUS	patchy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	4	0	10		calling	
BUS08		13/10/2023	12:30pm	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	2	0	15		calling	
BUS08		13/10/2023	01:02pm	BUS	heavy cloud, moderate wind	White-winged Fairywren	*Malurus leucopterus*	2	2	15			
BUS08		13/10/2023	02:01pm	BUS	patchy cloud, moderate wind	White-winged Fairywren	*Malurus leucopterus*	6	2	5			
BUS08		13/10/2023	02:33pm	BUS	patchy cloud, moderate wind	White-winged Fairywren	*Malurus leucopterus*	4	2	25			
BUS08		13/10/2023	12:30pm	BUS	heavy cloud, moderate wind	White-winged Fairywren	*Malurus leucopterus*	4	2	20			
BUS12		13/10/2023	08:50am	BUS	cloud cover increasing, light wind	Australasian Pipit	*Anthus novaeseelandiae*	1		50		heard only	
BUS12		13/10/2023	10:39am	BUS	heavy cloud, moderate wind	Australian Raven	*Corvus coronoides*	2	2	700		on roadside	
BUS12		13/10/2023	08:50am	BUS	cloud cover increasing, light wind	Black Kite	*Milvus migrans*	1	30	400		circling - north	
BUS12		13/10/2023	08:50am	BUS	cloud cover increasing, light wind	Black-shouldered Kite	*Elanus axillaris*	1	15	250		hovering	
BUS12		13/10/2023	10:39am	BUS	heavy cloud, moderate wind	Brown Falcon	*Falco berigora*	1	25	50		hovering - circling - landing	
BUS12		13/10/2023	08:50am	BUS	cloud cover increasing, light wind	Brown Songlark	*Cincloramphus cruralis*	8	18	30			
BUS12		13/10/2023	10:39am	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	9	17	30			
BUS12		13/10/2023	03:46pm	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	5	15	30			
BUS12		13/10/2023	08:50am	BUS	cloud cover increasing, light wind	Common Blackbird	*Turdus merula*	1	5	100		flying west	
BUS12		13/10/2023	08:50am	BUS	cloud cover increasing, light wind	Cormorant sp.	*Phalacrocorax sp.*	100	60	1000		flying north-east	
BUS12		13/10/2023	10:39am	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	1	1	20			
BUS12		13/10/2023	03:46pm	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	2	0	20		calling	
BUS12		13/10/2023	08:50am	BUS	cloud cover increasing, light wind	Stubble Quail	*Coturnix pectoralis*	2	0	30		calling	
BUS12		13/10/2023	03:46pm	BUS	heavy cloud, moderate wind	Whistling Kite	*Haliastur sphenurus*	1	12	500		circling	
BUS12		13/10/2023	10:39am	BUS	heavy cloud, moderate wind	White-fronted Chat	*Epthianura albifrons*	2	1	15			
BUS12		13/10/2023	03:46pm	BUS	heavy cloud, moderate wind	White-necked Heron	*Ardea pacifica*	1	40	20		flew overhead - flying south-east	
BUS12		13/10/2023	08:50am	BUS	cloud cover increasing, light wind	White-winged Fairywren	*Malurus leucopterus*	2		50		heard only	
BUS15		13/10/2023	07:45am	BUS	cloud cover increasing, light wind	Australasian Pipit	*Anthus novaeseelandiae*	2	10	2			
BUS15		13/10/2023	03:05pm	BUS	heavy cloud, moderate wind	Australasian Pipit	*Anthus novaeseelandiae*	1	1	15			
BUS15		13/10/2023	07:45am	BUS	cloud cover increasing, light wind	Australian Raven	*Corvus coronoides*	1	30	200		flying south-east	
BUS15		13/10/2023	12:37pm	BUS	patchy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	4	18	30			
BUS15		13/10/2023	03:05pm	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	3	8	50			
BUS15		13/10/2023	07:45am	BUS	cloud cover increasing, light wind	Brown Songlark	*Cincloramphus cruralis*	8	5	6			
BUS15		13/10/2023	07:45am	BUS	cloud cover increasing, light wind	Cormorant sp.	*Phalacrocorax sp.*	25	200	1000		flying south	
BUS15		13/10/2023	07:45am	BUS	cloud cover increasing, light wind	Nankeen Kestrel	*Falco cenchroides*	1	30	20		flying south	
BUS15		13/10/2023	07:45am	BUS	cloud cover increasing, light wind	Spotted Harrier	*Circus assimilis*	1	30	15		hunting - flying east	
BUS15		13/10/2023	07:45am	BUS	cloud cover increasing, light wind	Stubble Quail	*Coturnix pectoralis*	12	5	0		calling	
BUS15		13/10/2023	03:05pm	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	1	0	30		calling	
BUS15		13/10/2023	12:37pm	BUS	patchy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	2	0	50		calling	
BUS15		13/10/2023	07:45am	BUS	cloud cover increasing, light wind	White-winged Fairywren	*Malurus leucopterus*	2	20	1			
BUS15		13/10/2023	12:37pm	BUS	patchy cloud, moderate wind	White-winged Fairywren	*Malurus leucopterus*	1	1	100			
BUS15		13/10/2023	03:05pm	BUS	heavy cloud, moderate wind	White-winged Fairywren	*Malurus leucopterus*	2	0	25			
BUS17		13/10/2023	10:52am	BUS	heavy cloud, moderate wind	Australasian Pipit	*Anthus novaeseelandiae*	1	4	50			
BUS17		13/10/2023	09:33am	BUS	heavy cloud, moderate wind	Australian Raven	*Corvus coronoides*	1	20	300		flying west	
BUS17		13/10/2023	09:33am	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	6	12	20			
BUS17		13/10/2023	10:20am	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	4	5	10			
BUS17		13/10/2023	03:15p,	BUS	patchy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	2	4	30			
BUS17		13/10/2023	10:52am	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	2	4	20			
BUS17		13/10/2023	03:15p,	BUS	patchy cloud, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	10	100		flying east	
BUS17		13/10/2023	09:33am	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	2	0	30		calling	
BUS17		13/10/2023	10:20am	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	6	0	10		calling	
BUS17		13/10/2023	10:52am	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	4	0	8		calling	
BUS20		13/10/2023	02:02pm	BUS	heavy cloud, moderate wind	Australasian Pipit	*Anthus novaeseelandiae*	1	2	50			
BUS20		13/10/2023	01:32pm	BUS	heavy cloud, moderate wind	Australasian Pipit	*Anthus novaeseelandiae*	1	1	20			
BUS20		13/10/2023	01:32pm	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	4	12	40			
BUS20		13/10/2023	02:02pm	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	5	10	10			
BUS20		13/10/2023	09:30am	BUS	heavy cloud, moderate wind	Brown Songlark	*Cincloramphus cruralis*	4	8	15			
BUS20		13/10/2023	02:02pm	BUS	heavy cloud, moderate wind	Cockatiel	*Nymphicus hollandicus*	6	10	25		flying south-east	
BUS20		13/10/2023	01:32pm	BUS	heavy cloud, moderate wind	Masked Woodswallow	Artamus leucorynchus	10	80	20		flying north-east	
BUS20		13/10/2023	01:32pm	BUS	heavy cloud, moderate wind	Masked Woodswallow	Artamus leucorynchus	5	1	1000		flying between shrubs	
BUS20		13/10/2023	09:30am	BUS	heavy cloud, moderate wind	Red-backed Kingfisher	*Todiramphus pyrrhopygius*	1	3	0			
BUS20		13/10/2023	01:32pm	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	4	0	30		calling	
BUS20		13/10/2023	02:02pm	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	3	0	30		calling	
BUS20		13/10/2023	09:30am	BUS	heavy cloud, moderate wind	Stubble Quail	*Coturnix pectoralis*	6	0	10		calling	
BUS20		13/10/2023	09:30am	BUS	heavy cloud, moderate wind	Wedge-tailed Eagle	*Aquila audax*	2	100	50		circling - moving west	
BUS20		13/10/2023	02:02pm	BUS	heavy cloud, moderate wind	White-winged Fairywren	*Malurus leucopterus*	3	0	25		calling	
BUS20		13/10/2023	01:32pm	BUS	heavy cloud, moderate wind	White-winged Fairywren	*Malurus leucopterus*	1		50		heard only	
BUS01		28/05/2024	8:38 AM	BUS	4 degrees still 0/8 cloud	Australian raven	Corvus coronoides	1		500			heard
BUS01		28/05/2024	8:38 AM	BUS	4 degrees still 0/8 cloud	Brown Falcon	*Falco berigora*	1	2	200			perched on fence
BUS01		28/05/2024	8:38 AM	BUS	4 degrees still 0/8 cloud	Fairywren spp.		2	1	200			
BUS01		28/05/2024	8:38 AM	BUS	4 degrees still 0/8 cloud	Nankeen kestrel	*Malurus spp.*	1	2	300			perched on fence
BUS02		28/05/2024	9:13 AM	BUS	6 degrees still 0/8 cloud	Australian Magpie	*Gymnorhina tibicen*	1	10	150			Flying south
BUS02		28/05/2024	9:13 AM	BUS	6 degrees still 0/8 cloud	Australian raven	Corvus coronoides	30	10	800			
BUS02		28/05/2024	9:13 AM	BUS	6 degrees still 0/8 cloud	Australian raven	Corvus coronoides	2	20	500			
BUS02		28/05/2024	9:13 AM	BUS	6 degrees still 0/8 cloud	Fairywren spp.	*Malurus spp.*	1	1	30			perched in shrub
BUS02		28/05/2024	9:13 AM	BUS	6 degrees still 0/8 cloud	Wedge-tailed eagle	*Aquila audax*	2	5	800			Perched in dead tree
BUS03		28/05/2024	9:56 AM	BUS	8 degrees, still 0/8 cloud	Australasian Pipit	*Anthus novaeseelandiae*	1	1	200			
BUS03		28/05/2024	9:56 AM	BUS	8 degrees, still 0/8 cloud	Emu	*Dromaius novaehollandiae*	2		250			
BUS03		28/05/2024	9:56 AM	BUS	8 degrees, still 0/8 cloud	Fairywren spp.	*Malurus spp.*	4	1	50			perched on shrubs
BUS04		28/05/2024	4:16 PM	BUS	19 degrees, light breeze	Australian raven	Corvus coronoides	2	10	300			
BUS04		28/05/2024	4:16 PM	BUS	19 degrees, light breeze	Australian raven	Corvus coronoides	1	50	100			
BUS04		28/05/2024	4:16 PM	BUS	19 degrees, light breeze	Black-faced Woodswallow	*Artamus cinereus*	4	10	300			
BUS04		28/05/2024	4:16 PM	BUS	19 degrees, light breeze	Common Blackbird	*Turdus merula*	16	15	300			perched
BUS04		28/05/2024	4:16 PM	BUS	19 degrees, light breeze	Fairywren spp.	*Malurus spp.*	12	1	200			perched
BUS04		28/05/2024	4:16 PM	BUS	19 degrees, light breeze	Grey Butcherbird	*Cracticus torquatus*	1	10	300			
BUS04		28/05/2024	4:16 PM	BUS	19 degrees, light breeze	Wedge-tailed eagle	*Aquila audax*	1	40	40			
BUS05		28/05/2024	5:15 PM	BUS	20 degree , warm	Nil							
BUS06		28/05/2024	3:41 PM	BUS	19 degrees, light breeze	Common Blackbird	*Turdus merula*	10	10	400			perched
BUS06		28/05/2024	3:41 PM	BUS	19 degrees, light breeze	Fairywren spp.	*Malurus spp.*	2	1	150			perched
BUS06		28/05/2024	3:41 PM	BUS	19 degrees, light breeze	Nankeen kestrel	*Falco cenchroides*	1	40	400			
BUS06		28/05/2024	3:41 PM	BUS	19 degrees, light breeze	Pied Butcherbird	*Cracticus nigrogularis*	1	1	200			perched
BUS07		28/05/2024	12:04 PM	BUS	16 degrees, light breeze, 0/8 cloud	Nil							
BUS13		28/05/2024	10:57 AM	BUS	13 degrees cloudy , still	Australian raven	Corvus coronoides	1	50	100			Flying south
BUS13		28/05/2024	10:57 AM	BUS	13 degrees cloudy , still	Emu	*Dromaius novaehollandiae*	8	1	200			
BUS13		28/05/2024	10:57 AM	BUS	13 degrees cloudy , still	Fairywren spp.	*Malurus spp.*	1	1	100			perched in shrub
BUS13		28/05/2024	10:57 AM	BUS	13 degrees cloudy , still	Nankeen kestrel	*Falco cenchroides*	1	20	200			foraging
BUS13		28/05/2024	10:57 AM	BUS	13 degrees cloudy , still	White-winged Fairywren	*Malurus leucopterus*	7	5	10			perched in shrub

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS14		28/05/2024	12:51 PM	BUS	17 degrees, still 0/8 cloud	Australasian Pipit	*Anthus novaeseelandiae*	1	3	20			
BUS14		28/05/2024	1:21 PM	BUS	19 degrees, warm	Australasian Pipit	*Anthus novaeseelandiae*	3	1	60			
BUS14		28/05/2024	12:51 PM	BUS	17 degrees, still 0/8 cloud	Brown Falcon	*Falco berigora*	1	1	500			Flying near tracks
BUS14		28/05/2024	1:21 PM	BUS	19 degrees, warm	Fairywren spp.	*Malurus spp.*	2	1	60			females
BUS14		28/05/2024	1:21 PM	BUS	19 degrees, warm	Fairywren spp.	*Malurus spp.*	3		200			
BUS14		28/05/2024	1:21 PM	BUS	19 degrees, warm	Fairywren spp.	*Malurus spp.*	1	2	60			
BUS16		28/05/2024	1:38 PM	BUS	17 degrees, light breeze, warm	Australasian Pipit	*Anthus novaeseelandiae*	1	3	150			
BUS01		29/05/2024	12:27 PM	BUS	19 degrees light breeze	Nankeen kestrel	*Falco cenchroides*	1	40	200			
BUS02		29/05/2024	11:58 PM	BUS	Light breeze	Australian Magpie	*Gymnorhina tibicen*	2	5	200			
BUS02		29/05/2024	11:58 PM	BUS	Light breeze	Brown Falcon	*Falco berigora*	2	30	200			
BUS02		29/05/2024	11:58 PM	BUS	Light breeze	Nankeen kestrel	*Falco cenchroides*	1	70	150			foraging
BUS02		29/05/2024	11:58 PM	BUS	Light breeze	White-winged Fairywren	*Malurus leucopterus*	3	1	30			perched, female
BUS03		29/05/2024	1:33 PM	BUS	moderate winds 20 km/hr	Fairywren spp.	*Malurus spp.*	2	1	50			
BUS04		29/05/2024	7:40 AM	BUS	7 degrees calm, light breeze	Australian Magpie	*Gymnorhina tibicen*	1	30	200			perched
BUS04		29/05/2024	7:40 AM	BUS	7 degrees calm, light breeze	Australian Magpie	*Gymnorhina tibicen*	4	20	500			woodland patch
BUS04		29/05/2024	7:40 AM	BUS	7 degrees calm, light breeze	Black-faced Woodswallow	*Artamus cinereus*	7	10	50			
BUS04		29/05/2024	7:40 AM	BUS	7 degrees calm, light breeze	Blue-faced honeyeater	*Entomyzon cyanotis*	4	20	200			chasing bird
BUS04		29/05/2024	7:40 AM	BUS	7 degrees calm, light breeze	Common Blackbird	*Turdus merula*	2	20	500			
BUS04		29/05/2024	7:40 AM	BUS	7 degrees calm, light breeze	Galah	*Eolophus roseicapillus*	4	20	500			perched
BUS05		29/05/2024	9:50 AM	BUS	11 degrees light breeze	Nankeen kestrel	*Falco cenchroides*	1	30	200			
BUS06		29/05/2024	8:51 AM	BUS	9 degrees, calm light breeze (5-10km NE wind)	Fairywren spp.	*Malurus spp.*	1	1	30			Perched
BUS06		29/05/2024	8:51 AM	BUS		Nankeen kestrel	*Falco cenchroides*	1	40	200			
BUS07		29/05/2024	2:08 PM	BUS	21 degrees moderate winds	Brown Falcon	*Falco berigora*	1	40	150			
BUS07		29/05/2024	2:08 PM	BUS	21 degrees moderate winds	Brown Falcon	*Falco berigora*	1	50	200			
BUS07		29/05/2024	2:08 PM	BUS	21 degrees moderate winds	Nankeen kestrel	*Falco cenchroides*	1	30	50			
BUS13		29/05/2024	11:41 AM	BUS	17 Degrees	Nil							
BUS14		29/05/2024	10:43 AM	BUS	14 degrees, light breeze , winds 10km/hr	Brown Falcon	*Falco berigora*	1	60	50			
BUS14		29/05/2024	10:43 AM	BUS	14 degrees, light breeze , winds 10km/hr	Brown Falcon	*Falco berigora*	1	100	300			
BUS14		29/05/2024	10:43 AM	BUS	14 degrees, light breeze , winds 10km/hr	Fairy Martin	*Petrochelidon ariel*	1	4	300			dam
BUS14		29/05/2024	10:43 AM	BUS	14 degrees, light breeze , winds 10km/hr	Fairywren spp.	*Malurus spp.*	6	1	100			
BUS14		29/05/2024	10:43 AM	BUS	14 degrees, light breeze , winds 10km/hr	Nankeen kestrel	*Falco cenchroides*	1	1	300			perched
BUS16		29/05/2024	3:02 PM	BUS	21 degrees moderate winds	Brown Falcon	*Falco berigora*	1	100	400			
BUS16		29/05/2024	3:02 PM	BUS	21 degrees moderate winds	Nankeen kestrel	*Falco cenchroides*	1	100	400			
BUS19		29/05/2024	3:41 PM	BUS	21 degrees moderate winds	Brown Songlark	*Cincloramphus cruralis*	1	1	200			perched
BUS05		30/05/2024	11:50 AM	BUS	21 degrees, windy 20/30 kms/hr	Nil							
BUS06		30/05/2024	11:10 AM	BUS	20 degrees, 15-25 km/hr winds cloud cover 8/8	Nil							
BUS12		30/05/2024	10:00 AM	BUS	19 degrees 20-25 km/hr winds, 7/8 cloud cover	Black-shouldered Kite	*Elanus axillaris*	1	40	100			
BUS12		30/05/2024	10:00 AM	BUS	19 degrees 20-25 km/hr winds, 7/8 cloud cover	Common Blackbird	*Turdus merula*	20	10	200			
BUS12		30/05/2024	10:00 AM	BUS	19 degrees 20-25 km/hr winds, 7/8 cloud cover	Fairy Martin	*Petrochelidon ariel*	2	40	200			
BUS12		30/05/2024	10:00 AM	BUS	19 degrees 20-25 km/hr winds, 7/8 cloud cover	Nankeen kestrel	*Falco cenchroides*	1	10	400			
BUS13		30/05/2024	1:22 PM	BUS	20 degrees	Nil							
BUS14		30/05/2024	12:50 PM	BUS	22 degrees , windy 25-30 km/hr	White-winged Fairywren	*Malurus leucopterus*	1	1	50			
BUS16		30/05/2024	8:09 AM	BUS	14 degrees, 5-10 km/hr wind and 4/8 cloud cover	Brown Quail	*Synoicus ypsilophorus*	1	1	0			
BUS19		30/05/2024	7:32 AM	BUS	13 degrees, 2/8 cloudy	White-winged Fairywren	*Malurus leucopterus*	2	3	50			
BUS04		30/05/2024	10:42 AM	BUS	19 degrees 10-15 km/hr winds, 8/8 cloud cover	Australian Magpie	*Gymnorhina tibicen*	12	10	500			
BUS04		30/05/2024	10:42 AM	BUS	19 degrees 10-15 km/hr winds, 8/8 cloud cover	Nankeen kestrel	*Falco cenchroides*	1	40	100			
BUS07		30/05/2024	8:55 AM	BUS	16 degrees, 10-15 km/hr breeze, cloud cover 6/8	Australian raven	Corvus coronoides	2	5	300			
BUS07		30/05/2024	8:55 AM	BUS	16 degrees, 10-15 km/hr breeze, cloud cover 6/8	Common Blackbird	*Turdus merula*	6	5	300			perched on canopy tree
BUS08		26/08/2024	5:20pm	BUS	20 degrees, light wind, sunny	Brown Songlark	*Megalurus cruralis*	1	15	15	290	-	circling
BUS08		26/08/2024	5:20pm	BUS	20 degrees, light wind, sunny	Brown Songlark	*Megalurus cruralis*	1	5	80	240	130	
BUS08		26/08/2024	5:20pm	BUS	20 degrees, light wind, sunny	Brown Songlark	*Megalurus cruralis*	1	-	100	130	-	heard calling
BUS08		26/08/2024	5:20pm	BUS	20 degrees, light wind, sunny	Brown Songlark	*Megalurus cruralis*	1	5	100	350	240	
BUS08		26/08/2024	5:20pm	BUS	20 degrees, light wind, sunny	Harrier sp.	*Circus sp.*	1	7	300	130	30	hunting (likely Spotted Harrier)
BUS08		26/08/2024	5:20pm	BUS	20 degrees, light wind, sunny	Stubble Quail	*Coturnix pectoralis*	1	-	50	310	-	heard calling
BUS08		26/08/2024	5:20pm	BUS	20 degrees, light wind, sunny	Stubble Quail	*Coturnix pectoralis*	1	-	30	320	-	heard calling
BUS08		26/08/2024	5:20pm	BUS	20 degrees, light wind, sunny	White-winged Fairywren	*Malurus leucopterus*	4	-	50	-	-	heard all directions
BUS08		26/08/2024	5:20pm	BUS	20 degrees, light wind, sunny	White-winged Fairywren	*Malurus leucopterus*	2	1	50	180	-	perched in shrub
BUS12		26/08/2024	5:55pm	BUS	15 degrees, sunset, light wind	Black-shouldered Kite	*Elanus axillaris*	1	18	200	250	300	hunting
BUS12		26/08/2024	5:55pm	BUS	15 degrees, sunset, light wind	White-winged Fairywren	*Malurus leucopterus*	10	-	20	-	-	heard all directions
BUS15		26/08/2024	4:50pm	BUS	20 degrees, light wind, sunny	Brown Songlark	*Megalurus cruralis*	1	8	20	330	220	
BUS15		26/08/2024	4:50pm	BUS	20 degrees, light wind, sunny	Brown Songlark	*Megalurus cruralis*	1	10	0	230	50	flew overhead
BUS15		26/08/2024	4:50pm	BUS	20 degrees, light wind, sunny	Brown Songlark	*Megalurus cruralis*	1	15	75	90	320	landed in shrub
BUS15		26/08/2024	4:50pm	BUS	20 degrees, light wind, sunny	Brown Songlark	*Megalurus cruralis*	1	12	50	270	150	
BUS15		26/08/2024	4:50pm	BUS	20 degrees, light wind, sunny	Stubble Quail	*Coturnix pectoralis*	1	-	30	300	-	heard calling
BUS15		26/08/2024	4:50pm	BUS	20 degrees, light wind, sunny	White-fronted Chat	*Epthianura albifrons*	2	10	15	160	310	flying
BUS15		26/08/2024	4:50pm	BUS	20 degrees, light wind, sunny	White-winged Fairywren	*Malurus leucopterus*	1	-	50	220	-	heard calling
BUS17		26/08/2024	5:45 PM	BUS	17°C, WSW - 10 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	10	10	250	115	0	flock circling
BUS17		26/08/2024	5:45 PM	BUS	17°C, WSW - 10 km/h, No Rain, 1 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	8	15	80	120	215	gliding
BUS20		26/08/2024	5:00 PM	BUS	19°C, W - 13 km/h, No Rain, 1 Beauford Scale Wind	Australasian Pipit	*Anthus novaeseelandiae*	1	0	20	180	-	foraging
BUS20		26/08/2024	5:00 PM	BUS	19°C, W - 13 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	50	150	270	70	flying
BUS20		26/08/2024	5:00 PM	BUS	19°C, W - 13 km/h, No Rain, 1 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	10	10	30	180	180	calling
BUS20		26/08/2024	5:00 PM	BUS	19°C, W - 13 km/h, No Rain, 1 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	3	50	100	210	20	flying
BUS01		27/08/2024	7:40 AM	BUS	8.4°C, N - 13 km/h, No Rain, 3 Beauford Scale Wind	Australian Magpie	*Gymnorhina tibicen*	1	0	100	100	-	calling
BUS01		27/08/2024	7:40 AM	BUS	8.4°C, N - 13 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	3	10	400	300	60	flying
BUS01		27/08/2024	7:40 AM	BUS	8.4°C, N - 13 km/h, No Rain, 3 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	6	0	50	210	-	Calling
BUS01		27/08/2024	7:40 AM	BUS	8.4°C, N - 13 km/h, No Rain, 3 Beauford Scale Wind	Emu	*Dromaius novaehollandiae*	12	0	500	210	-	foraging
BUS01		27/08/2024	7:40 AM	BUS	8.4°C, N - 13 km/h, No Rain, 3 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	1	1	30	180	-	calling
BUS02		27/08/2024	8:10 AM	BUS	8.4°C, N - 13 km/h, No Rain, 3 Beauford Scale Wind	Australasian Pipit	*Anthus novaeseelandiae*	1	20	150	180	90	flying
BUS02		27/08/2024	8:10 AM	BUS	8.4°C, N - 13 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	15	150	180	150	flying
BUS02		27/08/2024	8:10 AM	BUS	8.4°C, N - 13 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	2	20	150	10	170	flying
BUS02		27/08/2024	8:10 AM	BUS	8.4°C, N - 13 km/h, No Rain, 3 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	4	0	100	200	-	calling
BUS03		27/08/2024	8:40 AM	BUS	11.2°C, N - 15 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	2	30	1000	210	100	flying
BUS03		27/08/2024	8:40 AM	BUS	11.2°C, N - 15 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	5	600	240	160	flying
BUS03		27/08/2024	8:40 AM	BUS	11.2°C, N - 15 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	4	15	200	0	200	flying
BUS03		27/08/2024	8:40 AM	BUS	11.2°C, N - 15 km/h, No Rain, 3 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	4	0	150	240	-	calling
BUS03		27/08/2024	8:40 AM	BUS	11.2°C, N - 15 km/h, No Rain, 3 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	5	1	50	0	-	calling
BUS03		27/08/2024	8:40 AM	BUS	11.2°C, N - 15 km/h, No Rain, 3 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	1	2	20	30	20	perched
BUS04		27/08/2024	3:10 PM	BUS	23°C, NNW - 30 km/h, No Rain, 4 Beauford Scale Wind	Australian Magpie	*Gymnorhina tibicen*	1	15	450	210	-	perched
BUS04		27/08/2024	3:10 PM	BUS	23°C, NNW - 30 km/h, No Rain, 4 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	15	450	210	-	perched
BUS04		27/08/2024	3:10 PM	BUS	23°C, NNW - 30 km/h, No Rain, 4 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	2	50	300	270	210	flying
BUS04		27/08/2024	3:10 PM	BUS	23°C, NNW - 30 km/h, No Rain, 4 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	40	20	210	60	flying
BUS05		27/08/2024	2:10 PM	BUS	23°C, NNW - 30 km/h, No Rain, 3 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	25	250	330	330	flying
BUS06		27/08/2024	2:30:00 PM	BUS	23°C, NNW - 30 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	40	400	320	210	flying
BUS06		27/08/2024	2:30:00 PM	BUS	23°C, NNW - 30 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	2	30	500	180	90	flying

