



Biodiversity Development Assessment Report

Hillview Hard Rock Quarry

Coastwide Materials Pty Ltd

11 Lucca Road
Wyong NSW 2259

Prepared by:

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Australia

SLR Project No.: 630.V12117.00600

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Revision: 3.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
3.0	27 March 2025	Gilbert Whyte, Jarrid Beeton, Fiona Iolini, J Pepper	Jeremy Pepper	J Pepper
2.0	26 June 2024	Gilbert Whyte, Jarrid Beeton, Fiona Iolini, J Pepper, J Peppin	Bo Davidson J Pepper	J Pepper
0.2	10 April 2024	Gilbert Whyte, Jarrid Beeton, Fiona Iolini, J Pepper	Jeremy Pepper	J Pepper

Basis of Report

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Coastwide Materials Pty Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.



Executive Summary

Coastwide Materials Pty Ltd intends to seek development consent for a new hard rock quarry at Booral (the Project), within the MidCoast local government area, New South Wales. The quarry would have capacity to extract up to 1.5 million tonnes per annum over a planned life of 30 years. This Biodiversity Development Assessment Report (BDAR) has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) and the Biodiversity Assessment Method (BAM).

The Project site is accessed from 67 Maytoms Lane, Booral NSW, and lists the various land titles within the project site including Lot 1 DP 159902, Lots 2, 3 and 4 DP 1166923, Lot 60 DP 1094397, Lot 62 and 63 DP 95029 and Lot 64 DP 95030. Cumulatively, the Project site is approximately 448 hectares. Local topography is irregular and undulating. Double Creek traverses the Project site in a south-easterly direction eventually draining into the Karuah River. The development footprint is approximately 48 hectares and predominately situated in the western section of the Project site, with a proposed haul road extending southeast along Maytoms Lane to The Buckets Way. Extensive vegetation clearing has (evidently) occurred for agricultural development (grazing) and the majority of the site is cleared grassland. The remaining native vegetation comprises patches of forest and isolated paddock trees.

A total of 282 plant species were recorded, comprising 213 native species and 69 exotic species. No threatened plant species listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were detected.

The native vegetation mapped across the site has been categorised into four distinct Plant Community Types (PCTs) as follows:

- PCT 3241 Lower North White Mahogany-Spotted Gum Moist Forest.
- PCT 3254 Northern Hinterland Tallowood-Forest Oak Grassy Forest.
- PCT 3436 Hunter Coast Sandy Creekflat Low Paperbark Scrub.
- PCT 3074 Hunter Coast Lowland Grey Myrtle Wet Forest.

The remainder of the subject land is mapped as exotic grassland and has been used for grazing cattle over several decades. Two Threatened Ecological Communities (TECs) listed under the BC Act have been identified within or adjacent to the subject land as part of the preparation of this BDAR, as follows:

- River Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions ('River-flat Forest EEC'), which is listed under Schedule 2, Part 2 of the BC Act and occurs on the subject land as PCT 3436 and PCT 3074. A total of 1.81 ha of River-flat Forest EEC has been mapped within the subject land and will require removal to allow development of the Proposal.
- Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions ('Lower Hunter Dry Rainforest VEC'), which is listed under Schedule 2, Part 3 of the BC Act and occurs on the subject land as PCT 3436.

The patch of PCT 3436 is located north of the proposed pit expansion and therefore lies outside of the development footprint; consequently, the Proposal will not have any direct impacts on Lower Hunter Dry Rainforest VEC.



A total of 99 fauna species were detected within the subject land. These comprise one fish, nine amphibians, 71 birds, one crustacean, 10 mammals and seven reptiles. Five threatened fauna species were detected, as follows:

- Little Lorikeet (*Glossopsitta pusilla*) - observed flying over the subject land (ecosystem credit species; Vulnerable BC Act).
- Varied Sittella (*Daphoenositta chrysoptera*) - observed foraging within the subject land (ecosystem credit species; Vulnerable BC Act).
- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*) - detected via Anabat (ecosystem credit species; Vulnerable BC Act).
- Squirrel Glider (*Petaurus norfolcensis*) - detected during spotlighting surveys (species credit species; Vulnerable BC Act).
- Koala (*Phascolarctos cinereus*) - detected during spotlighting surveys (species credit species; Endangered BC Act and EPBC Act).

Important habitat features for fauna species within the subject land include forest vegetation, aquatic habitat and habitat trees containing hollows.

One Matter of National Environmental Significance (MNES), the Koala, listed as 'Endangered' under the EPBC Act, was recorded on site. No other listed threatened species were recorded. A migratory species, Latham's Snipe (*Gallinago hardwickii*), listed under the EPBC Act was detected during the assessment. Additionally, the Black-faced Monarch (*Monarcha melanopsis*) has previously been recorded within the subject land. These species are likely to utilise the habitat within the subject land as part of a larger network of habitats within the region. No important wetlands or other such breeding habitat was identified. The subject land does, however, contain forest habitats that could be utilised periodically by a selection of mobile threatened birds and bats.

The habitats to be removed for the Koala and other listed threatened species that could potentially occur are not considered to be important to the long-term survival of these species, given the lack of evidence for these species and the retention of similar habitat across the periphery of the site. The Project is therefore not considered likely to have a significant impact on EPBC Act listed threatened or migratory species. One TEC, *Sub-tropical coastal floodplain forest*, listed under the EPBC Act, was recorded in a narrow belt along Maytoms Lane. No other EPBC Act matters are considered relevant to this assessment. Overall, the Project is not likely to have a significant impact on any MNES listed under the EPBC Act. However, given the presence of the Koala and likely presence of the Grey-headed Flying Fox (*Pteropus poliocephalus*), listed as 'Vulnerable' under the EPBC Act, a Referral is currently in preparation and will be submitted to the Department of Climate Change, Energy, the Environment and Water.

Avoidance measures have been incorporated into the design and layout of the proposed quarry. The pit shell has been specifically designed to avoid areas of high biodiversity value such as larger patches of forest with high vegetation integrity. In particular, a small gully containing rainforest vegetation (PCT 3436) has been avoided and will be retained on-site.

The residual impacts of the Project (after application of impact avoidance and mitigation measures) consist of the permanent removal of 10.59 hectares (ha) of native vegetation, comprising:

- Lower North White Mahogany-Spotted Gum Moist Forest (8.1 ha).
- Northern Hinterland Tallowood-Forest Oak Grassy Forest (0.7 ha).
- Hunter Coast Sandy Creekflat Low Paperbark Scrub (1.3 ha).



- Hunter Coast Lowland Grey Myrtle Wet Forest (0.49 ha).

The removal of native vegetation will also remove habitat for several threatened species which are species credit species that have either been recorded on site or assumed present:

- South-eastern Glossy Black-Cockatoo (Fauna).
- Red Helmet Orchid (Flora).
- Barking Owl (Fauna).
- Powerful Owl (Fauna).
- Squirrel Glider (Fauna).
- Brush-tailed Phascogale (Fauna).
- Koala (Fauna).
- Common Planigale (Fauna).
- Long-nosed Potoroo (Fauna).
- Masked Owl (Fauna).
- Sooty Owl (Fauna).

Mitigation measures have been presented to reduce the potential for impacts to biodiversity values, including pre-clearing surveys, tree felling protocol, wildlife exclusion fencing and monitoring and maintenance of retained bushland around the periphery of the site. A Rehabilitation Management Plan (RMP) will also be prepared to guide the staged soil management and planting of disturbed areas over the life of the project.

Biodiversity offset requirements for ecosystem credits are included in Table E-1.

Table E-1: Impacts that Require an Offset – Ecosystem Credits

Veg Zone Code	PCT Name	TEC	Impact Area (ha)	Ecosystem Credits
3241_Mod-good	Lower North White Mahogany-Spotted Gum Moist Forest	-	8.1	208
3254_Mod-good	Northern Hinterland Tallowwood-Forest Oak Grassy Forest		0.7	13
3436_Mod-good	Hunter Coast Sandy Creekflat Low Paperbark Scrub	-	1.3	17
3074_Mod-good	Hunter Coast Lowland Grey Myrtle Wet Forest	-	0.49	12
	Total:		10.59	250

Biodiversity offset requirements for species credit species are listed in Table E-2. Eleven candidate species require species credits under the BAM to offset the loss of suitable habitat on the subject land.



Table E-2: Impacts that Require an Offset – Species Credits

Species Credit	Species Name	Impact Area (ha)	Species Credits
South-eastern Glossy Black-Cockatoo (Fauna)	<i>Calyptrorhynchus lathamii lathamii</i>	10.59	331
Red Helmet Orchid (Flora)	<i>Corybas dowlingii</i>	10.59	331
Barking Owl (Fauna)	<i>Ninox connivens</i>	10.59	331
Powerful Owl (Fauna)	<i>Ninox strenua</i>	10.59	331
Squirrel Glider (Fauna)	<i>Petaurus norfolcensis</i>	10.59	331
Brush-tailed Phascogale (Fauna)	<i>Phascogale tapoatafa</i>	10.59	331
Koala (Fauna)	<i>Phascolarctos cinereus</i>	10.59	331
Common Planigale (Fauna)	<i>Planigale maculata</i>	10.59	331
Long-nosed Potoroo (Fauna)	<i>Potorous tridactylus</i>	10.59	331
Masked Owl (Fauna)	<i>Tyto novaehollandiae</i>	10.59	331
Sooty Owl (Fauna)	<i>Tyto tenebricosa</i>	10.59	496



Table of Contents

Basis of Report	i
Executive Summary	ii
Acronyms and Abbreviations	xii
DECLARATIONS	xiv
STAGE 1: BIODIVERSITY ASSESSMENT	1
1.0 Introduction	1
1.1 Proposed Development.....	1
1.1.1 Development Overview	1
1.1.2 Location	1
1.1.3 Proposed Development Stages.....	4
1.2 Secretaries Environmental Assessment Requirements	6
1.3 Excluded Impacts.....	7
1.4 Information Sources	7
2.0 Methods	8
2.1 Site Context Methods.....	8
2.1.1 Landscape Features	8
2.1.2 Native Vegetation Cover	8
2.2 Native Vegetation, Threatened Ecological Communities and Vegetation Integrity	8
2.2.1 Existing Information.....	8
2.2.2 Mapping Native Vegetation Extent	8
2.2.3 Plot-based Vegetation Survey	8
2.2.4 Vegetation Integrity Survey	9
2.3 Threatened Flora Survey Methods	9
2.3.1 Review of Existing Information	9
2.3.2 Habitat Constraints Assessment	9
2.3.3 Field Surveys	10
2.4 Threatened Fauna Survey Methods	10
2.4.1 Review of Existing information	10
2.4.2 Habitat Constraints Assessment	10
2.4.3 Field Surveys	10
2.5 Previous Ecological Surveys	11
2.6 Weather Conditions.....	13
2.7 Limitations.....	13
3.0 Landscape Context	14



3.1	IBRA Bioregion and IBRA Subregion	14
3.2	Rivers, Streams and Estuaries	14
3.3	Habitat Connectivity	16
3.4	Karst, Caves, Crevices, Cliffs, Rocks or Other Geological Features of Significance	16
3.5	Areas of Outstanding Biodiversity Value.....	16
3.6	NSW (Mitchell) Landscapes	16
3.7	Additional Landscape Features Identified in SEARs.....	17
3.8	Soil Hazard Features.....	17
3.9	Native Vegetation Cover	17
4.0	Native Vegetation	19
4.1	Native Vegetation Extent.....	19
4.1.1	Changes to the Mapped Native Vegetation Extent	19
4.1.2	Areas That Are Not Native Vegetation.....	19
4.2	Plant Community Types	20
4.2.1	Overview	20
4.2.2	Lower North White Mahogany-Spotted Gum Moist Forest (PCT 3241)	23
4.2.3	Northern Hinterland Tallowood-Forest Oak Grassy Forest (PCT 3254)	24
4.2.4	Hunter Coast Sandy Creekflat Low Paperbark Scrub (PCT 3436).....	26
4.2.5	Hunter Coast Lowland Grey Myrtle Wet Forest (PCT 3074)	27
4.3	Threatened Ecological Communities	28
4.3.1	Overview	28
4.3.2	River-Flat Eucalypt Forest EEC.....	30
4.3.3	Lower Hunter Dry Rainforest VEC.....	31
4.4	Vegetation Zones	32
4.4.1	Overview	32
4.4.2	Patch Size.....	35
4.5	Vegetation Integrity (Vegetation Condition)	35
4.5.1	Vegetation Integrity Survey Plots	35
4.5.2	VI Scores	35
4.5.3	Use of Benchmark Data	35
5.0	Habitat Suitability for Threatened Species	38
5.1	Identification of Threatened Species for Assessment	38
5.1.1	Predicted (Ecosystem Credit) Species	38
5.1.2	Species Credit Species	46
5.2	Presence of Candidate Species	52
5.2.1	Candidate Flora Species	52



5.2.2	Candidate Fauna Species	53
5.3	Threatened Species Surveys	55
5.3.1	Overview	55
5.3.2	Threatened Flora Surveys	56
5.3.3	Threatened Fauna Surveys	56
5.4	Expert Reports	77
5.5	More Appropriate Local Data	77
5.6	Species Polygons (for Relevant Species Credit Species)	77
5.7	EPBC Act Species Recorded within the Subject Land	81
6.0	Identifying Prescribed Impacts	83
STAGE 2: IMPACT ASSESSMENT		85
7.0	Avoid and Minimise Impacts	85
7.1	Avoidance Measures	85
7.2	Mitigation Measures – Before and During Construction Phase	87
7.2.1	Erosion Control	87
7.2.2	Stockpiling	87
7.2.3	Dust Control	87
7.2.4	Chemical Spill Control	87
7.2.5	Fauna Management (Mortality and Injury Prevention)	88
7.2.6	Weed Management	90
7.2.7	Monitoring and Adaptive Management	90
7.3	Mitigating Residual Impacts - Management Measures and Implementation	91
7.3.1	Mitigation Measures – Identification of Relevant Measures	91
7.3.2	Mitigation Measures – Monitoring and Evaluation	95
7.4	Mitigation of Prescribed Impacts	101
7.5	Adaptive Management of Uncertain Impacts	106
8.0	Impact Assessment	107
8.1	Serious and Irreversible Impacts (SAII)	107
8.1.1	Overview	107
8.1.2	Sooty Owl	107
8.2	Residual Direct Impacts	108
8.3	Impacts Requiring an Offset	109
8.3.1	Impacts on Native Vegetation (Ecosystem Credits)	109
8.3.2	Impacts on Candidate Species (Species Credits)	109
8.4	Indirect Impacts	112
8.5	Prescribed Impacts	116



8.5.1	Habitat Corridors for Threatened Species	116
8.5.2	Waterbodies, Water Quality and Hydrological Processes	116
8.5.3	Vehicle Strikes (Threatened Fauna)	117
8.6	Impacts Not Requiring an Offset	118
8.7	Areas Not Requiring Further Assessment	118
8.8	GDEs	118
8.8.1	Overview	118
8.8.2	Impacts on GDEs	119
9.0	Biodiversity Credit Reports (Offset Requirements)	122
9.1	Ecosystem Credits	122
9.1.1	Summary of Ecosystem Credits	122
9.1.2	Offset Trading Group	122
9.2	Species Credits	124
10.0	Matters of National Environmental Significance	125
10.1	Overview	125
10.2	Relevant Matters	125
10.2.1	Overview	125
10.2.2	Threatened Species	126
10.2.3	Listed Migratory Species	127
10.2.4	Threatened Ecological Communities	127
10.2.5	Ramsar Wetlands	129
10.3	Impacts on EPBC Matters	129
10.3.1	Listed Threatened Species	129
10.3.2	Listed Migratory Species	130
10.3.3	Threatened Ecological Communities	131
10.3.4	Conclusion	132
11.0	References	133
12.0	Feedback	136

Tables in Text

Table 1:	Project Details	1
Table 2:	Schedule of Land Titles	4
Table 3:	Vegetation Integrity Plots	9
Table 4:	Survey Effort Summary – Keystone (2017)	11
Table 5:	Karuah Manning Subregion	14



Table 6:	Native Vegetation Cover in the Assessment Area.....	17
Table 7:	Former and Current PCTs within the Development Footprint.....	21
Table 8:	PCTs within the Subject Land.....	23
Table 9:	Lower North White Mahogany-Spotted Gum Moist Forest	23
Table 10:	Northern Hinterland Tallowwood-Forest Oak Grassy Forest	25
Table 11:	Hunter Coast Sandy Creekflat Low Paperbark Scrub	26
Table 12:	Hunter Coast Lowland Grey Myrtle Wet Forest.....	27
Table 13:	TECs within the Subject Land.....	29
Table 14:	Vegetation Zones	32
Table 15:	Vegetation Integrity Scores.....	35
Table 16:	Predicted Ecosystem Credit Species	39
Table 17:	Candidate Flora (Species Credit) Species	47
Table 18:	Candidate Fauna Species Credit Species.....	49
Table 19:	Determining Presence of Candidate Flora Species.....	52
Table 20:	Determining Presence of Candidate Fauna Species.....	54
Table 21:	Summary of Field Surveys.....	55
Table 22:	Summary of Threatened Species Surveys for Candidate Flora Species	57
Table 23:	Summary of Threatened Species Surveys for Candidate Fauna Species	63
Table 24:	Candidate Species Recorded within the Subject Land.....	78
Table 25:	Prescribed Impacts Identified.....	83
Table 26:	Proposed Mitigation and Management Measures for Residual Impacts (Direct and Indirect)	91
Table 27:	Implementation and Monitoring of Mitigation Actions	95
Table 28:	Mitigation Measures for Prescribed Impacts	101
Table 29:	Prescribed Impacts: Implementation of Mitigation Measures	104
Table 30:	Summary of Residual Direct Impacts.....	108
Table 31:	Impacts that Require an Offset – Ecosystem Credits (by Veg Zone).....	110
Table 32:	Species Credits for Threatened Species.....	111
Table 33:	Summary of Residual Indirect Impacts.....	113
Table 34:	Impacts that Require an Offset – Ecosystem Credits	122
Table 35:	Ecosystem Credit Class and Matching Credit Profile	123
Table 36:	Species Credits for Threatened Species.....	124
Table 37:	EPBC Act Matters within the Locality.....	125
Table 38:	EPBC Act Migratory Species Recorded On Site	127
Table 39:	Assessment of Significance - Subtropical Eucalypt Floodplain Forest and Woodland	131



Figures in Text

Figure 1: Development Footprint	2
Figure 2: Site Map	3
Figure 3: Location Map	15
Figure 4: Native Vegetation Extent	18
Figure 5: Plant Community Types.....	22
Figure 6: Threatened Ecological Communities	33
Figure 7: Vegetation Zones	36
Figure 8: Threatened Species Records and Species Polygons.....	82
Figure 9: Alternative Development Footprints	86
Figure 10: Final Impacts Likely to Occur on the Subject Land.....	121

Photos in Text

Photo 1: View North across the Eastern Parts of the Project Site	6
Photo 2: Exotic Grassland and Isolated Patches of Forest.....	19
Photo 3: Exotic Grassland within Central Portion of Subject Land (Dams in Background)	20
Photo 4: Lower North White Mahogany-Spotted Gum Moist Forest	24
Photo 5: Northern Hinterland Tallwood-Forest Oak Grassy Forest.....	25
Photo 6: Hunter Coast Sandy Creekflat Low Paperbark Scrub	26
Photo 7: Hunter Coast Lowland Grey Myrtle Wet Forest.....	28

Appendices

Appendix A	BDAR Requirements Compliance
Appendix B	Methods Statement
Appendix C	PCT Descriptions
Appendix D	Flora Species List and BAM plot data
Appendix E	BAM Credit Reports
Appendix F	Threatened Biota – Likelihood of Occurrence
Appendix G	Fauna Data
Appendix H	EPBC Act Protected Matters Search Report (PMST)
Appendix I	EPBC Act Assessments of Significance



Acronyms and Abbreviations

Short Form	Long Form
APZ	asset protection zone
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method Calculator
BC Act	<i>Biodiversity Conservation Act 2016 (NSW)</i>
BC Regulation	<i>Biodiversity Conservation Regulation 2017 (NSW)</i>
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
BOS	Biodiversity Offsets Scheme
CEEC	critically endangered ecological community
DBH	diameter at breast height over bark
Development footprint	the area of land that is directly impacted by a Proposal, including access roads and areas used to store construction materials.
EC	ecological community listed under the EPBC Act
EEC	endangered ecological community
EIS	Environmental impact statement
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Cwlth)</i>
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
HTW, HTE	high threat weed, high threat exotic
IBRA	Interim Biogeographic Regionalisation for Australia
Koala SEPP 2020	<i>State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Ch3)</i>
LLS Act	Local Land Services Act 2013 (NSW)
MNES	matters of national environmental significance
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NSW	New South Wales
PCT	plant community type
Project Site	Area of land within which the project application is to occur, including the subject land and all surrounding areas not included in the application
Proposal	The proposed development, including all associated ancillary works and phases, including construction and operation
SAIL	Serious and Irreversible Impact, as defined under the BAM. (Impacts likely to contribute significantly to the risk of a threatened species or ecological community becoming extinct in accordance with the principles set out in clause 6.7(2) of the BC regulation)
SAT	Spot Assessment Technique (method for survey of Koalas)
SEARs	Secretary's Environmental Assessment Requirements for an environmental impact statement (EIS)



Short Form	Long Form
subject land	The area of disturbance of the Proposal, or development footprint, as defined under the BAM
Study area	Area of investigation included in field surveys for the BDAR, which includes subject land
SVTM	State Vegetation Type Map
TBDC	Threatened Biodiversity Data Collection
TEC	threatened ecological community
VEC	vulnerable ecological community
Vegetation SEPP	<i>State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017 (NSW)</i>



DECLARATIONS

i. Certification under clause 6.15 *Biodiversity Conservation Act 2016*

I 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: __27 March 2025_____

BAM Assessor Accreditation no: _____ BAAS17104_____

ii. Conflict of interest

I 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 interests of full disclosure to the decision-maker. Full disclosure has also been provided to the client.

Signature: _____



Date: __27 March 2025_____

BAM Assessor Accreditation no: _____ BAAS17104_____



STAGE 1: BIODIVERSITY ASSESSMENT

1.0 Introduction

1.1 Proposed Development

1.1.1 Development Overview

Coastwide Materials Pty Ltd intends to seek development consent for a new hard rock quarry within a rural area known as Booral in the Great Lakes Region of New South Wales (NSW). The proposed Hillview Hard Rock Quarry (the Project) will be undertaken over seven stages during which approximately 45 million tonnes of resource material is proposed to be extracted at a rate of up to 1.5 million tonnes per annum (Mtpa) over a planned life of 30 years. The Project will also include site preparation and infrastructure establishment works, public road upgrades and rehabilitation and revegetation works.

The Project is a State Significant Development (SSD) by virtue of *State Environmental Planning Policy (Planning Systems) 2021* (Planning Systems SEPP) and under the provisions of Division 4.7 of Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and in accordance with the *State Environmental Planning Policy (State and Regional Development) 2011* (SRD SEPP). It will require development consent from the Minister (or delegate), along with some secondary approvals. A summary of relevant project details is presented in Table 1.

Table 1: Project Details

Hillview Quarry	
Address	67 Maytoms Lane, Booral NSW
Applicant	Coastwide Materials Pty Ltd
Council	Mid-Coast local government area
Development Footprint (Subject Land)	Cumulatively comprises approximately 48 ha
Land Use	Remnant vegetation interspersed with land that has been cleared or partially cleared and being used for stock grazing, small-scale poultry operations and small rural/lifestyle holdings

1.1.2 Location

The Project site is located approximately 8 kilometres (km) south of Stroud and 5 km northwest of Allworth on the western side of The Bucketts Way in the Great Lakes district of NSW and the Mid-Coast local government area (LGA). The site is accessed from 67 Maytoms Lane, Booral NSW, Table 2 lists the various land titles within the project site, which cumulatively comprise approximately 448 ha. The development footprint is within a low-lying floodplain surrounded by elevated terrain and undulating topography, with areas of bushland (remnant and regrowth native vegetation) interspersed with land that has been cleared or partially cleared and used for stock grazing, small-scale poultry operations and small rural/lifestyle holdings (Figure 1, Photo 1). While the development footprint area has been partially modified and disturbed as a result of past clearing and agricultural activities, there remain some areas of undisturbed land and native vegetation. Site features are shown in the Site Map in Figure 2.



HILLVIEW QUARRY EIS BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Development Footprint

FIGURE 1

- ▬ Project Site
- ▬ Disturbance Footprint
- ▬ Waterbody
- ▬ Local Government Area
- ▬ IBRA Region/Subregion
- ▬ Cadastre
- ▬ Contour (50m interval)
- ▬ Watercourse
- ▬ Road

Data Sources:
NSW Spatial Information Exchange. ESRI Basemap
world imagery (May 2023). IBRA Regions Australian
Government Department of Agriculture, Water and the
Environment.



0 250 500
m

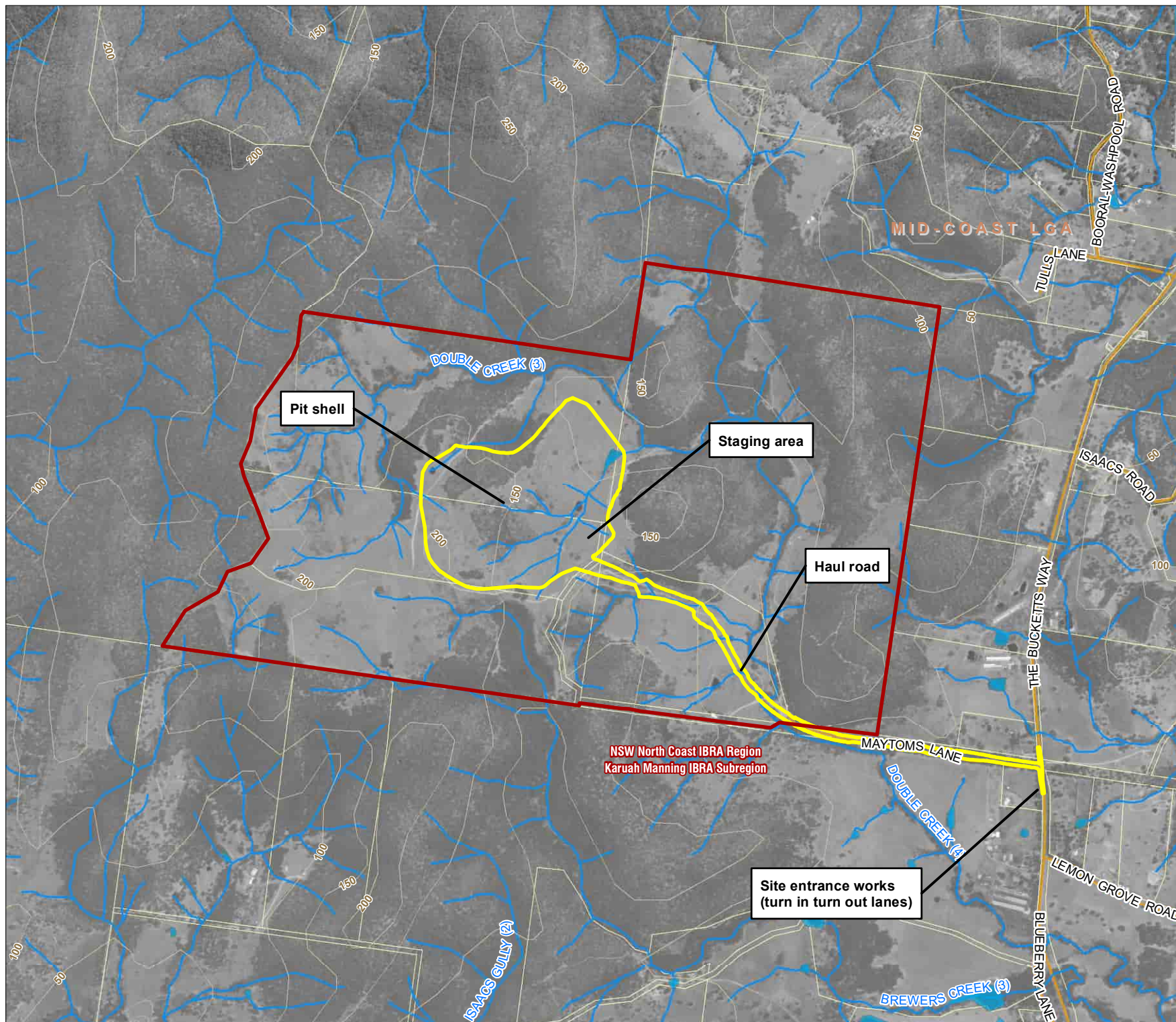
Coordinate System: GDA 1994 MGA Zone 56

Scale: 1:20,000 at A4

Project Number: 630.12117

Date: 25-Jun-2024

Drawn by: JH



HILLVIEW QUARRY EIS BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Site Map

FIGURE 2

- Project Site
- Disturbance Footprint (Subject Land)
- Waterbody (farm dam)
- IBRA Region/Subregion
- Cadastre
- Contour (50m interval)
- Watercourse
- Road

Data Sources:
NSW Spatial Information Exchange. ESRI Basemap
world imagery (May 2023).



Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:20,000 at A4
Project Number:	630.12117
Date:	26-Jun-2024
Drawn by:	JH

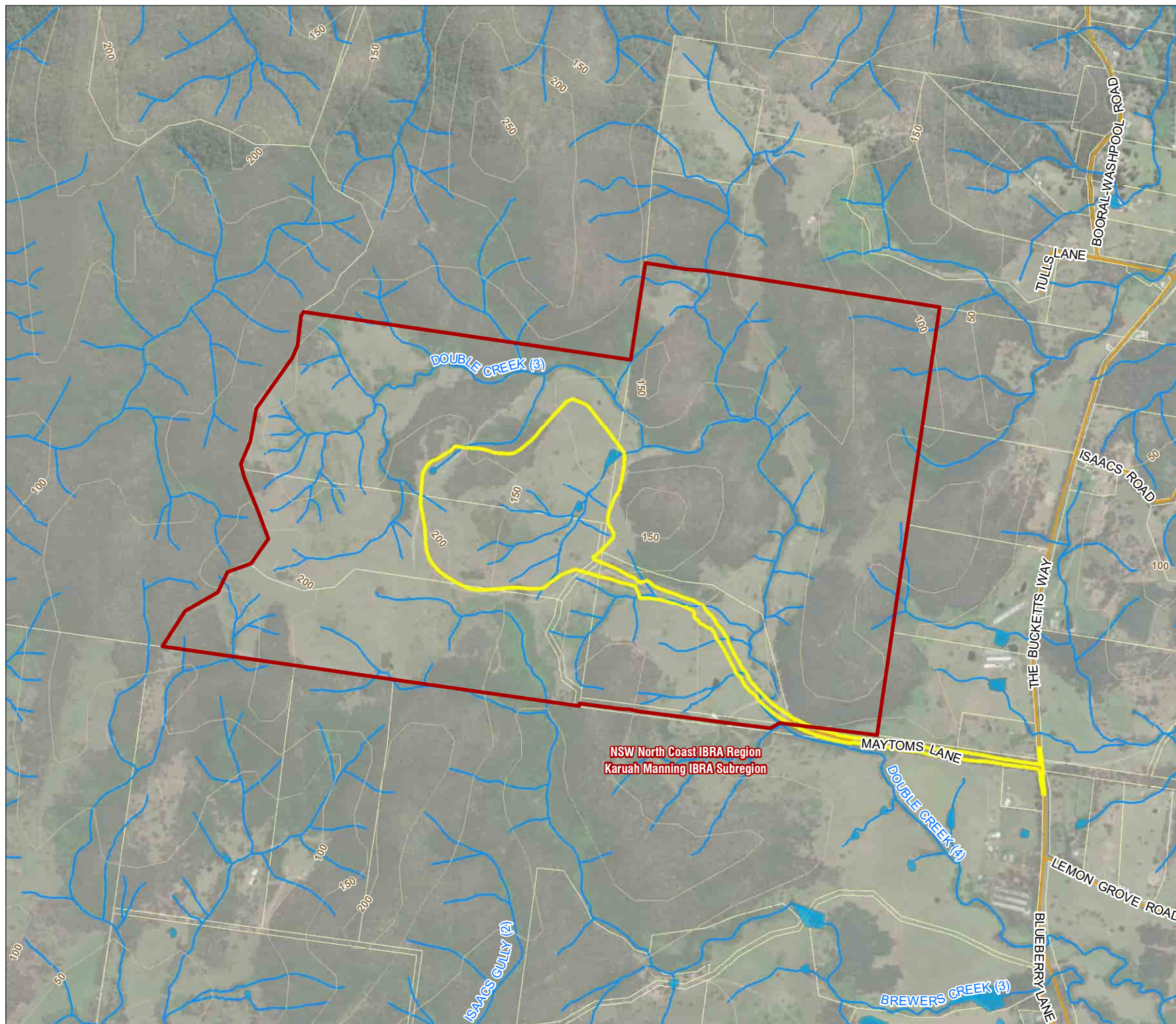


Table 2: Schedule of Land Titles

Lot	Deposited Plan (DP)	Tenure
Lot 1	DP 159902	Freehold
Lots 2, 3 and 4	DP 1166923	
Lot 60	DP 1094397	
Lot 62 and 63	DP 95029	
Lot 64	DP 95030	
Road reserve	Bucketts Way	Public (NSW Government)

1.1.3 Proposed Development Stages

The Project is proposed to take place over seven stages:

Stage 1 (between years 0 – 5 of project)

Stage 1 will result in a land disturbance area of 9.5 hectares, it will broadly comprise commencing of construction of the haul road from Maytoms Lane to the processing pad. During this stage, the 14m wide haul road will be pegged out and cleared as much as possible to expose underlying hard rock. A face will be created on the north side of the spur road with clearing to take place along the eastern underside to facilitate commencement of the processing pad where mobile plant will initially be set up.

Stage 2 (between years 0-5 of project)

Stage 2 will result in a land disturbance area of 2.4 hectares, it will broadly comprise increasing the size of the processing pad, continuing the slot and haul road southward, and upgrades to Maytoms Lane and intersection with The Bucketts Way.

Blasting and drilling will be required to advance the slots southwards. The size of the pad will be increased down to a Relative Level (RL) of 95m. Two weighbridges will be constructed during Stage 2 as well as other ancillary structures and uses required for the proposal including offices and maintenance shed. Construction of the intersection at Maytoms Lane and The Bucketts Way will be commenced by way of vegetation removal and expansion of the road envelope to accommodate the intersection.

Stage 3 (between years 0-5 of project)

Stage 3 will result in a land disturbance area of 10.6 hectares, it will broadly comprise finalising the processing pad and haul road to Maytoms Lane, completion of Maytoms Lane upgrades and the intersection with The Bucketts Way and commencing construction of the internal haul road to the new Run of Mine (ROM) pad to be located 10m above processing pad.

Stage 3 will see the levelling of the main processing pad completed. The processing pad will accommodate the space required for the main processing area dam and sand processing plant dam; tertiary and secondary crushers; sand wash plant; site office; and final product stockpiles which will be constructed or installed as part of Stage 3.

Stage 4 (between years 0-5 of project)

Stage 4 will result in a land disturbance area of 1.1 hectares, it will broadly comprise continued construction of the haul road and Run of Mine pad. Construction of the internal



haul road which commenced in Stage 3 will continue to facilitate access to parts of the site which will comprise extraction areas associated with Stage 5, Stage 6 and Stage 7 as well as the Run of Mine (ROM) pad.

The ROM pad will be constructed 10 metres above main pad area. The ROM will allow extracted material to be crushed with a primary crusher at the ROM pad, before being conveyed to the main processing pad where materials will undergo secondary and tertiary crushing processes. Approximately 339,000m³ tonnes of material will be bulldozed, drilled and blasted, loaded and hauled to create the ROM pad.

Stage 5 (Years 5-10 of project)

Stage 5 will result in a land disturbance area of 5.4 hectares and will involve extraction and processing of material. Material will be extracted from Stage 5 which will start from the highest point of the Project before excavation commences downward in a north-westerly direction. Initial dozer and track drilling at RL 206m will be most audible to residents adjacent to The Bucketts Way; however, as extraction continues in a north-westerly direction noise will be less audible as the rock face for Stage 5 will be higher at the eastern end which will limit noise reaching residences adjacent The Bucketts Way.

Stage 6 (Years 10 to 25 of project)

Stage 6 will result in a land disturbance area of 9.6 hectares and comprise of continued extraction. Extraction will continue down the eastern face and when the amount of excavation necessitates lowering of the area, the majority of the drill and blast, load and haul will be maintained behind the eastern face which will continue to limit acoustic impacts to residents adjacent The Bucketts Way.

Stage 7 (Years 25 to 30 of project)

Stage 7 will be the final landform, with extraction down to RL 95 m, which is the same level as the processing pad constructed as part of Stage 3. Consistent with Stage 5 and Stage 6, as the excavation area is lowered, the noise associated with the drill and blast, load and haul will be maintained behind the eastern face which will limit acoustic impacts to residents adjacent The Bucketts Way.

When excavation works are finalised at the end of the life of the project, the final landform design will be a self-draining. The eastern face and when the amount of excavation necessitates lowering of the area, the majority of the drill and blast, load and haul will be maintained behind the eastern face which will continue to limit acoustic impacts to residents adjacent The Bucketts Way.



Photo 1: View North across the Eastern Parts of the Project Site



1.2 Secretaries Environmental Assessment Requirements

An Environmental Impact Statement (EIS) will be prepared to address the Secretary's Environmental Assessment Requirements (SEARs), which were re-issued to the proponent on 27 May 2024 by the Department of Climate Change, Energy, the Environment and Water (Application number: SSD SSD-70557215). The agency inputs into the SEARs from NSW Biodiversity Conservation Division require the following issues to be addressed in the EIS:

- Biodiversity impacts related to the proposed development (SSD-70557215) are to be assessed in accordance with the Biodiversity Assessment Method 2020 and documented in a Biodiversity Development Assessment Report (BDAR). The BDAR must include information in the form detailed in the Biodiversity Conservation Act 2016 (s6.12), Biodiversity Conservation Regulation 2017 (s6.8) and Biodiversity Assessment Method 2020.
- The BDAR must document the application of the avoid, minimise and offset framework including assessing all direct, indirect and prescribed impacts in accordance with the Biodiversity Assessment Method 2020.
- The BDAR must include details of the measures proposed to address the offset obligation as follows:
 - The total number and classes of biodiversity credits required to be retired for the development/project.
 - The number and classes of like-for-like biodiversity credits proposed to be retired.
 - The number and classes of biodiversity credits proposed to be retired in accordance with the variation rules.
 - Any proposal to fund a biodiversity conservation action.
 - Any proposal to conduct ecological rehabilitation (if a mining project).
 - Any proposal to make a payment to the Biodiversity Conservation Fund. If seeking approval to use the variation rules, the BDAR must contain details of the



reasonable steps that have been taken to obtain requisite like-for-like biodiversity credits.

- The BDAR must be prepared by a person accredited in accordance with the Accreditation Scheme for the Application of the Biodiversity Assessment Method Order 2017 under s6.10 of the Biodiversity Conservation Act 2016.

Accordingly, key requirement for addressing biodiversity in the EIS is the preparation of a Biodiversity Development Assessment Report (BDAR). This BDAR has been prepared to address the SEARs and is prepared in accordance with the Biodiversity Assessment Method (BAM). A set of references tables listing compliance of this BDAR with the requirements of the BAM is provided in Appendix A.

1.3 Excluded Impacts

There are no excluded impacts (for example category 1-exempt land as defined in Part 5A of the LLS Act) applicable to this biodiversity assessment.

1.4 Information Sources

Existing information on the flora and fauna of the subject land and the locality, including relevant threatened biota, was obtained from the following resources:

- The *NSW BioNet* (DPE 2023b) and *Protected Matters Search Tool* (DCCEE 2023a) for previous records of threatened species, populations and ecological communities within a 10 km radius centred on the centre of the subject land.
- The *NSW BioNet* 'Threatened Biodiversity Data Collection' (TBDC) (DPE 2023b), *Final Determinations* (TSC 2023) and *Species Profile and Threats Database* (DCCEE 2023b) for information on threatened species, populations and ecological communities.
- The previous biodiversity assessment (ELA 2018) and *BioNet Vegetation Classification* (DPE 2023c) for information on the Plant Community Type (PCT).
- Regional vegetation mapping - Mid North Coast Vegetation (OEH, 2018)
- BioNet Vegetation Classification (OEH, 2019e)
- Department of the Environment and Energy (DoEE, 2019b) Species Profile and Threats Database (SPRAT)
- The NSW Office of Environment and Heritage (OEH, 2019f) Threatened Species Profiles

A full list of resources is provided in References (Section 11.0).



2.0 Methods

This chapter provides a summary of methods applied in the preparation of this BDAR. A detailed description of field survey methods, including application of the BAM is provided in Appendix B.

2.1 Site Context Methods

2.1.1 Landscape Features

Various field surveys enabling the identification of landscape features were undertaken in 2018, supplemented by additional surveys by SLR in October/November 2020.

The key methods used to identify landscape features in the assessment area (1500m buffer area around the subject land) include review of:

- Recent Nearmap aerial imagery (Nearmap 2023).
- Regional vegetation mapping (DPE 2022a).
- Stream order mapping (ESRI 2023).
- Other general GIS data (e.g. wetland, cliff line, EPI protection layer) available on the SEED portal (DPE 2023d).

2.1.2 Native Vegetation Cover

Various field surveys to assess the extent and condition of native vegetation cover on the subject land were undertaken in 2018 and 2020. The native vegetation mapping for the subject land was also compared to recent Nearmap (2023) aerial imagery November 2020 and subject to field reconnaissance by SLR in November 2020. Regional vegetation mapping (DPE 2022a) and aerial imagery (Nearmap 2023) were used to confirm the native vegetation cover in the assessment area.

2.2 Native Vegetation, Threatened Ecological Communities and Vegetation Integrity

2.2.1 Existing Information

Existing information that was used to identify PCTs (Section 4.2) and TECs (Section 4.3) for the subject land included the previous biodiversity assessment prepared by Keystone (2017) and the associated profiles available in the BioNet Vegetation Classification (DPE 2023c), as well as relevant Scientific Determinations (TSC 2023).

2.2.2 Mapping Native Vegetation Extent

Various field surveys to assess the extent of native vegetation within the subject land (see **Section 4.1**) were undertaken by ELA in 2018. The ELA (2018) native vegetation mapping for the subject land was compared to recent Nearmap (2023) aerial imagery dated March 2023 and subject to supplementary field reconnaissance by SLR in autumn 2023.

2.2.3 Plot-based Vegetation Survey

Plot-based vegetation surveys in accordance with BAM Subsection 4.2.1 were undertaken by SLR in 2018 and 2020 for this assessment. BAM plot data is discussed in Section 4.5 and the location of the plots within each vegetation zone is presented in Figure 7. Sampling



locations were selected randomly within each zone in accordance with the BAM requirements.

2.2.4 Vegetation Integrity Survey

The number of vegetation integrity plots sampled in each vegetation zone is in accordance with the following requirements of Table 3 of BAM 2020. The number of vegetation integrity plots completed per vegetation zone within the subject land is presented in Table 3.

Table 3: Vegetation Integrity Plots

Zone	Zone Code	Zone Area (ha)	PCT Name	VI Plots Req'd	VI Plots Done
1	3241_Mod-good	8.09	Lower North White Mahogany-Spotted Gum Moist Forest	3	4
2	3254_Mod-good	0.70	Northern Hinterland Tallowwood-Forest Oak Grassy Forest	1	3
3	3436_Mod-good	1.32	Hunter Coast Sandy Creekflat Low Paperbark Scrub	1	2
4	3074_Mod-good	0.49	Hunter Coast Lowland Grey Myrtle Wet Forest	1	1
	Total	10.59		6	10

Based on BAM 2020

2.3 Threatened Flora Survey Methods

2.3.1 Review of Existing Information

The BAM Calculator (BAM-C) and a BioNet Atlas search were used to create a list of threatened species of flora for consideration as target threatened species. The TBDC was used to identify habitat constraints and potential microhabitats (see Section 5.1) for each species likely to occur within the PCTs mapped for the subject land.

2.3.2 Habitat Constraints Assessment

Various field surveys to assess habitat constraints and microhabitats (see Section 5.1) were undertaken in 2018. These surveys were supplemented by surveys of the subject land in November 2020 to verify these habitats.

Specific habitat assessment survey techniques for threatened species of flora include:

- Surveys for the following habitat features: site condition, vegetation structure, presence of stock, evidence of feral animals, evidence of human disturbance, evidence of erosion, fire history, proximity to water, dominant canopy species and cover, dominant mid-storey species and cover, dominant ground species and cover, percent cover (of weeds, bare ground, leaf litter, rock cover), evidence of seedling recruitment, wetlands with emergent vegetation.
- Opportunistic and incidental observations during all field surveys.
- Inspection, notes, GPS point and photograph of waterbody, human-made structure and incidental habitat features detected during threatened flora transects by SLR in Autumn 2023.



2.3.3 Field Surveys

Field surveys undertaken to target threatened species of flora include:

- floristic quadrats plus random meanders in 2018, as well as targeted searches in suitable habitat.
- targeted searches in suitable habitat in October 2020 targeting *Cryptostylis hunteriana*, *Callistemon linearifolius*, *Pterostylis chaetophora*, *Rhodamnia rubescens* and *Rhodomyrtus psidioides*.

Further details, including flora survey locations, are provided in Appendix B.

2.4 Threatened Fauna Survey Methods

2.4.1 Review of Existing information

The BAM-C and a BioNet Atlas search were used to create a list of threatened species of fauna for consideration as target threatened species. The TBDC was used to identify habitat constraints and potential microhabitats (see Section 5.1) for each species likely to occur within the PCTs mapped for the subject land.

2.4.2 Habitat Constraints Assessment

Various field surveys to assess habitat constraints and microhabitats were undertaken in 2018. These were supplemented by surveys in Spring (October/November) 2020 to verify these habitats.

Specific habitat assessment survey techniques for threatened species of fauna include:

- Mapping of hollow-bearing trees.
- Surveys of the subject land for the following habitat features: site condition, vegetation structure, presence of stock, evidence of feral animals, evidence of human disturbance, evidence of erosion, fire history, nectar or fruit resources and perch sites, proximity to water, evidence of fauna occupation, dominant canopy species and cover, dominant mid-storey species and cover, dominant ground species and cover, percent cover (of weeds, bare ground, leaf litter, rock cover), evidence of seedling recruitment, hollow resources, wetlands with emergent vegetation, cliffs or caves.
- Opportunistic and incidental observations of fauna species during field surveys, including opportunistic observation of fauna activity such as scats, tracks, burrows, or other traces.
- Inspection of human-made structures as potential bat roost sites.
- Opportunistic searching for chewed cones beneath *Allocasuarina* and *Casuarina* tree species.

2.4.3 Field Surveys

Field surveys undertaken to target threatened species of fauna include:

- Spotlighting to target Squirrel Glider, Brush-tailed Phascogale, Masked Owl, Barking Owl, Powerful Owl and Koala.
- Call playback to target Squirrel Glider, Masked Owl, Barking Owl, Powerful Owl, Sooty Owl and Koala.



- Habitat searches for the Gang-gang Cockatoo, Glossy Black Cockatoo, White-bellied Sea-eagle, Little Eagle, Swift Parrot, Square-tailed Kite, Eastern Osprey.
- Passive surveillance using infra-red cameras to target, *inter alia*, Squirrel Glider, Brush-tailed Phascogale, Common Planigale and Koala.
- Deployment of ultrasonic bat detectors (Anabats) targeting threatened microchiropteran bats.
- Searches for threatened frogs around dams and creeks, employing a combination of tadpole surveys, call playback and active nocturnal searches to target Wallum Froglet, Giant Burrowing Frog, Stuttering Frog, Giant Barred Frog, Green and Golden Bell Frog, Green-thighed Frog and Mahony's Toadlet.
- Harp trapping to target Southern Myotis, Large Bentwing-bat and Little Bentwing-bat.

Supplementary fauna surveys by SLR in 2020 include:

- Aural visual surveys to target Wallum Froglet, Mahoney's Toadlet, Green-thighed Frog and Green and Golden Bell Frog.
- Stag-watches of tree hollows for Glossy Black Cockatoo, Gang Gang Cockatoo and large forest owls (Masked, Sooty, Powerful and Barking Owl).
- Spotlighting to target Southern Greater Glider, Squirrel Glider, Eastern Pygmy-possum, Koala and Pale-headed Snake.
- Surveillance using arboreal remote cameras to target the Brush-tailed Phascogale and Common Planigale.
- Deployment of Anabat detectors for threatened microbats.

Further details on targeted threatened fauna survey locations are provided in Appendix B.

2.5 Previous Ecological Surveys

A Flora and Fauna Assessment (FFA) for the Project Site was completed by Keystone (2017). This assessment was not prepared in accordance with the FBA (OEH, 2014) or the BAM (OEH, 2017b); however, threatened fauna species were identified during the assessment. In accordance with Section 6.1.1.3g of the BAM, the assessor is required to include information pertaining to "past records of threatened species on the subject land"; therefore, relevant information has been included in the current assessment. A summary of the methods employed by Keystone (2017) is presented in Table 4.

Table 4: Survey Effort Summary – Keystone (2017)

Field Survey Technique	Target Species	Current Survey Effort	No. Units	Survey Dates	Timing
Threatened Flora Surveys	Unknown	5 days	-	9/03/2015 – 10/03/2015, 17/10/2016, 11/12/2016 and 12/12/2016	Unknown
Flora Survey Plot/Transects	All flora	5 days	8 Plots - Presence/absence data only.	9/03/2015 – 10/03/2015,	Unknown



Field Survey Technique	Target Species	Current Survey Effort	No. Units	Survey Dates	Timing
				17/10/2016, 11/12/2016 and 12/12/2016	
Fauna Habitat Assessment	Completed for habitat trees and vegetation types although calculations of areas (ha) of each vegetation type has not been completed.	3 days	-	23/02/2015- 25/02/2015	Unknown
Diurnal Opportunistic Fauna Surveys	All fauna species	3 days	-	23/02/2015- 26/02/2015 and 11/12/2016	Unknown
Dawn Bird Surveys	All birds including the threatened bird species	3 mornings	-	23/02/2015- 26/02/2015	6:40- 7:00am
Amphibians (Audio recording, diurnal and nocturnal searches)	Unknown	6 days	-	09-10/03/2015, 23-25/02/2015 and 11- 12/12/2016	4:30- 5:30pm 7:30- 8:15pm
Reptile Survey (Maze and Funnel Traps)	All reptiles.	3 days	1 Maze trap 2 Funnel traps	23/02/2015- 25/02/2015	Unknown
Terrestrial Mammals (Cage Traps and Funnels)	Terrestrial mammals	3 days	10 Medium cage traps 1 Large cage trap 15 Funnels	23/02/2015- 26/02/2015	
Nocturnal Spotlighting	Nocturnal fauna species and relevant threatened species)	2 nights	-	23/02/2015- 25/02/2015	8:30- 10:00pm
Call Playback	Fauna call playback was used to survey for relevant threatened fauna species	2 nights	-	23/02/2015- 25/02/2015	8:30- 10:00pm
Camera Surveillance		8 weeks	6 Cameras	17/10/2016 – 12/12/2016	Continuous



Field Survey Technique	Target Species	Current Survey Effort	No. Units	Survey Dates	Timing
	All fauna (including pest species)	2.5 weeks	10 Cameras	23/02/2015-10/03/2015	Unknown
Microbat Surveys (Anabat)	Microbat species and relevant threatened species	3 nights	2 Anabats	23/02/2015-25/02/2015	8:30-10:00pm

Survey results from the Keystone study have been incorporated into this BDAR, where relevant.

2.6 Weather Conditions

Environmental conditions in the lead up to the 2018 surveys were generally dry drought conditions, whilst the 2023 surveys were undertaken following 2 years of La Nina weather patterns. Weather conditions during the surveys are detailed in Appendix B.

2.7 Limitations

Given the duration and timing of the field surveys, it is likely that some of the species that may occur within the subject land (i.e. permanently, seasonally or transiently) were not detected. However, a detailed habitat assessment was conducted to inform the 'likelihood of occurrence' of threatened species known or predicted to occur within the locality. Limitations with respect to survey timing in relation to candidate species is covered in Section 5.3.

Surveys across the subject land were slightly limited by access due to areas of dense vegetation (thickets of impenetrable *Lantana*, Blackberry and *Kunzea ambigua*) and areas of drainage; however, these access restrictions are not expected to affect the outcomes of this BDAR.

Multiple threatened species of flora were surveyed simultaneously during targeted flora searches (see Section 2.3), and multiple species of fauna were also targeted during fauna surveys (see Section 2.4) but this is unlikely to affect the outcomes of the field work.

Site conditions (including the presence of threatened species of flora and fauna) may change after the date of this report. SLR does not accept responsibility arising from, or in connection with, any change to the site conditions. SLR is also not responsible for updating this report if the site conditions change.

The SLR ecology team operates under a Scientific Licence (licence number SL100176, issued under the BC Act), which authorises field staff to trap, capture, harm, hold and release plants and animals protected under the BC Act and *National Parks and Wildlife Act 1974*, as well as Animal Research Authority (issued by the Secretary of the NSW Animal Care and Ethics Committee of DCCEEW), which allows trapping of animals in NSW for the purposes of 'animal research'.

Soft copies of data files in relation to the SLR surveys have been filed on the SLR project server and printed copies will be held by the author.



3.0 Landscape Context

This chapter describes the landscape features within and surrounding the subject land. Landscape features are shown in the Location Map (see Figure 3).

3.1 IBRA Bioregion and IBRA Subregion

The Interim Biogeographic Regionalisation of Australia (IBRA) regions represent a landscape-based approach to classifying the land surface, including attributes of climate, geomorphology, landform, lithology, and characteristic flora and fauna species present.

The subject land is located wholly within the NSW North Coast Bioregion. The North Coast Bioregion runs up the east coast of NSW from just north of Newcastle to just inside the Queensland border. The total area of the bioregion is 5,924,130 ha and the NSW portion is 5,692,351.6 ha or 96.1 per cent of the bioregion. The NSW portion of North Coast Bioregion occupies 7.11 per cent of the state (OEH, 2019c).

The subject land is located wholly within the Karuah Manning sub-region of the NSW North Coast Bioregion (SEED, 2019). Information pertaining to this subregion (OEH, 2019c) is presented in Table 5.

Table 5: Karuah Manning Subregion

Feature	Information
Geology	Extremely complex faulted terrain where the New England Fold belt over-thrusts the Sydney Basin. Main rocks present are: Silurian and Devonian slates, quartzites and acid volcanics; Carboniferous mudstones and lithic sandstones; and less deformed Permian shales and sandstones. Small areas of granite and plateaus of Tertiary basalt on Barrington and Comboyne Plateaus. Quaternary coastal sands.
Characteristic Landforms	Complex pattern of ridges and valleys running to the Great Escarpment, strong structural control along fault lines. Coastal beach, dune and lagoon barrier systems reach their maximum development at Myall Lakes.
Typical Soils	Red brown structured loams on basalt. A range of other soil types relating to geology but poorly known. Deep siliceous sands and very well developed podsoles in dunes, particularly the older high dunes. Organic sands in estuaries.
Vegetation	Wet sclerophyll forest with white mahogany, small-fruited grey gum, Sydney blue gum, blackbutt, tallowwood and brush box. White gum, blackbutt, forest red gum and grey box on dry open flats. Dense Antarctic beech on Barrington tops and patches of mixed cool temperate and warm temperate rainforest on Comboyne Plateau on basalt. Coastal complex of banksia, paperbark, Smooth-barked apple, and blackbutt with numerous shrubs and areas of heath and swamp on dunes. Mangroves in estuaries.

3.2 Rivers, Streams and Estuaries

Local topography is irregular and undulating. Elevation within the subject land ranges between approximately 30 and 200 metres (Australian Height Datum), with slopes ranging up to approximately 40 percent. Double Creek traverses the subject land in a south-easterly direction draining into the Karuah River located on the eastern side of Bucketts Way approximately 2 km from the subject land. Several other minor/intermittent drainage lines also traverse the subject land. Five constructed dams occur in the eastern portion of the subject land. These dams occur within a natural drainage channel that is fed by first and second order streams (Stahler, 1952) (see Site Map in Figure 2). No other landscape features were identified that are relevant to this assessment.



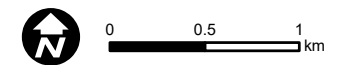
HILLVIEW QUARRY EIS BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Location Map

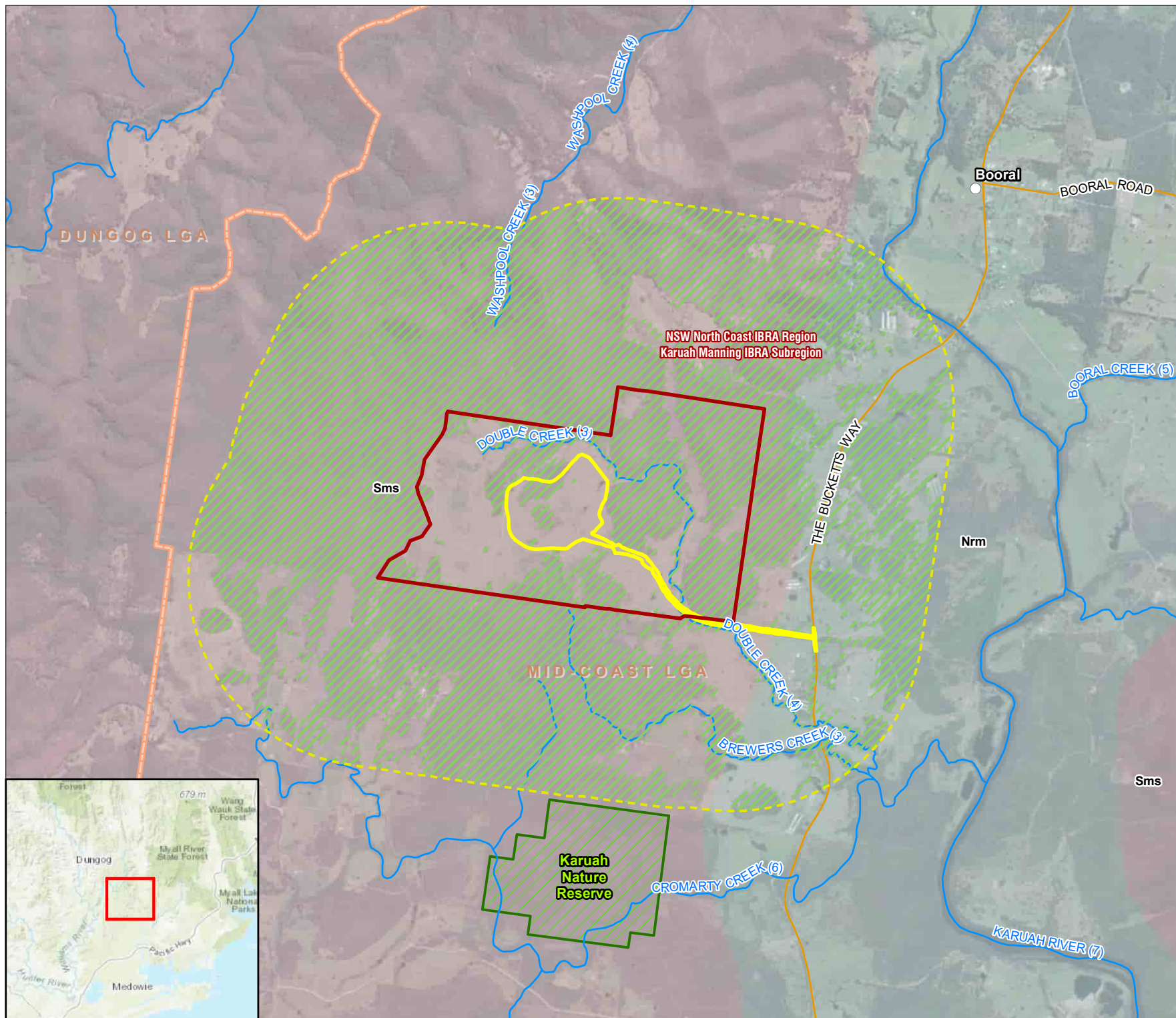
FIGURE 3

- Town
- ▭ Project Site
- ▭ Disturbance Footprint (Subject Land)
- - - 1500m Buffer
- ▨ Native Vegetation (1767.25 ha)
- ▭ Local Government Area
- ▭ IBRA Region/Subregion
- Watercourse
- Major Road
- ▨ National Park
- Mitchell Landscapes**
- ▭ Nrm - Newcastle Coastal Ramp
- ▭ Sms - Stroud Mountains

Data Sources:
NSW Spatial Information Exchange. ESRI Basemap world imagery (May 2023). Mitchell Landscapes © State Government of NSW and Department of Planning, Industry and Environment 2016. IBRA Regions Australian Government Department of Agriculture, Water and the Environment.



Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:40,000 at A4
Project Number:	630.12117
Date:	26-Jun-2024
Drawn by:	JH



3.3 Habitat Connectivity

An examination of aerial imagery and regional vegetation mapping (DPE 2022a) for the assessment area suggest that the vegetation and habitats within the subject land are generally connected to vegetation and habitats in the broader landscape. Due to historical vegetation clearing, the majority of the vegetation across the subject land is composed of exotic grassland (Photo 2). Native vegetation within the subject land is largely restricted to three separate patches of native forest. These patches of forest have good internal connectivity, but low to moderate external connectivity, with gaps separated by exotic grassland that are between 10 and 50 metres wide. The largest, northern-most patch of forest has good connectivity with a large area of forest vegetation to the north.

The Project does not involve the construction of wind turbines therefore there are no relevant impacts to flyways for migratory species that pass over the subject land.

3.4 Karst, Caves, Crevices, Cliffs, Rocks or Other Geological Features of Significance

The subject land and assessment area do not contain any karst, caves, crevices, cliffs or rocks. This has been determined through examining karst, cave, cliff and geological features on site.

The Booral region is underlain by complex suite of lithologies, which range from Permian aged sandstones, mudstones, conglomerates and coal seams to Carboniferous aged basalt flows, ignimbrites and rhyolites (Division of Resources and Geoscience 2019). The lithologies are intersected by the Targan Fault, a reverse fault that strikes in a north-south direction and dips at a moderate angle between 31 and 60 degrees.

On-site geological investigations have found that the subject land is underlain by a Rhyolitic Tuff composed of finely microcrystalline, coarse phenoclasts of feldspar and quartz, as well as other trace minerals. The Rhyolitic Tuff is thought to have originated as an acid ash flow tuff comprised of quartz and feldspars dispersed through a welded matrix of vitric shards and some compressed pumice. The upper 28 metres (on average) of Rhyolitic Tuff is hematized, with the underlying material being free of haematite mineralisation. Geotechnical aspects of the stratum are suitable for use in concrete and road construction applications.

3.5 Areas of Outstanding Biodiversity Value

There are no Areas of Outstanding Biodiversity Value (AOBV), as identified under the BC Act, within the subject land or assessment area.

3.6 NSW (Mitchell) Landscapes

The subject land lies within Stroud Mountains, Manning-Macleay Mitchell Landscape (DECC, 2002). The stroud mountains are northwest oriented ranges with high peaks and parallel valleys on extensively faulted and folded middle Devonian lithic sandstones, mudstone, chert and minor volcanics, Carboniferous conglomerate, lithic sandstone, mudstone, interbedded dacite and ignimbrite, Permian pebbly lithic sandstone, with interbedded rhyolite, dacite and basalt.

This landscape has strong structural control and general elevation 50 to 680m, with local relief of 400m. Higher slopes have gradational structured loams merging to red-brown to yellow texture-contrast soils on lower slopes and in valleys. Vegetation includes moist and dry forests and rainforest understorey with; Brush Box (*Lophostemon confertus*), Flooded Gum (*Eucalyptus grandis*), Turpentine (*Syncarpia glomulifera*), Scentless Rosewood



(*Synoum glandulosum*), Lilly Pilly (*Acmena* spp.), Rose Maple (*Cryptocarya erythroxylon*), Narrow-leaved Palm Lily (*Cordyline stricta*), Southern Mahogany (*Eucalyptus botryoides*), Spotted Gum (*Corymbia maculata*) and Grey Ironbark (*Eucalyptus paniculata*), with River Oak (*Casuarina cunninghamiana*) occurring along all major streams.

3.7 Additional Landscape Features Identified in SEARs

No additional landscape features have been identified in SEARs for the EIS.

3.8 Soil Hazard Features

No soil hazard features were identified within the subject land.

3.9 Native Vegetation Cover

In accordance with the BAM, the extent of native vegetation within a 1,500 m buffer (the assessment area) around the subject land was estimated. Native vegetation cover within the assessment area has been mapped using regional scale vegetation mapping sourced from the State Vegetation Type Map (SVTM) and recent aerial imagery (Nearmap 2023). There are no areas of vegetation that have been excluded from the assessment.

The distribution of native vegetation within the assessment area, based on regional scale SVTM mapping data, is presented in Figure 4. The total area of the 1,500 m buffer around the subject land is 2409 ha, with the area of native vegetation mapped within the buffer being 1766 ha. This is a native vegetation cover of 73 %, which was entered into the BAM-C. The remainder of the subject land consists of cleared agricultural land dominated by exotic grasslands.

Table 6 summarises the extent of native vegetation cover within the assessment area.

Table 6: Native Vegetation Cover in the Assessment Area

Assessment area (ha) (1500 m buffer)	2409
Total area of native vegetation cover (ha)	1766
Percentage of native vegetation cover (%)	73
Class (0-10, >10-30, >30-70 or >70%)	>70



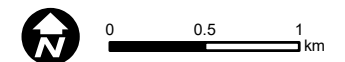
HILLVIEW QUARRY EIS BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Vegetation Extent

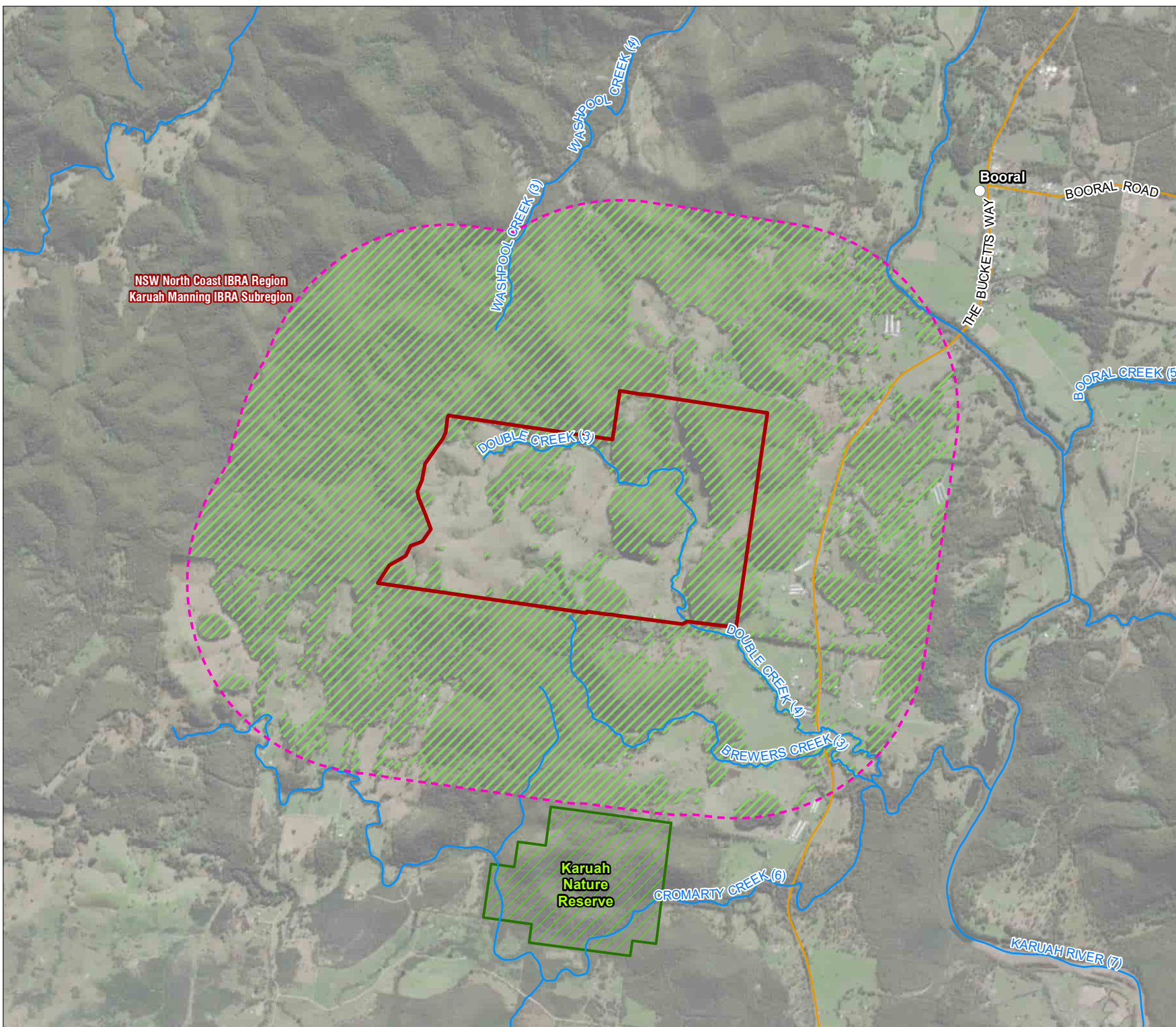
FIGURE 4

- Town
- ▭ Project Site
- ▭ 1500m Buffer (2409 ha)
- ▨ Native Vegetation (1766 ha)
- ▭ IBRA Region/Subregion
- ▨ National Park
- Watercourse
- Major Road

Data Sources:
NSW Spatial Information Exchange. ESRI Basemap world imagery (May 2023). IBRA Regions Australian Government Department of Agriculture, Water and the Environment. Native vegetation State Vegetation Type Map 2022



Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:40,000 at A4
Project Number:	630.12117
Date:	24-Aug-2023
Drawn by:	JH



4.0 Native Vegetation

4.1 Native Vegetation Extent

Mapping from the SVTM data (DP&E 2022) has been used to map vegetation extent across the subject land and within the 1500 m buffer, as shown in Figure 4. The vegetation mapping shown within the development footprint was revised following completion of a comprehensive site survey and vegetation assessment, combined with review of site data and PCT descriptions and mapping in BioNet and TreesNearMe. PCTs mapped within the site are described in detail in Section 4.2.

The extent of native vegetation mapped within the 1500 m buffer is 1766 ha.

4.1.1 Changes to the Mapped Native Vegetation Extent

Differences between the actual native vegetation extent and vegetation extent shown on aerial imagery (Nearmap, March 2023) and SVTM regional scale vegetation mapping data used in figures for this BDAR are due to the presence of exotic vegetation (areas of exotic pasture grass) and some small areas of regrowth woodland that possibly have appeared since grazing was scaled down several years ago. This is supported by field reconnaissance by SLR in 2018, 2020 and 2023. The native vegetation extent is mapped in Figure 4.

4.1.2 Areas That Are Not Native Vegetation

Areas that are not mapped as native vegetation are indicated on Figure 4 and comprise areas of cleared and grazed open grassland associated with the central parts of the subject land that have historically been used for cattle grazing (see Photo 2 and Photo 3).

These areas have also been mapped devoid of native vegetation on regional-scale mapping (DPE 2022a; see Figure 5) and have been site verified and sampled by SLR in 2018 and 2020.

Photo 2: Exotic Grassland and Isolated Patches of Forest



Photo 3: Exotic Grassland within Central Portion of Subject Land (Dams in Background)



4.2 Plant Community Types

4.2.1 Overview

Vegetation within the subject land has been assessed as aligning with the BioNet Vegetation Classification PCTs identified within Table 7 and their extent is shown in Figure 5. Detailed descriptions of each PCT are provided in the following subsections.

An analysis of the floristic structure and species composition of the vegetation using the BioNet Vegetation Information System (OEH 2018b) determined that four PCTs were present within the subject land, with the remainder of the site comprising exotic grassland, as follows:

- Spotted Gum - Broad-leaved Mahogany - Grey Gum grass - shrub open forest on Coastal Lowlands of the Central Coast (PCT 1589).
- Tallowwood - Spotted Gum - Grey Gum grassy tall open forest of the lower North Coast (1549).
- Grey Gum - Red Gum - Paperbark shrubby open forest on coastal lowlands of the Northern Sydney Basin and Lower North Coast (1749).
- Whalebone Tree - Red Kamala dry subtropical rainforest of the lower Hunter River (1541).



- Lilly Pilly – Sandpaper Fig – prickly-leaved Tea tree – warm temperate rainforest (1522).
- Prickly-leaved Paperbark Forest on coastal lowlands (1716).

Since the completion of the initial BDAR field work and mapping, the Eastern NSW PCTs were published, and benchmarks updated in the BAM-C. Accordingly, the above PCTs were converted to the equivalent current PCT, using information in BioNet ('Status, lineage history'), SVTM mapping and site floristics data. Additionally, the quarry pit was redesigned to avoid the patch of dry rainforest (previously mapped as PCT 1541, now as PCT 3076) and hence this PCT is no longer located within the development footprint and will be retained *in situ*.

As is shown in Figure 5, several other PCTs are mapped under the SVTM regional scale mapping as occurring outside of the development footprint but within the subject land.

The previous and current PCTs identified within the development footprint are listed below in Table 7.

Table 7: Former and Current PCTs within the Development Footprint

PCT ID	Old PCT Name	New PCT ID	Current PCT
1589	Spotted Gum - Broad-leaved Mahogany - Grey Gum grass - shrub open forest on Coastal Lowlands of the Central Coast	3241	Lower North White Mahogany-Spotted Gum Moist Forest
1549	Tallowwood - Spotted Gum - Grey Gum grassy tall open forest of the lower North	3254	Northern Hinterland Tallowwood-Forest Oak Grassy Forest
1749	Grey Gum - Red Gum - Paperbark shrubby open forest on coastal lowlands of the Northern Sydney Basin and Lower North Coast	3436	Hunter Coast Sandy Creekflat Low Paperbark Scrub
1541	Whalebone Tree - Red Kamala dry subtropical rainforest of the lower Hunter River	3076	Hunter Valley Whalebone Dry Rainforest
1522	Lilly Pilly – Sandpaper Fig – prickly-leaved Tea tree – warm temperate rainforest	3074	Hunter Coast Lowland Grey Myrtle Wet Forest
1716	Prickly-leaved Paperbark Forest on coastal lowlands	3436	Hunter Coast Sandy Creekflat Low Paperbark Scrub

The current PCTs mapped within the development footprint and their mapped areas are listed in Table 8 and their distribution shown in Figure 5.



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Plant Community Types

FIGURE 5

- Disturbance Footprint
- Project Site
- Site-verified Vegetation**
 - PCT 3074 - Hunter Coast Lowland Grey Myrtle Wet Forest
 - PCT 3241 - Lower North White Mahogany-Spotted Gum Moist Forest
 - PCT 3254 - Northern Hinterland Tallowood-Forest Oak Grassy Forest
 - PCT 3436 - Hunter Coast Sandy Creekflat Low Paperbark Scrub

Data Sources:
NSW Spatial Information Exchange, ESRI Basemap
world imagery (May 2023), State Vegetation Type
Map NSW DPE 2022 (version C1.1.M1.1)



0 250 500
m

Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:16,000 at A4
Project Number:	630.12117
Date:	30-Aug-2023
Drawn by:	JH



State Vegetation Type Mapping

 PCT 3029 - Lower North Wet Gully Palm Rainforest	 PCT 3100 - Northern Hinterland Baloghia-Dendrocnide Subtropical Rainforest	 PCT 3244 - Lower North Spotted Gum-Mahogany-Ironbark Sheltered Forest
 PCT 3074 - Hunter Coast Lowland Grey Myrtle Wet Forest	 PCT 3101 - Northern Hinterland Shatterwood Dry Rainforest	 PCT 3329 - Northern Hinterland Valleys Red Gum Grassy Forest
 PCT 3087 - Lower North Ranges Riparian Turpentine Forest	 PCT 3158 - Lower North Foothills Turpentine-Flooded Gum Wet Forest	 PCT 3433 - Hunter Coast Foothills Spotted Gum-Ironbark Grassy Forest
 PCT 3089 - Lower North Waterhousea Riparian Rainforest	 PCT 3241 - Lower North White Mahogany-Spotted Gum Moist Forest	 PCT 3435 - Hunter Coast Lowland Flats Damp Forest
 PCT 3091 - Lower North Waterhousea-Water Gum Rainforest	 PCT 3242 - Lower North Ranges Turpentine Moist Forest	 PCT 3446 - Lower North Foothills Ironbark-Box-Gum Grassy Forest

Table 8: PCTs within the Subject Land

PCT ID	Current PCT	Area (ha)
3241	Lower North White Mahogany-Spotted Gum Moist Forest	8.09
3254	Northern Hinterland Tallowwood-Forest Oak Grassy Forest	0.70
3436	Hunter Coast Sandy Creekflat Low Paperbark Scrub	1.32
3074	Hunter Coast Lowland Grey Myrtle Wet Forest	0.49
	Total Area (ha)	10.6
3076	Hunter Valley Whalebone Dry Rainforest [#]	0.9

PCT lies outside of development footprint due to avoidance measures (pit redesign)

Notably, a small patch of PCT 3076 Hunter Valley Whalebone Dry Rainforest lies outside of the subject land, owing to pit redesign to avoid this patch, given it has high biodiversity values. Importantly, it forms a representative stand of Lower Hunter Dry Rainforest Vulnerable Ecological Community (VEC), as described in Section 4.3, and contains a small population of the threatened plant species Scrub Turpentine *Rhodamnia rubescens*.

Detailed information relating to each PCT mapped within the subject land, as listed above in Table 8, is presented in Appendix C. This information includes vegetation class, vegetation type (PCT), mapped area (ha), justification (species relied upon for identification), legal status and percentage cleared value.

Summary descriptions of each PCT recorded in the subject land are provided in the following sections.

4.2.2 Lower North White Mahogany-Spotted Gum Moist Forest (PCT 3241)

A summary of information for PCT 3241 based on data contained within the BioNet Vegetation Classification, and the extent of this PCT within the subject land is listed below in Table 9. The general nature and condition of the vegetation is shown in Photo 4 and its distribution is displayed in Figure 5.

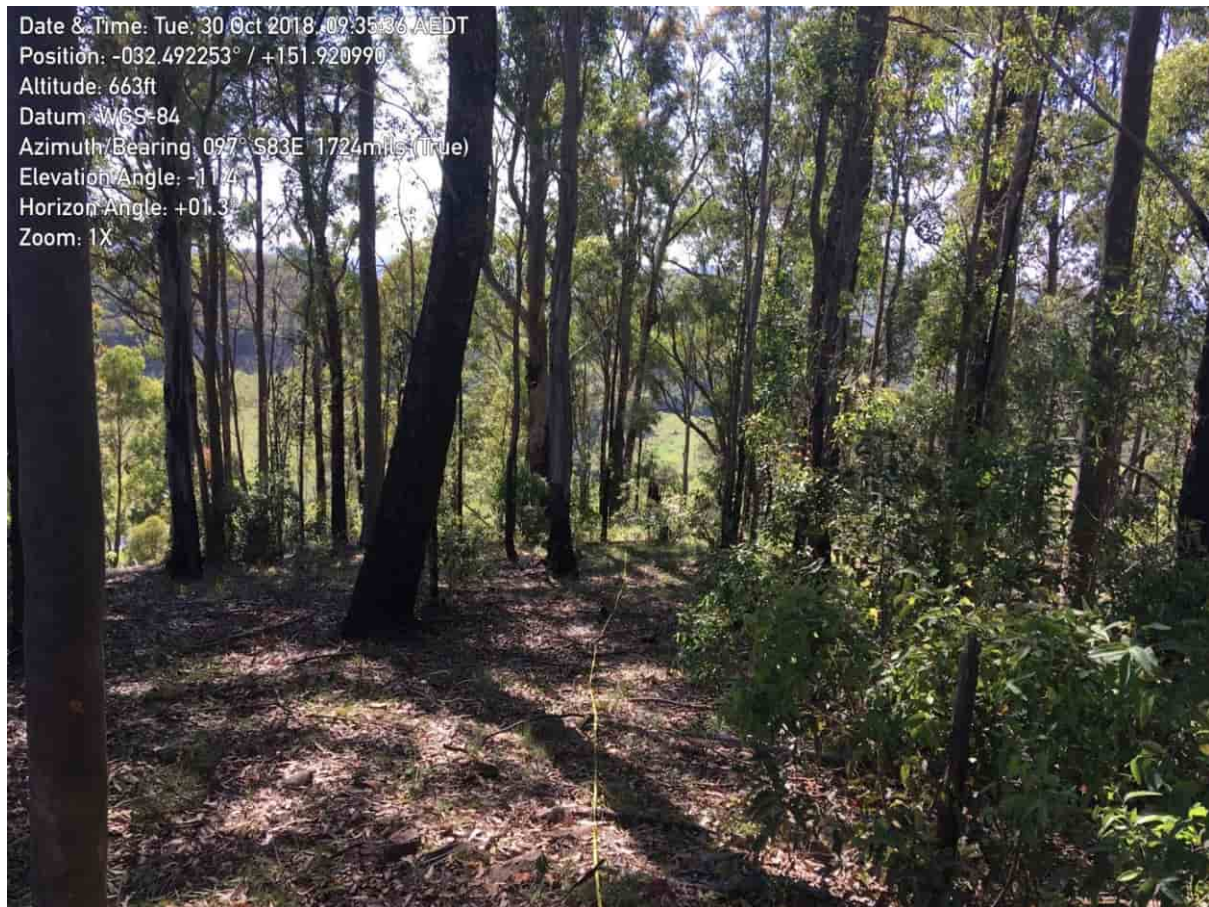
Notably, Lower North White Mahogany-Spotted Gum Moist Forest is the most abundant vegetation type on site, extending over the central and northern slopes of the subject land.

Table 9: Lower North White Mahogany-Spotted Gum Moist Forest

PCT ID	3241
PCT name	Lower North White Mahogany-Spotted Gum Moist Forest
Vegetation formation	Wet Sclerophyll Forests
Vegetation class	Northern Hinterland Wet Sclerophyll Forests
Per cent cleared value (%)	31 %
Extent within subject land (ha)	8.09
BC Act status (TEC listing)	n/a
SAIL entity	n/a



Photo 4: Lower North White Mahogany-Spotted Gum Moist Forest



Alignment with BC Act TECs

PCT 3241 does not align with a TEC within the BioNet Vegetation Classification.