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS06		27/08/2024	2:30:00 PM	BUS	23°C, NNW - 30 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	3	10	600	330	70	flying
BUS06		27/08/2024	2:30:00 PM	BUS	23°C, NNW - 30 km/h, No Rain, 3 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	3	1	50	80	80	flying
BUS06		27/08/2024	2:30:00 PM	BUS	23°C, NNW - 30 km/h, No Rain, 3 Beauford Scale Wind	White-winged Fairy-wren	*Malurus leucopterus*	1	1	50	280	340	flying
BUS07		27/08/2024	9:20 AM	BUS	12.8°C, NNW - 17 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	4	20	150	70	190	flying
BUS07		27/08/2024	9:20 AM	BUS	12.8°C, NNW - 17 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	6	30	500	30	330	flying
BUS07		27/08/2024	9:20 AM	BUS	12.8°C, NNW - 17 km/h, No Rain, 3 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	1	2	200	90	0	flying
BUS07		27/08/2024	9:20 AM	BUS	12.8°C, NNW - 17 km/h, No Rain, 3 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	7	4	100	350	0	flying
BUS09		27/08/2024	8:15am	BUS	12 degrees, sunny, light wind	Australian Raven	*Corvus coronoides*	3	12	150	210	50	flying
BUS09		27/08/2024	8:15am	BUS	12 degrees, sunny, light wind	Australian Raven	*Corvus coronoides*	1	10	80	240	30	flying
BUS09		27/08/2024	8:15am	BUS	12 degrees, sunny, light wind	Australian Raven	*Corvus coronoides*	1	20	150	70	270	flying
BUS09		27/08/2024	8:15am	BUS	12 degrees, sunny, light wind	Brown Songlark	*Megalurus cruralis*	1	-	100	210	-	heard calling
BUS09		27/08/2024	8:15am	BUS	12 degrees, sunny, light wind	Brown Songlark	*Megalurus cruralis*	1	5	75	30	30	flying
BUS09		27/08/2024	8:15am	BUS	12 degrees, sunny, light wind	Nankeen Kestrel	*Falco cenchroides*	1	10	150	270	0	hunting
BUS09		27/08/2024	8:15am	BUS	12 degrees, sunny, light wind	Stubble Quail	*Coturnix pectoralis*	1	-	40	310	-	heard calling
BUS09		27/08/2024	8:15am	BUS	12 degrees, sunny, light wind	White-fronted Chat	*Epthianura albifrons*	1	-	100	280	-	heard calling
BUS09		27/08/2024	8:15am	BUS	12 degrees, sunny, light wind	White-winged Fairywren	*Malurus leucopterus*	2	-	30	270	-	perched in shrub
BUS09		27/08/2024	8:15am	BUS	12 degrees, sunny, light wind	White-winged Fairywren	*Malurus leucopterus*	1	-	30	340	-	heard calling
BUS10		27/08/2024	10:55 AM	BUS	18°C, NNW - 22 km/h, No Rain, 3 Beauford Scale Wind	Australasian Pipit	*Anthus novaeseelandiae*	1	5	20	120	50	flying low
BUS10		27/08/2024	10:55 AM	BUS	18°C, NNW - 22 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	15	400	280	-	perched on powerline
BUS10		27/08/2024	10:55 AM	BUS	18°C, NNW - 22 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	11	30	600	160	270	flying overhead
BUS10		27/08/2024	10:55 AM	BUS	18°C, NNW - 22 km/h, No Rain, 3 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	4	20	20	180	140	flying
BUS11		27/08/2024	9:45am	BUS	14 degrees, sunny, moderate wind	Australian Magpie	*Gymnorhina tibicen*	1	30	100	150	-	perched on powerline
BUS11		27/08/2024	9:45am	BUS	14 degrees, sunny, moderate wind	Australian Raven	*Corvus coronoides*	1	-	400	180	-	heard calling
BUS11		27/08/2024	9:45am	BUS	14 degrees, sunny, moderate wind	Brown Songlark	*Megalurus cruralis*	1	15	150	70	-	landing
BUS11		27/08/2024	9:45am	BUS	14 degrees, sunny, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	20	200	40	-	hunting
BUS11		27/08/2024	9:45am	BUS	14 degrees, sunny, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	50	80	130	-	hunting
BUS11		27/08/2024	9:45am	BUS	14 degrees, sunny, moderate wind	Stubble Quail	*Coturnix pectoralis*	1	-	40	340	-	heard calling
BUS11		27/08/2024	9:45am	BUS	14 degrees, sunny, moderate wind	Wedge-tailed Eagle	*Aquila audax*	2	50	300	100	340	flew from nest in transmission tower
BUS11		27/08/2024	9:45am	BUS	14 degrees, sunny, moderate wind	White-winged Fairywren	*Malurus leucopterus*	1	-	30	50	-	heard calling
BUS11		27/08/2024	9:45am	BUS	14 degrees, sunny, moderate wind	Woodswallow sp.	*Artamus sp.*	1	30	150	120	250	flying
BUS12		27/08/2024	11:28am	BUS	18 degrees, sunny, moderate wind	Brown Falcon	*Falco berigora*	1	30	200	170	230	hunting
BUS12		27/08/2024	11:28am	BUS	18 degrees, sunny, moderate wind	White-fronted Chat	*Epthianura albifrons*	2	1	50	280		perched in shrub (1xM, 1xF)
BUS12		27/08/2024	11:28am	BUS	18 degrees, sunny, moderate wind	White-winged Fairywren	*Malurus leucopterus*	1	-	50	290	-	heard calling
BUS12		27/08/2024	11:28am	BUS	18 degrees, sunny, moderate wind	White-winged Fairywren	*Malurus leucopterus*	2	1	25	40	180	flying between shrubs
BUS13		27/08/2024	1:30pm	BUS	23 degrees, sunny, high wind	Australian Magpie	*Gymnorhina tibicen*	4	15	150	270	150	flying
BUS13		27/08/2024	1:30pm	BUS	23 degrees, sunny, high wind	Australian Pipit	*Anthus novaeseelandiae*	1	0	30	300	-	
BUS13		27/08/2024	1:30pm	BUS	23 degrees, sunny, high wind	Australian Raven	*Corvus coronoides*	2	5	250	330	50	flying
BUS13		27/08/2024	1:30pm	BUS	23 degrees, sunny, high wind	Brown Songlark	*Megalurus cruralis*	1	-	60	30	-	heard calling
BUS13		27/08/2024	12:50pm	BUS	23 degrees, sunny, moderate wind	Common Starling	*Sturnus vulgaris*	50	40	100	270	50	landed nearby
BUS13		27/08/2024	12:50pm	BUS	23 degrees, sunny, moderate wind	Common Starling	*Sturnus vulgaris*	50	60	100	270	50	flying
BUS13		27/08/2024	12:50pm	BUS	23 degrees, sunny, moderate wind	Common Starling	*Sturnus vulgaris*	10	2	90	290	-	among sheep
BUS13		27/08/2024	1:30pm	BUS	23 degrees, sunny, high wind	Little Eagle	*Hieraaetus morphnoides*	1	17	150	160	200	flying
BUS13		27/08/2024	1:30pm	BUS	23 degrees, sunny, high wind	Little Raven	*Corvus mellori*	2	1	25	350	280	flying between shrubs
BUS13		27/08/2024	12:50pm	BUS	23 degrees, sunny, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	25	250	260	-	hunting
BUS13		27/08/2024	1:30pm	BUS	23 degrees, sunny, high wind	Nankeen Kestrel	*Falco cenchroides*	2	20	250	75	-	circling
BUS13		27/08/2024	12:50pm	BUS	23 degrees, sunny, moderate wind	White-winged Fairywren	*Malurus leucopterus*	2	1	25	350	280	flying between shrubs
BUS13		27/08/2024	12:50pm	BUS	23 degrees, sunny, moderate wind	White-winged Fairywren	*Malurus leucopterus*	1	-	50	50	-	heard calling
BUS16		27/08/2024	10:20 AM	BUS	15.7°C, NNW - 22 km/h, No Rain, 3 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	2	20	150	150	260	flying
BUS16		27/08/2024	10:20 AM	BUS	15.7°C, NNW - 22 km/h, No Rain, 3 Beauford Scale Wind	Black Kite	*Milvus migrans*	1	10	500	50	0	foraging
BUS16		27/08/2024	10:20 AM	BUS	15.7°C, NNW - 22 km/h, No Rain, 3 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	3	10	150	180	10	calling
BUS16		27/08/2024	10:20 AM	BUS	15.7°C, NNW - 22 km/h, No Rain, 3 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	20	100	170	270	foraging
BUS17		27/08/2024	10:55am	BUS	18 degrees, sunny, moderate wind	Brown Songlark	*Megalurus cruralis*	1	20	70	160	360	
BUS17		27/08/2024	10:55am	BUS	18 degrees, sunny, moderate wind	Brown Songlark	*Megalurus cruralis*	1	15	80	350	110	
BUS17		27/08/2024	10:55am	BUS	18 degrees, sunny, moderate wind	Brown Songlark	*Megalurus cruralis*	1	10	120	230	-	landing
BUS17		27/08/2024	10:55am	BUS	18 degrees, sunny, moderate wind	Horsfield's Bronze Cuckoo	*Chrysococcyx basalis*	1	-	100	180	-	heard calling
BUS17		27/08/2024	10:55am	BUS	18 degrees, sunny, moderate wind	Stubble Quail	*Coturnix pectoralis*	1	-	40	70	-	heard calling
BUS17		27/08/2024	10:55am	BUS	18 degrees, sunny, moderate wind	White-fronted Chat	*Epthianura albifrons*	1	12	20	100	290	landed on fence
BUS17		27/08/2024	10:55am	BUS	18 degrees, sunny, moderate wind	White-fronted Chat	*Epthianura albifrons*	2	1	25	270	-	perched in shrub (1xM, 1xF)
BUS17		27/08/2024	10:55am	BUS	18 degrees, sunny, moderate wind	White-winged Fairywren	*Malurus leucopterus*	1	2	100	350	-	perched in shrub
BUS18		27/08/2024	9:05am	BUS	12 degrees, overcast, moderate wind	Australian Raven	*Corvus coronoides*	2	4	100	160	300	landed in shrub
BUS18		27/08/2024	9:05am	BUS	12 degrees, overcast, moderate wind	Brown Falcon	*Falco berigora*	1	18	250	90	10	flying
BUS18		27/08/2024	9:05am	BUS	12 degrees, overcast, moderate wind	Brown Songlark	*Megalurus cruralis*	1	7	100	30	20	
BUS18		27/08/2024	9:05am	BUS	12 degrees, overcast, moderate wind	Brown Songlark	*Megalurus cruralis*	1	20	100	50	280	
BUS18		27/08/2024	9:05am	BUS	12 degrees, overcast, moderate wind	Horsfield's Bronze Cuckoo	*Chrysococcyx basalis*	1	-	150	280	-	heard calling
BUS18		27/08/2024	9:05am	BUS	12 degrees, overcast, moderate wind	Little Raven	*Corvus mellori*	5	3	75	230	300	flying
BUS18		27/08/2024	9:05am	BUS	12 degrees, overcast, moderate wind	Little Raven	*Corvus mellori*	2	10	500	40	300	flying
BUS18		27/08/2024	9:05am	BUS	12 degrees, overcast, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	7	200	60	170	hunting
BUS18		27/08/2024	9:05am	BUS	12 degrees, overcast, moderate wind	White-winged Fairywren	*Malurus leucopterus*	1	-	50	50	-	heard calling
BUS19		27/08/2024	12:10 PM	BUS	20.9°C, NNW - 26 km/h, No Rain, 3 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	1	0	50	220	-	calling
BUS19		27/08/2024	12:10 PM	BUS	20.9°C, NNW - 26 km/h, No Rain, 3 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	40	100	230	60	foraging
BUS19		27/08/2024	12:10 PM	BUS	20.9°C, NNW - 26 km/h, No Rain, 3 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	3	2	50	50	0	flying
BUS21		27/08/2024	1:00 PM	BUS	21°C, NNW - 30 km/h, No Rain, 3 Beauford Scale Wind	Australasian Pipit	*Anthus novaeseelandiae*	3	1	20	45	50	flying low
BUS21		27/08/2024	1:00 PM	BUS	21°C, NNW - 30 km/h, No Rain, 3 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	3	4	60	225	50	flying
BUS21		27/08/2024	1:00 PM	BUS	21°C, NNW - 30 km/h, No Rain, 3 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	2	4	10	225	330	foraging
BUS01		28/08/2024	10:45 AM	BUS	17.4°C, W - 37 km/h, No Rain, 4 Beauford Scale Wind	Australian Magpie	*Gymnorhina tibicen*	2	30	150	150	230	flying
BUS01		28/08/2024	10:45 AM	BUS	17.4°C, W - 37 km/h, No Rain, 4 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	4	15	600	260	180	Flying
BUS01		28/08/2024	10:45 AM	BUS	17.4°C, W - 37 km/h, No Rain, 4 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	1	0	100	170	-	Calling
BUS01		28/08/2024	10:45 AM	BUS	17.4°C, W - 37 km/h, No Rain, 4 Beauford Scale Wind	Common Blackbird	*Turdus merula*	1	20	70	220	60	Flying
BUS01		28/08/2024	10:45 AM	BUS	17.4°C, W - 37 km/h, No Rain, 4 Beauford Scale Wind	Emu	*Dromaius novaehollandiae*	3	0	50	180	90	Running
BUS02		28/08/2024	11:10 AM	BUS	17.4°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	2	15	1000	100	120	flying
BUS02		28/08/2024	11:10 AM	BUS	17.4°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Common Starling	*Sturnus vulgaris*	140	20	1000	340	80	circling
BUS02		28/08/2024	11:10 AM	BUS	17.4°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	30	900	100	210	flying
BUS02		28/08/2024	11:10 AM	BUS	17.4°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Wedge-tailed Eagle	*Aquila audax*	1	120	1200	100	210	flying against wind
BUS03		28/08/2024	11:40 AM	BUS	18°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	10	400	340	340	flying
BUS03		28/08/2024	11:40 AM	BUS	18°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	5	20	300	140	350	flying
BUS03		28/08/2024	11:40 AM	BUS	18°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	30	100	20	290	flying/ foraging
BUS03		28/08/2024	11:40 AM	BUS	18°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	1	1	20	30	30	foraging
BUS04		28/08/2024	8:30am	BUS	18 degrees, sunny, moderate wind	Australian Magpie	*Gymnorhina tibicen*	3	15	250	160	-	circling
BUS04		28/08/2024	9:05am	BUS	18 degrees, cloudy, moderate wind	Australian Pipit	*Anthus novaeseelandiae*	1	7	100	260	190	
BUS04		28/08/2024	8:30am	BUS	18 degrees, sunny, moderate wind	Australian Raven	*Corvus coronoides*	5	25	100	160	50	flying
BUS04		28/08/2024	9:05am	BUS	18 degrees, cloudy, moderate wind	Australian Raven	*Corvus coronoides*	1	10	500	180	210	flying
BUS04		28/08/2024	8:30am	BUS	18 degrees, sunny, moderate wind	Brown Songlark	*Megalurus cruralis*	1	-	30	270	-	heard calling
BUS04		28/08/2024	9:05am	BUS	18 degrees, cloudy, moderate wind	Brown Songlark	*Megalurus cruralis*	1	-	50	-	-	heard calling

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS04		28/08/2024	8:30am	BUS	18 degrees, sunny, moderate wind	Common Starling	*Sturnus vulgaris*	10	20	500	220	-	circling
BUS04		28/08/2024	8:30am	BUS	18 degrees, sunny, moderate wind	Little Raven	*Corvus mellori*	3	17	50	240	80	flying
BUS04		28/08/2024	8:30am	BUS	18 degrees, sunny, moderate wind	Little Raven	*Corvus mellori*	2	30	75	230	20	flying
BUS04		28/08/2024	8:30am	BUS	18 degrees, sunny, moderate wind	Little Raven	*Corvus mellori*	4	40	500	240	340	flying
BUS04		28/08/2024	8:30am	BUS	18 degrees, sunny, moderate wind	Little Raven	*Corvus mellori*	3	70	350	45	355	flying
BUS04		28/08/2024	8:30am	BUS	18 degrees, sunny, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	25	100	180	110	hunting
BUS04		28/08/2024	8:30am	BUS	18 degrees, sunny, moderate wind	Nankeen Kestrel	*Falco cenchroides*	2	20	400	210	140	hunting
BUS04		28/08/2024	9:05am	BUS	18 degrees, cloudy, moderate wind	Wedge-tailed Eagle	*Aquila audax*	1	70	700	120	-	circling
BUS04		28/08/2024	8:30am	BUS	18 degrees, sunny, moderate wind	White-winged Fairywren	*Malurus leucopterus*	2	1	30	260	-	perched in shrub
BUS04		28/08/2024	9:05am	BUS	18 degrees, cloudy, moderate wind	White-winged Fairywren	*Malurus leucopterus*	2	-	50	-	-	heard calling
BUS04		28/08/2024	9:05am	BUS	18 degrees, cloudy, moderate wind	White-winged Fairywren	*Malurus leucopterus*	1	2	12	95	110	
BUS05		28/08/2024	9:40am	BUS	19 degrees, cloudy, high wind	Australian Raven	*Corvus coronoides*	1	50	150	130	15	flying
BUS05		28/08/2024	9:40am	BUS	19 degrees, cloudy, high wind	Australian Raven	*Corvus coronoides*	2	45	50	190	60	flying
BUS05		28/08/2024	9:40am	BUS	19 degrees, cloudy, high wind	Wedge-tailed Eagle	*Aquila audax*	1	25	200	200	-	in nest in transmission tower
BUS05		28/08/2024	9:40am	BUS	19 degrees, cloudy, high wind	White-fronted Chat	*Epthianura albifrons*	1	-	30	30	-	heard calling
BUS05		28/08/2024	9:40am	BUS	19 degrees, cloudy, high wind	White-winged Fairywren	*Malurus leucopterus*	1	-	20	0	-	heard calling
BUS07		28/08/2024	12:20 PM	BUS	18.5°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	4	10	500	270	330	flying
BUS07		28/08/2024	12:20 PM	BUS	18.5°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	1	1	20	210	-	calling
BUS07		28/08/2024	12:20 PM	BUS	18.5°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Wedge-tailed Eagle	*Aquila audax*	1	5	1200	230	300	flying
BUS09		28/08/2024	11:52am	BUS	20 degrees, sunny, very high wind	Brown Songlark	*Megalurus cruralis*	1	-	50	0	-	heard calling
BUS09		28/08/2024	11:52am	BUS	20 degrees, sunny, very high wind	Nankeen Kestrel	*Falco cenchroides*	1	25	80	310	260	flying
BUS09		28/08/2024	11:52am	BUS	20 degrees, sunny, very high wind	Nankeen Kestrel	*Falco cenchroides*	1	5	200	90	110	flying
BUS10		28/08/2024	2:30 PM	BUS	19.9°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	2	20	50	340	220	flying
BUS10		28/08/2024	2:30 PM	BUS	19.9°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	30	800	270	270	flying
BUS10		28/08/2024	2:30 PM	BUS	19.9°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	15	600	210	210	foraging
BUS10		28/08/2024	2:30 PM	BUS	19.9°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	5	150	70	140	flying
BUS11		28/08/2024	10:40am	BUS	19 degrees, cloudy, high wind	Brown Falcon	*Falco berigora*	1	80	90	320	50	flying
BUS11		28/08/2024	10:40am	BUS	19 degrees, cloudy, high wind	Common Starling	*Sturnus vulgaris*	45	15	600	245	-	dispersing
BUS11		28/08/2024	10:40am	BUS	19 degrees, cloudy, high wind	White-winged Fairywren	*Malurus leucopterus*	1	-	30	-	-	heard calling
BUS13		28/08/2024	3:40pm	BUS	18 degrees, cloudy, moderate wind	Brown Songlark	*Megalurus cruralis*	1	20	25	250	330	flying
BUS13		28/08/2024	3:40pm	BUS	18 degrees, cloudy, moderate wind	Horsfield's Bronze Cuckoo	*Chrysococcyx basalis*	1	25	40	240	-	circling
BUS13		28/08/2024	3:40pm	BUS	18 degrees, cloudy, moderate wind	White-winged Fairywren	*Malurus leucopterus*	4	-	50	-	-	heard all directions
BUS14		28/08/2024	04:20pm	BUS	21 degrees, cloudy, moderate wind	Australian Pipit	*Anthus novaeseelandiae*	1	1	17	120	320	
BUS14		28/08/2024	04:20pm	BUS	21 degrees, cloudy, moderate wind	Australian Wood Duck	*Chenonetta jubata*	2	0	120	160	-	beside dam
BUS14		28/08/2024	04:20pm	BUS	21 degrees, cloudy, moderate wind	Brown Falcon	*Falco berigora*	1	50	80	170	100	hunting
BUS14		28/08/2024	04:20pm	BUS	21 degrees, cloudy, moderate wind	Brown Songlark	*Megalurus cruralis*	1	-	50	180	-	heard calling
BUS14		28/08/2024	04:20pm	BUS	21 degrees, cloudy, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	30	150	170	160	hunting
BUS14		28/08/2024	04:20pm	BUS	21 degrees, cloudy, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	10	180	230	0	hunting
BUS16		28/08/2024	2:00 PM	BUS	19.5°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	2	15	50	180	40	flying
BUS16		28/08/2024	2:00 PM	BUS	19.5°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	1	15	400	40	60	flying
BUS16		28/08/2024	2:00 PM	BUS	19.5°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	30	450	100	100	flying
BUS16		28/08/2024	2:00 PM	BUS	19.5°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	15	600	80	210	foraging
BUS18		28/08/2024	11:15am	BUS	19 degrees, cloudy, high wind	Australian Pipit	*Anthus novaeseelandiae*	1	1	50	110	-	
BUS18		28/08/2024	11:15am	BUS	19 degrees, cloudy, high wind	Australian Raven	*Corvus coronoides*	2	4	600	280	20	flying
BUS18		28/08/2024	11:15am	BUS	19 degrees, cloudy, high wind	Brown Songlark	*Megalurus cruralis*	1	3	40	270	320	
BUS18		28/08/2024	11:15am	BUS	19 degrees, cloudy, high wind	Nankeen Kestrel	*Falco cenchroides*	1	10	30	190	100	hunting
BUS18		28/08/2024	11:15am	BUS	19 degrees, cloudy, high wind	White-winged Fairywren	*Malurus leucopterus*	1	-	40	280	-	heard calling
BUS19		28/08/2024	4:15 PM	BUS	18.7°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	2	2	100	340	240	flying low
BUS19		28/08/2024	4:15 PM	BUS	18.7°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	15	600	330	340	hovering
BUS19		28/08/2024	4:15 PM	BUS	18.7°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	1	1	10	60	-	calling
BUS19		28/08/2024	4:15 PM	BUS	18.7°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Wedge-tailed Eagle	*Aquila audax*	1	120	700	30	230	soaring
BUS19		28/08/2024	4:15 PM	BUS	18.7°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Wedge-tailed Eagle	*Aquila audax*	1	7	400	300	240	flying low
BUS20		28/08/2024	1:20pm	BUS	22 degrees, cloudy, high wind	Brown Songlark	*Megalurus cruralis*	1	1	60	120	-	landing
BUS20		28/08/2024	1:20pm	BUS	22 degrees, cloudy, high wind	Brown Songlark	*Megalurus cruralis*	1	2	50	350	-	landing
BUS20		28/08/2024	1:20pm	BUS	22 degrees, cloudy, high wind	Brown Songlark	*Megalurus cruralis*	1	-	50	300	-	heard calling
BUS20		28/08/2024	1:20pm	BUS	22 degrees, cloudy, high wind	Brown Songlark	*Megalurus cruralis*	1	15	35	90	10	flying
BUS20		28/08/2024	1:20pm	BUS	22 degrees, cloudy, high wind	Stubble Quail	*Coturnix pectoralis*	1	-	15	240	-	heard calling
BUS20		28/08/2024	1:20pm	BUS	22 degrees, cloudy, high wind	White-fronted Chat	*Epthianura albifrons*	1	15	40	170	70	flying
BUS21		28/08/2024	3:50 PM	BUS	19.4°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	1	0	100	330	-	calling
BUS21		28/08/2024	3:50 PM	BUS	19.4°C, W - 41 km/h, No Rain, 4 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	3	30	150	210	300	soaring
BUS01		29/08/2024	4:45 PM	BUS	17.4°C, W - 37 km/h, No Rain, 4 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	4	15	600	90	60	flying
BUS01		29/08/2024	4:45 PM	BUS	17.4°C, W - 37 km/h, No Rain, 4 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	7	20	1000	130	230	Flock flying
BUS01		29/08/2024	4:45 PM	BUS	17.4°C, W - 37 km/h, No Rain, 4 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	2	10	200	250	250	calling
BUS01		29/08/2024	4:45 PM	BUS	17.4°C, W - 37 km/h, No Rain, 4 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	1	1	150	130	50	flying
BUS02		29/08/2024	3:15 PM	BUS	19.9°C, NW - 37 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	2	300	90	320	flying
BUS02		29/08/2024	3:15 PM	BUS	19.9°C, NW - 37 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	20	500	280	40	flying
BUS02		29/08/2024	3:15 PM	BUS	19.9°C, NW - 37 km/h, No Rain, 1 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	1	0	120	230	-	percehd
BUS02		29/08/2024	3:15 PM	BUS	19.9°C, NW - 37 km/h, No Rain, 1 Beauford Scale Wind	Wedge-tailed Eagle	*Aquila audax*	1	250	2000	310	200	circling
BUS02		29/08/2024	3:15 PM	BUS	19.9°C, NW - 37 km/h, No Rain, 1 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	2	2	150	270	170	flying
BUS03		29/08/2024	2:00 PM	BUS	18.8°C, NW - 20 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	20	200	190	70	flying
BUS03		29/08/2024	2:00 PM	BUS	18.8°C, NW - 20 km/h, No Rain, 1 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	40	150	260	120	foraging
BUS03		29/08/2024	2:00 PM	BUS	18.8°C, NW - 20 km/h, No Rain, 1 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	5	1	20	310	-	calling
BUS03		29/08/2024	2:00 PM	BUS	18.8°C, NW - 20 km/h, No Rain, 1 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	2	1	15	80	30	flying
BUS03		29/08/2024	2:00 PM	BUS	18.8°C, NW - 20 km/h, No Rain, 1 Beauford Scale Wind	White-winged Fairy-wren	*Malurus leucopterus*	1	1	20	100	60	flying
BUS04		29/08/2024	11:00 AM	BUS	15.6°C, NW - 15 km/h, No Rain, 1 Beauford Scale Wind	Australian Magpie	*Gymnorhina tibicen*	2	5	400	330	230	flying
BUS04		29/08/2024	11:00 AM	BUS	15.6°C, NW - 15 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	3	10	300	200	-	perched in stag
BUS04		29/08/2024	11:00 AM	BUS	15.6°C, NW - 15 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	5	200	350	290	flying
BUS04		29/08/2024	11:00 AM	BUS	15.6°C, NW - 15 km/h, No Rain, 1 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	3	1	100	320	-	calling
BUS04		29/08/2024	11:00 AM	BUS	15.6°C, NW - 15 km/h, No Rain, 1 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	2	20	300	240	250	flying
BUS04		29/08/2024	11:00 AM	BUS	15.6°C, NW - 15 km/h, No Rain, 1 Beauford Scale Wind	Noisy Miner	*Manorina melanocephala*	2	4	350	200	250	flying
BUS04		29/08/2024	11:00 AM	BUS	15.6°C, NW - 15 km/h, No Rain, 1 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	3	1	50	340	-	calling
BUS05		29/08/2024	10:00 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	Australian Magpie	*Gymnorhina tibicen*	2	30	200	280	200	flying then perched
BUS05		29/08/2024	10:00 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	2	30	700	190	100	flying
BUS05		29/08/2024	10:00 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	2	0	200	20	-	calling
BUS05		29/08/2024	10:00 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	3	70	150	290	230	flying
BUS05		29/08/2024	10:00 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	1	5	200	20	90	flying
BUS06		29/08/2024	10:30 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	Australasian Pipit	*Anthus novaeseelandiae*	1	0	10	330	320	moving via ground
BUS06		29/08/2024	10:30 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	3	40	2200	340	230	flying
BUS06		29/08/2024	10:30 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	40	300	50	250	flying
BUS06		29/08/2024	10:30 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	1	1	200	30	-	calling
BUS06		29/08/2024	10:30 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	40	200	310	220	flying
BUS06		29/08/2024	10:30 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	2	1	50	150	-	calling
BUS06		29/08/2024	10:30 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	6	2	50	250	280	flying
BUS06		29/08/2024	10:30 AM	BUS	13.6°C, NW - 11 km/h, No Rain, 1 Beauford Scale Wind	White-winged Fairy-wren	*Malurus leucopterus*	3	1	100	270	-	calling

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS07		29/08/2024	2:40 PM	BUS	20.2°C, NW - 22 km/h, No Rain, 1 Beauford Scale Wind	Australian Magpie	*Gymnorhina tibicen*	3	5	300	250	280	flying
BUS07		29/08/2024	2:40 PM	BUS	20.2°C, NW - 22 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	4	10	300	170	240	flying
BUS07		29/08/2024	2:40 PM	BUS	20.2°C, NW - 22 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	2	15	150	50	160	flying
BUS07		29/08/2024	2:40 PM	BUS	20.2°C, NW - 22 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	2	80	1000	130	340	flying
BUS07		29/08/2024	2:40 PM	BUS	20.2°C, NW - 22 km/h, No Rain, 1 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	3	1	200	300	0	flying
BUS07		29/08/2024	2:40 PM	BUS	20.2°C, NW - 22 km/h, No Rain, 1 Beauford Scale Wind	Wedge-tailed Eagle	*Aquila audax*	1	200	1500	130	140	flying
BUS08		29/08/2024	10:42am	BUS	15 degrees, clear sky, light wind	Australian Pipit	*Anthus novaeseelandiae*	1	-	50	250	-	heard calling
BUS08		29/08/2024	10:42am	BUS	15 degrees, clear sky, light wind	Australian Pipit	*Anthus novaeseelandiae*	2	15	10	220	-	circling/chasing
BUS08		29/08/2024	10:42am	BUS	15 degrees, clear sky, light wind	Australian Raven	*Corvus coronoides*	1	60	75	320	210	flying
BUS08		29/08/2024	10:42am	BUS	15 degrees, clear sky, light wind	Australian Raven	*Corvus coronoides*	2	17	40	280	140	flying
BUS08		29/08/2024	10:42am	BUS	15 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	1	20	25	20	280	landed in shrub
BUS08		29/08/2024	10:42am	BUS	15 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	2	-	-	-	-	heard calling
BUS08		29/08/2024	10:42am	BUS	15 degrees, clear sky, light wind	Horsfield's Bronze Cuckoo	*Chrysococcyx basalis*	1	-	100	10	-	heard calling
BUS08		29/08/2024	10:42am	BUS	15 degrees, clear sky, light wind	Stubble Quail	*Coturnix pectoralis*	1	-	50	300	-	heard calling
BUS08		29/08/2024	10:42am	BUS	15 degrees, clear sky, light wind	White-winged Fairywren	*Malurus leucopterus*	1	-	15	130	-	heard calling
BUS08		29/08/2024	10:42am	BUS	15 degrees, clear sky, light wind	White-winged Fairywren	*Malurus leucopterus*	5	1	20	220	120	flying between shrubs
BUS09		29/08/2024	3:50pm	BUS	22 degrees, clear sky, moderate wind	Brown Songlark	*Megalurus cruralis*	1	-	30	20	-	heard calling
BUS09		29/08/2024	3:50pm	BUS	22 degrees, clear sky, moderate wind	Galah	*Eolophus roseicapilla*	16	10	500	200	310	flying
BUS09		29/08/2024	3:50pm	BUS	22 degrees, clear sky, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	45	20	40	130	hunting
BUS09		29/08/2024	3:50pm	BUS	22 degrees, clear sky, moderate wind	White-winged Fairywren	*Malurus leucopterus*	1	-	50	80	-	heard calling
BUS10		29/08/2024	9:12am	BUS	11 degrees, clear sky, light wind	Australian Pipit	*Anthus novaeseelandiae*	1	-	50	60	-	heard calling
BUS10		29/08/2024	9:12am	BUS	11 degrees, clear sky, light wind	Australian Pipit	*Anthus novaeseelandiae*	1	1	100	300	-	perched in shrub
BUS10		29/08/2024	9:12am	BUS	11 degrees, clear sky, light wind	Banded Lapwing	*Vanellus tricolor*	1	-	250	125	-	heard calling
BUS10		29/08/2024	9:12am	BUS	11 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	2	15	75	320	200	
BUS10		29/08/2024	9:12am	BUS	11 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	1	5	50	160	220	
BUS10		29/08/2024	9:12am	BUS	11 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	1	12	70	50	310	
BUS10		29/08/2024	9:12am	BUS	11 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	2	16	30	220	60	
BUS10		29/08/2024	9:12am	BUS	11 degrees, clear sky, light wind	Fairywren sp.	*Malurus sp.*	1	-	50	290	-	sounded different to white-winged
BUS10		29/08/2024	9:12am	BUS	11 degrees, clear sky, light wind	Little Corella	*Cacatua sanguinea*	4	35	100	300	180	flying
BUS10		29/08/2024	9:12am	BUS	11 degrees, clear sky, light wind	Spotted Harrier	*Circus assimilis*	1	2	150	320	100	hunting
BUS11		29/08/2024	2:40pm	BUS	22 degrees, clear sky, moderate wind	Australian Magpie	*Gymnorhina tibicen*	1	10	100	200	80	flying
BUS11		29/08/2024	2:40pm	BUS	22 degrees, clear sky, moderate wind	Australian Pipit	*Anthus novaeseelandiae*	1	1	25	30	-	perched in shrub
BUS11		29/08/2024	2:40pm	BUS	22 degrees, clear sky, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	50	50	100	-	perched on fence then flew up
BUS11		29/08/2024	2:40pm	BUS	22 degrees, clear sky, moderate wind	White-fronted Chat	*Epthianura albifrons*	1	15	30	170	10	flying
BUS11		29/08/2024	2:40pm	BUS	22 degrees, clear sky, moderate wind	White-winged Fairywren	*Malurus leucopterus*	1	-	20	320	-	heard calling
BUS13		29/08/2024	8:00am	BUS	9 degrees, clear sky, light wind	Australian Pipit	*Anthus novaeseelandiae*	1	-	30	300	-	heard calling
BUS13		29/08/2024	8:00am	BUS	9 degrees, clear sky, light wind	Australian Pipit	*Anthus novaeseelandiae*	1	-	50	300	-	heard calling
BUS13		29/08/2024	8:00am	BUS	9 degrees, clear sky, light wind	Australian Raven	*Corvus coronoides*	1	40	300	290	50	flying
BUS13		29/08/2024	8:00am	BUS	9 degrees, clear sky, light wind	Australian Raven	*Corvus coronoides*	8	25	50	280	90	flying
BUS13		29/08/2024	8:00am	BUS	9 degrees, clear sky, light wind	Little Raven	*Corvus mellori*	1	15	120	160	240	flying
BUS13		29/08/2024	8:00am	BUS	9 degrees, clear sky, light wind	Magpie-lark	*Grallina cyanoleuca*	2	17	40	210	120	flying
BUS13		29/08/2024	8:00am	BUS	9 degrees, clear sky, light wind	White-fronted Chat	*Epthianura albifrons*	1	1	60	160	-	perched in shrub
BUS13		29/08/2024	8:00am	BUS	9 degrees, clear sky, light wind	White-fronted Chat	*Epthianura albifrons*	1	3	20	60	180	flying
BUS13		29/08/2024	8:00am	BUS	9 degrees, clear sky, light wind	White-winged Fairywren	*Malurus leucopterus*	2	1	15	350	-	perched in shrub
BUS13		29/08/2024	8:00am	BUS	9 degrees, clear sky, light wind	White-winged Fairywren	*Malurus leucopterus*	3	-	50	190 - 260	-	heard calling
BUS14		29/08/2024	9:35am	BUS	9 degrees, clear sky, light wind	Australian Pipit	*Anthus novaeseelandiae*	1	-	30	260	-	heard calling
BUS14		29/08/2024	9:35am	BUS	9 degrees, clear sky, light wind	Australian Pipit	*Anthus novaeseelandiae*	1	5	30	130	0	landed in shrub
BUS14		29/08/2024	9:35am	BUS	9 degrees, clear sky, light wind	Australian Raven	*Corvus coronoides*	1	30	350	210	90	flying
BUS14		29/08/2024	9:35am	BUS	9 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	1	-	75	170	-	heard calling
BUS14		29/08/2024	9:35am	BUS	9 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	1	-	50	20	-	heard calling
BUS14		29/08/2024	9:35am	BUS	9 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	1	-	150	280	-	heard calling
BUS14		29/08/2024	9:35am	BUS	9 degrees, clear sky, light wind	Emu	*Dromaius novaehollandiae*	4	0	750	160	-	running east
BUS14		29/08/2024	9:35am	BUS	9 degrees, clear sky, light wind	White-winged Fairywren	*Malurus leucopterus*	1	-	50	340	-	heard calling
BUS15		29/08/2024	11:15am	BUS	18 degrees, clear sky, light wind	Australian Hobby	*Falco longipennis*	1	150	40	280	-	circling with Brown Falcon
BUS15		29/08/2024	11:15am	BUS	18 degrees, clear sky, light wind	Brown Falcon	*Falco berigora*	1	150	40	350	-	circling with Hobby
BUS15		29/08/2024	11:15am	BUS	18 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	1	14	60	210	290	
BUS15		29/08/2024	11:15am	BUS	18 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	1	16	50	130	50	
BUS15		29/08/2024	11:15am	BUS	18 degrees, clear sky, light wind	Brown Songlark	*Megalurus cruralis*	1	20	120	50	280	
BUS15		29/08/2024	11:15am	BUS	18 degrees, clear sky, light wind	Common Starling	*Sturnus vulgaris*	40	5	350	260	160	dispersing
BUS15		29/08/2024	11:15am	BUS	18 degrees, clear sky, light wind	Nankeen Kestrel	*Falco cenchroides*	1	35	300	70	0	hunting
BUS16		29/08/2024	8:25 AM	BUS	8.9°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Australasian Pipit	*Anthus novaeseelandiae*	4	15	20	210	90	flying
BUS16		29/08/2024	8:25 AM	BUS	8.9°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Australian Magpie	*Gymnorhina tibicen*	3	2	400	250	-	calling
BUS16		29/08/2024	8:25 AM	BUS	8.9°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	20	100	230	60	flying
BUS16		29/08/2024	8:25 AM	BUS	8.9°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	30	700	120	240	flying
BUS16		29/08/2024	8:25 AM	BUS	8.9°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	6	20	150	280	240	gliding
BUS16		29/08/2024	8:25 AM	BUS	8.9°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Horsfield's Bronze-Cuckoo	*Chalcites basalis*	2	1	100	330	-	calling
BUS16		29/08/2024	8:25 AM	BUS	8.9°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Superb Fairy-wren	*Malurus cyaneus*	3	1	1	180	-	calling
BUS16		29/08/2024	8:25 AM	BUS	8.9°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	1	5	150	270	120	calling
BUS18		29/08/2024	3:18pm	BUS	22 degrees, clear sky, moderate wind	Brown Falcon	*Falco berigora*	1	40	150	200	-	hunting
BUS18		29/08/2024	3:18pm	BUS	22 degrees, clear sky, moderate wind	Little Raven	*Corvus mellori*	1	3	120	240	310	flying
BUS18		29/08/2024	3:18pm	BUS	22 degrees, clear sky, moderate wind	Little Raven	*Corvus mellori*	10	3	500	300	-	dispersing
BUS18		29/08/2024	3:18pm	BUS	22 degrees, clear sky, moderate wind	Nankeen Kestrel	*Falco cenchroides*	1	25	0	180	0	flew overhead
BUS18		29/08/2024	3:18pm	BUS	22 degrees, clear sky, moderate wind	White-winged Fairywren	*Malurus leucopterus*	1	-	40	280	-	heard calling
BUS19		29/08/2024	7:55 AM	BUS	6.6°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Australian Magpie	*Gymnorhina tibicen*	1	0	300	220	-	calling
BUS19		29/08/2024	7:55 AM	BUS	6.6°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	5	20	150	340	60	flying then perched
BUS19		29/08/2024	7:55 AM	BUS	6.6°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	1	10	100	220	20	flying
BUS19		29/08/2024	7:55 AM	BUS	6.6°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	6	15	100	20	150	gliding
BUS19		29/08/2024	7:55 AM	BUS	6.6°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	1	30	450	160	220	gliding
BUS19		29/08/2024	7:55 AM	BUS	6.6°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	50	300	250	200	circling
BUS19		29/08/2024	7:55 AM	BUS	6.6°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Welcome Swallow	*Hirundo neoxena*	3	8	200	180	0	aerial feeding
BUS21		29/08/2024	9:05 AM	BUS	11.8°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Australasian Pipit	*Anthus novaeseelandiae*	1	1	150	250	-	calling
BUS21		29/08/2024	9:05 AM	BUS	11.8°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Australian Magpie	*Gymnorhina tibicen*	2	1	150	30	-	calling
BUS21		29/08/2024	9:05 AM	BUS	11.8°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	5	25	600	150	290	flying
BUS21		29/08/2024	9:05 AM	BUS	11.8°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	3	20	100	150	330	flying
BUS21		29/08/2024	9:05 AM	BUS	11.8°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Emu	*Dromaius novaehollandiae*	2	0	200	200	110	moving through shrubs
BUS21		29/08/2024	9:05 AM	BUS	11.8°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	15	500	150	240	calling
BUS21		29/08/2024	9:05 AM	BUS	11.8°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	3	40	100	150	60	flying
BUS21		29/08/2024	9:05 AM	BUS	11.8°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	2	5	100	20	150	flying
BUS21		29/08/2024	9:05 AM	BUS	11.8°C, NW - 9 km/h, No Rain, 1 Beauford Scale Wind	White-winged Fairy-wren	*Malurus leucopterus*	3	1	50	170	-	calling
BUS08		30/08/2024	8:27am	BUS	17 degrees, cloudy, light wind	Australian Pipit	*Anthus novaeseelandiae*	1	-	30	20	-	heard calling
BUS08		30/08/2024	8:27am	BUS	17 degrees, cloudy, light wind	Brown Songlark	*Megalurus cruralis*	1	-	50	90	-	heard calling
BUS08		30/08/2024	8:27am	BUS	17 degrees, cloudy, light wind	Brown Songlark	*Megalurus cruralis*	1	22	35	20	240	
BUS08		30/08/2024	8:27am	BUS	17 degrees, cloudy, light wind	Brown Songlark	*Megalurus cruralis*	1	10	60	320	140	
BUS08		30/08/2024	8:27am	BUS	17 degrees, cloudy, light wind	Brown Songlark	*Megalurus cruralis*	1	5	80	30	310	