Alignment with EPBC Act Listed ECs

PCT 3241 does not align with an EC listed under the EPBC Act within the BioNet Vegetation Classification.

4.2.3 Northern Hinterland Tallowwood-Forest Oak Grassy Forest (PCT 3254)

PCT Overview

A summary of information pertaining to PCT 3254 based on data contained within the BioNet Vegetation Classification, and the extent of this PCT within the subject land is provided in Table 10. The general nature and condition of the vegetation is shown in Photo 5 and its distribution is displayed in Figure 5.



Table 10: Northern Hinterland Tallowwood-Forest Oak Grassy Forest

PCT ID	3254
PCT name	Northern Hinterland Tallowwood-Forest Oak Grassy Forest
Vegetation formation	Wet Sclerophyll Forests (Grassy sub-formation)
Vegetation class	Northern Hinterland Wet Sclerophyll Forests
Per cent cleared value (%)	5 %
Extent within subject land (ha)	0.70
BC Act status (TEC listing)	n/a
SAIL entity	n/a

Photo 5: Northern Hinterland Tallowwood-Forest Oak Grassy Forest



Alignment with TECs

PCT 3254 does not align with a TEC within the BioNet Vegetation Classification.

Alignment with EPBC Act Listed ECs

PCT 3254 does not align with an EC listed under the EPBC Act.



4.2.4 Hunter Coast Sandy Creekflat Low Paperbark Scrub (PCT 3436)

PCT Overview

A summary of information pertaining to PCT 3254 based on data contained within the BioNet Vegetation Classification, and the extent of this PCT within the subject land is provided in Table 11. The general nature and condition of the vegetation is shown in Photo 6 and its distribution is displayed in Figure 5.

Table 11: Hunter Coast Sandy Creekflat Low Paperbark Scrub

PCT ID	PCT 3436
PCT name	Hunter Coast Sandy Creekflat Low Paperbark Scrub
Vegetation formation	Dry Sclerophyll Forests (Shrub/grass subformation)
Vegetation class	Hunter Macleay Dry Sclerophyll Forests
Per cent cleared value (%)	52
Extent within subject land (ha)	1.32
BC Act status (TEC listing)	River-flat Eucalypt Forest EEC (BC Act)
SAIL entity	n/a

Photo 6: Hunter Coast Sandy Creekflat Low Paperbark Scrub



Alignment with TECs

PCT 3436 is associated with a *River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* (River-flat Forest), an Endangered Ecological Community (EEC) listed under the BC Act (see Section 4.3.2). This vegetation was identified based on the assemblage of species recorded and the landscape position of the subject land.

Alignment with EPBC Act Listed ECs

PCT 3436 is associated with Subtropical eucalypt floodplain forest and woodland VEC, as listed under the EPBC Act. Further details on EPBC Act listed TECs are provided in Section 10.2.4.

4.2.5 Hunter Coast Lowland Grey Myrtle Wet Forest (PCT 3074)

PCT Overview

A summary of information pertaining to PCT 3074 based on data contained within the BioNet Vegetation Classification, and the extent of this PCT within the subject land is provided in Table 12. The general nature and condition of the vegetation is shown in Photo 7 and its distribution is displayed in Figure 5.

Table 12: Hunter Coast Lowland Grey Myrtle Wet Forest

PCT ID	PCT 3074
PCT name	Hunter Coast Lowland Grey Myrtle Wet Forest
Vegetation formation	Rainforests
Vegetation class	Dry Rainforests
Per cent cleared value (%)	39
Extent within subject land (ha)	0.49
BC Act status (TEC listing)	River-flat Eucalypt Forest EEC (BC Act)
SAIL entity	n/a



Photo 7: Hunter Coast Lowland Grey Myrtle Wet Forest



Alignment with TECs

PCT 3074 is associated with River-flat Forest EEC, as listed under the BC Act (see Section 4.3.2). This vegetation was identified based on the assemblage of species recorded, soil types and landscape position.

Alignment with EPBC Act Listed ECs

PCT 3074 is associated with Subtropical eucalypt floodplain forest and woodland VEC, as listed under the EPBC Act. Further details on EPBC Act listed TECs are provided in Section 10.2.4.

4.3 Threatened Ecological Communities

4.3.1 Overview

Two TECs listed under the BC Act have been identified within the subject land as part of the preparation of this BDAR, as follows:

- River Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions ('River-flat Forest EEC'), which is listed under Schedule 2, Part 2 of the BC Act and occurs on the subject land as small linear stands of riparian vegetation (identified as PCT 3436 and PCT 3074) along Double Creek.



- Lower Hunter Valley Dry Rainforest in the Sydney Basin and NSW North Coast Bioregions ('Lower Hunter Dry Rainforest VEC'), which is listed as a 'Vulnerable Ecological Community' (VEC) under Schedule 2, Part 3 of the BC Act and occurs in a narrow confined gully as a small linear stand PCT 3076 outside of the subject land.

TECs identified within the subject land are listed in Table 13 and their extent is shown on Figure 6.

Table 13: TECs within the Subject Land

TEC name	Potential SAIL	BC Act status	EPBC Act status	Associated vegetation zones	Impact Area (ha)
River-flat Eucalypt Forest	-	Endangered	-	VZ3-3436-Mod good VZ4-3074-Mod good	1.81
Lower Hunter Dry Rainforest	-	Vulnerable	-	VZ5-3076-Mod good	0.00 [#]

- # Approximately 0.90 ha of Lower Hunter Dry Rainforest TEC is mapped outside of the development footprint

As noted above, the patch of dry rainforest (PCT 3076) is located north of the proposed pit expansion footprint and therefore Lower Hunter Dry Rainforest VEC will not be directly affected by the Proposal.

The dams within the subject land, being artificial in origin, do not meet the definition of *Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions* and do not contain characteristic aquatic plant species of that TEC.

Another TEC potentially occurring on the site is Hunter Lowland Red Gum Forest. The presence of this TEC was considered given the presence of Forest Red Gum in one or two small patches of native vegetation. Notably, Forest Red Gum *Eucalyptus tereticornis* was recorded in a small degraded stand along a modified drainage line amongst open grazing land in the central parts of the site (see Plot 10 in Figure 7) and along Maytoms Lane (see Plot 14 in Figure 7). However, Hunter Lowland Red Gum Forest TEC was ruled out due to (i) location being outside of the nominated distribution (between Muswellbrook, Beresfield, Mulbring and Cessnock in the Lower Hunter) and (ii) the patches where *E. tereticornis* occur on site are not on Permian sediments on the Hunter Valley floor. Instead, these patches of vegetation have been identified as aligning to River-flat Forest EEC.

Another potential TEC on site is Subtropical Coastal Floodplain Forest, which is listed as a VEC under the BC Act. The community consists of tall mixed forest positioned on coastal floodplains on the north coast of NSW, north of Port Stephens. Characteristic canopy trees include Forest Red Gum (*Eucalyptus tereticornis*), Grey Ironbark (*E. siderophloia*), and Pink Bloodwood (*Corymbia intermedia*), and other eucalypt species (depending on the location within the North Coast bioregion), with rainforest trees such as Figs (*Ficus* spp.) and Tuckeroos (*Cupaniopsis* spp). Small trees include Forest Oak (*Allocasuarina torulosa*), Bottlebrushes (*Callistemon* spp.), with low numbers of Paperbarks (*Melaleuca* spp) and Swamp Oak (*Casuarina glauca*). Although patches of vegetation along Double Creek and along Maytoms Lane are positioned on coastal floodplain north of Port Stephens, and some of the characteristic species are present, this TEC was ruled out as the characteristic canopy tree species are not all present, particularly *E. siderophloia*, *Corymbia intermedia*, other eucalypt species and rainforest trees.

A description of the two TECs identified on site is provided below.



A discussion of TECs listed under the EPBC Act is provided in Section 10.2.4.

4.3.2 River-Flat Eucalypt Forest EEC

An examination of the floristics, structure and geomorphology of Hunter Coast Sandy Creekflat Low Paperbark Scrub (PCT 3436¹) and Hunter Coast Lowland Grey Myrtle Wet Forest (PCT 3074) indicates that these two communities are commensurate with River-flat Eucalypt Forest EEC.

River-flat Eucalypt Forest EEC occurs on silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains, generally below 50 m elevation, but may occur on localised river flats up to 250 m above sea level. The structure of the community may vary from tall open forests to woodlands, although partial clearing may have reduced the canopy to scattered trees. The community has a tall open tree layer of eucalypts, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality.

Although the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include *Eucalyptus tereticornis* (forest red gum), *E. amplifolia* (cabbage gum), *Angophora floribunda* (rough-barked apple) and *A. subvelutina* (broad-leaved apple). *E. saligna* (Sydney blue gum) and *E. grandis* (flooded gum) may occur north of Sydney. A layer of small trees may be present, including *Melaleuca decora*, *M. styphelioides* (prickly-leaved teatree), *Backhousia myrtifolia* (grey myrtle), *Melia azedarach* (white cedar), *Casuarina cunninghamiana* subsp. *cunninghamiana* (river oak) and *C. glauca* (swamp oak). Scattered shrubs include *Bursaria spinosa* subsp. *spinosa* (blackthorn), *Solanum prinophyllum* (forest nightshade), *Rubus parvifolius* (native raspberry), *Breynia oblongifolia* (coffee bush), *Ozothamnus diosmifolius*, *Hymenanthera dentata* (tree violet), *Acacia floribunda* (white sally) and *Phyllanthus gunnii*. The groundcover is composed of abundant forbs, scramblers and grasses.

Justification for this determination is as follows:

- The vegetation occurs within the North Coast Bioregion.
- The vegetation occurs on a low-lying river flat within a large valley.
- The vegetation has remnants of a forested wetland structure having a tall open tree layer of eucalypts.
- *Eucalyptus tereticornis* (Forest Red Gum) is present and appears to have been previously dominant.
- Remnants of a layer of small trees occurs, including *Melaleuca styphelioides* (Prickly-leaved Teatree).

The extent of this EEC within the subject land is shown on Figure 6. The examples of River-flat Forest EEC are along Maytoms Lane in the east of the site, in a narrow band that follows the course of Double Creek (and is crossed by the proposed haul road) and also a small degraded stand of Forest Red Gum along a drainage line in the central parts of the site.

River-flat Eucalypt Forest EEC is not an SAIL entity.

¹ Formerly mapped as PCT 1749 Grey Gum - Red Gum - Paperbark shrubby open forest on coastal lowlands of the Northern Sydney Basin and Lower North Coast



A version of River-flat Eucalypt Forest EEC is also listed under the EPBC Act, although this is subject to patch size and other criteria, as discussed further in Section 10.2.4.

4.3.3 Lower Hunter Dry Rainforest VEC

An examination of the floristic structure and landscape distribution of Hunter Valley Whalebone Dry Rainforest (PCT 3076²) indicates that this community is commensurate with Lower Hunter Dry Rainforest VEC.

Lower Hunter Dry Rainforest typically has a canopy of 15-25m high with 40-80% cover (FPC). The most common canopy trees include Hard Quandong *Elaeocarpus obovatus*, Brush Bloodwood *Baloghia inophylla*, Whalebone Tree *Streblus brunonianus*, Red Kamala *Mallotus philippensis*, Brush Caper Berry *Capparis arborea*, Native Olive *Olea paniculata* and Giant Stinging Tree *Dendrocnide excelsa*. Emergent trees 20 to 30m tall such as Kurrajong *Brachychiton populneus* subsp. *populneus*, Spotted Gum *Corymbia maculata*, Lacebark *Brachychiton discolor* and Port Jackson Fig *Ficus rubiginosa* are often present. A selection of other tree and tall shrub species are often present.

Lower Hunter Dry Rainforest mainly occurs on the Barrington footslopes along the northern rim of the Hunter Valley Floor, where it occupies gullies and steep hillslopes with south facing aspects. It typically occurs on Carboniferous sediments in gullies and on steep hillslopes with south facing aspects. It is generally found at elevations less than 300 m ASL with a mean annual rainfall less than 900 mm. The VEC is not known to occur in any conservation reserves. Remnants are mostly located on private property.

Justification for this determination is as follows:

- The vegetation occurs within in the NSW North Coast Bioregion.
- The vegetation has the floristic structure of a dry rainforest having:
 - A closed canopy.
 - A high diversity of characteristic dry rainforest species such as Whalebone Tree *Streblus brunonianus*, Red Kamala *Mallotus philippensis* and Giant Stinging Tree *Dendrocnide excelsa* and other trees with mesophyllous leaves.
 - Three major strata: emergent canopy, main-canopy and sub-canopy.
 - A taxonomically diverse assemblage at the genus and family levels.
 - Tree species with buttressed roots.
 - A large diversity of vines and vascular epiphytes.
- PCT 3076 is linked to Lower Hunter Dry Rainforest VEC in BioNet Vegetation Classification database.

The extent of this VEC within the subject land is shown in Figure 6. One small patch of this TEC is mapped within the subject land and lies outside of the development footprint. Direct impacts on this VEC have been avoided through re-design of the proposed pit layout.

Lower Hunter Dry Rainforest VEC is not an SAI entity.

Lower Hunter Dry Rainforest VEC is not listed under the EPBC Act.

² Formerly mapped as PCT 1541 Whalebone Tree - Red Kamala dry subtropical rainforest of the lower Hunter River



4.4 Vegetation Zones

4.4.1 Overview

Section 4.3.1 of BAM 2020 describes mapping of vegetation condition under “*broad condition states*” and suggests the following approach: “*Disturbance to growth form groups for tree, shrub and ground cover or extent of exotics (or combinations of these) can be used to identify areas of similar condition*”. Due to the mosaic of conditions across the subject land patches were grouped into a broad condition state of ‘moderate-good’. The moderate-good condition class typically incorporates areas with canopy or with sparse canopy, some areas of dense shrubs or more open shrub layers including under-scrubbed patches, and some areas with patches of weedy understorey and ground layers.

The vegetation zones mapped within the subject land are mapped on Figure 7 and details for each zone, including VI plots completed, are listed below in Table 14. Four vegetation zones have been identified, which align to the four PCTs mapped on the project site. All vegetation zones are categorised into a condition class of ‘moderate to good’, as there was no low condition vegetation identified within patches of native vegetation on the project site.

Table 14: Vegetation Zones

Zone	Zone Code	Zone Area (ha)	PCT Name	VI Plots Req'd	VI Plots Done	Plot Codes	Patch Size (ha)
1	3241_Mod-good	8.09	Lower North White Mahogany-Spotted Gum Moist Forest	3	4	P01, P03, P04, P05	101
2	3254_Mod-good	0.70	Northern Hinterland Tallowwood-Forest Oak Grassy Forest	1	3	P02, P09, P12	101
3	3436_Mod-good	1.32	Hunter Coast Sandy Creekflat Low Paperbark Scrub	1	2	P10, P14	101
4	3074_Mod-good	0.49	Hunter Coast Lowland Grey Myrtle Wet Forest	1	1	P13	101
	Total	10.59		6	10		

A fifth vegetation zone, VZ 5 Hunter Valley Whalebone Dry Rainforest (PCT 3076_Mod - good), will not be directly affected by the Project and lies outside of the subject land, but is included in the vegetation zones map for completeness (and to demonstrate avoidance measures).



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Threatened Ecological Communities

FIGURE 6a

-  Project Site
-  Disturbance Footprint
- Threatened Ecological Community**
 -  River-Flat Eucalypt Forest on Coastal Floodplains EEC (1.74 ha)
- Threatened Ecological Community outside of Development Footprint**
 -  River-Flat Eucalypt Forest on Coastal Floodplains EEC (2.56 ha)

Data Sources:
ESRI Basemap world imagery (May 2023).



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m

Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:7,000 at A4
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Drawn by:	JH



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Threatened Ecological Communities

FIGURE 6b

-  Project Site
-  Disturbance Footprint
- Threatened Ecological Community**
-  River-Flat Eucalypt Forest on
Coastal Floodplains EEC (0.07 ha)
- Threatened Ecological Community
outside of Development Footprint**
-  Lower Hunter Valley Dry Rainforest
VEC (0.90 ha)

Data Sources:
ESRI Basemap world imagery (May 2023).



0 100 200
m

Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:7,000 at A4
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4.4.2 Patch Size

Patch size is defined in Section 4.3.2 of BAM 2020 as “A patch is an area of native vegetation that occurs on the subject land 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).” Patch size area was calculated for each vegetation zone and assigned to a class, being < 5 ha, 5-24 ha, 25-100 ha or ≥ 100 ha.

Patches for each vegetation zone were mapped using GIS and the resulting patches are shown in Figure 7. Where gaps in the canopy of woody native vegetation are present, measurement bars have been shown that demonstrate a gap of less than 100 m in each case.

Patches size for all zones are substantially greater than 100 ha, which corresponds to the size class of ‘ ≥ 100 ha’ and so an area of 101 ha was entered into the BAM-C for each zone.

4.5 Vegetation Integrity (Vegetation Condition)

4.5.1 Vegetation Integrity Survey Plots

The number of BAM plots sampled in each vegetation zone was based on the minimum number of plots required for the area of the relevant zone within the subject land in accordance with Table 3 of BAM 2020, as detailed in Section 2.2. Floristic data, listing plant species recorded within each BAM plot, is provided in Appendix D.

Four vegetation zones have been mapped within the subject land and the minimum number of VI (BAM) plots was completed for each zone, as shown in Table 14.

4.5.2 VI Scores

The Vegetation Integrity Scores (VIS) for each vegetation zone are presented in Table 15.

Table 15: Vegetation Integrity Scores

Zone	Vegetation Zone ID	Composition Condition Score	Structure Condition Score	Function Condition Score	VI Score	Hollow Bearing Trees Present?
1	3241_Mod-good	91.4	68.3	51.9	68.7	Yes
2	3254_Mod-good	63.2	61.8	29.5	48.7	Yes
3	3436_Mod-good	24.8	24.9	38.3	28.7	No
4	3074_Mod-good	65.8	50.3	93.4	67.6	Yes

4.5.3 Use of Benchmark Data

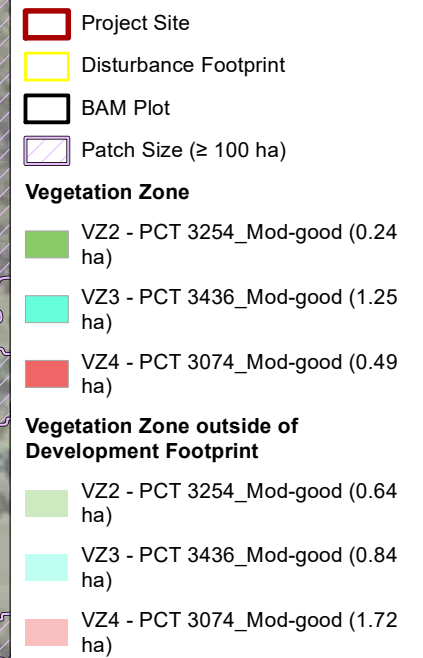
Vegetation benchmarks used in the calculation of the VIS were not amended and were adopted as per the BAM Calculator at the time of the assessment.



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Vegetation Zones

FIGURE 7a



Data Sources:
ESRI Basemap world imagery (May 2023).



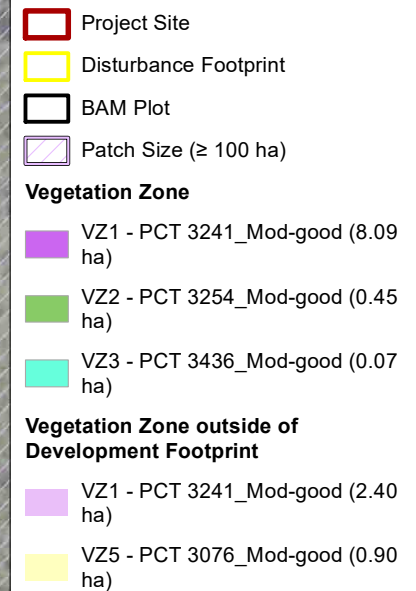
Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:7,000 at A4
Project Number:	630.12117
Date:	30-Aug-2023
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Vegetation Zones

FIGURE 7b



Data Sources:
ESRI Basemap world imagery (May 2023).



Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:7,000 at A4
Project Number:	630.12117
Date:	05-Sep-2023
Drawn by:	JH



5.0 Habitat Suitability for Threatened Species

5.1 Identification of Threatened Species for Assessment

5.1.1 Predicted (Ecosystem Credit) Species

Threatened species that are identified in the BAM-C as 'predicted species' (which generate ecosystem credits), being those species that are predicted to occur within the PCTs identified on the subject land, are listed in Table 16. The Predicted Species Report from the BAM-C is provided in Appendix E. For each species, the following attributes are listed:

- Source of information (e.g. automatically populated in BAM-C, recently listed under the BC Act and not yet added to the TBDC, previous ecological reports).
- Justification for species being added to the list or removed from the list in accordance with BAM sections 5.2.1 and 5.2.2.
- Sensitivity to gain class (from the TBDC).

No threatened species have been 'manually added' to the Predicted Species List in the BAM-C. That is, no predicted threatened species were recorded on site that are not listed in the Predicted Species Report.

Additionally, no threatened species have been excluded from the Predicted Species list based on habitat or geographical constraints.

As all PCTs have been grouped into the same vegetation zones, none of the predicted ecosystem credit species have been assessed differently in different vegetation zones.



Table 16: Predicted Ecosystem Credit Species

Common Name	Scientific Name	Listing Status		Dual Credit Species (Yes/ No)	Source	Retained For Further Assessment? (Yes/ No/ Partial*)	Reason For Exclusion from Further Assessment	Vegetation Type (PCT)	Sensitivity To Gain Class
		BC Act	EPBC Act						
Regent Honeyeater	<i>Anthochaera phrygia</i>	E4A	CE	Yes	BAM-C	No	Habitat Constraints	PCT 3241	High
Barred Cuckoo-shrike	<i>Coracina lineata</i>	V	-	No	BAM-C	No	n/a	PCT 3241 and PCT 3254	Moderate
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	E	-	No	BAM-C	No	n/a	PCT 3074	Moderate
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	V	-	No	BAM-C	No	n/a	PCT 3436	High
Common Blossom-bat	<i>Syconycteris australis</i>	V	-	No	BAM-C	No	n/a	PCT 3254	High
Diamond Firetail	<i>Stagonopleura guttata</i>	V	V	No	BAM-C	No	n/a	PCT 3254	Moderate
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	V	-	No	BAM-C	No	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	Moderate
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	V	E	Yes	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	High



Common Name	Scientific Name	Listing Status		Dual Credit Species (Yes/ No)	Source	Retained For Further Assessment? (Yes/ No/ Partial*)	Reason For Exclusion from Further Assessment	Vegetation Type (PCT)	Sensitivity To Gain Class
		BC Act	EPBC Act						
Glossy Black-Cockatoo	<i>Calyptorhynchus lathamii</i>	V	V	Yes	BAM-C/ Previous survey	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	High
Speckled Warbler	<i>Chthonicola sagittata</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254 and PCT 3436	High
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254 and PCT 3436.	High
Varied Sittella	<i>Daphoenositta chrysoptera</i>	V	-	No	BAM-C	Yes	n/a	PCT 3254, PCT 3436 and PCT 3074	Moderate
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074.	High
Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	E1	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436	n/a (Moderate)
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	High



Common Name	Scientific Name	Listing Status		Dual Credit Species (Yes/ No)	Source	Retained For Further Assessment? (Yes/ No/ Partial*)	Reason For Exclusion from Further Assessment	Vegetation Type (PCT)	Sensitivity To Gain Class
		BC Act	EPBC Act						
Flame Robin	<i>Petroica phoenicea</i>	V	-	No	BAM-C	No	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	Moderate
Little Lorikeet	<i>Glossopsitta pusilla</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	High
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V	-	Yes	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT3436 and PCT 3074	High
Little Eagle	<i>Hieraaetus morphnoides</i>	V	-	Yes	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	Moderate
White-throated Needletail	<i>Hirundapus caudacutus</i>	-	V	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT3436 and PCT 3074	High
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	-	V	No	BAM-C	Yes	n/a	PCT 3254 and PCT 3436	High
Black Bittern	<i>Ixobrychus flavicollis</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	n/a (Moderate)



Common Name	Scientific Name	Listing Status		Dual Credit Species (Yes/ No)	Source	Retained For Further Assessment? (Yes/ No/ Partial*)	Reason For Exclusion from Further Assessment	Vegetation Type (PCT)	Sensitivity To Gain Class
		BC Act	EPBC Act						
Swift Parrot	<i>Lathamus discolor</i>	E1	CE	Yes	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	Moderate
Square-tailed Kite	<i>Lophoictinia isura</i>	V	-	Yes	BAM-C	No	Habitat Constraints	PCT 3241, PCT 3254 and PCT 3436	Moderate
Black-chinned Honeyeater (eastern subspecies)	<i>Melithreptus gularis gularis</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254 and PCT 3436	Moderate
Eastern Coastal Free-tailed Bat	<i>Micronomus norfolkensis</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	High
Little Bent-winged Bat	<i>Miniopterus australis</i>	V	-	Yes	BAM-C	No	Habitat Constraints	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	High
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V	-	Yes	BAM-C	No	Habitat Constraints	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	High
Turquoise Parrot	<i>Neophema pulchella</i>	V	-	No	BAM-C	Yes	n/a	PCT 3436	High



Common Name	Scientific Name	Listing Status		Dual Credit Species (Yes/ No)	Source	Retained For Further Assessment? (Yes/ No/ Partial*)	Reason For Exclusion from Further Assessment	Vegetation Type (PCT)	Sensitivity To Gain Class
		BC Act	EPBC Act						
Eastern Osprey	<i>Pandion cristatus</i>	V	-	Yes	BAM-C	Yes	n/a	PCT 3241, PCT 3254 and PCT 3436	Moderate
Yellow-bellied Glider	<i>Petaurus australis</i>	V	V	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254 and PCT 3436	High
Scarlet Robin	<i>Petroica boodang</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254 and PCT 3436	Moderate
Golden-tipped Bat	<i>Phoniscus papuensis</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	High
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis temporalis</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254 and PCT 3436	Moderate
Eastern Chestnut Mouse	<i>Pseudomys gracilicaudatus</i>	V	-	No	BAM-C	Yes	n/a	PCT 3254 and PCT 3436	High
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	V	Yes	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	High



Common Name	Scientific Name	Listing Status		Dual Credit Species (Yes/ No)	Source	Retained For Further Assessment? (Yes/ No/ Partial*)	Reason For Exclusion from Further Assessment	Vegetation Type (PCT)	Sensitivity To Gain Class
		BC Act	EPBC Act						
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	V	-	No	BAM-C	Yes	n/a	PCT 3436 and PCT 3074	High
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	High
Red-legged Pademelon	<i>Thylogale stigmatica</i>	V	-	No	BAM-C	Yes	n/a	PCT 3254	High
Rose-crowned Fruit-Dove	<i>Ptilinopus regina</i>	V	-	No	BAM-C	Yes	n/a	PCT 3254	Moderate
South-eastern Hooded Robin	<i>Melanodryas cucullata cucullata</i>	E	E	No	BAM-C	Yes	n/a	PCT 3254	Moderate
Spotted Harrier	<i>Circus assimilis</i>	V	-	No	BAM-C	Yes	n/a	PCT 3436	Moderate
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	V	E	No	BAM-C	Yes	n/a	PCT 3241, PCT 3254, PCT 3436 and PCT 3074	High
Superb Fruit-Dove	<i>Ptilinopus superbus</i>	V	-	No	BAM-C	Yes	n/a	PCT 3254	Moderate



Common Name	Scientific Name	Listing Status		Dual Credit Species (Yes/ No)	Source	Retained For Further Assessment? (Yes/ No/ Partial*)	Reason For Exclusion from Further Assessment	Vegetation Type (PCT)	Sensitivity To Gain Class
		BC Act	EPBC Act						
Wompoo Fruit-Dove	<i>Ptilinopus magnificus</i>	V	-	No	BAM-C	Yes	n/a	PCT 3241, 3254 and PCT 3074	Moderate

*When a species is retained in one vegetation zone but not another



5.1.2 Species Credit Species

A Candidate Species Report was generated in the BAM-C and a copy is provided in Appendix E. A total of 61 threatened species are identified as candidate species for the Project.