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS08		30/08/2024	8:27am	BUS	17 degrees, cloudy, light wind	Brown Songlark	*Megalurus cruralis*	1	3	60	200	310	
BUS08		30/08/2024	8:27am	BUS	17 degrees, cloudy, light wind	Brown Songlark	*Megalurus cruralis*	1	35	45	0	220	
BUS08		30/08/2024	8:27am	BUS	17 degrees, cloudy, light wind	Horsfield's Bronze Cuckoo	*Chrysococcyx basalis*	1	2	15	170	70	perched in shrub and flew off
BUS08		30/08/2024	8:27am	BUS	17 degrees, cloudy, light wind	Nankeen Kestrel	*Falco cenchroides*	1	30	120	200	-	hunting
BUS08		30/08/2024	8:27am	BUS	17 degrees, cloudy, light wind	Stubble Quail	*Coturnix pectoralis*	3	-	20	-	-	heard in multiple directions
BUS08		30/08/2024	8:27am	BUS	17 degrees, cloudy, light wind	White-winged Fairywren	*Malurus leucopterus*	2	1	12	260	340	flying between shrubs
BUS12		30/08/2024	8:50 AM	BUS	18°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	6	15	700	30	30	flying
BUS12		30/08/2024	8:50 AM	BUS	18°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	3	40	100	270	280	calling
BUS12		30/08/2024	8:50 AM	BUS	18°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Gull-billed Tern	*Gelochelidon nilotica*	6	20	680	0	30	flying
BUS12		30/08/2024	8:50 AM	BUS	18°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	15	250	270	330	flying
BUS12		30/08/2024	8:50 AM	BUS	18°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Welcome Swallow	*Hirundo neoxena*	2	30	150	290	150	flying
BUS12		30/08/2024	8:50 AM	BUS	18°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	1	2	300	330	180	calling
BUS12		30/08/2024	8:50 AM	BUS	18°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	White-winged Fairy-wren	*Malurus leucopterus*	3	10	50	270	20	flying
BUS15		30/08/2024	08:57am	BUS	17 degrees, cloudy, moderate wind	Black Kite	*Milvus migrans*	1	30	100	80	300	flying
BUS15		30/08/2024	08:57am	BUS	17 degrees, cloudy, moderate wind	Brown Songlark	*Megalurus cruralis*	1	30	40	320	20	
BUS15		30/08/2024	08:57am	BUS	17 degrees, cloudy, moderate wind	Brown Songlark	*Megalurus cruralis*	1	18	50	310	280	
BUS15		30/08/2024	08:57am	BUS	17 degrees, cloudy, moderate wind	Brown Songlark	*Megalurus cruralis*	1	5	50	40	250	
BUS15		30/08/2024	08:57am	BUS	17 degrees, cloudy, moderate wind	Brown Songlark	*Megalurus cruralis*	1	25	40	100	270	
BUS15		30/08/2024	08:57am	BUS	17 degrees, cloudy, moderate wind	Little Raven	*Corvus mellori*	8	7	350	340	-	dispersing
BUS15		30/08/2024	08:57am	BUS	17 degrees, cloudy, moderate wind	Little Raven	*Corvus mellori*	4	20	650	305	60	flying
BUS15		30/08/2024	08:57am	BUS	17 degrees, cloudy, moderate wind	Little Raven	*Corvus mellori*	6	10	500	290	80	flying
BUS15		30/08/2024	08:57am	BUS	17 degrees, cloudy, moderate wind	Spotted Harrier	*Circus assimilis*	1	10	100	90	330	hunting
BUS15		30/08/2024	08:57am	BUS	17 degrees, cloudy, moderate wind	Stubble Quail	*Coturnix pectoralis*	1	-	30	10	-	heard calling
BUS15		30/08/2024	08:57am	BUS	17 degrees, cloudy, moderate wind	White-fronted Chat	*Epthianura albifrons*	1	-	40	250	-	heard calling
BUS17		30/08/2024	8:15 AM	BUS	17°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Australasian Pipit	*Anthus novaeseelandiae*	1	2	75	350	30	flying
BUS17		30/08/2024	8:15 AM	BUS	17°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Australasian Pipit	*Anthus novaeseelandiae*	1	10	60	180	200	flying
BUS17		30/08/2024	8:15 AM	BUS	17°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Australian Raven	*Corvus coronoides*	7	25	800	210	30	flying
BUS17		30/08/2024	8:15 AM	BUS	17°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	4	10	50	250	90	calling
BUS17		30/08/2024	8:15 AM	BUS	17°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Brown Songlark	*Megalurus cruralis*	1	20	100	230	310	gliding
BUS17		30/08/2024	8:15 AM	BUS	17°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Nankeen Kestrel	*Falco cenchroides*	1	25	700	40	210	foraging
BUS17		30/08/2024	8:15 AM	BUS	17°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	Welcome Swallow	*Hirundo neoxena*	1	20	20	330	280	flying
BUS17		30/08/2024	8:15 AM	BUS	17°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	White-fronted Chat	*Epthianura albifrons*	2	5	70	300	260	flying
BUS17		30/08/2024	8:15 AM	BUS	17°C, W - 26 km/h, No Rain, 2 Beauford Scale Wind	White-winged Fairy-wren	*Malurus leucopterus*	1	2	80	0	180	flying
Bird Census 2	143.873547, -34.805588	19/09/2024	8:00	CENSUS	8 degrees celsius, light winds, 3/8 cloud cover	Australian Magpie	*Gymnorhina tibicen*	1	2	80	-	-	Perched in tree
Bird Census 2	143.873547, -34.805588	19/09/2024	8:00	CENSUS	8 degrees celsius, light winds, 3/8 cloud cover	Australian Raven	*Corvus coronoides*	1	20	80	-	-	Flying overhead, then flew north
Bird Census 2	143.873547, -34.805588	19/09/2024	8:00	CENSUS	8 degrees celsius, light winds, 3/8 cloud cover	Brown Falcon	*Falco berigora*	1	2	150	-	-	Perched in tree
Bird Census 2	143.873547, -34.805588	19/09/2024	8:00	CENSUS	8 degrees celsius, light winds, 3/8 cloud cover	Brown Falcon	*Falco berigora*	1	1	100	-	-	Perched on fence
Bird Census 2	143.873547, -34.805588	19/09/2024	8:00	CENSUS	8 degrees celsius, light winds, 3/8 cloud cover	Emu	*Dromaius novaehollandiae*	3	0	200	-	-	Foraging throuh grass
Bird Census 2	143.873547, -34.805588	19/09/2024	8:00	CENSUS	8 degrees celsius, light winds, 3/8 cloud cover	Nankeen Kestrel	*Falco cenchroides*	2	2	120	-	-	Perched in tree
Bird Census 2	143.873547, -34.805588	19/09/2024	8:00	CENSUS	8 degrees celsius, light winds, 3/8 cloud cover	Nankeen Kestrel	*Falco cenchroides*	1	15	200	-	-	Hovering overhead
Bird Census 2	143.873547, -34.805588	19/09/2024	8:00	CENSUS	8 degrees celsius, light winds, 3/8 cloud cover	Superb Fairywren	*Malurus cyaneus*	2	1	50	-	-	Calling in shrub
Bird Census 3	143.933662, -34.765591	19/09/2024	15:05	CENSUS	20 degrees celsius, light winds, 3/8 cloud cover	Brown Songlark	*Megalurus cruralis*	2	0	70	-	-	Calling in shrub
Bird Census 3	143.933662, -34.765591	19/09/2024	15:05	CENSUS	20 degrees celsius, light winds, 3/8 cloud cover	Galah	*Eolophus roseicapilla*	12	90	50	-	-	Small flock flying overhead
Bird Census 3	143.933662, -34.765591	19/09/2024	15:05	CENSUS	20 degrees celsius, light winds, 3/8 cloud cover	Galah	*Eolophus roseicapilla*	2	3	100	-	-	Flying from ground
Bird Census 3	143.933662, -34.765591	19/09/2024	15:05	CENSUS	20 degrees celsius, light winds, 3/8 cloud cover	Nankeen Kestrel	*Falco cenchroides*	1	15	200	-	-	Hovering overhead
Bird Census 7	143.928299, -34.723837	21/09/2024	13:36	CENSUS	19 degrees celsius, cloudy, high wind, 5/8 cloud cover	Australasian Pipit	*Anthus novaeseelandiae*	1	10	10	-	-	Perched in tree, calling.
Bird Census 7	143.928299, -34.723837	21/09/2024	13:36	CENSUS	19 degrees celsius, cloudy, high wind, 5/8 cloud cover	Australian Raven	*Corvus coronoides*	1	15	80	-	-	Pestering Nankeen Kestrel
Bird Census 7	143.928299, -34.723837	21/09/2024	13:36	CENSUS	19 degrees celsius, cloudy, high wind, 5/8 cloud cover	Australian Raven	*Corvus coronoides*	2	15	10	-	-	Two individuals sitting in highest stick nest
Bird Census 7	143.928299, -34.723837	21/09/2024	13:36	CENSUS	19 degrees celsius, cloudy, high wind, 5/8 cloud cover	Australian Raven	*Corvus coronoides*	2	20	50	-	-	Flew from ground near hwy
Bird Census 7	143.928299, -34.723837	21/09/2024	13:36	CENSUS	19 degrees celsius, cloudy, high wind, 5/8 cloud cover	Black-faced Woodswallow	*Artamus cinereus*	3	20	10	-	-	Flew to and perched in tree
Bird Census 7	143.928299, -34.723837	21/09/2024	13:36	CENSUS	19 degrees celsius, cloudy, high wind, 5/8 cloud cover	Nankeen Kestrel	*Falco cenchroides*	2	30	100	-	-	Gliding, one individual attended stick nest
Bird Census 7	143.928299, -34.723837	21/09/2024	13:36	CENSUS	19 degrees celsius, cloudy, high wind, 5/8 cloud cover	White-winged Fairywren	*Malurus leucopterus*	1	2	20	-	-	Flew between shrubs
Bird Census 8	143.909025, -34.745428	21/09/2024	9:18	CENSUS	12 degrees celsius, moderate wind, 7/8 cloud cover	Australian Magpie	*Gymnorhina tibicen*	1	7	200	-	-	Flying
Bird Census 8	143.909025, -34.745428	21/09/2024	9:18	CENSUS	12 degrees celsius, moderate wind, 7/8 cloud cover	Australian Raven	*Corvus coronoides*	2	12	180	-	-	In nest
Bird Census 8	143.909025, -34.745428	21/09/2024	9:18	CENSUS	12 degrees celsius, moderate wind, 7/8 cloud cover	Australian Raven	*Corvus coronoides*	2	5	250	-	-	Flying
Bird Census 8	143.909025, -34.745428	21/09/2024	9:18	CENSUS	12 degrees celsius, moderate wind, 7/8 cloud cover	Australian Raven	*Corvus coronoides*	2	2	500	-	-	Flying
Bird Census 8	143.909025, -34.745428	21/09/2024	9:18	CENSUS	12 degrees celsius, moderate wind, 7/8 cloud cover	Nankeen Kestrel	*Falco cenchroides*	1	15	180	-	-	Flew from trees
Bird Census 8	143.909025, -34.745428	21/09/2024	9:18	CENSUS	12 degrees celsius, moderate wind, 7/8 cloud cover	White-winged Fairywren	*Malurus leucopterus*	3	-	20	-	-	Calls heard
Opportunistic		23/09/2024	15:40	Bam plot??	light wind, 2/8 cloud cover	Australian Raven	*Corvus coronoides*	2	-	-	-	-	BAM Plot 31
Opportunistic		23/09/2024	10:25	Bam plot??	light wind, 1/8 cloud cover	Brown Songlark	*Megalurus cruralis*	6	-	-	-	-	BAM Plot 23
Opportunistic		23/09/2024	12:05	Bam plot??	moderate wind, 1/8 cloud cover	Brown Songlark	*Megalurus cruralis*	1	-	-	-	-	BAM Plot 34
Opportunistic		23/09/2024	-	Bam plot??	light wind, 2/8 cloud cover	Brown Songlark	*Megalurus cruralis*	6	-	-	-	-	BAM Plot in transmission corridor SW of BAM Plot 29
Opportunistic		23/09/2024	15:40	Bam plot??	light wind, 2/8 cloud cover	Wedge-tailed Eagle	*Aquila audax*	1	-	-	-	-	BAM Plot 31
Bird Census 1	144.033395, -34.768599	24/09/2024	8:45:00 AM	CENSUS	23 degrees celsius, light winds, 8/8 cloud cover	Black Kite	*Milvus migrans*	1	45	40	-	-	-
Bird Census 1	144.033395, -34.768599	24/09/2024	8:45:00 AM	CENSUS	23 degrees celsius, light winds, 8/8 cloud cover	Brown Songlark	*Megalurus cruralis*	2	-	-	-	-	-
Bird Census 1	144.033395, -34.768599	24/09/2024	8:45:00 AM	CENSUS	23 degrees celsius, light winds, 8/8 cloud cover	Wedge-tailed Eagle	*Aquila audax*	2	20	950	-	-	One sitting in nest and one sitting on stag
Bird Census 1	144.033395, -34.768599	24/09/2024	8:45:00 AM	CENSUS	23 degrees celsius, light winds, 8/8 cloud cover	White-winged Fairywren	*Malurus leucopterus*	2	1	-	-	-	Flying between shrubs
Bird Census 5	144.0090118, -34.7747820	25/09/2024	15:18	CENSUS	21 degrees celsius, light winds, 6/8 cloud cover	Black Kite	*Milvus migrans*	1	800	200	-	-	-
Bird Census 5	144.0090118, -34.7747820	25/09/2024	15:18	CENSUS	21 degrees celsius, light winds, 6/8 cloud cover	Brown Songlark	*Megalurus cruralis*	1	-	-	-	-	-
Bird Census 5	144.0090118, -34.7747820	25/09/2024	15:18	CENSUS	21 degrees celsius, light winds, 6/8 cloud cover	Galah	*Eolophus roseicapilla*	2	500	25	-	-	-
Bird Census 5	144.0090118, -34.7747820	25/09/2024	15:18	CENSUS	21 degrees celsius, light winds, 6/8 cloud cover	Little Raven	*Corvus mellori*	1	400	25	-	-	-
Bird Census 5	144.0090118, -34.7747820	25/09/2024	15:18	CENSUS	21 degrees celsius, light winds, 6/8 cloud cover	Magpie-lark	*Grallina cyanoleuca*	1	-	-	-	-	-
Bird Census 5	144.0090118, -34.7747820	25/09/2024	15:18	CENSUS	21 degrees celsius, light winds, 6/8 cloud cover	Nankeen Kestrel	*Falco cenchroides*	1	650	25	-	-	-
Bird Census 5	144.0090118, -34.7747820	25/09/2024	15:18	CENSUS	21 degrees celsius, light winds, 6/8 cloud cover	Wedge-tailed Eagle	*Aquila audax*	1	450	150	-	-	-
Bird Census 5	144.0090118, -34.7747820	25/09/2024	15:18	CENSUS	21 degrees celsius, light winds, 6/8 cloud cover	White-winged Fairywren	*Malurus leucopterus*	1	-	-	-	-	-
Opportunistic		26/09/2024	15:01	Bam plot??	Strong winds, 0/8 cloud cover	Australian Raven	*Corvus coronoides*	6	-	-	-	-	BAM Plot 21
Opportunistic		26/09/2024	12:32	Bam plot??	Strong winds, 0/8 cloud cover	Brown Songlark	*Megalurus cruralis*	2	-	-	-	-	BAM Plot 26
Opportunistic		26/09/2024	16:04	Bam plot??	Strong winds, 0/8 cloud cover	Brown Songlark	*Megalurus cruralis*	1	-	-	-	-	BAM Plot 22
Opportunistic		26/09/2024	15:01	Bam plot??	Strong winds, 0/8 cloud cover	Little Eagle	*Hieraaetus morphonoides*	1	-	-	-	-	BAM Plot 21
Opportunistic		26/09/2024	15:01	Bam plot??	Strong winds, 0/8 cloud cover	Nankeen Kestrel	*Falco cenchroides*	1	-	-	-	-	BAM Plot 21
Opportunistic		26/09/2024	16:04	Bam plot??	Strong winds, 0/8 cloud cover	Nankeen Kestrel	*Falco cenchroides*	1	-	-	-	-	BAM Plot 22
Opportunistic		26/09/2024	12:32	Bam plot??	Strong winds, 0/8 cloud cover	Wedge-tailed Eagle	*Aquila audax*	1	-	-	-	-	BAM Plot 26
Opportunistic		26/09/2024	15:01	Bam plot??	Strong winds, 0/8 cloud cover	White-fronted Chat	*Epthianura albifrons*	1	-	-	-	-	BAM Plot 21
Bird Census 4	143.9713733, -34.7831423	27/09/2024	16:15	CENSUS	18 degrees celsius, light winds, 0/8 cloud cover	Brown Songlark	*Megalurus cruralis*	2	-	-	-	-	-
Bird Census 6	144.0026723, -34.7074978	27/09/2024	14:35	CENSUS	- degrees celsius, sunny, light winds, 0/8 cloud cover	Australasian Pipit	Anthus novaeseelandiae	2	-	-	-	-	-
Opportunistic		27/09/2024	9:37	Bam plot??	moderate winds, 0/8 cloud cover	Australasian Pipit	*Anthus novaeseelandiae*	2	-	-	-	-	BAM Plot 10
Opportunistic		27/09/2024	10:02	Bam plot??	light to moderate winds, 0/8 cloud cover	Australasian Pipit	*Anthus novaeseelandiae*	2	-	-	-	-	BAM Plot 11
Opportunistic		27/09/2024	10:39	Bam plot??	light to moderate winds, 0/8 cloud cover	Australian Magpie	*Gymnorhina tibicen*	1	-	-	-	-	BAM Plot 12
Opportunistic		27/09/2024	10:02	Bam plot??	light to moderate winds, 0/8 cloud cover	Australian Raven	*Corvus coronoides*	1	-	-	-	-	BAM Plot 11
Opportunistic		27/09/2024	8:22	Bam plot??	moderate winds, 0/8 cloud cover	Brown Songlark	*Megalurus cruralis*	1	-	-	-	-	BAM Plot 7
Opportunistic		27/09/2024	8:55	Bam plot??	moderate winds, 0/8 cloud cover	Brown Songlark	*Megalurus cruralis*	4	-	-	-	-	BAM Plot 9
Opportunistic		27/09/2024	9:37	Bam plot??	moderate winds, 0/8 cloud cover	Brown Songlark	*Megalurus cruralis*	2	-	-	-	-	BAM Plot 10
Opportunistic		27/09/2024	10:02	Bam plot??	light to moderate winds, 0/8 cloud cover	Brown Songlark	*Megalurus cruralis*	4	-	-	-	-	BAM Plot 11
Opportunistic		27/09/2024	10:39	Bam plot??	light to moderate winds, 0/8 cloud cover	Brown Songlark	*Megalurus cruralis*	2	-	-	-	-	BAM Plot 12

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
Opportunistic		27/09/2024	11:37	Bam plot??	light winds, 0/8 cloud cover	Brown Songlark	*Megalurus cruralis*	2	-	-	-	-	BAM Plot 16
Opportunistic		27/09/2024	8:22	Bam plot??	moderate winds, 0/8 cloud cover	Galah	*Eolophus roseicapillus*	2	-	-	-	-	BAM Plot 7
Opportunistic		27/09/2024	8:22	Bam plot??	moderate winds, 0/8 cloud cover	Nankeen Kestrel	*Falco cenchroides*	1	-	-	-	-	BAM Plot 7
Opportunistic		27/09/2024	9:37	Bam plot??	moderate winds, 0/8 cloud cover	Rufous Songlark	*Cincloramphus mathewsi*	1	-	-	-	-	BAM Plot 10
Opportunistic		27/09/2024	10:02	Bam plot??	light to moderate winds, 0/8 cloud cover	Rufous Songlark	*Cincloramphus mathewsi*	1	-	-	-	-	BAM Plot 11
Opportunistic		27/09/2024	9:37	Bam plot??	moderate winds, 0/8 cloud cover	White-fronted Chat	*Epthianura albifrons*	1	-	-	-	-	BAM Plot 10
Opportunistic		27/09/2024	9:37	Bam plot??	moderate winds, 0/8 cloud cover	White-winged Fairywren	*Malurus leucopterus*	1	-	-	-	-	BAM Plot 10
Opportunistic		27/09/2024	10:02	Bam plot??	light to moderate winds, 0/8 cloud cover	White-winged Fairywren	*Malurus leucopterus*	1	-	-	-	-	BAM Plot 11
BUS04		27/11/2024	11:43 AM	BUS	28 degrees celsius , Southerly winds, moderate to light winds, moderate cloud cover 50/60%	Australian Magpie	*Gymnorhina tibicen*	3	10	100	340° N	220° SW	
BUS04		27/11/2024	11:43 AM	BUS	28 degrees celsius , Southerly winds, moderate to light winds, moderate cloud cover 50/60%	Australian raven	Corvus coronoides	1	10	30	120° SE	220° SW	Flying between trees
BUS04		27/11/2024	11:43 AM	BUS	28 degrees celsius , Southerly winds, moderate to light winds, moderate cloud cover 50/60%	Brown songlark	*Cincloramphus cruralis*	1	25	130	79° E	280° W	Flying between trees
BUS04		27/11/2024	11:43 AM	BUS	28 degrees celsius , Southerly winds, moderate to light winds, moderate cloud cover 50/60%	Brown songlark	*Cincloramphus cruralis*	2		60	300° NW		Heard
BUS04		27/11/2024	11:43 AM	BUS	28 degrees celsius , Southerly winds, moderate to light winds, moderate cloud cover 50/60%	Superb Fairywren	*Malurus cyaneus*	5	2	75	4° N		Foraging around bush
BUS04		27/11/2024	11:43 AM	BUS	28 degrees celsius , Southerly winds, moderate to light winds, moderate cloud cover 50/60%	Wedge-tailed eagle	*Aquila audax*	1	10	350	150° SE		Perched onto of tree
BUS01		28/11/2024	12:02 PM	BUS	24 degrees celsius, sunny light winds , 1/8 cloud cover, Agricultural shrubland with extensive grass coverage	Brown Songlark	*Megalurus cruralis*	1	15	150	140° SE	180° S	Flying into shrubs
BUS01		28/11/2024	12:02 PM	BUS	24 degrees celsius, sunny light winds , 1/8 cloud cover, Agricultural shrubland with extensive grass coverage	Brown Songlark	*Megalurus cruralis*	1	1	100	220° SW		Jumping/ flying between shrubs
BUS02		28/11/2024	11:35 AM	BUS	24 degrees celsius, sunny light winds , 1/8 cloud cover, Shrubland with moderate grass cover and exposed clay soil	Little Eagle	*Hieraaetus morphnoides*	2	50	100	200° SW	280° W	Hovering, swooping and land
BUS02		28/11/2024	11:35 AM	BUS	24 degrees celsius, sunny light winds , 1/8 cloud cover, Shrubland with moderate grass cover and exposed clay soil	White-winged Fairywren	*Malurus leucopterus*	1	1	70	10° N		Jumping between shrubs
BUS02		28/11/2024	11:35 AM	BUS	24 degrees celsius, sunny light winds , 1/8 cloud cover, Shrubland with moderate grass cover and exposed clay soil	White-winged Fairywren	*Malurus leucopterus*	2	2	40	140° SE		Jumping between shrubs and fly to ground
BUS04		28/11/2024	1:17 PM	BUS	26 degrees celsius, sunny light winds , 0/8 cloud cover, Agricultural shr	White-winged Fairywren	*Malurus leucopterus*	2		150	270° W		In shrubs
BUS06		28/11/2024	12:25 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 5-10%	Australian Magpie	*Gymnorhina tibicen*	2	1.5	25	119 ° SE		perched
BUS06		28/11/2024	12:25 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 5-10%	Australian Magpie	*Gymnorhina tibicen*	1	10	125	294° NW	9° N	
BUS06		28/11/2024	12:25 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 5-10%	Australian Magpie	*Gymnorhina tibicen*	1	7	75	171° S	23° NE	Flying between shrubs
BUS06		28/11/2024	12:25 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 5-10%	Australian Magpie	*Gymnorhina tibicen*	1		150	80° E		perched
BUS06		28/11/2024	12:25 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 5-10%	Australian raven	Corvus coronoides	3	12	150	45° NE	326° NW	
BUS06		28/11/2024	12:25 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 5-10%	Brown songlark	*Cincloramphus cruralis*	1	5	100	38° NE	98° E	
BUS06		28/11/2024	12:25 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 5-10%	Wedge-tailed eagle	*Aquila audax*	1	100	600	47° NE	193° S	soaring
BUS06		28/11/2024	12:25 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 5-10%	White-winged Fairywren	*Malurus leucopterus*	3	1	70	165° SSE	80° E	Flying between shrubs
BUS07		28/11/2024	10:56 AM	BUS	23 degrees, sunny, moderate winds 3/8 cloud cover, Shrubland with sparse grass coverage and exposed clay soil	Australasian Pipit	*Anthus novaeseelandiae*	1	10	30	220° SW		Flying to land in scrub
BUS07		28/11/2024	10:56 AM	BUS	23 degrees, sunny, moderate winds 3/8 cloud cover, Shrubland with sparse grass coverage and exposed clay soil	White-winged Fairywren	*Malurus leucopterus*	2	1	50	180° S		Jumping between shrubs
BUS09		28/11/2024	9:42 AM	BUS	25 degrees celsius. light breeze, minimal cloud cover 5-10%	Brown songlark	*Cincloramphus cruralis*	2	10	75	206° SW	179° S	
BUS09		28/11/2024	9:42 AM	BUS	25 degrees celsius. light breeze, minimal cloud cover 5-10%	Brown songlark	*Cincloramphus cruralis*	1	12	80	95° E	26° NE	Circling
BUS09		28/11/2024	9:42 AM	BUS	25 degrees celsius. light breeze, minimal cloud cover 5-10%	Brown songlark	*Cincloramphus cruralis*	1	15	20	NNE	315° NW	
BUS09		28/11/2024	5:00 PM	BUS	27 degrees celsius, sunny light winds , 0/8 cloud cover, Cleared agricul	Nil							
BUS09		28/11/2024	9:42 AM	BUS	25 degrees celsius. light breeze, minimal cloud cover 5-10%	Superb Fairywren	*Malurus cyaneus*	5	1	85	262° W	184° S	Flight into shrub
BUS10		28/11/2024	9:00 AM	BUS	20 degrees celsius. Light winds. Shrubland with exposed clay soil , cloud cover 0/8	Australasian Pipit	*Anthus novaeseelandiae*	1		40	30° N		Perched on shrubs
BUS10		28/11/2024	9:00 AM	BUS	20 degrees celsius. Light winds. Shrubland with exposed clay soil , cloud cover 0/8	Australasian Pipit	*Anthus novaeseelandiae*	1		40	300° NW		Perched on shrubs
BUS10		28/11/2024	9:00 AM	BUS	20 degrees celsius. Light winds. Shrubland with exposed clay soil , cloud cover 0/8	Brown Songlark	*Megalurus cruralis*	1	1	100	220° W		In Shrubs
BUS10		28/11/2024	9:00 AM	BUS	20 degrees celsius. Light winds. Shrubland with exposed clay soil , cloud cover 0/8	Brown Songlark	*Megalurus cruralis*	1	1	100	220° W		Jumping between shrubs
BUS10		28/11/2024	3:01 PM	BUS	27 degrees celsius, sunny light to moderate winds , 0/8 cloud cover, Shrubland with exposed clay soil	Brown Songlark	*Megalurus cruralis*	1		30	100° SE		In shrubs

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS10		28/11/2024	9:00 AM	BUS	20 degrees celsius. Light winds. Shrubland with exposed clay soil , cloud cover 0/8	White-faced Heron	*Egretta novaehollandiae*	1		200	230° W		Standing on ground
BUS10		28/11/2024	3:01 PM	BUS	27 degrees celsius, sunny light to moderate winds , 0/8 cloud cover, Shrubland with exposed clay soil	White-winged Fairywren	*Malurus leucopterus*	1		200	190° SSW		In shrubs
BUS11		28/11/2024	5:52 PM	BUS	31 degrees celsius. light breeze , Sunny minimal cloud cover 5%	Australian raven	Corvus coronoides	3	10	250	276° W	194° S	
BUS11		28/11/2024	8:49 AM	BUS	23 degrees celsius. Westerly breeze, light wind. No cloud	Brown songlark	*Cincloramphus cruralis*	1	15	45	290° W	9° N	
BUS11		28/11/2024	8:49 AM	BUS	23 degrees celsius. Westerly breeze, light wind. No cloud	Brown songlark	*Cincloramphus cruralis*	1	7	225	108° E	196° S	Flight into shrub
BUS11		28/11/2024	8:49 AM	BUS	23 degrees celsius. Westerly breeze, light wind. No cloud	Brown songlark	*Cincloramphus cruralis*	2		100	332 ° NW	230° SW	Flight into shrub
BUS11		28/11/2024	5:52 PM	BUS	31 degrees celsius. light breeze , Sunny minimal cloud cover 5%	Brown songlark	*Cincloramphus cruralis*	1		50	260° W	265° W	perched in shrubs
BUS11		28/11/2024	5:52 PM	BUS	31 degrees celsius. light breeze , Sunny minimal cloud cover 5%	Brown songlark	*Cincloramphus cruralis*	3		40	287° W		Heard
BUS11		28/11/2024	8:49 AM	BUS	23 degrees celsius. Westerly breeze, light wind. No cloud	Superb Fairywren	*Malurus cyaneus*	2	0.5	150	150° SE		perched
BUS11		28/11/2024	5:52 PM	BUS	31 degrees celsius. light breeze , Sunny minimal cloud cover 5%	Wedge-tailed eagle	*Aquila audax*	1	125	500	100° E	353° N	Soaring next to nest
BUS16		28/11/2024	9:38 AM	BUS	21 degrees, light winds 1/8 cloud cover, Cleared agricultural shrubland with exposed clay soil	Australasian Pipit	*Anthus novaeseelandiae*	1	20	80	120° S	190° SW	Flying to perch on shrub
BUS16		28/11/2024	9:38 AM	BUS	21 degrees, light winds 1/8 cloud cover, Cleared agricultural shrubland with exposed clay soil	Australasian Pipit	*Anthus novaeseelandiae*	1	10	60	120° S	300° NW	Flying onto ground
BUS16		28/11/2024	9:38 AM	BUS	21 degrees, light winds 1/8 cloud cover, Cleared agricultural shrubland with exposed clay soil	Brown Songlark	*Megalurus cruralis*	2		20	0° N		In grass
BUS16		28/11/2024	3:50 PM	BUS	27 degrees celsius, sunny light winds , 0/8 cloud cover,Cleared agricultural shrubland with exposed clay soil	Brown Songlark	*Megalurus cruralis*	2	200	200	170° S	300° NW	Flying and circling
BUS16		28/11/2024	3:50 PM	BUS	27 degrees celsius, sunny light winds , 0/8 cloud cover,Cleared agricultural shrubland with exposed clay soil	Brown Songlark	*Megalurus cruralis*	1	80	200	10° N	240° SW	Flying to land
BUS16		28/11/2024	3:50 PM	BUS	27 degrees celsius, sunny light winds , 0/8 cloud cover,Cleared agricultural shrubland with exposed clay soil	Brown Songlark	*Megalurus cruralis*	1		200	350° N		Perched on shrubs
BUS16		28/11/2024	9:38 AM	BUS	21 degrees, light winds 1/8 cloud cover, Cleared agricultural shrubland with exposed clay soil	medium plump body, fluttering motion of wings		1	30	150	230° SW	140° S	Flying south-east
BUS16		28/11/2024	9:38 AM	BUS	21 degrees, light winds 1/8 cloud cover, Cleared agricultural shrubland with exposed clay soil	White-fronted Chat	*Epthianura albifrons*	1	5	80	200° SW	280° W	Flying west
BUS16		28/11/2024	9:38 AM	BUS	21 degrees, light winds 1/8 cloud cover, Cleared agricultural shrubland with exposed clay soil	White-winged Fairywren	*Malurus leucopterus*	2	1	60	100° SE		Flying between shrubs
BUS18		28/11/2024	9:13 AM	BUS	23 degrees celsius. Westerly winds, light breeze, minimal cloud cover 5%	Australian Magpie	*Gymnorhina tibicen*	1	10	80	113° SE	10° N	
BUS18		28/11/2024	9:13 AM	BUS	23 degrees celsius. Westerly winds, light breeze, minimal cloud cover 5%	Brown songlark	*Cincloramphus cruralis*	1	0.5	200	189° S		perched
BUS18		28/11/2024	9:13 AM	BUS	23 degrees celsius. Westerly winds, light breeze, minimal cloud cover 5%	Brown songlark	*Cincloramphus cruralis*	1	0.5	125	202° S		perched
BUS19		28/11/2024	2:16 PM	BUS	26 degrees celsius, sunny light winds , 0/8 cloud cover, Agricultural shr	Nil							
BUS21		28/11/2024	11:05 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 10%	Australian Magpie	*Gymnorhina tibicen*	1	12	10	152 ° SE	244° SW	
BUS21		28/11/2024	11:05 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 10%	Australian Magpie	*Gymnorhina tibicen*	2		180	SW		perched
BUS21		28/11/2024	11:05 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 10%	Brown songlark	*Cincloramphus cruralis*	1		75	81° E		heard
BUS21		28/11/2024	11:05 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 10%	Brown songlark	*Cincloramphus cruralis*	2	10	150	279° W	187° S	
BUS21		28/11/2024	11:05 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 10%	White-fronted Chat	*Epthianura albifrons*	3	5	125	350° N	250° W	Flying between shrubs
BUS21		28/11/2024	11:05 AM	BUS	26 degrees celsius. light breeze WSW, Sunny minimal cloud cover 10%	White-fronted Chat	*Epthianura albifrons*	20	0.5	50	300° NW		Flying between shrubs
BUS01		29/11/2024	4:21 PM	BUS	38 degrees celsius. light breeze , Sunny, moderate cloud cover 35-40%	Australian Magpie	*Gymnorhina tibicen*	3	7	100	220° S	280° NE	Flying between shrubs
BUS01		29/11/2024	7:14 AM	BUS	20 degrees celsius. light breeze , Sunny minimal cloud cover 5%	Brown songlark	*Cincloramphus cruralis*	4	15	50	40° NE	130° SE	Flying between shrubs
BUS01		29/11/2024	7:14 AM	BUS	20 degrees celsius. light breeze , Sunny minimal cloud cover 5%	Brown songlark	*Cincloramphus cruralis*	4	20	60	6° N	96° E	Flying between shrubs
BUS01		29/11/2024	7:14 AM	BUS	20 degrees celsius. light breeze , Sunny minimal cloud cover 5%	Brown songlark	*Cincloramphus cruralis*	2	3	50	36° NE		perched on fence
BUS01		29/11/2024	7:14 AM	BUS	20 degrees celsius. light breeze , Sunny minimal cloud cover 5%	Brown songlark	*Cincloramphus cruralis*	2	15	65	265° W	124° SE	Flying between shrubs
BUS01		29/11/2024	4:21 PM	BUS	38 degrees celsius. light breeze , Sunny, moderate cloud cover 35-40%	Brown songlark	*Cincloramphus cruralis*	2	10	40	80° E	350° N	
BUS01		29/11/2024	4:21 PM	BUS	38 degrees celsius. light breeze , Sunny, moderate cloud cover 35-40%	Brown songlark	*Cincloramphus cruralis*	1	1	200	170° S		Perched
BUS01		29/11/2024	4:21 PM	BUS	38 degrees celsius. light breeze , Sunny, moderate cloud cover 35-40%	Brown songlark	*Cincloramphus cruralis*	1	12	40	80° E	250° W	
BUS01		29/11/2024	7:14 AM	BUS	20 degrees celsius. light breeze , Sunny minimal cloud cover 5%	Horsfield's Bush Lark	*Mirafra javanica*	2	20	50	225° SW	344° N	Flying between shrubs
BUS01		29/11/2024	4:21 PM	BUS	38 degrees celsius. light breeze , Sunny, moderate cloud cover 35-40%	Horsfield's Bush Lark	*Mirafra javanica*	2	1	40	16° N		Perched
BUS01		29/11/2024	7:14 AM	BUS	20 degrees celsius. light breeze , Sunny minimal cloud cover 5%	Nankeen kestrel	*Falco cenchroides*	1	5	150	60° NE	325° NW	flew and perched onton fence
BUS01		29/11/2024	7:14 AM	BUS	20 degrees celsius. light breeze , Sunny minimal cloud cover 5%	Wedge-tailed eagle	*Aquila audax*	1	15	500	305° NW		perched on fence
BUS01		29/11/2024	7:14 AM	BUS	20 degrees celsius. light breeze , Sunny minimal cloud cover 5%	White-fronted Chat	*Epthianura albifrons*	3	2	70	208° SW	296° NW	Flying between shrubs
BUS02		29/11/2024	5:05 PM	BUS	39 degrees celsius. Moderate winds , Sunny, moderate cloud cover 30%	Brown songlark	*Cincloramphus cruralis*	1	7	85	165° S	240° SW	
BUS02		29/11/2024	5:05 PM	BUS	39 degrees celsius. Moderate winds , Sunny, moderate cloud cover 30%	Brown songlark	*Cincloramphus cruralis*	1	15	200	260° W	340° N	Heard and seen perched
BUS02		29/11/2024	5:05 PM	BUS	39 degrees celsius. Moderate winds , Sunny, moderate cloud cover 30%	Nankeen kestrel	*Falco cenchroides*	1	45	500	226° Sw	150° S	Soaring
BUS02		29/11/2024	5:05 PM	BUS	39 degrees celsius. Moderate winds , Sunny, moderate cloud cover 30%	White-winged Fairywren	*Malurus leucopterus*	3	0.5	45	300° NW	10° N	Flying between shrubs
BUS02		29/11/2024	5:05 PM	BUS	39 degrees celsius. Moderate winds , Sunny, moderate cloud cover 30%	White-winged Fairywren	*Malurus leucopterus*	2	0.5	70	330° NW	80° E	Flying between shrubs
BUS02		29/11/2024	5:05 PM	BUS	39 degrees celsius. Moderate winds , Sunny, moderate cloud cover 30%	White-winged Fairywren	*Malurus leucopterus*	3	0.5	65	133° SE	220° SW	Flying between shrubs
BUS02		29/11/2024	5:05 PM	BUS	39 degrees celsius. Moderate winds , Sunny, moderate cloud cover 30%	White-winged Fairywren	*Malurus leucopterus*	3	0.5	15	173° S	150° SE	Flying between shrubs
BUS04		29/11/2024	3:47 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 20%	Brown songlark	*Cincloramphus cruralis*	1		75	213° SW		called out, perched

AVIFAUNA OBSERVATIONS

Project Name Keri Keri 0617753
Location Keri Keri - NSW

Site	GPS Coords	Date	Time	Type	Weather	Common Name	Scientific Name	Number of Individuals	Flight Height (m)	Distance (m)	Direction (degrees)	Direction of travel	Comments
BUS04		29/11/2024	3:47 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 20%	Brown songlark	*Cincloramphus cruralis*	2	10	50	20° N	80° E	
BUS04		29/11/2024	3:47 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 20%	Horsfield's Bush Lark	*Mirafra javanica*	1	5	15	123° SE	120° SE	
BUS04		29/11/2024	3:47 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 20%	Wedge-tailed eagle	*Aquila audax*	3	100	150	205° SW	soaring	soaring
BUS06		29/11/2024	7:59 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	Australian Magpie	*Gymnorhina tibicen*	2	10	200	25° NE	277° W	
BUS06		29/11/2024	3:14 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 25%	Australian raven	Corvus coronoides	2	20	100	39° NE	120° SE	
BUS06		29/11/2024	7:59 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	Brown songlark	*Cincloramphus cruralis*	1	5	35	154° SE	183° S	Erratic flight
BUS06		29/11/2024	3:14 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 25%	Brown songlark	*Cincloramphus cruralis*	1	15	100	176° SE	10° N	
BUS06		29/11/2024	3:14 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 25%	Brown songlark	*Cincloramphus cruralis*	3		50	21° NE		Heard
BUS06		29/11/2024	7:59 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	Horsfield's Bush Lark	*Mirafra javanica*	1		10	188° S		perched on ground
BUS06		29/11/2024	7:59 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	Nankeen kestrel	*Falco cenchroides*	1	35	500	199° S	105° E	Flying between shrubs
BUS06		29/11/2024	7:59 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	Superb Fairywren	*Malurus cyaneus*	3	0.5	20	312° NW	205° SW	Flying between shrubs
BUS06		29/11/2024	7:59 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	Superb Fairywren	*Malurus cyaneus*	3	0.5	50	169° S	42° NE	Flying between shrubs
BUS06		29/11/2024	3:14 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 25%	Superb Fairywren	*Malurus cyaneus*	3	0.5	40	116° SE	20° N	Flying between shrubs
BUS06		29/11/2024	7:59 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	White-winged Fairywren	*Malurus leucopterus*	2	0.5	10	287° W	204° SW	Flying between shrubs
BUS09		29/11/2024	12:52 PM	BUS	35 degrees celsius. light breeze , Sunny, minimal cloud cover 10%	Brown songlark	*Cincloramphus cruralis*	1		50	260° W		Heard
BUS09		29/11/2024	12:52 PM	BUS	35 degrees celsius. light breeze , Sunny, minimal cloud cover 10%	Brown songlark	*Cincloramphus cruralis*	1		50	SW		Heard
BUS09		29/11/2024	12:52 PM	BUS	35 degrees celsius. light breeze , Sunny, minimal cloud cover 10%	Brown songlark	*Cincloramphus cruralis*	1	10	100	68° E	130° SE	
BUS09		29/11/2024	12:52 PM	BUS	35 degrees celsius. light breeze , Sunny, minimal cloud cover 10%	Brown songlark	*Cincloramphus cruralis*	1	2	50	68° E	131° SE	
BUS09		29/11/2024	12:52 PM	BUS	35 degrees celsius. light breeze , Sunny, minimal cloud cover 10%	White-winged Fairywren	*Malurus leucopterus*	2	0.5	75	305° NW		Perched
BUS10		29/11/2024	1:36 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 15-25%	Brown songlark	*Cincloramphus cruralis*	1	4	50	31° NE	129° SE	
BUS10		29/11/2024	1:36 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 15-25%	Brown songlark	*Cincloramphus cruralis*	2	10	80	201° S	269° W	
BUS10		29/11/2024	1:36 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 15-25%	Horsfield's Bush Lark	*Mirafra javanica*	1	0.5	60	200° S		Perched
BUS11		29/11/2024	10:38 AM	BUS	29 degrees celsius. light breeze , Sunny, no cloud cover	Horsfield's Bush Lark	*Mirafra javanica*	1	0.5	70	262° W	180° S	Flying between shrubs
BUS18		29/11/2024	12:16 PM	BUS	34 degrees celsius. light breeze , Sunny, minimal cloud cover 2%	Brown songlark	*Cincloramphus cruralis*	1	5	100	152° SE	43° NE	Flying between shrubs
BUS18		29/11/2024	12:16 PM	BUS	34 degrees celsius. light breeze , Sunny, minimal cloud cover 2%	Superb Fairywren	*Malurus cyaneus*	5	0.5	75	223° SW	320° NW	Flying between shrubs
BUS18		29/11/2024	12:16 PM	BUS	34 degrees celsius. light breeze , Sunny, minimal cloud cover 2%	Superb Fairywren	*Malurus cyaneus*	1	1	80	SE		Perched
BUS21		29/11/2024	8:37 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	Australian Magpie	*Gymnorhina tibicen*	2	0	20	208° SW		Perched on ground
BUS21		29/11/2024	8:37 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	Australian Pratincole	*Stiltia isabella*	1	0	70	120° SE		Perched on ground
BUS21		29/11/2024	8:37 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	Brown songlark	*Cincloramphus cruralis*	1	10	80	330° NW	270° W	
BUS21		29/11/2024	8:37 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	White-fronted Chat	*Epthianura albifrons*	4	0.5	55	115° SE		Flying between shrubs
BUS21		29/11/2024	2:19 PM	BUS	36 degrees celsius. light breeze , Sunny, low cloud cover 20%	White-fronted Chat	*Epthianura albifrons*	1		40	252° W		Perched
BUS21		29/11/2024	8:37 AM	BUS	24 degrees celsius. light breeze , Sunny, no cloud cover	White-winged Fairywren	*Malurus leucopterus*	3	0.5	30	115° SE		Flying between shrubs
BUS04		<Null>		BUS	N/A	Nankeen kestrel	*Falco cenchroides*	1	10	15			
BUS20		<Null>		BUS	N/A	Wedge-tailed eagle	*Aquila audax*	2	100	300		South of survey point, flying NW	
BUS16				BUS	N/A	Brown falcon	*Falco berigora*	1	3	75			
opportunistic 11				BUS	N/A	White-fronted Chat	*Epthianura albifrons*	3	3	15			
opportunistic 3				BUS	N/A	White-fronted Chat	*Epthianura albifrons*	1	2	1			

APPENDIX C BAT CALL ANALYSIS REPORTS

Bat Call Analysis Report

Keri Keri Wind Farm Project

Prepared for ERM

Prepared by:

Green Tape SOLUTIONS

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Document Records - Quality

TITLE	Bat Analysis for the Keri Keri Wind Farm
FILED AS	ME22019_Bat Call Analysis Keri Keri Wind Farm

Revision	Date	Description	Prepared by	Reviewed by
Version A	4/12/2025	2024-2025 Dataset	KM	ERM
Version B	17/12/2025	2024-2025 Dataset	KM	ERM

Table of Contents

1.0 INTRODUCTION 1
1.1 BACKGROUND 1
1.2 SCOPE OF WORK 1
2.0 METHODOLOGY 2
2.1 CAPTURE TECHNIQUE 2
2.2 CALL IDENTIFICATION 2
2.3 NATIONAL STANDARD 2
3.0 RESULTS 3
3.1 TOTAL SPECIES RECORDED 3
3.2 SAMPLES OF CALLS / SEQUENCES FILES 4
4.0 DATA ANALYSIS 8
4.1 MEAN CALLS PER NIGHT BY SPECIES AND PER HEIGHT 8
4.2 TIME RANGE AND TOTAL NUMBER OF CALLS FOR EACH SPECIES 9
4.3 MEAN NIGHTLY ACTIVITY PER MONTH FOR EACH SPECIES 12
5.0 CONCLUSION 14
6.0 REFERENCES 15

TABLES

Table 1: Detector Locations 3
Table 2: Summary of bat call analysis 3
Table 3: Extract of Bat Call 4
Table 4: Mean calls per night by species and per height 8
Table 5: Time range and total number of calls for each species 10
Table 6: Mean nightly activity per month for each species 13

FIGURES

Figure 1: *Austronomus australis* 4
Figure 2: *Chalinolobus gouldii* 4
Figure 3: *Chalinolobus morio* 5
Figure 4: *Nyctophilus spp* 5
Figure 5: *Ozimops planiceps* 6
Figure 6: *Ozimops ridei* 6
Figure 7: *Scotorepens balstoni* 7
Figure 8: *Vespadelus vulturnus* 7
Figure 9: Time range and total number of calls for each species 11
Figure 10: Mean nightly activity per month for each species 13

1.0 Introduction

1.1 Background

Green Tape Solutions was commissioned to undertake bat call analysis for the Keri Keri Wind Farm project located near Mildura in New South Wales.

1.2 Scope of Work

The specific scope of work for this report includes the following:

- Outline the methodology used to analyse the microbat call within the subject site; and,
- Present the findings of all of the bat call surveys conducted at the project site.

2.0 Methodology

2.1 Capture Technique

Microbat calls were sampled using three (3) Anabat Swift detectors (Titley Electronics). Passive monitoring was undertaken from 22 November 2024 to 28 March 2025. The devices were installed on a mast at different heights. The original call files display Australian Eastern Standard Time. The data was analysed using Anabat Insight.