The information listed below for each species includes the relevant source of information, whether the species is retained for further assessment (or excluded) and the reason for the exclusion of any species.

Candidate Flora Species

A total of 22 threatened flora species are identified in the Candidate Species Report. These species, including their legal status, source of record and reasons for exclusion (if any) are listed below in Table 17. One candidate flora species, Coast Groundsel (*Senecio spathulatus*), was excluded from further assessment based on habitat constraints (i.e. the site is not located within 500 m of the coast). No other species have been excluded from further assessment or geographic limitations.

Candidate Fauna Species

A total of 39 threatened fauna species are identified in the Candidate Species Report. These species are listed below in Table 18. The following species have been excluded from further assessment based on geographic limitations:

- Rufous Bettong, which is noted as 'North of Gloucester' (Booral is situated south of Gloucester).

The following species have been excluded based on habitat constraints:

- Regent Honeyeater, Broad-billed Sandpiper and Swift Parrot, as the subject land is not mapped as containing 'Important Habitat' for these species on the Important Habitat Map.
- Square-tailed Kite, Little Eagle and Eastern Osprey, as the subject land does not contain "nest trees"; no suitable nest trees and no stick nests have been located within the subject land.
- Little Bent-winged Bat and the Large Bent-winged Bat, as there are no 'caves, tunnels, mines, culverts or other structures' present within the subject land or within the relevant buffer distances from the subject land for these species (100m).
- Grey-headed Flying Fox, as no 'breeding camps' have been identified on the subject land.

As all PCTs have been grouped into the same vegetation zones, no species credit species have been assessed differently in different vegetation zones.



Table 17: Candidate Flora (Species Credit) Species

Common Name	Scientific Name	Listing Status		Source	Species Retained for Further Assessment?	Reason For Exclusion from Further Assessment
		BC Act	EPBC Act			
Charmhaven Apple	<i>Angophora inopina</i>	V	V	BAM-C	Yes	n/a
Netted Bottle Brush	<i>Callistemon linearifolius</i>	V	-	BAM-C	Yes	n/a
Pale Yellow Doubletail	<i>Diuris flavescens</i>	CE	CE	BAM-C	Yes	n/a
Native Guava	<i>Rhodomyrtus psidioides</i>	CE	CE	BAM-C	Yes	n/a
Red Helmet Orchid	<i>Corybas dowlingii</i>	E	-	BAM-C / Current Survey	Yes	n/a
Coast Groundsel	<i>Senecio spathulatus</i>	E	-	BAM-C	No	Habitat constraint
Biconvex Paperbark	<i>Melaleuca biconvexa</i>	V	V	BAM-C	Yes	n/a
Grove's Paperbark	<i>Melaleuca groveana</i>	V	-	BAM-C	Yes	n/a
Magenta Lilly Pilly	<i>Syzygium paniculatum</i>	E	V	BAM-C	Yes	n/a
Manning Yellow Solanum	<i>Solanum sulphureum</i>	E	E	BAM-C	Yes	n/a
Eastern Australian Underground Orchid	<i>Rhizanthella slateri</i>	V	E	BAM-C	Yes	n/a
<i>Rhizanthella slateri</i> (Rupp) M.A. Clem. & Cribb in the Great Lakes local government area	<i>Rhizanthella slateri</i> – endangered population	V	E	BAM-C	Yes	n/a
Black-eyed Susan	<i>Tetradlea juncea</i>	V	V	BAM-C	Yes	n/a
White-flowered Wax Plant	<i>Cynanchum elegans</i>	E	E	BAM-C	Yes	n/a
Slaty Red Gum	<i>Eucalyptus glaucina</i>	V	E	BAM-C	Yes	n/a



Common Name	Scientific Name	Listing Status		Source	Species Retained for Further Assessment?	Reason For Exclusion from Further Assessment
		BC Act	EPBC Act			
Craven Grey Box	<i>Eucalyptus largeana</i>	E	E	BAM-C	Yes	n/a
Guthrie's Grevillea	<i>Grevillea guthrieana</i>	E	E	BAM-C	Yes	n/a
Small-flower Grevillea	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	V	V	BAM-C	Yes	n/a
Noah's False Chickweed	<i>Lindernia alsinoides</i>	E	-	BAM-C	Yes	n/a
Scant Pomaderris	<i>Pomaderris queenslandica</i>	E	-	BAM-C	Yes	n/a
	<i>Pterostylis chaetophora</i>	V	-	BAM-C	Yes	n/a
Scrub Turpentine	<i>Rhodamnia rubescens</i>	CE	CE	BAM-C	Yes	n/a



Table 18: Candidate Fauna Species Credit Species

Common Name	Scientific Name	Listing Status		Dual Credit Species (Yes/ No)	Source	Species Retained for Further Assessment?	Reason for Exclusion
		BC Act	EPBC Act				
Rufous Bettong	<i>Aepyprymnus rufescens</i>	V	-	Yes	BAM-C	No	Geographic limitations
Regent Honeyeater	<i>Anthochaera phrygia</i>	E4A	CE	Yes	BAM-C	No	Important Areas Map (not mapped)
Bush Stone-curlew	<i>Burhinus grallarius</i>	E1	-	No	BAM-C	Yes	n/a
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	V	E	Yes	BAM-C	Yes	n/a
Glossy Black-Cockatoo	<i>Calyptorhynchus lathami</i>	V	V	Yes	BAM-C	Yes	n/a
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	V	-	No	BAM-C	Yes	n/a
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	V	V	No	BAM-C	Yes	n/a
Wallum Froglet	<i>Crinia tinnula</i>	V	-	No	BAM-C	Yes	n/a
Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	<i>Dromaius novaehollandiae</i> - endangered population	-	-	No	BAM-C	Yes	n/a
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V	-	Yes	BAM-C	Yes	n/a
Little Eagle	<i>Hieraaetus morphnoides</i>	V	-	Yes	BAM-C	No	Habitat Constrains
Stephens' Banded Snake	<i>Hoplocephalus stephensii</i>	V	-	No	BAM-C	Yes	n/a
Swift Parrot	<i>Lathamus discolor</i>	E1	CE	Yes	BAM-C	No	Important Areas Map (not mapped)
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	V	-	No	BAM-C	No	Important Areas Map (not mapped)
Green and Golden Bell Frog	<i>Litoria aurea</i>	E1	V	No	BAM-C	Yes	n/a



Common Name	Scientific Name	Listing Status		Dual Credit Species (Yes/ No)	Source	Species Retained for Further Assessment?	Reason for Exclusion
		BC Act	EPBC Act				
Green-thighed Frog	<i>Litoria brevipalmata</i>	V	-	No	BAM-C	Yes	n/a
Square-tailed Kite	<i>Lophoictinia isura</i>	V	-	Yes	BAM-C	No	Habitat Constrains
Little Bent-winged Bat	<i>Miniopterus australis</i>	V	-	Yes	BAM-C	No	Habitat constraints
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	V	-	Yes	BAM-C	No	Habitat constraints
Southern Myotis	<i>Myotis macropus</i>	V	-	No	BAM-C	Yes	n/a
Barking Owl	<i>Ninox connivens</i>	V	-	Yes	BAM-C	Yes	n/a
Powerful Owl	<i>Ninox strenua</i>	V	-	Yes	BAM-C	Yes	n/a
Stuttering Frog	<i>Mixophyes balbus</i>	E	V	No	BAM-C	Yes	n/a
Giant Barred Frog	<i>Mixophyes iteratus</i>	E	V	No	BAM-C	Yes	n/a
Parma Wallaby	<i>Notamacropus parma</i>	V	V	No	BAM-C	Yes	n/a
Eastern Osprey	<i>Pandion cristatus</i>	V	-	Yes	BAM-C	No	Habitat constraints
Southern Greater Glider	<i>Petauroides volans</i>	E1	E	Yes	BAM-C	Yes	n/a
Squirrel Glider	<i>Petaurus norfolcensis</i>	V	-	Yes	BAM-C	Yes	n/a
Brush-tailed Rock-wallaby	<i>Petrogale penicillata</i>	E1	V	Yes	BAM-C	Yes	n/a
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	V	-	Yes	BAM-C	Yes	n/a
Koala	<i>Phascolarctos cinereus</i>	E1	E	Yes	BAM-C	Yes	n/a
Common Planigale	<i>Planigale maculata</i>	V	-	No	BAM-C	Yes	n/a
Long-nosed Potoroo	<i>Potorous tridactylus</i>	V	V	No	BAM-C	Yes	n/a
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	V	Yes	BAM-C	No	Habitat constraint



Common Name	Scientific Name	Listing Status		Dual Credit Species (Yes/ No)	Source	Species Retained for Further Assessment?	Reason for Exclusion
		BC Act	EPBC Act				
Red-backed Button-quail	<i>Turnix maculosus</i>	V	-	No	BAM-C	Yes	n/a
Masked Owl	<i>Tyto novaehollandiae</i>	V	-	Yes	BAM-C	Yes	n/a
Sooty Owl	<i>Tyto tenebricosa</i>	V	-	Yes	BAM-C	Yes	n/a
Mahony's Toadlet	<i>Uperoleia mahonyi</i>	E1	-	No	BAM-C	Yes	n/a
Eastern Cave Bat	<i>Vespadelus trougtoni</i>	V	-	No	BAM-C	Yes	n/a



5.2 Presence of Candidate Species

This section of the BDAR summarises the determination of whether or not candidate threatened species are present on the subject land (or a specific vegetation zone). In accordance with BAM subsection 5.2.4, candidate species are determined to be present within the subject land based on:

- 'Assumed presence'.
- Important habitat map (for dual credit species).
- Targeted threatened species surveys.
- An expert report.

In the case of the Project, there are no species with habitat mapped on the Important Areas Map (which applies to Regent Honeyeater, Swift Parot and Broad-billed Sandpiper) and no expert reports have been used in the preparation of this BDAR. Therefore, presence of candidate species on the subject land is determined either by assumed presence or survey results.

Additionally, an assessment of the presence or likely presence of threatened species previously recorded in the locality (BioNet search data) and/or listed in the Candidate Species Report is provided in Appendix F. This 'Likelihood of Occurrence' table was used to assist in the determination of likely presence of candidate species within the subject land based on specific habitat requirements and on the nature and condition of habitats on site.

5.2.1 Candidate Flora Species

The presence of candidate flora species that have been retained for further assessment is determined below in Table 19. As noted above, a total of 22 threatened flora species are identified in the Candidate Species Report and all were retained for further assessment.

With reference to the presence of candidate flora species, only one species is recorded as present in the subject land: Red Helmet Orchid (*Corybas dowlingii*), listed as 'Endangered' under the BC Act, which was assumed present as field surveys could not be conducted during the nominated survey period (June-July). Targeted field surveys were completed for all other threatened plant species within their respective survey periods (refer to Candidate Species report in Appendix E).

Notably, another threatened plant species, Scrub Turpentine (*Rhodamnia rubescens*), listed as 'Critically Endangered' under the BC Act, was recorded within the patch of dry rainforest (PCT 3076). However, this species now lies outside of the subject land by virtue of design changes to the pit shell to avoid the habitat for this species. Accordingly, Scrub Turpentine does not require further assessment.

Table 19: Determining Presence of Candidate Flora Species

Common Name	Scientific Name	Method Used to Determine Presence	Presence	Further Assessment (Species Polygon)
Charmhaven Apple	<i>Angophora inopina</i>	Target survey	No	No
Trailing Woodruff	<i>Asperula asthenes</i>	Target survey	No	No
Netted Bottle Brush	<i>Callistemon linearifolius</i>	Target survey	No	No



Common Name	Scientific Name	Method Used to Determine Presence	Presence	Further Assessment (Species Polygon)
Red Helmet Orchid	<i>Corybas dowlingii</i>	Assume present	Yes	Yes
White-flowered Wax Plant	<i>Cynanchum elegans</i>	Target survey	No	No
Pale Yellow Doubletail	<i>Diuris flavescens</i>	Target survey	No	No
Slaty Red Gum	<i>Eucalyptus glaucina</i>	Target survey	No	No
Craven Grey Box	<i>Eucalyptus largeana</i>	Target survey	No	No
Guthrie's Grevillea	<i>Grevillea guthrieana</i>	Target survey	No	No
Small-flower Grevillea	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Target survey	No	No
Noah's False Chickweed	<i>Lindernia alsinoides</i>	Target survey	No	No
Biconvex Paperbark	<i>Melaleuca biconvexa</i>	Target survey	No	No
Grove's Paperbark	<i>Melaleuca groveana</i>	Target survey	No	No
Scant Pomaderris	<i>Pomaderris queenslandica</i>	Target survey	No	No
(An orchid)	<i>Pterostylis chaetophora</i>	Target survey	No	No
Eastern Australian Underground Orchid	<i>Rhizanthella slateri</i>	Target survey	No	No
<i>Rhizanthella slateri</i> (Rupp) M.A. Clem. & Cribb in the Great Lakes local government area	<i>Rhizanthella slateri</i> – endangered population	Target survey	No	No
Scrub Turpentine	<i>Rhodamnia rubescens</i>	Target survey	No	No
Native Guava	<i>Rhodomyrtus psidioides</i>	Target survey	No	No
Magenta Lilly Pilly	<i>Syzygium paniculatum</i>	Target survey	No	No
Manning Yellow Solanum	<i>Solanum sulphureum</i>	Target survey	No	No
Black-eyed Susan	<i>Tetradlea juncea</i>	Target survey	No	No

5.2.2 Candidate Fauna Species

The presence of candidate fauna species that have been retained for further assessment is determined below in Table 20. As noted above, a total of 39 threatened fauna species are identified in the Candidate Species Report and 28 of these species were retained for further assessment. These 28 species are listed below in Table 20.



Table 20: Determining Presence of Candidate Fauna Species

Common Name	Scientific Name	Method	Presence	Further Assessment (Species Polygon)
Bush Stone-curlew	<i>Burhinus grallarius</i>	Target survey	No	No
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	Target survey	No	No
Glossy Black-Cockatoo	<i>Calyptorhynchus lathamii</i>	Assumed present	Yes	Yes
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	Target survey	No	No
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Target survey	No	No
Wallum Froglet	<i>Crinia tinnula</i>	Target survey	No	No
Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	<i>Dromaius novaehollandiae</i> - endangered population	Target survey	No	No
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Target survey	No	No
Stephens' Banded Snake	<i>Hoplocephalus stephensii</i>	Target survey	No	No
Green and Golden Bell Frog	<i>Litoria aurea</i>	Target survey	No	No
Green-thighed Frog	<i>Litoria brevipalmata</i>	Target survey	No	No
Stuttering Frog	<i>Mixophyes balbus</i>	Target survey	No	No
Giant Barred Frog	<i>Mixophyes iteratus</i>	Target survey	No	No
Southern Myotis	<i>Myotis macropus</i>	Target survey	No	No
Barking Owl	<i>Ninox connivens</i>	Assumed present	Yes	Yes
Powerful Owl	<i>Ninox strenua</i>	Assumed present	Yes	Yes
Parma Wallaby	<i>Notamacropus parma</i>	Target survey	No	No
Southern Greater Glider	<i>Petauroides volans</i>	Target survey	No	No
Squirrel Glider	<i>Petaurus norfolcensis</i>	Target survey	Yes	Yes
Brush-tailed Rock-wallaby	<i>Petrogale penicillata</i>	Target survey	No	No
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	Assumed present	Yes	Yes
Koala	<i>Phascolarctos cinereus</i>	Target survey	Yes	Yes
Common Planigale	<i>Planigale maculata</i>	Assumed present	Yes	Yes



Common Name	Scientific Name	Method	Presence	Further Assessment (Species Polygon)
Long-nosed Potoroo	<i>Potorous tridactylus</i>	Assumed present	Yes	Yes
Red-backed Button-quail	<i>Turnix maculosus</i>	Target survey	No	No
Masked Owl	<i>Tyto novaehollandiae</i>	Assumed present	Yes	Yes
Sooty Owl	<i>Tyto tenebricosa</i>	Assumed present	Yes	Yes
Mahony's Toadlet	<i>Uperoleia mahonyi</i>	Target survey	No	No
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	Target survey	No	No

A total of nine candidate fauna species are assumed present, with two species recorded in the subject land. As noted earlier, several species were assumed present as targeted surveys could not be completed during the nominated survey period. Further details on survey effort and survey results are provided below in Section 5.3.

5.3 Threatened Species Surveys

5.3.1 Overview

Table 22 and Table 23 have been completed for candidate species where targeted threatened species surveys were used to determine presence of the species. Details on survey methods and effort are provided in Appendix B.

Targeted threatened species surveys have been conducted on the subject land over three main periods, as outlined below in Table 21.

Table 21: Summary of Field Surveys

Survey & Date	Description	Survey Dates
Keystone 2017	Flora and fauna surveys across the project site according to published guidelines	9/03/2015 – 10/03/2015, 17/10/2016, 11/12/2016 and 12/12/2016
SLR 2018	Flora and fauna surveys across the project site, focussed on the previous version of the development footprint according to BAM and relevant published guidelines. Completion of BAM plots and targeted threatened species surveys	22/10/2018 to 01/11/2018 and 03/04/2019
SLR 2020	Supplementary surveys targeting specific threatened species, with additional two BAM plots, updates to PCT mapping and TEC identification and nocturnal surveys targeting microchiropteran bats, cockatoos (Glossy Black and Gang Gang), large forest owls (Sooty, Powerful and Barking) and arboreal mammals	22/10/2020 – 26/10/2020



5.3.2 Threatened Flora Surveys

Threatened flora surveys as detailed in Section 2.3.3 were undertaken with reference to the *BAM Surveying threatened plants and their habitats guide* (DPIE 2020a) and survey notes within the TBDC. Survey methods, timing and results (presence on site) is listed below in Table 22 for all candidate flora species requiring survey.

With regard to the threatened flora surveys and results, the following is noted:

- Surveys were conducted by SLR for threatened plants over two main periods, being October 2018 and November 2020, with previous surveys conducted by Keystone in March 2015, October 2016 and December 2016; collectively, these surveys covered the required survey periods for all but one candidate flora species (Red Helmet Orchid *Corybas dowlingii*, which flowers in June and July).
- No threatened plant species have been recorded within the subject land.
- One threatened species, Red Helmet Orchid (*Corybas dowlingii*), listed as Endangered under the BC Act, is assumed present given surveys were not conducted during the required survey period (Jun-Jul). Habitat for *C. dowlingii* comprises sheltered areas in tall open forest on well-drained gravelly soil at elevations of 10-200 m, as well as sandy soils in swamp forest areas. A species polygon has been drawn based on vegetation zones within the subject land that contain suitable habitat (see Section 5.6).
- One threatened species, Scrub Turpentine (*Rhodamnia rubescens*), listed as Critically Endangered under the BC Act, was recorded outside of the subject land within the dry rainforest patch (PCT 3076), which lies to the north of the proposed quarry pit. The population will not be directly impacted by the Proposal and further assessment (i.e. species polygon and species credits) is not required.

5.3.3 Threatened Fauna Surveys

Threatened fauna surveys as detailed in **Section 2.4.3** were undertaken with reference to the survey notes within the TBDC, as well as the following BAM survey guidelines:

- NSW Survey Guide for Threatened Frogs (DPIE 2020b).
- Koala (*Phascolarctos cinereus*): Biodiversity Assessment Method Survey Guide (DPE 2022b).
- NSW Survey Guide for Threatened Reptiles (DPE 2022c).
- 'Species credit' threatened bats and their habitats NSW survey guide for the Biodiversity Assessment Method (OEH 2018).

Survey methods, timing and results (presence on site) are listed below in Table 23 for all candidate fauna species requiring survey.

Fauna species recorded during surveys conducted for this BDAR are listed in Appendix G.



Table 22: Summary of Threatened Species Surveys for Candidate Flora Species

Common Name	Scientific Name	Threatened flora species surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (Transects or Grids)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People) Note, Total Person-Hours Used		
Charmhaven Apple	<i>Angophora inopina</i>	Transects	☒ Yes (all year) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) 22/10/2020 - 23/10/2020 Parallel transects	No	No
Netted Bottle Brush	<i>Callistemon linearifolius</i>	Transects	☒ Yes (Oct-Jan) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) 22/10/2020 - 23/10/2020 Parallel transects	No	No
Red Helmet Orchid	<i>Corybas dowlingii</i>	Transects	☐ Yes (Jun-Jul)	☒ No	N/a	Assumed present	Yes
White-flowered Wax Plant	<i>Cynanchum elegans</i>	Transects	☒ Yes (all year) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) 22/10/2020 - 23/10/2020 Parallel transects	No	No
Pale Yellow Doubletail	<i>Diuris flavescens</i>	Transects	☒ Yes (Sep-Oct) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018,	No	No



Common Name	Scientific Name	Threatened flora species surveys			Presence	Further Assessment Required (Species Polygon)	
		Survey Method (Transects or Grids)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)	Effort (Hours & No. People) Note, Total Person-Hours Used			
					30/10/2018, 31/10/2018 and 01/11/2018 22/10/2020 - 23/10/2020 Parallel transects		
Slaty Red Gum	<i>Eucalyptus glaucina</i>	Transects	☒ Yes (All year) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) 22/10/2020 - 23/10/2020 Parallel transects	No	No
Craven Grey Box	<i>Eucalyptus largeana</i>	Transects	☒ Yes (All year) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No	No
Guthrie's Grevillea	<i>Grevillea guthrieana</i>	Transects	☒ Yes (All year) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No	No



Common Name	Scientific Name	Threatened flora species surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (Transects or Grids)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People) Note, Total Person-Hours Used		
Small-flower Grevillea	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Transects	☒ Yes (Aug-Nov) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No	No
Noah's False Chickweed	<i>Lindernia alsinoides</i>	Transects	☒ Yes (Nov-Feb) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No	No
Biconvex Paperbark	<i>Melaleuca biconvexa</i>	Transects	☒ Yes (All year) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No	No
Grove's Paperbark	<i>Melaleuca groveana</i>	Transects	☒ Yes (All year) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018)	No	No



Common Name	Scientific Name	Threatened flora species surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (Transects or Grids)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People) Note, Total Person-Hours Used		
					Two ecologists over two days 22-23/10/2020 Parallel transects		
Scant Pomaderris	<i>Pomaderris queenslandica</i>	Transects	☒ Yes (All year) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No	No
(an orchid)	<i>Pterostylis chaetophora</i>	Transects	☒ Yes (Sep-Nov) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 (with reference population inspected and in flower) Parallel transects	No	No
Eastern Australian Underground Orchid	<i>Rhizanthella slateri</i>	Transects	☒ Yes (Sep-Nov) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No	No



Common Name	Scientific Name	Threatened flora species surveys			Presence	Further Assessment Required (Species Polygon)	
		Survey Method (Transects or Grids)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)				Effort (Hours & No. People) Note, Total Person-Hours Used
<i>Rhizanthella slateri</i> (Rupp) M.A. Clem. & Cribb in the Great Lakes local government area	<i>Rhizanthella slateri</i> – endangered population	Transects	☒ Yes (Sep-Nov) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No	No
Scrub Turpentine	<i>Rhodamnia rubescens</i>	Transects	☒ Yes (All year) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No (recorded outside development footprint)	No
Native Guava	<i>Rhodomyrtus psidioides</i>	Transects	☒ Yes (All year) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No	No
Manning Yellow Solanum	<i>Solanum sulphureum</i>	Transects	☒ Yes (All year) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018)	No	No



Common Name	Scientific Name	Threatened flora species surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (Transects or Grids)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People) Note, Total Person-Hours Used		
					Two ecologists over two days 22-23/10/2020 Parallel transects		
Magenta Lilly Pilly	<i>Syzygium paniculatum</i>	Transects	☐ Yes (Apr-Jun)	☒ No Oct 2018 Nov 2020	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No (No other <i>Syzygium</i> spp. recorded)	No
Black-eyed Susan	<i>Tetradlea juncea</i>	Transects	☒ Yes (Sep-Oct) Oct 2018 Nov 2020	☐ No	Two ecologists over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018) Two ecologists over two days 22-23/10/2020 Parallel transects	No	No



Table 23: Summary of Threatened Species Surveys for Candidate Fauna Species

Common Name	Scientific Name	Threatened Flora Species Surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People)		
Bush Stone-curlew	<i>Burhinus grallarius</i>	Diurnal habitat searches	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Diurnal habitat searches Dusk bird surveys - three 60-min evening periods of (Nov 2020)	No	No
		Dawn bird surveys	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Two ecologists over four mornings 23/02/2015-26/02/2015 Three 30-min dawn bird census over three mornings (Oct 2018)		
		Spotlighting	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)		
		Camera Surveillance	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Four cameras over 10 weeks		



Common Name	Scientific Name	Threatened Flora Species Surveys			Presence	Further Assessment Required (Species Polygon)	
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)				
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	Areas searched for breeding habitat (i.e. hollow-bearing tree inventory) Stag-watches Dawn bird surveys	☒ Yes (Oct-Jan) Oct 2018 Nov 2020	☐ No	Diurnal surveys for tree hollows (3 days in Oct 2018; 2 days Nov 2020) Three 60-min evening periods of stag-watches and dusk bird surveys (Nov 2020) Three 30-min dawn bird census over three mornings (Oct 2018)	No	No
Glossy Black-Cockatoo	<i>Calyptorhynchus lathamii</i>	Areas searched for breeding habitat (i.e. hollow-bearing tree inventory) Stag-watches Dawn bird surveys	☐ Yes (Jan-Sep)	☒ No Oct 2018 Nov 2020	Diurnal surveys for tree hollows (3 days in Oct 2018; 2 days Nov 2020) Three 60-min evening periods of stag-watches and dusk bird surveys (Nov 2020) Three 30-min dawn bird census over three mornings (Oct 2018)	Assumed present	Yes
Eastern Pygmy-possum	<i>Cercartetus nanus</i>	Spotlighting	☒ Yes (Oct-Mar) Feb 2016 Oct 2018 Nov 2020	☐ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	No	No



Common Name	Scientific Name	Threatened Flora Species Surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People)		
		Camera Surveillance	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Four cameras over 10 weeks		
Large-eared Pied Bat	<i>Chalinolobus dwyeri</i>	Areas searched for breeding habitat (i.e. hollow-bearing tree inventory)	☒ Yes (Nov-Jan) Nov 2020	☒ No Oct 2018 Oct 2020	Diurnal surveys for tree hollows (3 days in Oct 2018; 2 days Nov 2020)	No	No
		Stag-watches	☐ Yes (Nov-Jan)	☒ No Oct 2018 Oct 2020	Three 60-min evening periods of stag-watches (Oct 2020)		
		Anabat detectors	☐ Yes (Nov-Jan)	☒ No Oct 2018 Nov 2020	Four Anabat Express detectors over two nights (30/10/2018 – 31/10/2018) Four Anabat Express detectors deployed at four dams over four nights (22/10/2020 -26/10/2020)		
		Harp traps	☐ Yes (Nov-Jan)	☒ No Oct 2018	Two traps over two nights (30/10/2018 – 31/10/2018)		