Monitoring commenced at dusk (approximately 1800 hours) and continued until dawn (approximately 0530 hours). Ultrasonic call monitoring surveys on anabat detectors were conducted using a full-spectrum fitted with an omnidirectional ultrasonic microphone.

2.2 Call Identification

Anabat recordings were analysed using Anabat software (Anabat Insight). Identifications were made by categorising call shape and frequency, with a species match given in consideration of region, known bat distributions, and habitats present. The focus of the bat surveys was to assess the presence of bat species found within the Project Area, and to assess the potential for rare and threatened species to occur.

Call identification for this dataset was based on call keys and descriptions published for Queensland. (Reinhold *et al.*, 2001) and New South Wales (Pennay *et al.*, 2004).

Species identification was further refined using the probability of occurrence of each species based on its geographic distribution. (Churchill, 2008, Van Dyck and Strahan, 2008). Species nomenclature used in this report follows Churchill (2008).

The reliability of identification is as follows:

- **Definite** - one or more calls where there is no doubt about the identification of the species;
- **Probable** - most likely to be the species named, low probability of confusion with species that use similar calls; and,
- **Possible -** call is comparable with the named species, with a moderate to high probability of confusion with species of similar calls.

2.3 National Standard

The format and content of this report comply with the nationally accepted standards for the interpretation and reporting of Anabat and Songmeter data (Reardon, 2003), which is currently available from the Australasian Bat Society at www.ausbats.org.au.

3.0 Results

3.1 Total Species Recorded

The location of each detector, including both the locality and GPS coordinates, is included in **Table 1.**

Table 1: Detector Locations

Detectors	Coordinates	Locality
1- 2m - Device 792806	-34.772660, 143.967090	South-east of Balranald, NSW
2- 30m - Device 792961	-34.772700, 143.967090	South-east of Balranald, NSW
3- 95m – Device 798925	-34.772790, 143.967060	South-east of Balranald, NSW

A summary of the species identified through bat call analysis is provided in **Table 2**. The total number of calls per detector is also given in **Table 2**. This number is indicative of bat activity but may still include some background noise or poor-quality calls that were not identifiable. While some call sequences were recognised as bat calls, the quality was not sufficient to assign species identification.

Table 2: Summary of bat call analysis

Species	Biodiversity Act	EPBC Act	1	2	3
Total calls (Poor calls or Noise)			23,647 (20,796)	48,517 (40,753)	56,609 (56,118)
Austronomus australis	LC	NOC	Definite	Definite	Definite
Chalinolobus gouldii	LC	NOC	Definite	Definite	Definite
Chalinolobus morio	LC	NOC		Definite	
Nyctophilus geoffroyi	LC	NOC	Possible	Possible	
Nyctophilus gouldii	LC	NOC	Possible	Possible	
Ozimops planiceps	LC	NOC	Probable	Probable	Probable
Ozimops ridei	LC	NOC	Definite	Definite	Definite
Scotorepens balstoni	LC	NOC	Definite	Definite	
Vespadelus vulturnus	LC	NOC	Probable	Probable	

LC: Least Concern, NOC: Not of Concern, V: Vulnerable

3.2 Samples of Calls / Sequences Files

Samples of calls extracted from the dataset for each species identified are provided in the following figures.

Table 3: Extract of Bat Call

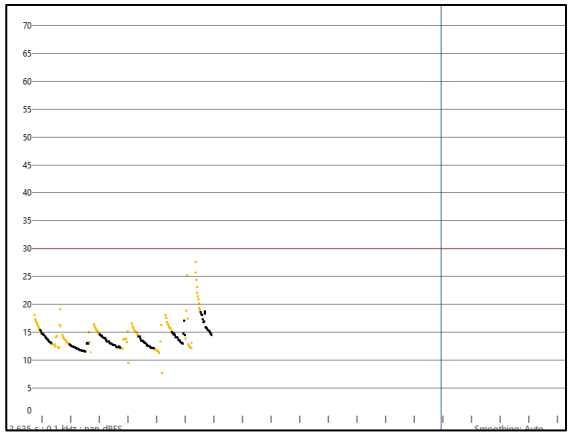
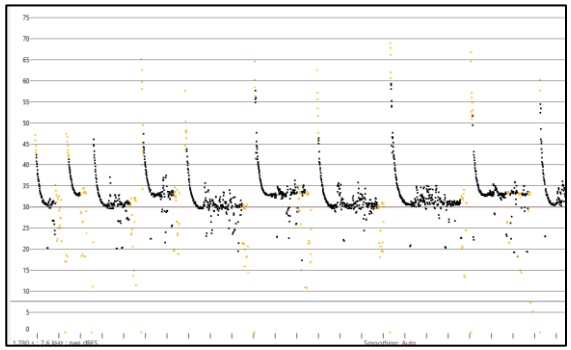
Species	Calls	Known distribution (Extract from Ausbats maps from Australian Bat Society)
Figure 1: *Austronomus australis* Definite call. This bat is easily recognised by its constant frequency calls, which range in bandwidth from 10.5 to 15 kHz (Pennay *et al.*, 2004).		
Figure 2: *Chalinolobus gouldii* Definite call. This species has a curved shape with a characteristic frequency of 28 to 34kHz. Pulse alternates in frequency and mostly has a down-sweeping tail or no tail.		

Figure 3: *Chalinolobus morio*

Definite call.

C. morio has a down-sweeping tail curved pulse with a characteristic frequency of 47.5 to 53 kHz. It often has a very brief characteristic section.

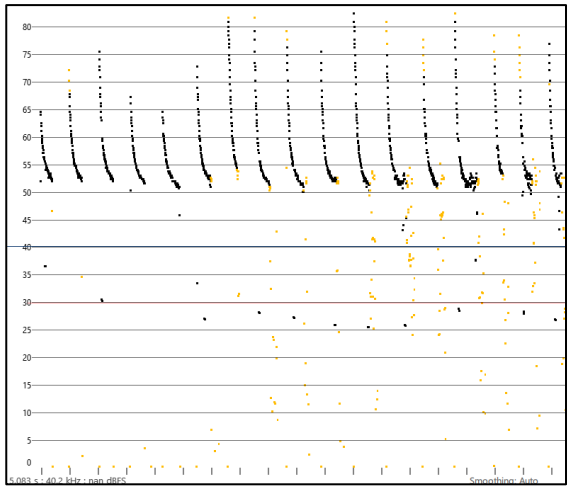


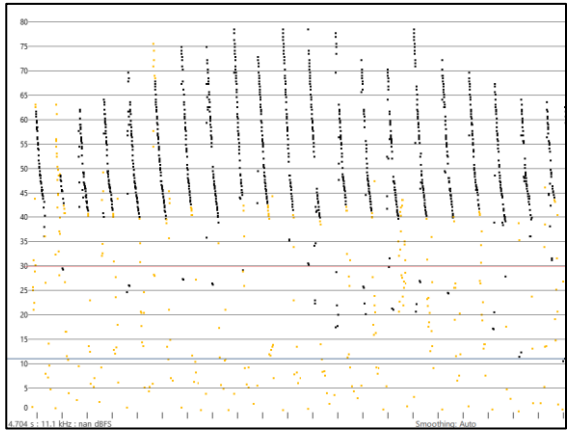


Figure 4: *Nyctophilus spp*

Definite call.

This species displays a near-vertical pulse, characteristic frequency between and 80 35KHz (Pennay *et al*, 2004).

The species from this genus cannot be distinguished from each other. There are two species that are known to occur in the project area.





N. geoffroyi



N. gouldi

Figure 5: *Ozimops planiceps*

Probable call.

This bat's calls are flat, and its characteristic frequency is between 24 and 29 kHz.

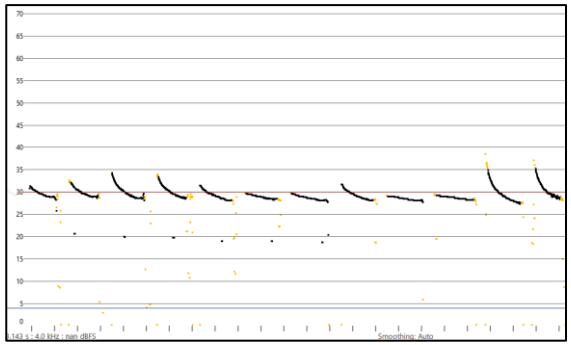




Figure 6: *Ozimops ridei*

Definite call

O. ridei calls are flat and sometimes a bit curved, with frequency a bit lower than 30kHz. The characteristic frequency of this species is between 28 and 36 kHz.

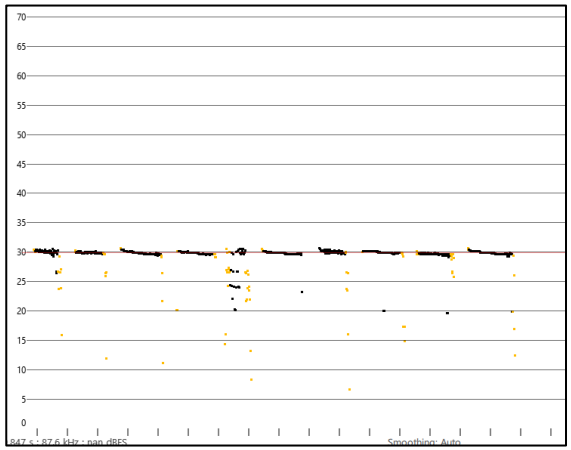




Figure 7: *Scotorepens balstoni*

Definite call.

Pulse of this species is curved with a variable tail: characteristic frequency 31 to 35 kHz and the frequency of the knee 33 to 37 kHz.

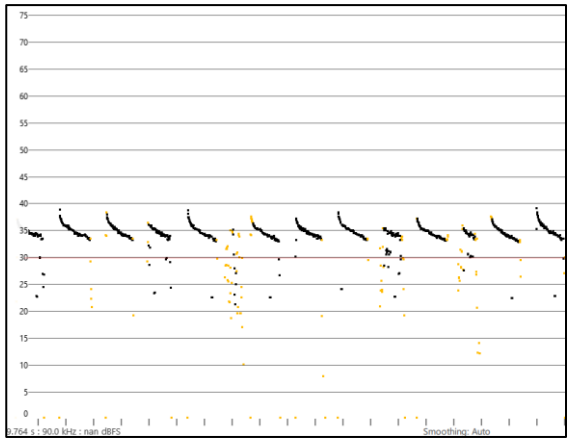
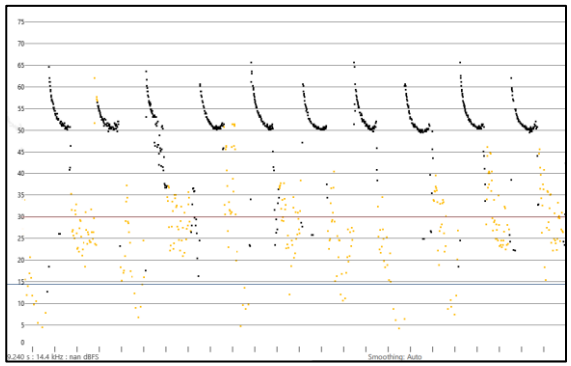




Figure 8: *Vespadelus vulturnus*

Probable call.

Curved and up-sweeping tail calls with characteristic frequency between 45 and 53 kHz.





4.0 Data Analysis

To assess potential impacts of the proposed wind farm on microbat fauna, acoustic monitoring data were analysed to characterise patterns of activity across species, detector heights, and monitoring locations. Microbat activity is expressed as mean calls per night, which provides a relative index of activity and allows comparison between species, detector heights, and temporal periods. It is noted that call rates represent relative activity levels and do not equate to population size or abundance.

The following tables and figures summarise species-specific activity patterns, vertical stratification of activity across detector heights, diel patterns of call activity, and seasonal variation in activity. Detailed interpretation of these results, including implications for collision risk and operational impacts, is provided in the ERM wind farm assessment report.

Although *Ozimops ridei* and *Ozimops planiceps* have been reported separately in the dataset, these taxa cannot be reliably distinguished using acoustic data alone due to overlap in call characteristics. Accordingly, for the purposes of activity analysis and interpretation, detections assigned to *O. ridei* and *O. planiceps* should be treated conservatively as a combined group (e.g. *Ozimops ridei/planiceps or Ozimops spp.*), and any apparent differences between the two identifications should be interpreted with caution.

4.1 Mean calls per night by species and per height

Table 4 summarises mean microbat activity levels by species across detector heights. For each species–height combination, total calls, number of nights sampled, and mean calls per night are presented. This analysis provides insight into vertical patterns of activity, which are relevant to assessing potential interaction risk with turbine rotor-swept zones. Differences in sampling effort between detector heights are accounted for through the use of mean calls per night.

Table 4: Mean calls per night by species and per height

Species / Height	Total of calls	Nights sampled	Mean calls per night
Austronomus australis	**378**	48	7.9
2	57	25	2.3
30	191	21	9.1
95	130	22	5.9
Chalinolobus gouldii	**20**	11	1.8
2	1	1	1.0
30	18	10	1.8
95	1	1	1.0
Chalinolobus morio	**11**	8	1.4
2	10	8	1.3
30	1	1	1.0
Nyctophilus spp	**35**	20	1.8
2	29	15	1.9
30	6	5	1.2
Ozimops planiceps	**8133**	74	109.9
2	6143	60	102.4

Species / Height		Total of calls	Nights sampled	Mean calls per night
	30	1673	73	22.9
	95	317	37	8.6
Ozimops ridei		**2495**	77	32.4
	2	1499	61	24.6
	30	953	75	12.7
	95	43	21	2.0
Scotorepens balstoni		**2**	2	1.0
	2	1	1	1.0
	30	1	1	1.0
Scotorepens greyii		**21**	8	2.6
	2	13	6	2.2
	30	8	3	2.7
Vespadelus regulus		**1**	1	1.0
	2	1	1	1.0
Vespadelus vulturnus		**10**	8	1.3
	2	10	8	

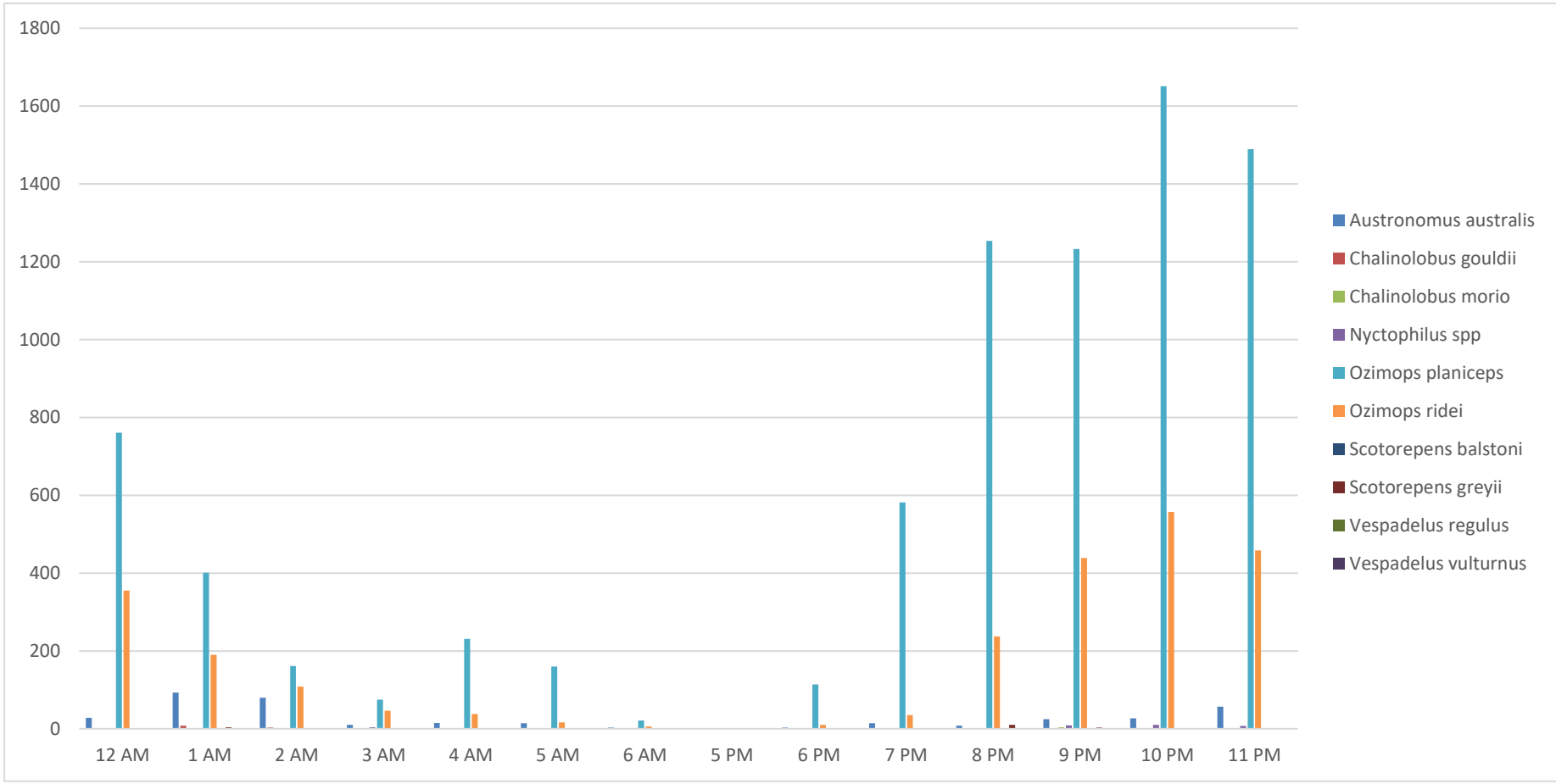
4.2 Time range and total number of calls for each species

Table 5 and **Figure 9** present the distribution of recorded microbat calls across hourly time periods throughout the night, together with total call counts for each species. This table illustrates diel activity patterns, highlighting periods of peak activity and interspecific differences in temporal behaviour. These patterns assist in understanding when microbat activity is most concentrated during the night and may inform considerations of operational risk.

Table 5: Time range and total number of calls for each species

Time of the day	*Austronomus australis*	*Chalinolobus gouldii*	*Chalinolobus morio*	*Nyctophilus spp*	*Ozimops planiceps*	*Ozimops ridei*	*Scotorepens balstoni*	*Scotorepens greyii*	*Vespadelus regulus*	*Vespadelus vulturnus*	Grand Total
12 AM	28	1	2	1	761	355		1		1	1150
1 AM	93	8		2	401	190		4		2	700
2 AM	80	3	2	1	161	108				2	357
3 AM	10			4	75	46		1			136
4 AM	15				231	38					284
5 AM	14	2			160	16	1	1			194
6 AM	3				21	6					30
5 PM	1										1
6 PM	3				114	10					127
7 PM	14	2			582	35					633
8 PM	8	1	1	1	1254	237		10		1	1513
9 PM	25	1	4	9	1233	439		3	1	2	1717
10 PM	27	2	1	10	1651	557				2	2250
11 PM	57		1	7	1489	458	1	1			2014
Grand Total	**378**	**20**	**11**	**35**	**8133**	**2495**	**2**	**21**	**1**	**10**	**11106**

Figure 9: Time range and total number of calls for each species



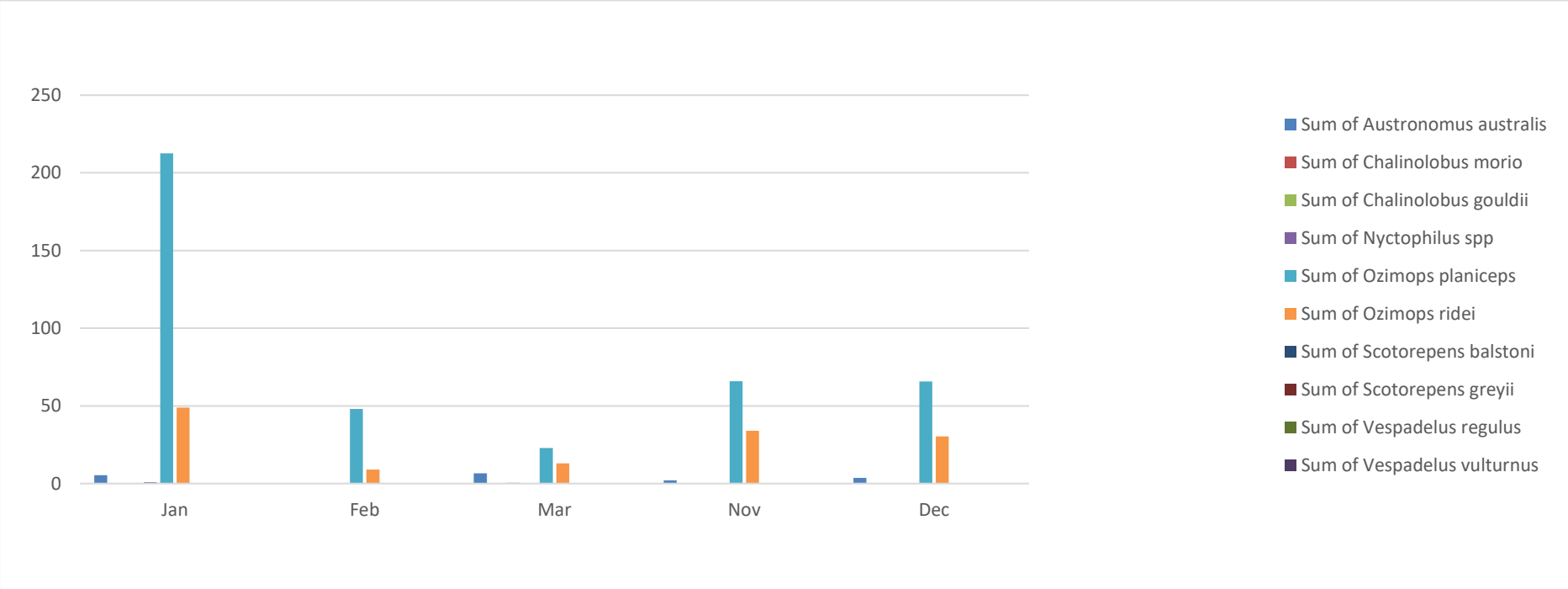
4.3 Mean nightly activity per month for each species

Table 6 and Figure 10 summarises mean nightly microbat activity by month for each species. Mean calls per night were calculated by dividing the total number of calls recorded in each month by the number of survey nights conducted during that month. This approach standardises activity levels for uneven sampling effort and provides an indication of seasonal trends in microbat activity across the monitoring period.

Table 6: Mean nightly activity per month for each species

Month	*Austronomus australis*	*Chalinolobus gouldii*	*Chalinolobus morio*	*Nyctophilus spp*	*Ozimops planiceps*	*Ozimops ridei*	*Scotorepens balstoni*	*Scotorepens greyii*	*Vespadelus regulus*	*Vespadelus vulturnus*	Grand Total
Jan	5.333	0.185	0.222	0.778	212.593	48.926		0.333	0.037	0.222	5.333
Feb					48.000	9.000					
Mar	6.545	0.455	0.045	0.273	22.909	13.045		0.273		0.045	6.545
Nov	2.000	0.375	0.250	0.250	65.875	34.000	0.125			0.125	2.000
Dec	3.700	0.100	0.100	0.300	65.700	30.300	0.050	0.300		0.100	3.700

Figure 10: Mean nightly activity per month for each species



5.0 Conclusion

A total of nine (9) microbat species were either confirmed ‘definite’ or ‘possible’ within the Project area. All bats identified on the site were expected to be present within the region. No species listed as threatened under the State or Federal legislation were confirmed in the dataset.

Calls from *Nyctophilus sp* have been confirmed across the project areas. Two species of *Nyctophilus* possibly occur within the Project Area. The calls of these species cannot be distinguished from each other.

6.0 References

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APPENDIX D BIODIVERSITY CREDIT REPORTS

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00029215/BAAS17034/24/00046438

Proposal Name
Keri Keri WF

BAM data last updated *
05/08/2025

Assessor Name
Mark Aitkens

Assessor Number
BAAS17034

BAM Data version *
Current classification (live - default) (82)

Proponent Names

Report Created
15/01/2026

BAM Case Status
Finalised

Assessment Revision
1

BOS entry trigger

Assessment Type
Major Projects

Date Finalised
15/01/2026

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

PCT
164-Cotton Bush open shrubland of the semi-arid (warm) zone

PCTs With Customized Benchmarks

PCT
163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
164-Cotton Bush open shrubland of the semi-arid (warm) zone

Predicted Threatened Species Not On Site

Name
Certhionyx variegatus / Pied Honeyeater
Grus rubicunda / Brolga

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
164-Cotton Bush open shrubland of the semi-arid (warm) zone	Not a TEC	649.4	0	18272	18272
163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	Not a TEC	115.5	0	4256	4256

163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	163_6	No	4256	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
164-Cotton Bush open shrubland of the semi-arid (warm) zone	**Like-for-like credit retirement options**					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	164_1	No	5985	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

	Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	164_2	No	2544	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	164_3	No	202	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	164_4	No	7662	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Riverine Chenopod Shrublands This includes PCT's: 157, 158, 159, 163, 164, 168, 195, 196, 211, 212, 216, 236, 254, 377, 466	Riverine Chenopod Shrublands <50%	164_5	No	1879	Murrumbidgee, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Brachyscome papillosa / Mossgiel Daisy	**164_1, 164_2, 164_3, 164_4, 164_5, 163_6**	162.0	6430.00
Maireana cheelii / Chariot Wheels	**164_1, 164_2, 164_3, 164_4, 164_5, 163_6**	28.0	1212.00

Credit Retirement Options

Like-for-like credit retirement options

Brachyscome papillosa / Mossgiel Daisy	Spp	IBRA subregion
	Brachyscome papillosa / Mossgiel Daisy	Any in NSW
Maireana cheelii / Chariot Wheels	Spp	IBRA subregion
	Maireana cheelii / Chariot Wheels	Any in NSW

BAM Candidate Species Report

Proposal Details

Assessment Id 00029215/BAAS17034/24/00046438	Proposal Name Keri Keri WF	BAM data last updated * 05/08/2025
Assessor Name Mark Aitkens	Report Created 15/01/2026	BAM Data version * Current classification (live - default) (82)
Assessor Number BAAS17034	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 1	BOS entry trigger	Date Finalised 15/01/2026

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
Ardeotis australis Australian Bustard	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☑ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☑ Sep ☑ Oct ☑ Nov ☑ Dec ☐ Survey month outside the specified months?
Brachyscome papillosa Mossgiel Daisy	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Convolvulus tedmoorei Bindweed	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Lepidium monoplocoides Winged Peppercress	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Maireana cheelii Chariot Wheels	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☑ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Swainsona murrayana Slender Darling Pea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Little Eagle	Hieraaetus morphnoides	Habitat constraints
Pink Cockatoo	Lophochroa leadbeateri	Habitat constraints
Pink-tailed Legless Lizard	Aprasia parapulchella	Habitat constraints
White-bellied Sea-Eagle	Haliaeetus leucogaster	Habitat constraints

BAM Credit Summary Report

Proposal Details

Assessment Id
00029215/BAAS17034/24/00046438

Proposal Name
Keri Keri WF

BAM data last updated *
05/08/2025

Assessor Name
Mark Aitkens

Report Created
15/01/2026

BAM Data version *
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Assessor Number
BAAS17034

BAM Case Status
Finalised

Date Finalised
15/01/2026

Assessment Revision
1

BOS entry trigger

Assessment Type
Major Projects

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits
Cotton Bush open shrubland of the semi-arid (warm) zone												
1	164_1	Not a TEC	80.1	80.1	197.4	PCT Cleared - 8%	High Sensitivity to Gain			1.50		5929

2	164_2	Not a TEC	53.1	53.1	138.8	PCT Cleared - 8%	High Sensitivity to Gain			1.50		2766
3	164_3	Not a TEC	36.5	36.5	18.3	PCT Cleared - 8%	High Sensitivity to Gain			1.50		251
4	164_4	Not a TEC	91.4	91.4	224	PCT Cleared - 8%	High Sensitivity to Gain			1.50		7680
5	164_5	Not a TEC	68.2	68.2	70.9	PCT Cleared - 8%	High Sensitivity to Gain			1.50		1815
											Subtotal	**18441**
Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones												
6	163_6	Not a TEC	98.3	98.3	115.5	PCT Cleared - 26%	High Sensitivity to Gain			1.50		4256
											Subtotal	**4256**
											Total	**22697**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

Brachyscome papillosa / Mossgiel Daisy (Flora)									
164_1	80.1	80.1	40.2	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	1611
164_2	53.1	53.1	20.4	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	541
164_3	36.5	36.5	3.1	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	57
164_4	91.4	91.4	56.3	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	2573
164_5	68.2	68.2	27	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	920
163_6	98.3	98.3	15.1	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	742
								Subtotal	**6444**

Maireana cheelii / Chariot Wheels (Flora)									
164_1	80.1	80.1	1.2	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	47
164_2	53.1	53.1	3.3	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	88
164_3	36.5	36.5	0.17	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	3
164_4	91.4	91.4	9.2	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	420
164_5	68.2	68.2	2.3	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	79
163_6	98.3	98.3	11.8	Biodiversity Conservation Act listing status	Ability to colonise improved habitat	Vulnerable	Vulnerable	False	580
								Subtotal	**1217**

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00029215/BAAS17034/24/00046438	Keri Keri WF	05/08/2025
Assessor Name	Report Created	BAM Data version *
Mark Aitkens	15/01/2026	Current classification (live - default) (82)
Assessor Number	Assessment Type	BAM Case Status
BAAS17034	Major Projects	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
1		15/01/2026

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Falcon	Falco subniger	164-Cotton Bush open shrubland of the semi-arid (warm) zone
		163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Blue-winged Parrot	Neophema chrysostoma	164-Cotton Bush open shrubland of the semi-arid (warm) zone
		163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Dusky Woodswallow	Artamus cyanopterus cyanopterus	164-Cotton Bush open shrubland of the semi-arid (warm) zone
		163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Grey Falcon	Falco hypoleucos	164-Cotton Bush open shrubland of the semi-arid (warm) zone
		163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Little Eagle	Hieraaetus morphnoides	164-Cotton Bush open shrubland of the semi-arid (warm) zone

Little Eagle	Hieraaetus morphnoides	163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Little Pied Bat	Chalinolobus picatus	164-Cotton Bush open shrubland of the semi-arid (warm) zone
		163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Magpie Goose	Anseranas semipalmata	163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Pink Cockatoo	Lophochroa leadbeateri	163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Redthroat	Pyrrholaemus brunneus	163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Southern Whiteface	Aphelocephala leucopsis	164-Cotton Bush open shrubland of the semi-arid (warm) zone
		163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Spotted Harrier	Circus assimilis	164-Cotton Bush open shrubland of the semi-arid (warm) zone
		163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
White-bellied Sea-Eagle	Haliaeetus leucogaster	164-Cotton Bush open shrubland of the semi-arid (warm) zone
		163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
White-fronted Chat	Epthianura albifrons	164-Cotton Bush open shrubland of the semi-arid (warm) zone
		163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Common Name	Scientific Name	Plant Community Type(s)
Brolga	Grus rubicunda	163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones
Pied Honeyeater	Certhionyx variegatus	163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones

BAM Predicted Species Report

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C
Brolga	Grus rubicunda	Refer to BAR
Pied Honeyeater	Certhionyx variegatus	Refer to BAR

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00029215/BAAS17034/24/00046438

Assessment name
Keri Keri WF

BAM data last updated *
05/08/2025

Assessor Name
Mark Aitkens

Report Created
15/01/2026

BAM Data version *
Current classification (live - default) (82)

Assessor Number
BAAS17034

Assessment Type
Major Projects

BAM Case Status
Finalised

Assessment Revision
1

BOS entry trigger

Date Finalised
15/01/2026

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	164_1	164-Cotton Bush open shrubland of the semi-arid (warm) zone	1	197.37	6	
2	164_2	164-Cotton Bush open shrubland of the semi-arid (warm) zone	2	138.82	6	

3	164_3	164-Cotton Bush open shrubland of the semi-arid (warm) zone	3	18.33	3	
4	164_4	164-Cotton Bush open shrubland of the semi-arid (warm) zone	4	223.98	6	
5	164_5	164-Cotton Bush open shrubland of the semi-arid (warm) zone	5	70.92	5	
6	163_6	163-Dillon Bush (Nitre Bush) shrubland of the semi-arid and arid zones	6	115.47	6	

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00029215/BAAS17034/21/00029216

Proposal Name
Keri Keri WF

BAM data last updated *
05/08/2025

Assessor Name
Mark Aitkens

Assessor Number
BAAS17034

BAM Data version *
Current classification (live - default) (82)

Proponent Names

Report Created
15/01/2026

BAM Case Status
Finalised

Assessment Revision
2

BOS entry trigger

Assessment Type
Major Projects

Date Finalised
15/01/2026

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

BAM Biodiversity Credit Report (Like for like)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	Not a TEC	0.2	0	6	6

BAM Biodiversity Credit Report (Like for like)

159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Riverine Chenopod Shrublands This includes PCT's: 159, 195	Riverine Chenopod Shrublands >=90%	159_7	No	6	Robinvale Plains, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

No Species Credit Data

Credit Retirement Options

Like-for-like credit retirement options

BAM Candidate Species Report

Proposal Details

Assessment Id 00029215/BAAS17034/21/00029216	Proposal Name Keri Keri WF	BAM data last updated * 05/08/2025
Assessor Name Mark Aitkens	Report Created 15/01/2026	BAM Data version * Current classification (live - default) (82)
Assessor Number BAAS17034	Assessment Type Major Projects	BAM Case Status Finalised
Assessment Revision 2	BOS entry trigger	Date Finalised 15/01/2026

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Black-breasted Buzzard	Hamirostra melanosternon	Habitat constraints
Little Eagle	Hieraaetus morphnoides	Habitat constraints
Pink Cockatoo	Lophochroa leadbeateri	Habitat constraints
White-bellied Sea-Eagle	Haliaeetus leucogaster	Habitat constraints

BAM Credit Summary Report

Proposal Details

Assessment Id
00029215/BAAS17034/21/00029216

Proposal Name
Keri Keri WF

BAM data last updated *
05/08/2025

Assessor Name
Mark Aitkens

Report Created
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BAM Data version *
Current classification (live - default) (82)

Assessor Number
BAAS17034

BAM Case Status
Finalised

Date Finalised
15/01/2026

Assessment Revision
2

BOS entry trigger

Assessment Type
Major Projects

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)												
1	159_7	Not a TEC	53.9	53.9	0.17	PCT Cleared - 92%	High Sensitivity to Gain			2.50		6
											Subtotal	**6**
											Total	**6**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00029215/BAAS17034/21/00029216	Keri Keri WF	05/08/2025
Assessor Name	Report Created	BAM Data version *
Mark Aitkens	15/01/2026	Current classification (live - default) (82)
Assessor Number	Assessment Type	BAM Case Status
BAAS17034	Major Projects	Finalised
Assessment Revision	BOS entry trigger	Date Finalised
2		15/01/2026

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Falcon	Falco subniger	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
Black-breasted Buzzard	Hamirostra melanosternon	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
Blue-winged Parrot	Neophema chrysostoma	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
Dusky Woodswallow	Artamus cyanopterus cyanopterus	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
Grey Falcon	Falco hypoleucos	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
Little Eagle	Hieraaetus morphnoides	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
Little Pied Bat	Chalinolobus picatus	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
Pink Cockatoo	Lophochroa leadbeateri	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
Spotted Harrier	Circus assimilis	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)

White-bellied Sea-Eagle	Haliaeetus leucogaster	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)
White-fronted Chat	Epthianura albifrons	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)

Threatened species Manually Added

None added

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

BAM Vegetation Zones Report

Proposal Details

Assessment Id
00029215/BAAS17034/21/00029216

Assessment name
Keri Keri WF

BAM data last updated *
05/08/2025

Assessor Name
Mark Aitkens

Report Created
15/01/2026

BAM Data version *
Current classification (live - default) (82)

Assessor Number
BAAS17034

Assessment Type
Major Projects

BAM Case Status
Finalised

Assessment Revision
2

BOS entry trigger

Date Finalised
15/01/2026

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Vegetation Zones

#	Name	PCT	Condition	Area	Minimum number of plots	Management zones
1	159_7	159-Old Man Saltbush shrubland mainly of the semi-arid (warm) climate zone (south western NSW)	7	0.17	1	

APPENDIX E ASSESSMENT OF MNES

In accordance with *Guidance for Accredited Assessors on the assessment of MNES*, published by DPHI in 2024 (after the publishing of the first BDAR version (ERM 2024)), Appendix E has been prepared to summarise the assessment of predicted impacts on EBPC Act-listed Threatened Species and Communities and provide a completion checklist relating to the assessments.

The Summary Table (Attachment 1) and Completion Checklist (Attachment 2) are provided below. Resources used for the completion of Appendix E and the assessment of impacts to MNES throughout this BDAR include:

- EPBC Act Referral Decision (2022/9176) provided by the Australian Government's Department of Agriculture, Water and the Environment on the 2 May 2022:
    - The decision brief advised that the proposed action is a controlled action and that the project will require assessment under the assessment bilateral agreement with New South Wales. The relevant controlling provisions included listed threatened species and communities.
- The Secretary's Environmental Assessment Requirements (SSD-38358962) dated 14 April 2022 and supplementary SEARs relating to Commonwealth matters;
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) EPBC Protected Matters Search Tool (PMST) (http://www.environment.gov.au/epbc/protectedmatters- search-tool);
- DCCEEW Species Profiles and Threats (SPRAT) database (http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl);
- DCCEEW Directory of Important Wetlands in Australia (https://www.dcceew.gov.au/water/wetlands/australian-wetlands-database/directory-important-wetlands);
- Interim Biogeographical Regionalisation for Australia (IBRA) and IBRA sub-regions v7 (http://www.environment.gov.au/land/nrs/science/ibra);
- NSW Department of Planning, Industry and Environment (DPIE) Threatened Species Database Collection (http://www.environment.nsw.gov.au/threatenedspeciesapp/);
- DPIE Guidance to assist a decision-maker to determine a serious and irreversible impact (DPIE, 2019);
- NSW Biodiversity Values Map (https://www.lmbc.nsw.gov.au/Maps/index.html?viewer=BVMap);
- NSW Department of Primary Industries (DPI) Key Fish Habitat mapping;
- DPE State Vegetation Type Mapping Version C2.0M2.0 (https://datasets.seed.nsw.gov.au/dataset/nsw-state-vegetation-type-map);
- DPE BioNet Atlas of NSW database;
- DPE Threatened Biodiversity Data Collection (TBDC) database;
- DPE BioNet Vegetation Classification database;
- NSW Mitchell Landscapes map and descriptions (NPWS, 2003);

- Groundwater Dependent Ecosystem Atlas (BoM, 2023);
- Matters of National Environmental Significance Significant Impact Guidelines 1.1 *Environment Protection and Biodiversity Conservation Act 1999* (Australian Government Department of the Environment (2013);
- Draft Wind Farms – turbine strike assessment & adaptive impact management – Biodiversity Assessment Method Guide – February 2024 (DCCEEW, 2024).

ATTACHMENT 1 SUMMARY TABLE FOR ASSESSMENT OF PREDICTED IMPACTS ON EPBC ACT-LISTED THREATENED SPECIES AND COMMUNITIES

Description of Threatened Species/Community	Associated PCTs	Impact	Credits Required	Offsetting Approach	Page references
Natural Grasslands of the Murray Valley Plains	None	None	None	None	Section 8.7.1
Plains-wanderer (*Pedionomus torquatus*)	None	None	None	None	Section 8.7.1
Mossgiel Daisy (*Brachyscome papillosa*)	163, 164	162.02	6,444	Retirement of 'Like for Like' species credits	Section 8.7.1
Chariot Wheels (*Maireana cheelii*)	164	27.97	1,217	Retirement of 'Like for Like' species credits	Section 8.7.1
Winged Peppercress (*Lepidium monoplocoides*)	163	None	None	None	Section 8.7.1

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ATTACHMENT 2 COMPLETION CHECKLIST FOR BDAR APPENDIX E, RELATING TO ASSESSMENT OF PREDICTED IMPACTS ON EPBC ACT-LISTED THREATENED SPECIES AND COMMUNITIES

Information Required to be Included	Comments	Complete?
Part A		
Appendix E clearly shows how operational and construction footprints, including clearing boundaries, structures to be built and elements of the action, are situated with regard to MNES (and/or references to where this detail is provided within the body of the BDAR)	Table 5-11 summarises the MNES that are present within the Development Footprint.	Y
Appendix E includes a map(s) of the subject land boundary showing the proposal/disturbance footprint with respect to location of MNES, including links to or directory locations of GIS shape files (and/or references to where this detail is provided within the body of the BDAR).	Figure Appendix E 01 Observed extent of Mossgiel Daisy (*Brachyscome papillosa*) within the Subject Land Figure Appendix E 02 Observed extent of Chariot Wheels (*Maireana cheelii*) within the Subject Land Figure Appendix E 03 Observed incidence of Plains Wanderer (*Pedionomus torquatus*) within the Subject Land	Y
Appendix E identifies any other site constraints in selecting the location and design of the proposed development (such as bushfire protection requirements, flood planning levels, servicing constraints) (and/or references to where this detail is provided within the body of the EIS or BDAR)	The Applicant has completed an environmental assessment of the Project Area in accordance with the SEARs and has modified the project layout based on the outcomes of these assessments, consideration of technical, environmental, and constructability issues, and community feedback. Section describes Project alternatives that were considered, and modifications made to previous designs.	Y
Appendix E clearly depicts stages and timing of the action that may impact on MNES (and/or references to where this detail is provided within the body of the BDAR)	Table 8-4 clearly depicts stages and timing of the action that may impact on MNES.	Y
The BDAR Declarations (Section i) include an explicit statement that all EPBC Act listed threatened species and communities that occur on the subject land, or in the vicinity, have been identified in the BDAR/EIS including those that are ecosystem credit species	I, Mark Aitkens, declare that all EPBC Act listed threatened species and communities that occur on the subject land, or in the vicinity, have been identified in the BDAR/EIS including those that are ecosystem credit species.	Y

Information Required to be Included	Comments	Complete?
		
Appendix E contains a completed Summary Table	See Attachment 1.	Y
Appendix E contains sufficient general information regarding the project's predicted impact on MNES	The evaluation of direct, indirect and prescribed impacts on biodiversity values is provided in Sections 7 and Section 8. The significance assessment for each MNES, includes general information regarding the projects predicted impacts on MNES, see Section 8.7.1 for more detail.	Y
Appendix E contains (or references) a separate assessment for each threatened species and community that occurs on or near the site (containing minimum information requirements)	The significance assessment for each MNES, includes general information regarding the projects predicted impacts on MNES is provided in Section 8.7.1.	Y
Appendix E contains appropriate analysis and justification for any species and communities identified in the referral documentation (provided by the Australian Government) that have been ruled out because they don't occur on or near the site.	None of the species identified in the referral documentation have been ruled out (i.e., survey has been performed for all species). Some species have not attracted an offset liability as they were found to not occur within the impact area. See Section 8.7.1 for more detail.	Y
Appendix E identifies any relevant Commonwealth guidelines and policy statements applicable to the proposed development, including but not limited to: ▪ International environmental obligations; ▪ Recovery Plans; ▪ Approved Conservation Advice, and ▪ Threat Abatement Plans	Relevant Commonwealth guidelines that have been considered include: • Conservation Advice for *Brachyscome papillosa* (Mossgiel Daisy) (Cwth DEWHA, 2008); • Commonwealth Listing Advice on Natural Grasslands of the Murray Valley Plains (Cwth TSSC, 2012); • Conservation Advice for *Pedionomus torquatus* (plains-wanderer) (Cwth TSSC, 2015); • Conservation Advice for *Maireana cheelii* (chariot wheels) (Cwth DCCEEW, 2024)	Y

Information Required to be Included	Comments	Complete?
	• National Recovery Plan for the Winged Peppercress (*Lepidium monoplocoides)* (Mavromihalis, 2010)	
Part B **Confirm that Appendix E (MNES) contains the following items for each EPBC Act listed threatened species and community on the site or in the vicinity**		
Appendix E includes relevant information on the identification of MNES on the site or in the vicinity via: ▪ Field based survey effort; ▪ Published peer reviewed literature; ▪ Local data, and ▪ Supporting databases (such as the NSW BioNet Vegetation Classification, NSW BioNet Threatened Biodiversity Data Collection, NSW BioNet Atlas, Commonwealth Species Profile and Threats Database search results).	Refer to Section 8.7.1 for details, which includes cross referencing to relevant` parts of the BDAR (e.g., Sections 2.2, 4 and 5)	Y
Appendix E includes appropriate mapping in accordance with the relevant Commonwealth Listing Advice	The mapping of MNES is provided throughout the BDAR notably: ▪ Mossgiel Daisy mapping in Figure 5-2 ▪ Chariot Wheels mapping in Figure 5-3	Y
Appendix E includes consideration of important populations and critical habitat as defined in Approved Listing Advice, Approved Conservation Advice, Threat Abatement Plans and Recovery Action Plans.	Important populations and critical habitat as defined in Approved Listing Advice, Approved Conservation Advice, Threat Abatement Plans and Recovery Action Plans is taken into consideration in Section 8.7.1.	Y
Appendix E identifies feasible alternatives and efforts to avoid and minimise predicted impacts on MNES (including direct, indirect and prescribed impacts) including an analysis of the following alternatives: ▪ Designs and engineering solutions; ▪ Modes or technologies; ▪ Routes and locations of facilities, and ▪ Sites within the subject site.	Avoid and minimise outcomes have been achieved to reduce the impact on MNES, as discussed in Sections 7 to 8 .	Y

Information Required to be Included	Comments	Complete?
Appendix E identifies feasible measures to mitigate and/or manage predicted impacts on MNES (including direct, indirect and prescribed impacts) including: ▪ Techniques, timing, frequency and responsibility; ▪ Identify measures for which there is a risk of failure; ▪ Evaluate the risk and consequence of any residual impacts, and ▪ Any adaptive management strategy proposed to monitor and respond to impacts	Feasible measures to mitigate and/or manage predicted impacts on MNES are identified through Sections 8.1 to 8.8.	Y
Appendix E identifies the residual adverse impacts likely to occur to MNES after the proposed avoidance and mitigation measures are taken into account, including: ▪ Nature and consequences of impacts (i.e. direct and indirect); ▪ Duration of impact (e.g. construction, operation, life of project); ▪ Quantum of impact, and ▪ Consequences of impacts on the species, the population and/or extent of the community at local, state and national scales.	Residual impacts have been determined through assessments provided in Section 8.7.1.	Y
Appendix E identifies the level of predicted residual impact and provides adequate justification and evidence for the predicted level of impact, with reference to the Commonwealth's Significant Impact Guideline. Note. This will mean that the level of predicted impact is described as either: ▪ High likelihood of significant residual impact (requiring offsets) or ▪ Low likelihood of significant residual impact (not requiring offsets).	A conclusion as to whether there is a risk of a significant residual impact is provided in Section 8.7.1. A conclusion is provided as to the likelihood for a low or high significant residual impact.	Y
Appendix E identifies plans for offsetting, including: ▪ whether the MNES has been offset using the BAM;	Plans for offsetting are detailed in Section 10 and summarised in Attachment 1.	Y