Common Name	Scientific Name	Threatened Flora Species Surveys			Presence	Further Assessment Required (Species Polygon)	
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)				Effort (Hours & No. People)
Wallum Froglet	<i>Crinia tinnula</i>	Spotlighting, tadpole and call surveys	☒ Yes (All year) Feb 2016 Oct 2018	☐ No	09-10/03/2015, 23-25/02/2015 and 11-12/12/2016 30/10/2018 – 01/11/2018	No	No
		Diurnal visual and aural surveys	☒ Yes Oct 2018	☐ No	Three days two ecologists (Oct 2018)		
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	Areas searched for breeding habitat (stick nests)	☒ Yes (Jul-Dec) Feb 2016 Oct 2018 Oct 2020	☐ No	Diurnal searches by two ecologists over three days	No	No
Stephens' Banded Snake	<i>Hoplocephalus stephensii</i>	Spotlighting	☒ Yes (Jan-Mar; Oct-Dec) Oct 2018	☐ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	No	No
Green and Golden Bell Frog	<i>Litoria aurea</i>	Spotlighting, tadpole and call surveys	☒ Yes (All year) Feb 2016 Oct 2018	☐ No	09-10/03/2015, 23-25/02/2015 and 11-12/12/2016 30/10/2018 – 01/11/2018	No	No
		Diurnal visual and aural surveys	☒ Yes Oct 2018	☐ No	Three days two ecologists (Oct 2018)		



Common Name	Scientific Name	Threatened Flora Species Surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People)		
Green-thighed Frog	<i>Litoria brevipalmata</i>	Spotlighting, tadpole and call surveys	☒ Yes (Jan-Apr; Sep-Dec) Feb 2016 Oct 2018	☐ No	09-10/03/2015, 23-25/02/2015 and 11-12/12/2016 30/10/2018 – 01/11/2018	No	No
		Diurnal visual and aural surveys	☒ Yes Feb 2016 Oct 2018	☐ No	Three days two ecologists (Oct 2018)		
Stuttering Frog	<i>Mixophyes balbus</i>	Spotlighting, tadpole and call surveys	☒ Yes (Sep-Mar) Feb 2016 Oct 2018	☐ No	09-10/03/2015, 23-25/02/2015 and 11-12/12/2016 30/10/2018 – 01/11/2018	No	No
		Diurnal visual and aural surveys	☒ Yes Feb 2016 Oct 2018	☐ No	Three days two ecologists (Oct 2018)		
Giant Barred Frog	<i>Mixophyes iteratus</i>	Spotlighting, tadpole and call surveys	☒ Yes (Oct-Mar) Feb 2016 Oct 2018	☐ No	09-10/03/2015, 23-25/02/2015 and 11-12/12/2016 30/10/2018 – 01/11/2018	No	No
		Diurnal visual and aural surveys	☒ Yes Feb 2016 Oct 2018	☐ No	Three days two ecologists (Oct 2018)		



Common Name	Scientific Name	Threatened Flora Species Surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People)		
Southern Myotis	<i>Myotis macropus</i>	Areas searched for breeding habitat (i.e. hollow-bearing tree inventory)	☒ Yes (Oct-Mar) Oct 2018 Nov 2020	☐ No	Diurnal surveys for tree hollows (3 days in Oct 2018; 2 days Nov 2020)	No	No
		Stag-watches	☒ Yes (Oct-Mar) Oct 2018 Oct 2020	☐ No	Three 60-min evening periods of stag-watches (Oct 2020)		
		Anabat detectors	☒ Yes (Oct-Mar) Oct 2018 Nov 2020	☐ No	Four Anabat Express detectors over two nights (30/10/2018 – 31/10/2018) Four Anabat Express detectors deployed at four dams over four nights (22/10/2020 -26/10/2020)		
		Harp traps	☒ Yes (Oct-Mar) Oct 2018	☐ No	Two traps over two nights (30/10/2018 – 31/10/2018)		
Barking Owl	<i>Ninox connivens</i>	Spotlighting	☐ Yes (Jan-Aug)	☒ No Oct 2018 Nov 2020	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	Assumed present	Yes



Common Name	Scientific Name	Threatened Flora Species Surveys			Presence	Further Assessment Required (Species Polygon)
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People)	
		Call Playback	☐ Yes (Jan-Aug)	☒ No Oct 2018 Nov 2020	Call playback for 30 minutes with 2 observers two nights.	
		Areas searched for breeding habitat (i.e. hollow-bearing tree inventory)	☐ Yes (Jan-Aug)	☒ No Oct 2018 Oct 2020	Diurnal surveys for tree hollows (3 days in Oct 2018; 2 days Nov 2020)	
Powerful Owl	<i>Ninox strenua</i>	Spotlighting	☐ Yes (Jan-Aug)	☒ No Oct 2018 Nov 2020	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	Assumed present Yes
		Call Playback	☐ Yes (Jan-Aug)	☒ No Oct 2018 Nov 2020	Call playback for 30 minutes with 2 observers two nights.	
		Areas searched for breeding habitat (i.e. hollow-bearing tree inventory)	☐ Yes (Jan-Aug)	☒ No Oct 2018 Oct 2020	Diurnal surveys for tree hollows (3 days in Oct 2018; 2 days Nov 2020)	



Common Name	Scientific Name	Threatened Flora Species Surveys			Presence	Further Assessment Required (Species Polygon)	
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)				Effort (Hours & No. People)
Parma Wallaby	<i>Notamacropus parma</i>	Spotlighting	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	No	No
		Camera Surveillance	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Four cameras over 10 weeks		
Southern Greater Glider	<i>Petauroides volans</i>	Spotlighting	☒ Yes (Oct-Mar) Feb 2016 Oct 2018 Nov 2020	☐ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	No	No
		Camera Surveillance	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Four cameras over 10 weeks		
Squirrel Glider	<i>Petaurus norfolcensis</i>	Spotlighting	☒ Yes (Oct-Mar) Feb 2016 Oct 2018 Nov 2020	☐ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	Yes (survey)	Yes



Common Name	Scientific Name	Threatened Flora Species Surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People)		
		Camera Surveillance	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Four cameras over 10 weeks		
Brush-tailed Rock Wallaby	<i>Petrogale penicillata</i>	Spotlighting	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	No	No
		Camera Surveillance	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Four cameras over 10 weeks		
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	Spotlighting	☒ Yes (Dec-Jun) Feb 2016 Oct 2018 Nov 2020	☐ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	Assumed present	Yes
		Camera Surveillance	☒ Yes (Dec-Jun) Feb 2016 Oct 2018 Nov 2020	☐ No	Four cameras over 10 weeks		



Common Name	Scientific Name	Threatened Flora Species Surveys			Presence	Further Assessment Required (Species Polygon)	
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)				Effort (Hours & No. People)
Koala	<i>Phascolarctos cinereus</i>	Spotlighting	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	Yes (survey)	Yes
		Camera Surveillance	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Four cameras over 10 weeks		
		Call playback	☒ Yes (Dec-Jun) Feb 2016 Oct 2018 Nov 2020	☐ No	Call playback for 30 minutes with 2 observers two nights.		
Common Planigale	<i>Planigale maculata</i>	Spotlighting	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☒ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	Assumed present	Yes
		Camera Surveillance	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Four cameras over 10 weeks		



Common Name	Scientific Name	Threatened Flora Species Surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People)		
Long-nosed Potoroo	<i>Potorous tridactylus</i>	Spotlighting	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☒ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	Assumed present	Yes
		Camera Surveillance	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Four cameras over 10 weeks		
Red-backed Button-quail	<i>Turnix maculosus</i>	Diurnal habitat searches	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Diurnal habitat searches Dusk bird surveys - three 60-min evening periods of (Nov 2020)	No	No
		Dawn bird surveys	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Two ecologists over four mornings 23/02/2015-26/02/2015 Three 30-min dawn bird census over three mornings (Oct 2018)		
		Spotlighting	☒ Yes (All year) Feb 2016 Oct 2018	☐ No	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)		



Common Name	Scientific Name	Threatened Flora Species Surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People)		
			Nov 2020				
		Camera Surveillance	☒ Yes (All year) Feb 2016 Oct 2018 Nov 2020	☐ No	Four cameras over 10 weeks		
Masked Owl	<i>Tyto novaehollandiae</i>	Spotlighting	☐ Yes (Jan-Aug)	☒ No Oct 2018 Nov 2020	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	Assumed present	Yes
		Call Playback	☐ Yes (Jan-Aug)	☒ No Oct 2018 Nov 2020	Call playback for 30 minutes with 2 observers two nights.		
		Areas searched for breeding habitat (i.e. hollow-bearing tree inventory)	☐ Yes (Jan-Aug)	☒ No Oct 2018 Oct 2020	Diurnal surveys for tree hollows (3 days in Oct 2018; 2 days Nov 2020)		
Sooty Owl	<i>Tyto tenebricosa</i>	Spotlighting	☐ Yes (Jan-Aug)	☒ No Oct 2018 Nov 2020	Two ecologists for two hours over three nights (30/10/2018 – 01/11/2018)	Assumed present	Yes



Common Name	Scientific Name	Threatened Flora Species Surveys			Presence	Further Assessment Required (Species Polygon)
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People)	
		Call Playback	☐ Yes (Jan-Aug)	☒ No Oct 2018 Nov 2020	Call playback for 30 minutes with 2 observers two nights.	
		Areas searched for breeding habitat (i.e. hollow-bearing tree inventory)	☐ Yes (Jan-Aug)	☒ No Oct 2018 Oct 2020	Diurnal surveys for tree hollows (3 days in Oct 2018; 2 days Nov 2020)	
Mahony's Toadlet	<i>Uperoleia mahonyi</i>	Spotlighting, tadpole and call surveys	☒ Yes (Jan-Apr; Sep-Dec) Feb 2016 Oct 2018	☐ No	09-10/03/2015, 23-25/02/2015 and 11-12/12/2016 30/10/2018 – 01/11/2018	No
		Diurnal visual and aural surveys	☒ Yes Feb 2016 Oct 2018	☐ No	Three days two ecologists (Oct 2018)	
Eastern Cave Bat	<i>Vespadelus troughtoni</i>	Areas searched for breeding habitat (i.e. hollow-bearing tree inventory)	☒ Yes (Nov-Jan) Nov 2020	☒ No Oct 2018 Oct 2020	Diurnal surveys for tree hollows (3 days in Oct 2018; 2 days Oct & Nov 2020)	No



Common Name	Scientific Name	Threatened Flora Species Surveys				Presence	Further Assessment Required (Species Polygon)
		Survey Method (E.G. Harp Trap, Elliott Trap, Bioacoustics, Etc.)	Timing Of Survey – Within Recommended Period? (BAM-C / TBDC)		Effort (Hours & No. People)		
		Stag-watches	☐ Yes (Nov-Jan)	☒ No Oct 2018 Oct 2020	Three 60-min evening periods of stag-watches (Oct 2020)		
		Anabat detectors	☐ Yes (Nov-Jan)	☒ No Oct 2018 Oct 2020	Four Anabat Express detectors over two nights (30/10/2018 – 31/10/2018) Four Anabat Express detectors deployed at four dams over four nights (22/10/2020 -26/10/2020)		
		Harp traps	☐ Yes (Nov-Jan)	☒ No Oct 2018	Two traps over two nights (30/10/2018 – 31/10/2018)		



5.4 Expert Reports

No expert reports have been used to determine species presence/absence.

5.5 More Appropriate Local Data

More appropriate local data has not been adopted for this assessment.

5.6 Species Polygons (for Relevant Species Credit Species)

The assessment of survey results and presence on site for relevant candidate species is summarised above in Table 23. The removal of native forest vegetation as part of the construction of the project will generate a requirement for offsetting impacts on threatened species habitat. The following candidate species have either been recorded on the project site (i.e. Koala, Squirrel Glider) or assumed present:

- South-eastern Glossy Black-Cockatoo (assumed present).
- Red Helmet Orchid (assumed present).
- Barking Owl (assumed present).
- Powerful Owl (assumed present).
- Squirrel Glider (recorded on site).
- Brush-tailed Phascogale (assumed present).
- Koala (recorded on site).
- Common Planigale (assumed present).
- Long-nosed Potoroo (assumed present).
- Masked Owl (assumed present).
- Sooty Owl (assumed present).

Species polygons for each of the above listed candidate species are displayed in Figure 8. Species polygons have been created with reference to each species profile in the TBDC. However, for the above listed candidate species, species polygons have been (conservatively) drawn to include all PCTs associated with each species within the subject land, regardless of buffer requirements for some species in the TBDC. Candidate species recorded on site or assumed present are also listed below in Table 24, along with details on habitat constraints, mapped area of suitable habitat (i.e. area of species polygon) and requirements for species polygons (from the TBDC).



Table 24: Candidate Species Recorded within the Subject Land

Common Name	Scientific Name	Biodiversity Risk Weighting	SAIL Entity	Habitat Constraints / Microhabitats Present on Subject Land / Vegetation Zone	Extent (Ha) Suitable Habitat	Species Polygon Requirements
Red Helmet Orchid	<i>Corybas dowlingii</i>	High	No	-	10.59 ha	-
South-eastern Glossy Black-Cockatoo	<i>Calyptorhynchus lathamii lathamii</i>	High	No	Tree hollows >15 cm diameter >8 m above ground	10.59 ha	200 m disturbance free buffer of potential nest trees
Barking Owl	<i>Ninox connivens</i>	High	No	tree hollows >20 cm diameter >4 m above ground	10.59 ha	All vegetation zones (i) within 800m of detected owl, and (ii) containing living or dead tree with hollow >20cm diameter >4m above ground
Powerful Owl	<i>Ninox strenua</i>	High	No	tree hollows >20 cm diameter >4 m above ground	10.59 ha	All vegetation zones (i) within 800m of detected owl, and (ii) containing living or dead tree with hollow >20cm diameter >4m above ground
Squirrel Glider	<i>Petaurus norfolcensis</i>	High	No		10.59 ha	n/a (All PCTs associated with species)
Brush-tailed Phascogale	<i>Phascogale tapoatafa</i>	High	No	Land within 1 km of rocky escarpments, gorges, steep slopes, boulder	10.59 ha	outer-edge of PCTs associated with species



Common Name	Scientific Name	Biodiversity Risk Weighting	SAIL Entity	Habitat Constraints / Microhabitats Present on Subject Land / Vegetation Zone	Extent (Ha) Suitable Habitat	Species Polygon Requirements
				piles, rock outcrops or cliff line		
Koala	<i>Phascolarctos cinereus</i>	High	No	Presence of koala use trees	10.59 ha	All PCTs contain Koala feed trees See BAM Survey Guide).
Common Planigale (Fauna)	<i>Planigale maculata</i>	High	No		10.59 ha	drawn to 500 m either side of the PCT ecotonal boundary, or to the other PCT boundary, whichever is smaller.
Long-nosed Potoroo	<i>Potorous tridactylus</i>	High	No	Dense shrub layer or high canopy cover >70 % FPC	10.59 ha	-
Masked Owl	<i>Tyto novaehollandiae</i>	High	No	tree hollows >20 cm diameter >4 m above ground	10.59 ha	All vegetation zones (i) within 800m of detected owl, and (ii) containing living or dead tree with hollow >20cm diameter >4m above ground
Sooty Owl	<i>Tyto tenebriosa</i>	Very High	Yes	tree hollows >20 cm diameter >4 m above ground	10.59 ha	All vegetation zones (i) within 800m of detected owl, and (ii) containing living or dead tree with hollow >20cm diameter >4m above ground, or



Common Name	Scientific Name	Biodiversity Risk Weighting	SAIL Entity	Habitat Constraints / Microhabitats Present on Subject Land / Vegetation Zone	Extent (Ha) Suitable Habitat	Species Polygon Requirements
						caves, cliffs, escarpments, or cliff lines/ledges.



5.7 EPBC Act Species Recorded within the Subject Land

Two EPBC Act listed threatened species were recorded in the project site during field surveys conducted for this BDAR:

- Scrub Turpentine (*Rhodamnia rubescens*).
- Koala (*Phascolarctos cinereus*).

Individuals of other threatened fauna species could be expected to occur on the subject land periodically as part of their foraging activity and dispersal movements due to the presence of suitable habitats. However, none of these species is likely to inhabit the site on a permanent basis.

Assessment of EPBC Act listed threatened species is provided in Section 10.0.



HILLVIEW QUARRY EIS BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Threatened Species Records and Species Polygons

FIGURE 8

-  Disturbance Footprint
 -  Project Site
 -  Multi-species polygon (10.59 ha)*
 -  Threatened Microbat (Anabat record)^
- Threatened Species Recorded**
-  Eastern False Pipistrelle (*Falsistrellus tasmaniensis*)
 -  Little Lorikeet (*Glossopsitta pusilla*)
 -  Squirrel Glider (*Petaurus norfolcensis*)
 -  Varied Sittella (*Daphoenositta chrysoptera*)
 -  Scrub Turpentine (*Rhodamnia rubescens*)
 -  Koala (*Phascolarctos cinereus*)

* Species Credit Species Polygon representing: Glossy Black Cockatoo, Red Helmet Orchid, Southern Myotis, Powerful Owl, Squirrel Glider, Brush-tailed Phascogale, Koala, Common Planigale, Long-nosed Potoroo, Masked Owl, Sooty Owl

^ Anabat records comprising: Eastern False Pipistrelle, Little Bent-wing Bat, Large Bent-winged Bat, Yellow-bellied Sheath-tail-bat, Eastern Coastal Free-tailed Bat

Data Sources:
NSW Spatial Information Exchange. ESRI Basemap world imagery (May 2023).



0 250 500 m

Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:16,000 at A4
Project Number:	630.12117
Date:	25-Jun-2024
Drawn by:	JH



6.0 Identifying Prescribed Impacts

Prescribed additional biodiversity impacts (prescribed impacts) are defined under clause 6.1 of the BC Regulation. Such prescribed impacts (including direct and indirect impacts) are impacts:

- On the habitat of threatened entities including:
 - Karst, caves, crevices, cliffs, rocks and other geological features of significance.
 - Human-made structures.
 - Non-native vegetation.
- On areas connecting threatened species habitat, such as movement corridors.
- That affect water quality, water bodies and hydrological processes that sustain threatened entities (including from subsidence or upsidence from underground mining).
- On threatened and protected animals from turbine strikes from a wind farm.
- On threatened species of fauna, or fauna that are part of a TEC, from vehicle strikes.

Prescribed impact features that are identified in BAM 2020 are listed below in **Table 25** with respect to the subject land.

Table 25: Prescribed Impacts Identified

Feature	Present	Description Of Feature Characteristics and Location	Threatened Entities Associated with Habitat Feature
Karst, caves, crevices, cliffs, rocks or other geological features of significance	☐ Yes / ☒ No	n/a	n/a
Human-made structures	☐ Yes / ☒ No	No buildings or structures present	n/a
Non-native vegetation	☐ Yes / ☒ No	No planted native or exotic trees on site. No stands of plantation or other exotic vegetation on site	n/a
Habitat connectivity	☒ Yes / ☐ No	Native forest patches within the site are contiguous, in some parts of the site, with forest vegetation on adjoining land	Patches of PCT 3241 are contiguous with similar vegetation north of the subject land and within the site. A range of mobile threatened fauna, being mainly arboreal mammals, bats and birds, are likely to use this corridor of habitat for dispersal and foraging (at least periodically). Elsewhere, forest vegetation along the site entrance on Bucketts Way and along Maytoms Lane forms part of a vegetated link to the north and south. The



Feature	Present	Description Of Feature Characteristics and Location	Threatened Entities Associated with Habitat Feature
			proposed haul road will pass beside narrow riparian stands of River-flat Forest EEC along Maytoms Lane that form part of a riparian corridor that extends north along Double Creek.
Waterbodies, water quality and hydrological processes	☒ Yes / ☐ No	Watercourses downstream from proposed active quarry areas: Double Creek (and tributaries) Ephemeral tributary of Double Creek supporting dry rainforest community Farm dams and water courses receiving surface water flows from the site and surrounding land	Small linear stands of River-flat Forest EEC (PCT 3436 and PCT 3074) lining Double Creek (also identified as Sub-tropical coastal floodplain forest TEC under EPBC Act) Small patch of Lower Hunter Dry Rainforest VEC (PCT 3076) north of subject land
Wind turbine strikes (wind farm development only)	☐ Yes / ☒ No	n/a	n/a
Vehicle strikes	☒ Yes / ☐ No	n/a	Mobile threatened fauna (e.g. Sooty Owl), arboreal mammals (eg Squirrel Glider, Spotted-tail Quoll, Koala) could utilise forest corridors in eastern part of site and could be at risk of vehicle strikes on haul road during quarry operation

The list of threatened entities was generated based on site survey, habitat assessment and consideration of the habitats described for each species in the TBDC.

Potential impacts associated with prescribed impact features are discussed in Section 8.5.



STAGE 2: IMPACT ASSESSMENT

7.0 Avoid and Minimise Impacts

7.1 Avoidance Measures

The current proposed layout of the quarry and associated infrastructure has undergone an iterative design process, taking into consideration engineering, surface water, traffic and transport and biodiversity values. Avoidance of impacts on native vegetation, fauna habitats watercourses and other biodiversity values have been taken into consideration in the design.

Avoidance measures to reduce the quantum of direct impacts on biodiversity values within the project site include:

- Positioning of the subject land within the project site to place the pit and ancillary works area largely within the cleared parts of the project site (i.e. within exotic pasture grass with scattered paddock trees).
- Modifying the layout of the subject land during the design phase to reduce the amount of clearing of native vegetation required. The majority of the subject land lies within exotic grassland, which is considered to have less biodiversity value than the extant forest vegetation. Importantly, the pit shell layout was modified during the design process to *inter alia*, avoid a small patch of dry rainforest in the northern parts of the project site. In terms of alternative development footprints, an earlier version of the proposed quarry layout, showing the dry rainforest patch within the footprint, is shown in Figure 9. This patch, comprising 0.9 ha of vegetation identified as Hunter Valley Whalebone Dry Rainforest (PCT 3076), now lies outside of the subject land and will not be directly affected by vegetation clearing as part of the quarry development (see Figure 7). A 30 m buffer has been allowed around the perimeter of the rainforest patch to manage potential indirect impacts (see Section 8.4). Additionally, the revised pit shell also allows for the retention of around 2.40 ha of Lower North White Mahogany-Spotted Gum Moist Forest (PCT 3241), which lies around the rainforest patch (see Figure 7).
- Access to the subject land will be achieved by upgrade of an existing access track (as an alternative to construction along a new track alignment, which would involve substantial vegetation clearing) so that minimal clearing of native vegetation is required to allow construction of the haul road.
- Creek crossings – crossing of the haul road over Double Creek will be via a bridge and culvert structure (as opposed to at-grade crossing through the bed of the creek), which will avoid blocking of fish passage and minimise damage to riparian vegetation at this location.



HILLVIEW QUARRY EIS BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Alternative Development Footprints

FIGURE 9

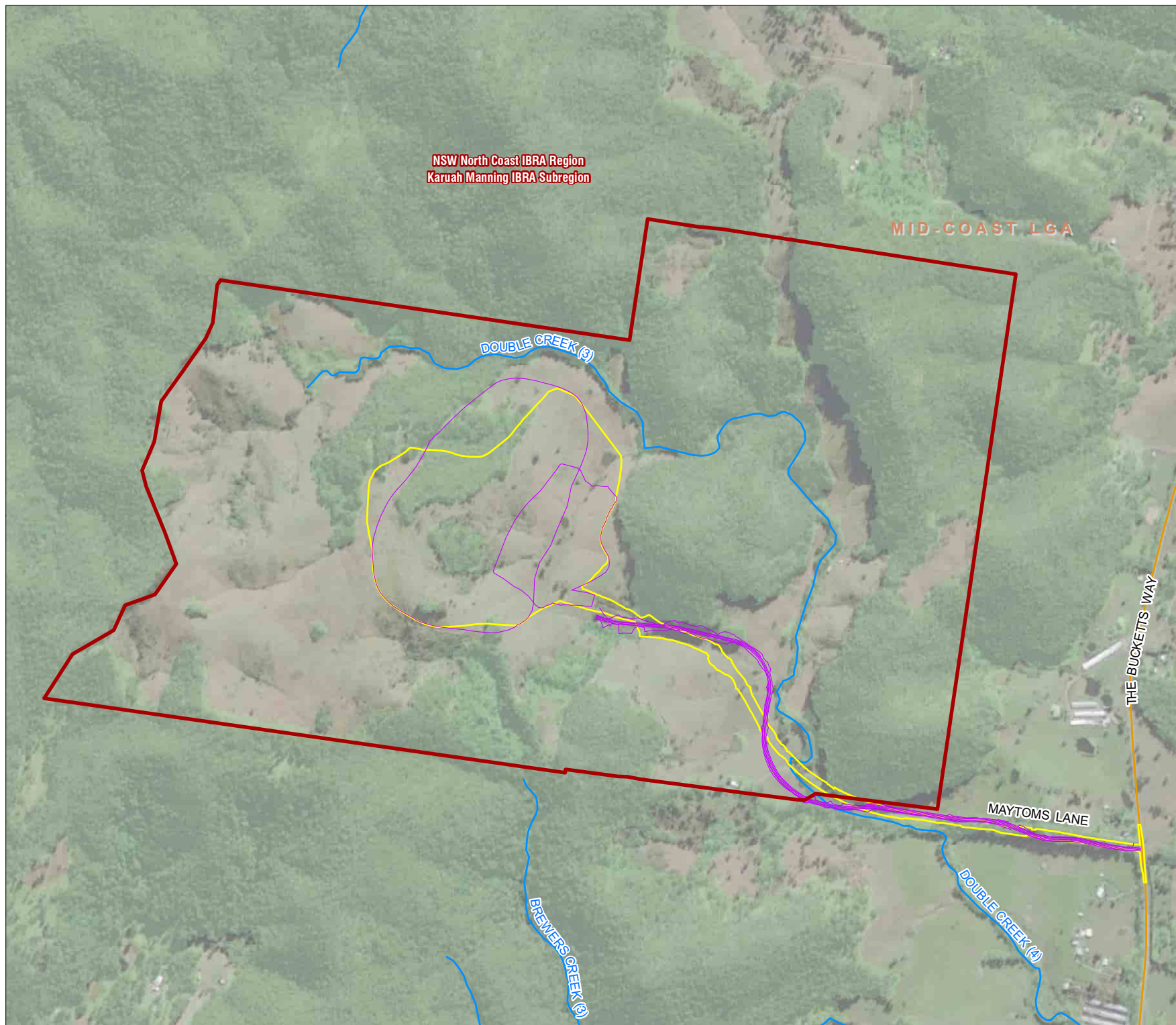
- Project Site
- Disturbance Footprint
- Local Government Area
- IBRA Region/Subregion
- Native Vegetation
- Previous Disturbance Footprint
- Watercourse
- Major Road

Data Sources:
NSW Spatial Information Exchange. ESRI Basemap
world imagery (May 2023). IBRA Regions Australian
Government Department of Agriculture, Water and the
Environment. Native vegetation State Vegetation Type
Map 2022



0 250 500
m

Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:16,000 at A4
Project Number:	630.12117
Date:	15-Sep-2023
Drawn by:	JH



7.2 Mitigation Measures – Before and During Construction Phase

The Proposal will directly remove and/or modify native vegetation and associated fauna habitats. There is also potential to impact on habitats within and adjoining the subject land indirectly through sedimentation, dust, pollution, noise and light during construction. The following mitigation measures are recommended to minimise direct and indirect impacts on biodiversity values.

A Flora and Fauna Management Plan (FFMP) will be developed following approval of the SSD application and prior to commencement that will incorporate all mitigation measures outlined in this BDAR, including timing, responsibility, and performance criteria. The FFMP will include a monitoring programme and allowance for adaptive management and response as a result of ongoing monitoring of threatened entities that could utilise the site, for which impacts are difficult to predict.

7.2.1 Erosion Control

Mitigation measures to reduce soil erosion and pollutant run-off during construction activities should include:

- Installation of erosion and sediment control measures prior to any works.
- Regular inspection of erosion and sediment control measures, particularly following rainfall events, to ensure their ongoing functionality.
- The immediate removal offsite of excavated materials.

7.2.2 Stockpiling

Mitigation measures that should be adopted during stockpiling of materials should include:

- Avoid stockpiling of materials adjacent to native vegetation, but instead use areas that are already cleared/ disturbed.
- Undertake maintenance of silt fences and other mitigation measures to isolate runoff.

7.2.3 Dust Control

Specific measures to minimise the generation of dust and associated impacts on adjacent natural environments should include:

- Setting maximum speed limits for all traffic within the subject land to limit dust generation.
- Use of a water tanker or similar to spray unpaved access tracks during the construction phase where required.
- Application of dust suppressants or covers on soil stockpiles.

7.2.4 Chemical Spill Control

Specific measures to minimise the potential for chemical spills and associated impacts on adjacent natural environments should include the following:

- All chemicals must be kept in clearly marked bunded areas.
- Regularly inspect vehicles and mechanical plant for leakage of fuel or oil.



- No re-fuelling of vehicles, washing of vehicles or maintenance of vehicles and plant to be undertaken within 20 m of natural drainage lines.

7.2.5 Fauna Management (Mortality and Injury Prevention)

Pre-Clearance Surveys

Pre-clearing surveys are to be undertaken by a suitably qualified Project Ecologist prior to commencement of any vegetation clearing activities within the subject land. The Project Ecologist will conduct pre-clearing surveys to identify:

- Resident native fauna (including threatened fauna species, where present), including nesting birds, arboreal fauna (e.g. possums, gliders, micro-bats, reptiles) occupying tree hollows and ground dwelling fauna (e.g. burrowing animals, such as wombats, bandicoots, etc.).
- Fauna species likely to be encountered during construction and potential impacts to fauna during vegetation clearing.
- Preferred locations to relocate fauna species and habitat features that can be retained following construction.

Pre-clearing surveys will take place 1-2 weeks prior to the commencement of vegetation clearing. The Project Ecologist will mark all potential fauna habitat (e.g. habitat trees, nest trees, burrows, etc.) in the development footprint with high visibility tape (e.g. trees, large woody debris and nests) and mark their locations with a hand-held GPS.

Vegetation Clearing Protocols

The following vegetation clearing protocols are to be implemented during vegetation clearing:

- A Project Ecologist is to be present on site during all vegetation clearing operations.
- Areas of vegetation outside the development footprint are to be clearly demarcated with high visibility tape to prevent accidental clearing during the construction phase.
- Vegetation should be cleared in a way that will allow fauna species living in or near the clearing site enough time to move out of the area without additional human intervention.
- No clearing should occur during the early evening or at night, as this is when fauna species are most likely to be on the move and are more vulnerable to injury.
- Habitat links must be maintained during clearing to allow fauna species to move safely from the site to adjacent areas.
- Clearing should begin in the area that is furthest from vegetation to be retained.
- The direction of clearing should also ensure that fauna species are directed away from threats such as roads, developed areas or disturbed areas.
- Sequential clearing should not create an 'island' of habitat that is isolated from adjoining habitat by roads or cleared and disturbed areas.



Habitat Tree Removal Protocols

Habitat trees shall be carefully felled under the supervision of the Project Ecologist. The following recommendations have been developed in consideration of best practise guidelines:

- All habitat trees to be cleared are to be surveyed and marked with high visibility tape prior to clearing.
- Clearing should be undertaken in the Spring period to facilitate survival of displaced animals.
- Habitat trees are to be mechanically shaken or agitated prior to felling to encourage any remaining animals to either leave the tree or show themselves and subsequently be removed by the Project Ecologist prior to felling.
- Felling will involve gently pushing the tree and lowering or felling using a forestry harvester to avoid sudden falling as this is likely to injure wildlife.
- Following felling, habitat trees will be systematically checked from the ground by the Project Ecologist for any remaining fauna.
- Felled habitat trees will be left overnight (i.e. in an adjacent habitat area if required) to allow any undetected fauna further opportunity to escape.
- If any hollow-bearing tree is found or suspected to contain any threatened species, the tree should be left in place for a minimum of two days and, if possible, be reinspected no more than two hours prior to felling.

Management of Displaced Fauna

The following recommendations apply to the management of any displaced fauna species during vegetation clearing:

- All handling of fauna species should be conducted by the Project Ecologist.
- In the event that arboreal animals do not move, or they cannot be captured because the tree hollow to be removed is too large, too high or its recovery would breach OH&S requirements then the tree will be felled (i.e. in the direction of other tree debris if possible) and animals recovered and relocated to suitable adjacent habitat.
- Animals are to be removed and relocated to the adjacent bushland/nest boxes within the Western Offset Area prior to felling or the tree shall be sectioned and dismantled under the supervision of the Project Ecologist before relocating the animals.
- Nocturnal fauna species, such as microbats, are to be 'soft released' using bat boxes placed in adjacent habitat.
- Nocturnal fauna species, such as gliders and possums, are to be secured in suitable enclosures and kept in a quiet, dark and cool environment until they can be released into suitable habitat after dark.
- If any injured fauna species are found during the construction period, construction must stop immediately so that the injured animal can be taken to a vet or wildlife carer.



7.2.6 Weed Management

Several weed species, including High Threat Weeds, were identified within the subject land. Accordingly, measures to prevent the spread of weeds should include the following hygiene procedures:

- Induction materials containing detailed information pertaining to the identification of high threat weeds should be prepared by a suitably trained ecologist or bush regenerator. These materials should be provided to contractors who will carry out construction works within the subject land.
- All vehicles, equipment, footwear and clothing should be clean and free of weed propagules prior to entering the subject land.
- Any weeds that are removed during the construction phase should be disposed of via an appropriate waste facility.

7.2.7 Monitoring and Adaptive Management

A monitoring program will be included in the FFMP that will provide for surveillance of threatened entities within retained bushland adjoining the subject land, including:

- Dry rainforest patch located north of the subject land (PCT 3076), which represents Lower Hunter Dry Rainforest VEC, and could be subject to indirect impacts and prescribed impacts (see Section 8.4 and Section 8.5.2).
- Riparian vegetation along Double Creek (PCT 3436 and 3074), which represents River-flat Foerst EEC and could be subject to indirect impacts and prescribed impacts (see Section 8.4 and Section 8.5.2)
- Vehicle strikes on mobile threatened fauna (see Section 8.5).

The monitoring program will include:

- Passive surveillance of fauna (e.g. using infra-red cameras).
- Records of fauna sightings from site staff.
- Vegetation monitoring via establishment of permanent plots (using the Ecological Monitoring Method, or EMM) at selected locations within retained vegetation adjacent to the subject land.
- Inspections of fauna habitats, including features relocated during site establishment, fauna crossing structures, nest boxes and other features.

Further discussion of adaptive management of uncertain impacts is provided in Section 7.5.



7.3 Mitigating Residual Impacts - Management Measures and Implementation

7.3.1 Mitigation Measures – Identification of Relevant Measures

Measures proposed to mitigate direct and indirect impacts on biodiversity values are identified in Section 7.2. In addition, a detailed compilation of mitigation measures is provided below in Table 26. The measures in Table 26 are taken from Section 8.4 of the BAM, noting that only measures relevant to the Project and the subject land are listed. The measures listed in this section will be included in the FFMP, as outlined in Section 7.2. The FFMP will include a monitoring programme and allowance for adaptive management and response for impacts that are difficult to predict.

Table 26: Proposed Mitigation and Management Measures for Residual Impacts (Direct and Indirect)

Mitigation Measure	Method/Technique	Timing	Frequency	Responsible Party	Likely Efficacy (Inc. Risk of Failure)
2a. Timing works to avoid critical life cycle events, such as breeding or nursing	Avoid felling of habitat trees during bird /mammal nesting/breeding season (where evidence of nesting or roosting is detected) – generally late winter to Spring	Pre-clearing survey less than one month prior to native vegetation clearing (during breeding season)	One off survey program	Project ecologist	High efficacy and low risk of failure
2b. Clearing protocols, including pre-clearing surveys, daily surveys and staged clearing, and using a trained ecologist or licensed wildlife handler during clearing events	Pre-clearing surveys, daily surveys during vegetation clearing and staged clearing for fauna generally, as well as measures for animal rescue and care.	Within one month prior to tree felling Surveys/fauna rescue to occur for duration of vegetation clearing	One off and daily during any vegetation clearing	Project ecologist	Moderate efficacy with some risk of failure
2c. Relocating habitat features (e.g. fallen timber, hollow logs) from the development or clearing site, to adjacent retained vegetation	Pre-clearance surveys to identify and relocate hollow logs and fallen timber to be salvaged for use in habitat enhancement nearby areas of retained vegetation	Pre-clearance surveys to occur within one month of native vegetation clearing and relocation to occur within one month after clearing	One off	Construction team, project ecologist	High efficacy and low risk of failure



Mitigation Measure	Method/Technique	Timing	Frequency	Responsible Party	Likely Efficacy (Inc. Risk of Failure)
3a. Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance	Flora and Fauna Management Plan to incorporate clearing protocol including: • Identification of vegetation to be retained vs removed • Installation of protective fencing and sediment fencing prior to clearing commencement • Clearing direction from existing pit of to the boundary fence side of site (vegetation) • Clearing to be staged so that only areas required to be cleared for upcoming quarrying activities are cleared at a time.	During any vegetation clearance	One off during any site clearing activities	Construction team, project ecologist	High efficacy and low risk of failure
3d. Using adaptive dust management and monitoring programs to control air quality	Dust mitigation measures to manage dust including setting maximum speed limits, use of dust suppressants and limiting soil exposure and truck movements during high winds	Construction and operation	One off	Construction team, project ecologist	High efficacy and low risk of failure
3e. Scheduling the timing of construction activities to avoid impacts (e.g. timing the construction for when migratory species are not at the site, or when particular species known to, or likely to use the habitat on the site, are not breeding or nesting)	Avoid tree felling activities during bird nesting / mammal breeding season. Pre-clearing surveys	Late winter to summer, generally.	Prior to construction monthly site surveys during construction	Construction team, ecologist	High efficacy and low risk of failure



Mitigation Measure	Method/Technique	Timing	Frequency	Responsible Party	Likely Efficacy (Inc. Risk of Failure)
3f. Erecting temporary fencing to protect significant environmental features, such as native vegetation and riparian zones	Temporary fencing to be installed around retained native vegetation areas	Prior to commencement of construction	One off	Proponent, construction team, ecologist	High efficacy and low risk of failure
3g. Using hygiene protocols to prevent the spread of weeds or pathogens between infected and uninfected areas	Truck wheel wash at entrance to quarry. Flora and Fauna Management Plan to include hygiene protocols to prevent the spread of weeds and pathogens	Construction and operation	Duration of construction and operation	Project ecologist	High efficacy and low risk of failure
3h. Training staff and conducting site briefings to communicate environmental features to be protected and measures to be implemented	Site briefings for quarry staff identifying areas of retained native vegetation, threatened entities and monitoring activities	Construction	Duration of construction	Project ecologist Construction	High efficacy and low risk of failure
3i. Preparing a vegetation management plan to regulate activity in vegetation and habitats adjacent to residential developments.	Flora and Fauna Management Plan to be prepared to manage impacts on fauna during construction, as well as indirect impacts on retained vegetation and habitats surrounding quarry pit, prescribed impacts and uncertain impacts	Prior to commencement of construction	One off	Project , ecologist	High efficacy and low risk of failure
3j. Providing for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on, or adjacent to, the development or clearing site	Flora and Fauna Management Plan	Prior to commencement of construction	One off	Project , ecologist	High efficacy and low risk of failure



Mitigation Measure	Method/Technique	Timing	Frequency	Responsible Party	Likely Efficacy (Inc. Risk of Failure)
Nest boxes	Install nest boxes within suitable host trees within areas of retained native vegetation on -site to replace tree hollows removed	Prior to commencement of construction	One off, with ongoing monitoring as per FFMP	Project , ecologist	High efficacy and moderate risk of failure



7.3.2 Mitigation Measures – Monitoring and Evaluation

In relation to the mitigation measures identified for the Proposal in Table 26, further details on monitoring and evaluation of each measure are provided in Table 27.

Table 27: Implementation and Monitoring of Mitigation Actions

Measure/Action	Monitoring And Evaluation Strategy (Data, Frequency, Timing and Reporting)	Performance Criteria (Linked to Monitoring and Evaluation Strategy)	Adaptive Management Threshold (Trigger for Adaptive Management Plan/Actions)	Adaptive Management Response (When triggered)
Undertake ecological pre-clearance surveys of native vegetation areas 2a	Survey once prior to construction commencement. Details and outcomes reported in pre-clearance report.	No fauna deaths recorded during clearing activities	Pre-clearance surveys detect evidence of breeding (nest)	Where evidence of breeding detected, postpone clearing and instigate fauna rescue and relocation plan
Vegetation clearing is to be staged (e.g. only one hectare is cleared at a time and allowing one week between clearing each hectare) 2b	Staged clearing areas to be mapped and works documented in post-construction report.	No whole site clearing	n/a	n/a
No clearing should occur during the early evening or at night, when nocturnal fauna species are most likely to be active 2a	Time of clearing to be documented post-construction report.	No clearing in evening hours (Note: quarry activities during the operational phase will be during daylight hours only, eight hours per day)	n/a	n/a
The direction of clearing should also ensure that fauna species are directed away from threats such as roads, developed areas or disturbed	Staged clearing areas to be mapped and numbered consecutively to allow for clearing to begin at disturbance end. Clearing	No fauna deaths due to clearing towards hazards	n/a	n/a



Measure/Action	Monitoring And Evaluation Strategy (Data, Frequency, Timing and Reporting)	Performance Criteria (Linked to Monitoring and Evaluation Strategy)	Adaptive Management Threshold (Trigger for Adaptive Management Plan/Actions)	Adaptive Management Response (When triggered)
areas (e.g. clearing direction from road at west end of site to vegetation at east end of the subject land) 2b, 3a	works to be documented in post-construction report.			
Supervision of tree felling – project ecologist or licensed wildlife handler is on-site during all native vegetation clearance 2b	Daily during native vegetation clearing. Details and outcomes reported in post-clearance report.	No fauna deaths recorded during clearing activities	Wildlife injured during site clearing	Displaced animals to be captured and relocated to nearby bushland (subject to landowner approval); Trees containing wildlife shall be sectioned and dismantled before relocating the animals. Injured animals to be captured and rehabilitated before being returned to nearby bushland.
Pre-clearance survey of vegetation within subject land to identify suitable habitat features for salvage (e.g. tree hollows, nests, fallen timber or hollows logs) 2b	Once within one month prior to native vegetation clearing. Habitat features are to be mapped and documented in pre-clearance report.	Suitable habitat features identified by project ecologist	n/a	n/a
Relocation and placement of salvaged habitat features into retained bushland on the subject land 2c	Once during site clearing or as needed. Relocated habitat features to be mapped and documented in post-clearance report.	Suitable habitat features re-located under supervision of project ecologist	n/a	n/a



Measure/Action	Monitoring And Evaluation Strategy (Data, Frequency, Timing and Reporting)	Performance Criteria (Linked to Monitoring and Evaluation Strategy)	Adaptive Management Threshold (Trigger for Adaptive Management Plan/Actions)	Adaptive Management Response (When triggered)
Identify and mark areas of vegetation to be retained outside of the subject land with temporary chain mesh fencing lined with sediment fencing 3a	Survey of protective measures undertaken preconstruction commencement. Protective measures to be photographed and documented in pre-construction report.	No accidental clearing of areas of native vegetation that have been identified for retention	Accidental clearing outside (development footprint) occurs	Rehabilitate area with native vegetation as soon as practicable after disturbance
Set maximum speed limits for all traffic within the subject land to limit dust generation 3d	Inspect retained vegetation for evidence of dust and document outcome in post-construction report	No obvious dust accumulations on retained vegetation	Dust accumulation detected on adjoining vegetation, continue to monitor until reduction evident	Construction team to adjust dust management measures, continue to monitor until reduction evident
Use water tanker and spray unpaved access tracks during the construction phase where required 3d	Inspect retained vegetation for evidence of dust and document outcome in post-construction report	No obvious dust accumulations on retained vegetation	Dust accumulation detected on adjoining vegetation, continue to monitor until reduction evident	Construction team to adjust dust management measures, continue to monitor until reduction evident
Apply dust suppressants or covers on soil stockpiles 3d	Inspect retained vegetation for evidence of dust and document outcome in post-construction report	No obvious dust accumulations on retained vegetation	Dust accumulation detected on adjoining vegetation, continue to monitor until reduction evident	Construction team to adjust dust management measures, continue to monitor until reduction evident
Pre-clearing surveys of retained native vegetation for evidence of breeding / nesting 3e	Once prior to commencement of tree felling (vegetation clearing) activities early in the construction phase construction activities	No impacts to breeding and/or nesting activities	Pre-clearance surveys detect evidence of nesting/breeding	Where pre-clearance surveys detect evidence of nesting or breeding, delay construction during to end of breeding season. Survey to detect nest tree and investigate methods to reduce impacts



Measure/Action	Monitoring And Evaluation Strategy (Data, Frequency, Timing and Reporting)	Performance Criteria (Linked to Monitoring and Evaluation Strategy)	Adaptive Management Threshold (Trigger for Adaptive Management Plan/Actions)	Adaptive Management Response (When triggered)
Temporary fencing - areas of vegetation outside of the subject land are to be clearly demarcated with temporary chain mesh fencing to prevent accidental clearing during the construction phase 3f	Inspect and photograph fencing adequacy and document in pre-construction report. Inspection prior to construction commencement and during construction.	Fencing remains adequate for duration of construction works. No incidental clearing of retained native vegetation.	Fencing not adequate (may become damaged). Accidental clearing occurs.	Construction team to adjust fencing as required. Rehabilitate area with native vegetation as soon as practicable after disturbance
Weed management - all vehicles, equipment, footwear and clothing should be clean and free of weed propagules prior to entering the construction site 3g Construct truck wheel wash at site entrance 3g	Six-monthly weed survey of retained vegetation during construction. Outcomes documented in post-clearing report. Ongoing vegetation monitoring during operation documented in Flora and Fauna Management Plan reporting.	No increase in diversity or cover of weeds (including HTEs) in retained native vegetation	Weeds are detected in higher numbers (new species, HTEs, outbreaks, expansion of extent) retained native vegetation	Bush regeneration contractor to be engaged to undertake weed removal
Weed management - any weeds removed during construction phase should be disposed of appropriately 3g	Six monthly weed survey of retained vegetation during construction. Outcomes documented in post-clearing report. Ongoing vegetation monitoring during operation documented in Flora and Fauna Management Plan reporting.	No increase in diversity or cover of weeds (including HTEs) in retained native vegetation	Weeds are detected in higher numbers (new species, HTEs, outbreaks, expansion of extent) retained native vegetation	Bush regeneration contractor to be engaged to undertake weed removal



Measure/Action	Monitoring And Evaluation Strategy (Data, Frequency, Timing and Reporting)	Performance Criteria (Linked to Monitoring and Evaluation Strategy)	Adaptive Management Threshold (Trigger for Adaptive Management Plan/Actions)	Adaptive Management Response (When triggered)
On-site briefings - sensitive environmental areas (i.e. retained vegetation) are to be identified and communicated to quarry staff (and contractors) prior to start of work 3h	Inspections of retained native vegetation every 6 months during construction to ensure no stockpiling or rubbish dumping is occurring. Outcomes documented in post-clearing report.	No evidence of construction staff impacting the retained native vegetation areas	Evidence of staff impacting retained native vegetation	Construction team to rehabilitate impacted areas (e.g. remove waste, repair fence) and undertake additional environmental site briefings. Additional measures such as signage to be considered.
Flora and Fauna Management Plan to be implemented for retained vegetation within the site 3i, 3j	Vegetation and fauna monitoring to be included in plan (FFMP) with annual reporting	Flora and Fauna Management Plan implemented, and monitoring activities commenced	n/a	n/a
Vegetation Management Plan is to ensure weed removal and planting works over a minimum of three years 3i, 3j	Annual vegetation monitoring including weed survey and review of planting to monitor vegetation for 3 years post-construction. Outcomes to be reported annually.	Vegetation monitoring detects low level of weeds and high success rate of plant survival	Weeds occurring and plantings not surviving	Additional efforts required for weed removal
Vegetation Management Plan will aim to monitor retained vegetation against benchmark values (refer BioNet Vegetation Classification) 3i, 3j	Annual vegetation monitoring including BAM plots, to monitor vegetation for 3 years post-construction. Outcomes to be reported annually.	Vegetation monitoring detects minimal change to vegetation condition	Vegetation monitoring detects reduction in vegetation condition	Additional on-site activities to improve vegetation condition (e.g. increase weed removal activities, additional planting, additional fencing, etc)



Measure/Action	Monitoring And Evaluation Strategy (Data, Frequency, Timing and Reporting)	Performance Criteria (Linked to Monitoring and Evaluation Strategy)	Adaptive Management Threshold (Trigger for Adaptive Management Plan/Actions)	Adaptive Management Response (When triggered)
Nest boxes	Annual inspection of nest boxes (installed within trees within the Project Site); record photos and notes on (i) condition of box (ii) evidence of habitation (iii) resident fauna (iv) pest species	Box in working order and attachment to host tree secure No pest species	Box damaged and/or attachment failing; Box detached from host tree Box occupied by pest species	Replace lost or damaged boxes; Remove pest species or destroy box and replace with new box



7.4 Mitigation of Prescribed Impacts

The identification of suitable and relevant mitigation measures for prescribed impacts is summarised in Table 28. Measures are derived from those listed in Section 8.4.2 of the BAM.

Table 28: Mitigation Measures for Prescribed Impacts

Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy (including risk of failure)	MNES (when relevant)
1a. Scheduling the timing of construction activities to avoid critical life cycle events (e.g. timing construction activities to avoid migratory species on site, or using the site)	n/a	n/a	n/a	n/a	n/a	n/a
1b. Instigating clearing protocols, including pre-clearing surveys, daily surveys and staged clearing, and using a trained ecologist or licensed wildlife handler during clearing, construction and maintenance activities for human-made structures and non-native vegetation	n/a	n/a	n/a	n/a	n/a	n/a
1c. Retaining habitat features (e.g. fallen timber, hollow logs, rocks) within the subject land, or relocating them to adjacent retained remnant vegetation	n/a	n/a	n/a	n/a	n/a	n/a
1d. Installing artificial connectivity measures (e.g. glider poles, rope crossings, habitat bridges) to re-establish connections between habitat and favoured transport corridors	Design culvert for haul road crossing of Double Creek to allow ground fauna movement (e.g. Koalas) through culvert Speed limits and Go Slow zones along haul road to	Construction phase	One off	Project civil engineer (design of culvert) Project Ecologist	Moderate	Koala, Spotted-tail Quoll



Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy (including risk of failure)	MNES (when relevant)
	minimise risk of vehicle strike within potential fauna movement corridors.					
1e. Erecting temporary fencing to protect significant environmental features, such as karst, caves, rock outcrops and water bodies	Install temporary fencing along haul road during site establishment to minimise risk of vehicle strikes Koala exclusion (floppy top) fencing	Operation	One off	Construction contractor	Moderate	Koala, Spotted-tail Quoll
1f. Replacing habitat provided by human-made structures and non-native vegetation with alternative habitat	n/a	n/a	n/a	n/a	n/a	n/a
1g. Using sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Proposed development to incorporate sediment barriers and sediment ponds, where recommended by engineer	Construction and operation	One off	Construction contractor	High efficacy and low risk of failure	n/a
1h. Training staff and conducting site briefings to communicate environmental features to be protected and the measures implemented to protect them	Flora and Fauna Management Plan to include site briefings identifying threatened fauna	Prior to construction	One off	Construction contractor Project Ecologist	High efficacy and low risk of failure	n/a



Mitigation measure	Method/technique	Timing	Frequency	Responsibility	Likely efficacy (including risk of failure)	MNES (when relevant)
	at risk of vehicle strike.					
1i. Ecological restoration, rehabilitation actions and/or maintenance of retained native vegetation on, or adjacent to, the subject land	n/a	n/a	n/a	n/a	n/a	n/a
1j. Development control measures that regulate the types of activities that can occur in native vegetation and habitat adjacent to residential development	n/a (no adjoining residential development)	n/a	n/a	n/a	n/a	n/a
Waterbodies, Water Quality and Hydrological Processes: - FFMP - Monitoring Programme, adaptive management and TARP for TECs	Implement monitoring of retained TEC vegetation to ensure no long-term decline in ecosystem processes and condition, within Lower Hunter Dry Rainforest VEC and River-flat Forest EEC Include performance criteria and TARP in FFMP	Prior to construction	Annual	Project Ecologist	High	Scrub Turpentine within patch of Lower Hunter Dry Rainforest VEC Subtropical coastal floodplain forest TEC along Double Creek

The implementation of relevant mitigation measures for prescribed impacts is summarised in Table 29.



Table 29: Prescribed Impacts: Implementation of Mitigation Measures

Measure/Action	Monitoring And Evaluation Strategy (Data, Frequency, Timing and Reporting)	Performance Criteria (Linked to Monitoring and Evaluation Strategy)	Adaptive Management Threshold (Trigger for Adaptive Management Plan/Actions)	Adaptive Management Response (When triggered)
1d. Installing artificial connectivity measures (e.g. glider poles, rope crossings, habitat bridges) to re-establish connections between habitat and favoured transport corridors	Design	Evidence of fauna using culvert or other structures	Evidence of fauna mortality (road kills)	Re-evaluate culver design
1e. Erecting temporary fencing to protect significant environmental features, such as karst, caves, rock outcrops and water bodies (and threatened fauna movements)	Passive surveillance	No evidence of fauna crossing haul road	Evidence of fauna mortalities on haul road	Increase surveillance; Adjust, repair or increase fencing Adapt vehicle movement limits
1g. Using sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Inspections of creeks & sediment controls	Sediment barriers functioning; Low sediment load in receiving waters on site	Sediment barriers failing; High turbidity in receiving waters	Replace or repair sediment barriers
1h. Training staff and conducting site briefings to communicate environmental features to be protected and the measures implemented to protect them	At commencement of construction	Briefings complete	n/a	Na/
Ecologists to be present during dam de-watering activities	One off survey for duration of dam de-watering to rescue displaced animals	Minimise aquatic fauna mortality	Threatened species detected in prescribed impact features	Delay demolition if breeding evidence is detected



Measure/Action	Monitoring And Evaluation Strategy (Data, Frequency, Timing and Reporting)	Performance Criteria (Linked to Monitoring and Evaluation Strategy)	Adaptive Management Threshold (Trigger for Adaptive Management Plan/Actions)	Adaptive Management Response (When triggered)
Monitoring of fauna movements through potential corridors	Install camera traps at selected locations to observe fauna movements	Fauna detected moving across haul road and/or through project site	Road kills – native fauna (inc. threatened species) recorded on haul road	Amend speed limits, daily truck movements and timing
Waterbodies, Water Quality and Hydrological Processes – Monitoring and adaptive management for retained TECs associated with creeks	Ecological monitoring programme as part of FFMP Monitoring of Lower Hunter Dry Rainforest VEC and River-flat Forest EEC	BAM condition criteria – composition and structure maintained in TEC vegetation Vegetation integrity (VI) score in TEC vegetation Other EMM (Ecological Monitoring Module) criteria as relevant	Reduction in composition and structure scores Reduction in VI score Reduction in water table (from groundwater monitoring data)	Re-evaluate quarry extent and/or quarrying activities Review groundwater monitoring data and water table in synch with vegetation monitoring Review climatic data



7.5 Adaptive Management of Uncertain Impacts

An adaptive management plan can be used to address impacts that are infrequent or difficult to measure. These include indirect or prescribed impacts, or other remaining biodiversity impacts. The proponent must develop an adaptive management plan to address any remaining impacts where mitigation measures have not been proposed. In the case of the Project, the indirect and prescribed impacts on adjacent vegetation and fauna that will require adaptive management measures are:

- Changes to hydrological regime for dry rainforest patch (Hunter Valley Whalebone Dry Rainforest, PCT 3076), which represents Lower Hunter Dry Rainforest VEC, as listed under the BC Act. The potential indirect impacts on this community, which lies outside of the development footprint, but within the site (indirect impact, see Section 8.4).
- Vehicle strikes on mobile threatened fauna (prescribed impact, see Section 8.5).