Information Required to be Included	Comments	Complete?
▪ how impacts requiring offsets correlate to MNES impacts; ▪ whether ecological rehabilitation and/or biodiversity conservation actions are proposed for offsetting; and ▪ whether any other offsetting approach is proposed, such as land-based offsets, retiring credits by payment into the Biodiversity Conservation Fund and/or through supplementary measures.		
Appendix E identifies the number and type of (species/ecosystem) credits required for predicted residual adverse impacts to MNES.	The number of credits are detailed in Section 10 and summarised in Attachment 1.	Y
Appendix E contains an explicit statement that confirms that the BAM (and BAM calculator) has been used correctly to identify the number and class of biodiversity credits that need to be offset to achieve a standard of 'no net loss' of biodiversity	See Declarations.	Y

LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD

Legend

- Mossgiel Daisy (*Brachyscome papillosa*)
- Mossgiel Daisy (*Brachyscome papillosa*)
- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 12/01/2026
Created By: VN
Drawing Size: A3

0 1 2Km

1:70,000

F AE-1 Observed extent of Mossgiel Daisy (*Brachyscome papillosa*)

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LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD

Legend

- Chariot Wheels (*Maireana cheelii*)
- Chariot Wheels (*Maireana cheelii*)
- Project Area
- Subject Land
- Main Road
- Road
- Path/Track

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54

Date: 12/01/2026
Created By: VN
Drawing Size: A3

0 1 2Km

1:70,000

F5-3 Species' Polygon for Chariot Wheels (*Maireana cheelii*) within the Subject Land

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LOORICA ROAD

STURT HIGHWAY

KERI KERI ROAD

Legend

- Plains Wanderer (*Pedionomus torquatus*)
- Subject Land
- Project Area

DCDB_Roads functionhi

- Main Road
- Road
- Path/Track

Source:
Boundary: Client Provided
Base Data: NSW DCDB/DTDB.
Imagery: ESRI World Imagery

Coordinate System:
GDA 1994 MGA Zone 54
Date: 12/01/2026
Created By: VN
Drawing Size: A3
0 1 2Km
1:70,000

F AE-3 Observed incidence of Plains Wanderer (*Pedionomus torquatus*) within the Subject Land

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APPENDIX F FULL FLORISTIC PLOT DATA

Scientific Name	Feb-04	Feb-08	Feb-09	Feb-11	Feb-12	25	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 10	PLOT 11	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10
Abutilon halophilum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Alternanthera denticulata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aristida spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Arthropodium sp. Albury	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae sp. 1	0.1	0.1	1	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae sp. 2	0	0	0	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae sp. 3	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Asteraceae spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1.1
Atriplex eardleyae	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Atriplex holocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex leptocarpa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0
Atriplex lindleyi	0.1	0	0.1	0	0	0.1	0.1	0	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0
Atriplex nummularia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex pseudocampanulata	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex semibaccata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Atriplex spp.	0.1	0	0.1	0	0	0	0	0	0	0	0	0.1	0.2	0	0	0	0	0	0	0	0	0
Atriplex vesicaria	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Austrostipa elegantissima	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Austrostipa scabra	0	15	2	15	10	0	2	0.2	70	25	20	5	1	10	20	1	3	5	0	10	0	0
Brachyscome lineariloba	0.1	0	5	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome papillosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0.5	0	0.1	0
Brachyscome sp. 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Brachyscome spp.	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine bulbosa	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0
Bulbine semibarbata	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0	0.1	0.1	0.1	0.1	0.1	0	0.1	0.1	0	0.1	0	0	0
Calandrinia eremaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Calandrinia volubilis	0	0	0	0	0	0	0.1	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0	0	0
Calocephalus sonderi	0.1	0	0	0.1	0.1	0.2	0	0	0	0.1	0	0	0	0	0	0	0.3	0	0.1	0	0	0.1
Calotis scabiosifolia	0	0	0	0	0	0	0.1	0	5	0.1	0	0	0	0.1	0.2	1	0.2	0.1	0.1	0.1	0	0.1
Casuarina cristata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium curvispicatum	0	0.1	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chenopodium nitrariaceum	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0
Chloris truncata	0	0	0.1	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0.2	0.2	1	5	1
Chrysocephalum apiculatum	3	0	0.1	0.2	2	0.1	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0.1
Convolvulus clementii	0	0	0	0	0.1	0	0	0	0	0	0.1	0	0	0.1	0	0	0	0	0	0	0	0
Convolvulus erubescens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cotula spp.	0	0.3	0	0.1	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula colorata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Crassula sieberiana	0	0	0	0	0	0	0.1	0	0	0	0	0.1	0	0	0.1	0	0.1	0	0	0	0	0.1
Daucus glochidiatus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0
Dissocarpus paradoxus	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Duma florulenta	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0.3	0	0
Dysphania pumilio	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Einadia nutans	0	0	0	0.1	0.1	0	0.1	0	0	0.1	0	0.1	0.1	0	0.5	0	0	0	0.2	0	0	0
Enchylaena tomentosa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Enteropogon acicularis	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0.1	1	0	0	0	0	0	0	0
Eragrostis australasica	0	0.1	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Eragrostis setifolia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Eragrostis spp.	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erigeron spp.	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Erodium crinitum	0	0	0	0	0	0	0	0	0.1	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0
Euphorbia drummondii	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Euphorbia planiticola	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Geranium spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Goodenia fascicularis	0	0.1	0	0	0.1	0	0.1	0.1	0	5	0	0.1	0.1	0	0	0	0	0	0	0	0	0
Goodenia spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalosperma glutinosum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Hyalosperma semisterile	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Juncus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lachnagrostis filiformis	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leiocarpa panaetioides	0	0.1	0	0	0	0	0.1	2	0	0.1	0	0.1	0	0	0	0.5	0.3	0.5	0.1	0.5	0.2	0.2
Lepidium phlebopetalum	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Leucochrysum molle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Linum spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Lycium australe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana aphylla	10	0.1	20	10	5	0.5	10	10	8	20	20	0.2	10	15	20	20	5	10	0.2	0.5	0	2
Maireana brevifolia	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Maireana cheelii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana georgei	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pentagona	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0
Maireana spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.3
Maireana turbinata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malacocera tricornis	0	0	0.2	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Malva preissiana	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Scientific Name	Feb-04	Feb-08	Feb-09	Feb-11	Feb-12	25	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 10	PLOT 11	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10
Marselea drummondii	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Minuria cunninghamii	0.1	0.5	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.3
Nitraria billardierei	0.2	3	3	0	0	5	0	0	0.1	5	0.2	20	0	0	1	0	0	0	0	0	0	1
Osteocarpum acropterum	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oxalis perennans	0	0	0	0	0.1	0	0.1	0	0.1	0.1	0.2	0.1	0	0	0.1	0	0	0	0	0	0	0
Phyllanthus spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Pimelea curviflora	0	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Plantago cunninghamii	0	0	0	0	0	0	0	0	0.1	0.1	1	0	0	0	0	0	0	0	0	0	0	0
Plantago drummondii	0.1	0.1	0.1	0.1	0.1	0.1	2	2	0.2	0.5	0.1	0.1	15	0.2	0.2	5	3	2	3	1	0	0.1
Podolepis muelleri	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Portulaca oleracea	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Ptilotus spathulatus	0	0	0.1	0	0	0	0	0	0	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0
Rhagodia spinescens	0.1	1	0.3	0.1	2	0.1	0	0	0.1	0.1	0.3	0	0	0	0	0	0.1	0	0	0	0	0.5
Rhodanthe corymbiflora	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe pygmaea	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rhodanthe stuartiana	5	5	5	5	2	0.2	2	4	5	25	0.5	15	40	30	2	15	3	3	1	1	20	0.1
Roepera glauca	0	0.1	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0
Rytidosperma caespitosum	1	10	5	10	10	0.1	5	10	0.2	0	0.2	10	0	0	0.2	10	5	5	0.4	5	5	30
Rytidosperma spp.	0	0	0	0	0	0	20	5	0	15	5	0.1	0	0.1	2	0	0	0	0	0	0	0
Rytidosperma spp.	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Rytidosperma spp.	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Salsola australis	0	0.5	0.4	0.2	0.2	0	0	0	0	0.1	0.1	0	0	0.1	0	0	0	0	0	0	0	0
Sclerolaena bicornis	0.1	2	1	2	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1
Sclerolaena brachyptera	0.1	0	0.1	0.1	0	3	0	0	0	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.1	0	0	0	0	0.1
Sclerolaena diacantha	0	0	0	0	0	0	1	1	0.2	5	1	0.3	1	0.1	2	0	0	0	0	0	0	0
Sclerolaena divaricata	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0
Sclerolaena muricata	0	1	0.1	0	0	0	0	0.1	0	0	0	0.2	0	0.1	0	0	1	0	0.3	0.2	5	0
Sclerolaena spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0
Sclerolaena stelligera	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0
Sclerolaena tricuspis	1	0.2	0	0	0	5	0	0	0.2	0.1	0	0	0	0	0.5	2	0.2	0	0	0.3	0	0.1
Senecio glossanthus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0
Sida intricata	0	0.3	0	0.1	0	0	0	0	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0
Sida spp.	0	0	0	0.1	0	0	0	0	0	0	0.1	0	0	0.5	0.1	0	0	0	0	0	0	0
Sida trichopoda	0.1	0.1	0.1	0	0.3	0	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0.2	0.1	0	0.1
Solanum esuriale	0	0	0	0.1	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Sporobolus caroli	0	0	0	0	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tetragonia spp.	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Teucrium racemosum	0	2	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Triptilodicus pygmaeus	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia gracilis	0	0	0	0	1	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0
Vittadinia pterochaeta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1	0	0
Vittadinia spp.	0.1	1	1	1	0	0.1	0	1	0.1	0.5	0.1	1	0.1	0.2	0.1	0	0	0	0	0	0	0
Vittadinia spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vittadinia spp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0
Wahlenbergia spp.	0	0	0	0	0	0	0	0	0.1	0.1	0	0	0.1	0	0.1	0	0	0	0	0	0	0
Walwhalleya proluta	0.5	0.1	0	0.2	1	0.1	0	0	0.1	0	0	0	0.1	0.1	0.1	0	0	0	0	0	0	1
Wurmbea dioica	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Maireana pyramidata																						

2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM2	HuEco BAM3	HuEco BAM6	HuEco BAM7	HuEco BAM8	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM1	HuEco BAM2	HuEco BAM3	HuEco BAM6	HuEco BAM7	HuEco BAM8	2.024E+10	2.024E+10	2.024E+10	2.024E+10	2.024E+10
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.5	1	0	0	0	0	0	0	0.2	0.1	0	0.1
0.3	0.1	2	0	1	1	0	0	0	0.5	60	0	0	30	15	7	20	0	0	0	0.5	0	0	0.1	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.1	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0.8	0	0.3	0	0	0	0.1	0	0	0	0.1	0	0.1	0	0	0	0	0
0.3	0.3	0.1	0	0	0.5	0.3	1	0.5	0.2	0.5	0.2	0.2	0	0.1	0.1	0.2	0.8	0.4	0	0.1	0.3	0.3	0	0.2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.3	0	0	0.1	0.1	0	0	1.5	0	0	0	0	0	0.5	0	0.8	1	0	0	0	0	0.1	0	0	0.1
0	0	0	0	0	0	0	0	0	0.1	0	0.1	0.1	0.1	0.1	0.5	0.1	0.1	0	0.1	0	0	0	0	0
0	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0.1	0.2	0	0	0	0	0	0	0	0
15	1	5	5	2	0.2	0.3	4	20	20	0.5	5	5	2	5	6	0.1	10	8	4	0.2	0.5	0.2	0.2	0.2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5	25	0.5	0.5	2	25	25	8	50	20	20	6	0	2	0.8	40	30	20	0	3	0.3	10	30	0.5	10
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.1	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0.2	0	0.2	0.1	0	0	0	0.3	0	0
0.1	0.1	0	0	0.2	0.1	0.3	0.1	0	0	0.1	0	0.2	0.1	0	0.1	0.1	0.1	0.3	0.1	0	1	0	0	0.2
0	0	1	0	0	0.1	0	0	0	0	0	0	0	0.1	0.2	0	0.2	0	0	0	0.2	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.2	0	0	0.2	0.5	0	0	0	0	0.5	0.2	0	3	0	0	0	0	0	0.1	0	0.2	0.1	0.1	0.2	0.2
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0.1	0	0	0	0	0.1	0	0	0	0.1
0	0	0.1	0	0	0	0	0	0.3	0	0	0	0	5	8	0.2	3	0.5	0	0	0.3	0	0	0.1	0.1
0	0	0	0	0	0.1	0	0	0.1	0	0	0.1	0.1	0	0	0	0	0	0	0.1	0.1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0	0.2	0.1
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.8	0.1	0.2	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0.1	0	0	0.2	0	0	0	0	0	0	0.1	0	0	0	0
0	0.1	0.1	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

2.024E+10	2.024E+10	2.024E+10	25093001	25093003	25033004	25093005	25100106	25100107	
0	0	0					0.1		
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0	0.1	0							
0	0	0	0.1						
0	0	0							
0	0	0							
0	0	0	0.1						
0	0	0							
0	0.1	0							
0	0	0		0.1			0.3		
0.1	0.2	0.5	0.1	0.2				0.2	
0	0.1	0		0.2		0.1			
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0	0.1	0.1		0.1			0.1	0.1	
0	0	0							
0	0	0					0.1		
0	0	0							
0	0	0			0.1			0.1	
0	0	0							
0	0	0			0.2			0.5	
0	0	0	1						
0	0	0						0.1	
0	0	0.1							
0	0	0		0.1					
0	0	0							
0	0	0							
0	0	0		0.1					
0	0	0							
0	0	0							
0	0	0							
0	0	0		0.1	0.1				
0	0	0							
0	0	0		0.1	0.1				
0	0	0							
0	0	0			10				
0	0	0							
0	0	0			0.2		0.1		
0	0	0							
0	0	0.5	1		0.1				
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0	0	0		0.1					
0	0	0						0.1	
0	0	0							
0	0	0							
0	0	0		0.2		0.1	0.1		
0	0	0					1		
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0	0	0.1		0.1	0.3				
0	0	0					0.1		
0	0	0							
0	0	0		0.1					
0	0	0							
0.5	2	0		0.5	1	1	3		
0	0.1	0	10						
0	0.1	0							
0	0	0							
0	0.1	0.1	0.1			0.2	0.2		
0	0	0							
0	0	0							
0	0	0							
0	0	0							

2.024E+10	2.024E+10	2.024E+10	25093001	25093003	25033004	25093005	25100106	25100107	
0	0	0.1							
0	0	0		0.3		0.1	0.5		
0	0	0.3		0.1			0.5		
0	0	0							
0	0	0.2							
0	0	0							
0	0	0							
0	0	0		0.3					
0.2	0.1	0		1	0.2	0.5	0.5		
0	0	0							
0	0	0							
0	0	0		0.1					
0	0.2	3							
0	0	0							
0	0	0				0.1			
0.1	0.1	0		5	2	0.2	1	10	
0	0	0		0.1					
1	1	0.2		1	1		0.2	0.1	
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0.1	0.2	5		0.1	0.1		0.1	0.2	
0	0.2	0				2	0.3		
0	0	0	0.1						
0	0	0							
0.1	0	0.1			0.1			0.3	
0	0	0							
0.1	0	0	0.3		0.1				
0	0	0.3						0.1	
0	0	0							
0	0	0							
0	0	0							
0.1	0	0.1	0.2						
0	0	0							
0	0.1	0.5							
0	0	0							
0	0	0.1		0.1	0.1				
0	0	0					0.3		
0	0	0		0.1					
0	0	0		0.1	0.1		0.1		
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0	0	0							
0	0	0							
								0.1	

APPENDIX G BAM PLOT DATA

plot	pct	area	patchsize	conditioncla	zone	easting	northing	bearing	compTree	compShrub	compGrass	compForbs	compFerns	compOther	strucTree	strucShrub	strucGrass	strucForbs
Text[Maximum 10	Number	Number with	Number	Text[Letters	[54 or 55 or 56]			Range in [0-	Number	Number	Number	Number	Number	Number	Number with	Number with	Number with	Number with
Feb-8	164	197.37	101	1	54	772239	6147986	215	0	9	4	14	0	0	0	8.2	25.2	14.6
Feb-11	164	197.37	101	1	54	773965	6146074	320	0	6	4	16	0	0	0	12.5	25.3	7.7
Feb-12	164	197.37	101	1	54	773690	6146229	340	0	5	5	14	0	1	0	13.2	21.3	6.6
PLOT3	164	197.37	101	1	54	772785	6148556	44	0	6	3	10	0	0	0	8.7	70.3	10.9
PLOT4	164	197.37	101	1	55	225941	6145863	283	0	8	2	14	0	0	0	30.5	40	32
PLOT5	164	197.37	101	1	54	773446	6146434	192	0	8	3	10	0	1	0	21.9	25.2	2.5
PLOT6	164	197.37	101	1	54	770601	6565655	222	0	7	4	12	0	0	0	21	15.2	17
PLOT11	164	197.37	101	1	54	769818	6143956	150	0	5	5	11	0	0	0	23.7	23.3	3.6
240924005	164	197.37	101	1	55	227126	6150798	323	0	5	3	8	0	0	0	1.6	16	3.1
240926010	164	197.37	101	1	54	768243	6148489	180	0	3	2	8	0	0	0	0.4	40	1.9
240927015	164	197.37	101	1	54	769202	6146883	6	0	3	3	6	0	0	0	1.2	30.2	1.1
240927016	164	197.37	101	1	54	765218	6148745	278	0	2	2	14	0	0	0	5.3	35	2.1
HuEcoBAM10	164	197.37	101	1	54	769145	6151470	63	0	5	3	11	0	0	0	10.5	48.3	6.6
HuEcoBAM12	164	197.37	101	1	54	769882	6149442	297	0	3	2	6	0	0	0	1.5	25	20.8
241128006	164	197.37	101	1	54	771165	6149806	31	0	3	2	3	0	0	0	0.7	40	0.6
Feb-4	164	138.82	101	2	54	767613	6151642	230	0	9	3	12	0	0	0	11.8	1.6	9
Feb-25	164	138.82	101	2	54	769821	6146124	330	0	9	3	8	0	0	0	14.1	0.3	1
240927012	164	138.82	101	2	55	225621	6143954	50	0	5	2	8	0	0	0	5.2	1.5	6.1
241128010	164	138.82	101	2	54	766372	6151353	89	0	8	3	6	0	0	0	3	1.3	0.6
25093003	164	138.82	101	2	54	766155	6151949	44	0	3	3	16	0	1	0	0.7	1.3	8
25093005	164	138.82	101	2	54	764775	6148529	84	0	2	0	7	0	0	0	3	0	1.3
25100106	164	138.82	101	2	54	769048	6143518	249	0	5	2	12	0	0	0	4	0.5	4.1
241128007	164	18.33	101	3	54	771288	6149994	293	0	3	2	2	0	0	0	0.4	2.5	0.4
241128009	164	18.33	101	3	54	770068	6149039	111	0	4	2	3	0	0	0	0.8	1.1	0.4
241128011	164	18.33	101	3	54	767465	6151737	290	0	5	4	8	1	0	0	8.7	1.7	0.9
25100107	164	18.33	101	3	54	768282	6145805	284	0	5	3	5	0	0	0	1.2	0.4	10.4
Feb-9	164	223.98	101	4	54	771035	6147995	255	0	9	3	9	0	0	0	25.2	7.1	11.6
PLOT1	164	223.98	101	4	54	763780	6148984	91	0	2	3	12	0	0	0	11	27	5
PLOT2	164	223.98	101	4	54	767355	6148084	270	0	3	5	7	0	0	0	11.1	17.2	9.4
PLOT7	164	223.98	101	4	55	226617	6153178	266	0	6	2	9	0	0	0	11.6	1.1	55.7
PLOT10	164	223.98	101	4	54	773561	6144684	64	0	5	4	7	0	1	0	15.4	10.3	31.2
240923001	164	223.98	101	4	55	226474	6149475	107	0	3	2	5	0	0	0	22.2	11	21.6
240923002	164	223.98	101	4	55	229858	6148935	86	0	5	2	8	0	0	0	6.4	8	7.2
240923003	164	223.98	101	4	55	228078	6152746	258	0	1	3	5	0	0	0	10	10.2	5.7
HuEcoBAM15	164	223.98	101	4	54	770187	6143385	152	0	1	2	10	0	0	0	50	6.5	6.3
HuEcoBAM6	164	223.98	101	4	54	774095	6150711	75	0	4	2	6	0	0	0	25.8	28	11.4
HuEcoBAM7	164	223.98	101	4	55	225920	6152107	37	0	5	1	9	0	0	0	35.6	2	9.9
HuEcoBAM8	164	223.98	101	4	54	770819	6150736	247	0	2	3	10	0	0	0	30.1	28.2	4.9
241128001	164	223.98	101	4	54	772572	6143117	93	0	7	4	9	0	0	0	27.3	0.9	1.2
241128005	164	223.98	101	4	54	772240	6148931	334	0	4	2	6	0	0	0	16.2	15	1.4
241128008	164	223.98	101	4	54	771702	6150510	49	0	6	2	4	0	0	0	5.7	11	0.6
240924004	164	70.92	101	5	55	230973	6151064	167	0	5	2	11	0	0	0	2.7	0.6	5.5
240926007	164	70.92	101	5	55	229423	6150719	98	0	1	2	5	0	0	0	5	10	20.5
240926009	164	70.92	101	5	54	770561	6152593	10	0	8	3	7	0	0	0	4.6	7	15.9
240927013	164	70.92	101	5	54	772569	6144980	50	0	4	3	2	0	0	0	5.4	1.5	5.5
240927014	164	70.92	101	5	54	771295	6145222	296	0	6	3	8	0	0	0	4.8	7.3	2.8
HuEcoBAM11	164	70.92	101	5	54	768251	6149700	86	0	2	1	6	0	0	0	5.3	50	21.1
HuEcoBAM16	164	70.92	101	5	54	770936	6143582	112	0	5	2	11	0	0	0	26.4	20.5	6.7
25033004	164	70.92	101	5	54	765582	6150397	62	0	6	2	8	0	0	0	11.5	1.1	3.1
240926008	163	115.47	101	6	54	768223	6153211	146	0	7	5	9	0	0	0	4.1	33.3	1.2
HuEcoBAM13	163	115.47	101	6	54	768410	6147814	156	0	4	2	5	0	0	0	60.5	25	1.3
HuEcoBAM17	163	115.47	101	6	54	768401	6145173	307	0	6	2	11	0	0	0	39.7	12	3.6
HuEcoBAM18	163	115.47	101	6	54	767371	6144298	109	0	6	4	13	0	0	0	31.3	3.7	7.1
HuEcoBAM2	163	115.47	101	6	55	226758	6155449	285	0	8	3	8	0	0	0	10.5	42.1	7.3
HuEcoBAM3	163	115.47	101	6	55	227135	6154713	92	0	7	4	13	0	0	0	26.5	35.4	2.6
25093001	159	0.18	101	7	54	661270	6174593	292	0	5	2	3	0	0	0	11.5	1.1	0.4

strucFerns	strucOther	funLargeTre	funHollowtr	funLitterCov	funLenFaller	funTreeStem	funTreeStem	funTreeStem	funTreeStem	funTreeStem	funTreeRege	funHighThreatExotic
Number with	Number with	Number	Number	Number with	Number with	[0,1]	[0,1]	[0,1]	[0,1]	[0,1]	[0,1]	Number with 1 decimal point
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0.1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0.1	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0.3
0	0	0	0	0	0	0	0	0	0	0	0	0

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