To minimise the risk of ongoing or long-term adverse effects on these two threatened entities, a 'Trigger-Action-Response-Plan' (TARP) will be included in the FFMP. The TARP will be based on monitoring results and data collected as part of ecological monitoring conducted prior to and during the construction and operation phases of the Project. The TARP will set out performance criteria, which will be related to the condition of vegetation in the dry rainforest patch and the number of animal sightings and collisions (if any) along the haul road, and associated actions and responses when criteria meet certain thresholds. The TARP will be updated as necessary over the implementation period of the FFMP.

Additionally, adaptive management responses are listed, where applicable, in Table 27. These will be included in the TARP and FFMP.

Other indirect impacts are likely to be minor in nature and limited in extent and/or will be sufficiently mitigated and managed by implementing measures outlined in this BDAR. Additionally, no other prescribed impacts or other residual impacts are predicted to occur.



8.0 Impact Assessment

8.1 Serious and Irreversible Impacts (SII)

8.1.1 Overview

The BDAR must contain details of the assessment of SII, in accordance with the criteria set out in Subsection 9.1 of the BAM. All criteria must be addressed for each TEC or threatened species at risk of an SII and likely to be impacted by the Project.

No TECs recorded on site are listed as SII entities.

One threatened species assumed present on the subject land, the Sooty Owl, listed as Vulnerable under the BC Act, is considered an SII entity. The Sooty Owl was not recorded on the subject land, but due to the presence of suitable habitat, it's listing in the BAM-C as a candidate species requiring survey, and the fact that surveys were not conducted within the nominated survey period, this species has been assumed present within the subject land and species credits have been calculated to offset the loss of suitable habitat as part of the Project (see Section 5.6). Impacts on the habitat of the Sooty Owl as an SII entity, being the species polygon, are shown in Figure 10.

Criteria (BAM Subsection 9.1.2) for threatened species at risk of an SII present on the subject land are addressed for the Sooty Owl in the following section.

8.1.2 Sooty Owl

General

A medium-sized owl to 45 cm long, with dark eyes set in a prominent flat, heart-shaped facial disc. Dark sooty-grey in colour, with large eyes in a grey face, fine white spotting above and below, and a pale belly.

Occurs along the coast, coastal escarpment and eastern tablelands. Territories are occupied permanently. Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests.

Roosts by day in the hollow of a tall forest tree or in heavy vegetation; hunts by night for small ground mammals or tree-dwelling mammals such as the Common Ringtail Possum (*Pseudocheirus peregrinus*) or Sugar Glider (*Petaurus breviceps*).

Measures to Avoid Impacts

See Section 7.0 for avoidance measures taken in the design of the subject land layout.

Current Population

There is no evidence (based on surveys conducted to date) that the Sooty Owl resides on the subject land, and suitable breeding hollows (>20 cm diameter, >4 m above ground) are very limited on site. Other habitat constraints noted in the TBDC for the Sooty Owl are caves, cliffs and escarpments (including cliff lines/edges), which are features not present on the site.

In terms of the criteria in Section 9.1.2 of the BAM:

- There is no data available for evidence of 'rapid decline' in population size.
- There is no data readily available to support evidence of 'small population size', although it can be assumed that small populations exist in the North Coast region, given breeding pairs occupy home ranges of around 2000 ha.



- Evidence of limited geographic range for the threatened species.
- Evidence that the species is unlikely to respond to management. In this regard the TBDC notes the Sooty Owl has a 'Very High Sensitivity to Gain'.

Impact on Geographic Range

The Proposal is not likely to affect the area of geographic range of the Sooty Owl (if present in the locality).

Overall, there is limited evidence for the Sooty Owl on the subject land and based on the limited availability of roosting hollows, is unlikely to breed on site. There is limited readily available data on local size and distribution of local or regional populations. Regardless, the impact of the Project on the Sooty Owl is assessed as a loss of potential foraging (hunting) habitat, given the presence of forest vegetation and cleared areas that are likely to contain prey species (e.g. Ringtail Possum, Sugar Glider and small ground mammals). The species polygon for the Sooty Owl takes this foraging habitat into consideration (see Section 8.3.2).

8.2 Residual Direct Impacts

The Proposal will require the removal of 10.59 ha of native vegetation and associated fauna habitat, including 11 hollow-bearing trees. Direct residual impacts on native vegetation (by PCT) within the subject land as a result of the Proposal, after steps are taken to avoid and minimise impacts, as follows:

- Lower North White Mahogany-Spotted Gum Moist Forest (8.1 ha).
- Northern Hinterland Tallowwood-Forest Oak Grassy Forest (0.7 ha).
- Hunter Coast Sandy Creekflat Low Paperbark Scrub (1.3 ha).
- Hunter Coast Lowland Grey Myrtle Wet Forest (0.49 ha).

The biodiversity offsets required (under the BAM) to compensate for the loss of the above vegetation are detailed in Section 0 below.

Table 30: Summary of Residual Direct Impacts

Direct Impact	BC Act Status	EPBC Act Status	SAIL Entity	Project Phase	Extent (Ha)
Lower North White Mahogany-Spotted Gum Moist Forest	-	-	-	Staged	8.1
Northern Hinterland Tallowwood-Forest Oak Grassy Forest	-	-	-	Staged	0.7
Hunter Coast Sandy Creekflat Low Paperbark Scrub	EEC	VEC	-	Staged	1.3
Hunter Coast Lowland Grey Myrtle Wet Forest	EEC	-	-	Staged	0.49
				Total	10.59



8.3 Impacts Requiring an Offset

Impacts requiring an offset, as calculated using the BAM, are described in this section and their location depicted in Figure 10.

8.3.1 Impacts on Native Vegetation (Ecosystem Credits)

The removal of native vegetation as part of the Proposal is a residual impact that cannot be avoided or mitigated and so under the BAM, it must be offset. The BAM (section 9.2.1) identifies thresholds for assessment and offsetting impacts based on the VI scores of the vegetation, as follows:

- ≥ 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.
- ≥ 20 , where the PCT does not represent a TEC and is not associated with threatened species habitat.

The vegetation to be removed comprises vegetation zones that are not representative of a TEC, but represent potential habitat for a selection of threatened species (PCT 3241 and PCT 3254), as well as TEC vegetation (PCT 3436 and PCT 3074, being associated with River-flat Forest EEC). Accordingly, the VI threshold for offsetting impacts on vegetation zones 1 and 2 is ≥ 15 and for zone 3 and 4 is ≥ 17 . The VI scores for the vegetation zones to be impacted range from 28.7 to 68.7, as shown below in Table 31, and so an offset is required for all vegetation zones.

8.3.2 Impacts on Candidate Species (Species Credits)

Fauna habitat removal will mainly consist of the removal of 10.59 ha of native forest vegetation and the removal of 11 hollow-bearing trees. This habitat is considered to be suitable for a range of vertebrate fauna species, including arboreal and terrestrial mammals, microbats, reptiles, amphibians and birds.



Table 31: Impacts that Require an Offset – Ecosystem Credits (by Veg Zone)

Veg Zone	Veg Zone Code	PCT Name	TEC	Impact Area (Ha)	Current VI Score	Change In VI Score	Offset VI Threshold	Risk Weight	SAIL	Ecosystem Credits Required
1	3241_Mod-good	Lower North White Mahogany-Spotted Gum Moist Forest	-	8.1	68.7	68.7	17	1.5	-	208
2	3254_Mod-good	Northern Hinterland Tallowwood-Forest Oak Grassy Forest	-	0.7	48.7	48.7	17	1.5	-	13
3	3436_Mod-good	Hunter Coast Sandy Creekflat Low Paperbark Scrub	Y	1.3	28.7	28.7	15	1.75	-	17
4	3074_Mod-good	Hunter Coast Lowland Grey Myrtle Wet Forest	Y	0.49	67.6	67.6	15	1.5	-	12
Total Ecosystem Credits:										250



The removal of native forest vegetation as part of the construction of the Proposal will generate a requirement for offsetting impacts on threatened species habitat. Offsetting in the form of species credits will be required for the following candidate species:

- South-eastern Glossy Black-Cockatoo (assumed present).
- Red Helmet Orchid (assumed present).
- Barking Owl (assumed present).
- Powerful Owl (assumed present).
- Squirrel Glider (recorded on site).
- Brush-tailed Phascogale (assumed present).
- Koala (recorded on site).
- Common Planigale (assumed present).
- Long-nosed Potoroo (assumed present).
- Masked Owl (assumed present).
- Sooty Owl (assumed present).

The BAM-C was used to determine the offset obligation for the removal habitat for species credit species. The BAM-C determined that 331 species credits for 11 of the threatened species, with 496 credits required for the Sooty Owl, would be required to meet the offset obligation, as presented in Table 32.

One species credit entity, the Sooty Owl, is listed as a potential SAIL entity.

Table 32: Species Credits for Threatened Species

Species Credit	BC Act Status	EPBC Act Status	SAIL	Impact Area (Ha)	Species Credits
<i>Calyptorhynchus lathami lathami</i> / South-eastern Glossy Black-Cockatoo (Fauna)	Vulnerable	Vulnerable	No	10.59	331
<i>Corybas dowlingii</i> / Red Helmet Orchid (Flora)	Endangered		No	10.59	331
<i>Ninox connivens</i> / Barking Owl (Fauna)	Vulnerable		No	10.59	331
<i>Ninox strenua</i> / Powerful Owl (Fauna)	Vulnerable		No	10.59	331
<i>Petaurus norfolcensis</i> / Squirrel Glider (Fauna)	Vulnerable		No	10.59	331
<i>Phascogale tapoatafa</i> / Brush-tailed Phascogale (Fauna)	Vulnerable		No	10.59	331
<i>Phascolarctos cinereus</i> / Koala (Fauna)	Endangered	Endangered	No	10.59	331
<i>Planigale maculata</i> / Common Planigale (Fauna)	Vulnerable		No	10.59	331
<i>Potorous tridactylus</i> / Long-nosed Potoroo (Fauna)	Vulnerable	Vulnerable	No	10.59	331
<i>Tyto novaehollandiae</i> / Masked Owl (Fauna)	Vulnerable		No	10.59	331
<i>Tyto tenebricosa</i> / Sooty Owl (Fauna)	Vulnerable		Yes	10.59	496



8.4 Indirect Impacts

Residual indirect impacts that are identified in the BAM as potentially occurring on development sites are listed in Table 33. Indirect impacts can affect retained vegetation and habitats on a development site, as well as downstream riparian ecosystems. Potential indirect impacts on native vegetation, threatened ecological communities and threatened entities (and their habitats) beyond the subject land are identified in Table 33.

Potential indirect impacts on native vegetation and habitat could occur during the construction and operational phases of the Proposal. Such impacts may include the following:

- Increased traffic and visitation within the subject land during construction and operation may facilitate the spread of weeds that could further degrade native vegetation in surrounding areas.
- Pollution such as chemical spills from construction machinery may have adverse effects on native vegetation, fauna and the wetland occurring west of the subject land.
- Ground disturbance by machinery during the construction phase may create dust and facilitate the movement of water-borne sediment. Sedimentation could adversely affect the surrounding vegetation and aquatic habitat.
- Increased noise by vehicles, machinery and increased human visitation may disrupt the natural behaviour of fauna species (if and where present) during the construction phase.
- Light spill from artificial lighting during the construction phase or operational phase may adversely affect the natural behaviour of nocturnal fauna species such as arboreal mammals, large forest owls and foraging microbats.
- Changes to hydrology and groundwater that could affect ecosystem processes on retained vegetation and habitat quality adjacent to or downstream of the subject land.

Mitigation measures are presented in Section 7.2 to reduce the risk of indirect impacts (and their severity and duration) on retained biodiversity values within the project site.



Table 33: Summary of Residual Indirect Impacts

Indirect Impact	Impacted Entities [#]	Extent (Ha or Zone Reference)	Frequency	Duration	Project Phase/ Timing Of Impact	Likelihood And Consequences
2a. Inadvertent impacts on adjacent habitat or vegetation	Native vegetation and associated general fauna habitats	5-10 m from pit edge	Daily for the duration of construction (6 months to 2 years). Sporadically during operation.	Long-term	Construction and operation	Low likelihood of occurring provided exclusion fencing is in place prior to construction. Disturbance and damage to adjacent vegetation and disturbance to resident fauna; reduction in quality of adjacent vegetation and habitats
2b. Reduced viability of adjacent habitat due to edge effects	Native vegetation and associated general fauna habitats	5-10 m from pit edge	Daily for the duration of construction (6m to 2yr). Sporadically during operation.	Long-term	Construction and operation	Low likelihood of occurring; could impact condition of retained vegetation and habitats
2c. Reduced viability of adjacent habitat due to noise, dust or light spill	Native vegetation and associated general fauna habitats	5-10 m from pit edge	Daily for the duration of construction and operation.	Long-term	Construction and operation	Dust likely to be deposited in vegetation adjacent to haul roads and quarry pit, extending over approximately 5-10 m. Moderate likelihood of occurring; could reduce quality of habitats for foraging and breeding activities of local or resident fauna. Note: no night works are proposed, so light spill is not a relevant impact on adjacent habitats within the quarry.



Indirect Impact	Impacted Entities [#]	Extent (Ha or Zone Reference)	Frequency	Duration	Project Phase/ Timing Of Impact	Likelihood And Consequences
2d. Transportation of weeds and pathogens from the site to adjacent vegetation	Native vegetation and associated general fauna habitats	All areas of adjoining vegetation	Monthly	Long-term	Construction and operation	Moderate likelihood of occurring and could result in a reduction in native flora diversity and increase in cover and diversity of weeds (including high threat weeds, HTWs), and function of the retained vegetation
2e. Increased risk of starvation or exposure, and loss of shade or shelter	Local hollow dependent fauna, mainly arboreal mammals, bats and birds displaced by clearing works	2.2 ha	One off	Short term	Construction	Low likelihood Tree removal could result in temporary reduction in availability of foraging habitat, but unlikely to cause starvation in local fauna populations
2f. Loss of breeding habitat	Local hollow dependent fauna, mainly arboreal mammals, bats and birds displaced by clearing works	2.2 ha	One off	Short term	Construction	Low likelihood Noise and activity from quarry operations could disrupt breeding activity adjacent to active work areas, but unlikely to cause loss of breeding habitat
2g. Trampling of threatened flora species	n/a	n/a	n/a	n/a	n/a	Negligible No threatened plants recorded on site and none like to be present in adjacent habitats



Indirect Impact	Impacted Entities [#]	Extent (Ha or Zone Reference)	Frequency	Duration	Project Phase/ Timing Of Impact	Likelihood And Consequences
2h. Inhibition of nitrogen fixation and increased soil salinity	n/a	n/a	n/a	n/a	n/a	n/a
2i. Fertiliser drift	n/a	n/a	n/a	n/a	n/a	n/a
2j. Rubbish dumping	Native vegetation and associated general fauna habitats	2.5 ha	Potentially daily or weekly	Long term	Construction and operation	Low likelihood Could result in reduced vegetation and habitat condition Risk of rubbish dumping higher during construction; no evidence of rubbish on site during current investigation.
2k. Wood collection	Native vegetation and associated general fauna habitats	Within retained vegetation around periphery of site	Potentially every few months or years	Long term	Construction and operation	Low likelihood of occurring Could result in reduced extent and condition of vegetation and habitats
2l. Removal and disturbance of rocks, including bush rock	n/a	n/a	n/a	n/a	n/a	n/a
2m. Increase in predators	n/a	n/a	n/a	n/a	n/a	n/a
2n. Increase in pest animal populations	n/a	n/a	n/a	n/a	n/a	n/a
2o. Changed fire regimes	n/a	n/a	n/a	n/a	n/a	n/a
2p. Disturbance to specialist breeding and foraging habitat (e.g. beach nesting for shorebirds).	n/a	n/a	n/a	n/a	n/a	n/a

PCT/threatened entity (and their habitats) and where relevant, EPBC Act listing



8.5 Prescribed Impacts

Prescribed impact features identified on the subject land and as relevant to the Proposal in Section 6.0 are:

- Areas connecting threatened species habitat, such as movement corridors.
- Activities that affect water quality, water bodies and hydrological processes that sustain threatened entities.
- On threatened species of fauna, or fauna that are part of a TEC, from vehicle strikes.

The potential for the Proposal to affect these prescribed impact features is discussed below. The assessment of prescribed impacts in this section of the BDAR takes into account the proposed mitigation measures in Section 0.

8.5.1 Habitat Corridors for Threatened Species

- Nature: Impacts clearing of native vegetation that lines Maytoms Lane for the haul road, vegetation along Bucketts Way for the proposed entrance road works and within the northern parts of the subject land could reduce the width of forest canopy in these areas. potential movement corridor.
- Extent: The extent of clearing of forest vegetation along the site entrance and Maytoms Lane for the haul road is around 2 hectares. The main clearing area (for the pit shell) is around 8-9 ha within the central northern parts of the subject land.
- Duration: Long-term – permanent removal of vegetation at site entrance and along Maytoms Lane for the haul road. Impacts on vegetation and potential corridors within the central parts of the subject land will be staged and progressively rehabilitated to forest or woodland over time (subject to a rehabilitation plan).
- Consequences: any potential movements of threatened species through the project site using the existing forest vegetation will not be halted or severed by virtue of the Proposal. North-south movements of threatened species or across the project site would currently be interrupted by large expanses or cleared grazing land through the central parts of the project site; the potential north-south corridor along Double Creek, Maytoms Lane and Bucketts Way is already partially broken by the cleared road reserve of Maytoms Lane. Vegetation clearing for the proposal haul road will widen this existing clearing, rather than create a fragment an existing corridor. Truck movements during operation of the quarry will increase the risk of vehicle strikes on mobile native fauna. Mitigation measures are required to minimise the risk of fauna injury and mortality during quarry operation (see Section 0).
- Maximum predicted offset liability: not applicable as the proposal is not in relation to longwall mining.

8.5.2 Waterbodies, Water Quality and Hydrological Processes

- Nature: Impacts to water bodies, water quality and hydrological processes could affect the condition of receiving waters (within Double Creek and its tributaries) and the condition of vegetation within the adjacent patch of dry rainforest (PCT 3076) and riparian vegetation along Double Creek (PCT 3436 and PCT 3074), as well as riparian forest habitat for threatened species of fauna. Groundwater modelling indicates that the pit excavation and associated quarrying activities could lower the water table within the vicinity of the dry rainforest patch. Accordingly, a monitoring program with associated adaptive management will be implemented as part of the



FFMP (see Section 7.0) to ensure that there is no long-term decline in the condition (measured using composition and structure BAM criteria) of the dry rainforest ecosystem.

- **Extent:** The extent dry rainforest vegetation (PCT 3076) located outside the subject land) to be retained is approximately 0.9 ha. The extent of River-flat Forest EEC along Double Creek (PCT 3436 and PCT 3074), to be removed is 1.81 ha, with additional areas adjoining the subject land along the riparian zone of the creek to the north and south of the proposed haul road, as shown in Figure 7.
- **Duration:** Short term during construction and long-term during operation
- **Consequences:** Impacts on water bodies, water quality and hydrological processes could lead to erosion, sedimentation, pollution, increased phosphorous in soils, weed invasion and changes to native species composition. Groundwater draw-down, could reduce available soil moisture and root zone water uptake for the rainforest plants within the patch of dry rainforest PCT 3076. Removal of artificial waterbodies could result an overall reduction in available watering habitat for threatened species of fauna. It is likely that there are many other waterbodies that represent potential watering habitat for threatened fauna species in the locality. As such, the consequence for local threatened fauna species of removing the degraded waterbodies from within the subject land is minor.
- **Maximum predicted offset liability:** not applicable as the proposal is not in relation to longwall mining.

8.5.3 Vehicle Strikes (Threatened Fauna)

- **Nature:** Mortality or injury to mobile threatened fauna due to collisions with moving vehicles, particularly heavy vehicles using the haul road during quarrying operations. Species at risk of vehicle strike are ground based threatened fauna, particularly mammals and some low flying birds, such as the Koala (recorded on the subject land), Spotted-tail Quoll (potentially present), Brush-tailed Phascogale (assumed present) and large forest owls, such as the Powerful Owl (potentially present).
- **Extent:** The extent of potential vehicle strikes is uncertain, as the utilisation of the project site by mobile threatened fauna is not known. However, collisions with native mobile fauna are more likely at dawn, dusk and night-time hours, when nocturnal fauna are active. However, quarry operating hours will not involve vehicle movements during night-time hours and so the risk of vehicle strikes on nocturnal fauna is considered low.
- **Duration:** Long-term during quarry operation
- **Consequences:** Mortality or injury to individuals of threatened fauna species due to collision with moving vehicles using the haul road (and throughout the active work areas of the quarry). Specific site measures will be required to mitigate the risk of vehicle / animal interactions and consequent mortality of threatened species. Traffic control measures, signage and (possibly) fauna crossing structures along the haul road are proposed in Section 0.
- **Maximum predicted offset liability:** not applicable as the proposal is not in relation to longwall mining.

Recommended mitigation measures for the above listed prescribed impacts are provided in Section 0



8.6 Impacts Not Requiring an Offset

Areas within the subject land mapped as exotic grassland, as shown in Figure 7, do not contain native vegetation and are not mapped as native PCTs. The vegetation within these areas is in low condition and falls below the VI threshold for offsetting listed in Section 9.2.1 of the BAM. According to the BAM, the assessor is not required to calculate an offset for these areas of exotic vegetation.

8.7 Areas Not Requiring Further Assessment

Areas outside of the subject land but within the project site do not form part of the SSD application and are classified as 'areas not requiring further assessment' (see Figure 10). Notwithstanding, the potential for Proposal activities to have indirect adverse effects on the vegetation and fauna habitats within these areas has been assessed in Section 8.4.

8.8 GDEs

8.8.1 Overview

A requirement for an assessment of groundwater dependent ecosystems (GDEs) is included in the SEARs. Although not a specific requirement for inclusion in a BDAR, a brief overview of potential impacts on GDEs is provided here. This section draws on and summarises information contained with the Groundwater Assessment (SLR 2024) prepared for the EIS.

Groundwater dependent ecosystems (GDEs) are defined as 'ecosystems that need access to groundwater to meet all or some of their water requirements to maintain their communities of plants and animals, ecological processes and ecosystem services'. GDEs include a broad range of environments and can be highly specialised, possessing unique characteristics that 'separate' them from other ecosystems. The dependence of GDEs on groundwater varies from seasonal or episodic, to continual. They can range in size from a few metres to many square kilometres. The types of GDEs currently recognised in NSW include:

- Subterranean or aquifer ecosystems.
- Aquatic and base flow stream ecosystems.
- Cave and karst ecosystems.
- Groundwater dependent wetlands.
- Great Artesian Basin Springs.
- Estuarine and marine ecosystems.

The potential GDEs within the project site at Booral are limited to aquatic and base flow stream ecosystems, which are associated with riparian ecosystems along waterways. Aquatic ecosystems rely on the surface expression of groundwater. This includes surface water ecosystems that may have a groundwater component, such as rivers, wetlands, and springs. Potential GDEs within the project site are mapped in the Groundwater Assessment report.

Areas of moderate and low potential GDE are also associated with the riparian zones along Double Creek and Brewers Creek as well as the Volcanic Permian and Carboniferous deposits.

The key areas of GDEs within the project site are:

- Riparian vegetation located along Double Creek, which correlates to high potential GDEs along on the BoM database. This includes PCT 3074 Hunter Coast Lowland



Grey Myrtle Wet Forest and PCT 3436 Hunter Coast Sandy Creekflat Low Paperbark Scrub. The patches of PCT 3436 align with the River-flat Eucalypt Forest, an endangered ecological community listed under the BC Act.

- Dry rainforest habitat northwest of the development footprint, situated along an unnamed tributary of Double Creek. This vegetation is identified as PCT 3076 Hunter Valley Whalebone Dry Rainforest, which is commensurate with Lower Hunter Dry Rainforest, a vulnerable ecological community under the BC Act. A small population of Scrub Turpentine *Rhodamnia rubescens*, listed as a critically endangered species under the BC Act and EPBC Act. It is noted that this habitat is not mapped as a GDE (in either the BoM Atlas or the WSP) and therefore its groundwater dependency is considered to be limited.

High potential GDEs are indicated in the BoM GDE Atlas (BoM, 2012) along parts of Double Creek, Brewers Creek, and their tributaries but there have been no field studies to confirm the actual presence of GDEs, their dependence on groundwater, or their resilience to changes in groundwater levels.

8.8.2 Impacts on GDEs

Changes in water quantity, either by the decrease in groundwater levels through extraction to meet the needs of agriculture or industry, or increases in groundwater levels through land clearing are threats to GDEs. Either lowering or increasing groundwater levels has the potential to cause a change in GDE community structure.

Modelling completed for the Groundwater Assessment (SLR 2024) indicates that groundwater drawdown is predicted to occur progressively through the staged development of the quarry. A lowering of the local water table across the project site of around 1 m is predicted. Accordingly, GDEs within the project site could be affected by this drawdown as it occurs over time. However, there are several variables to consider:

- It is not known whether any of the vegetation mapped within the subject land is actually groundwater dependent.
- The nature and seasonality of the groundwater dependence is not known, but can be assumed to vary over time in response to climatic variations (e.g. drought).

Riparian vegetation located along Double Creek

The riparian vegetation along Double Creek (PCT 3074 and PCT 3436) does not lie within the radius of drawdown of the Project, and therefore, there is predicted to be a negligible direct drawdown impact to this potential GDE. However, a moderate flow impact is anticipated along Double Creek which may cause a long-term decrease of flow to the potential GDE and could impact on integrity of the vegetation if it is solely or predominantly groundwater-fed.

Lower Hunter Valley Dry Rainforest

Operation of the Project is likely to have a major impact on groundwater level and flow pertinent to the Lower Hunter Valley Dry Rainforest ecosystem. This potential GDE lies within the radius of drawdown of the Project, with up to 25 m drawdown anticipated. This drawdown will also create a major flow impact to the potential GDE as the long-term reduction in water level will cause groundwater baseflow to no longer discharge to this habitat. This could result in a long-term loss of this vegetation if the potential GDE is solely or predominantly groundwater-fed. A potential major baseflow impact could lead to a major adverse baseflow effect.



Mitigation measures are identified in Section 7.0 to address the indirect impacts of groundwater drawdown on the potential GDEs within the subject land.



HILLVIEW QUARRY EIS BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

**Final Impacts likely to occur
on the Subject Land**

FIGURE 10

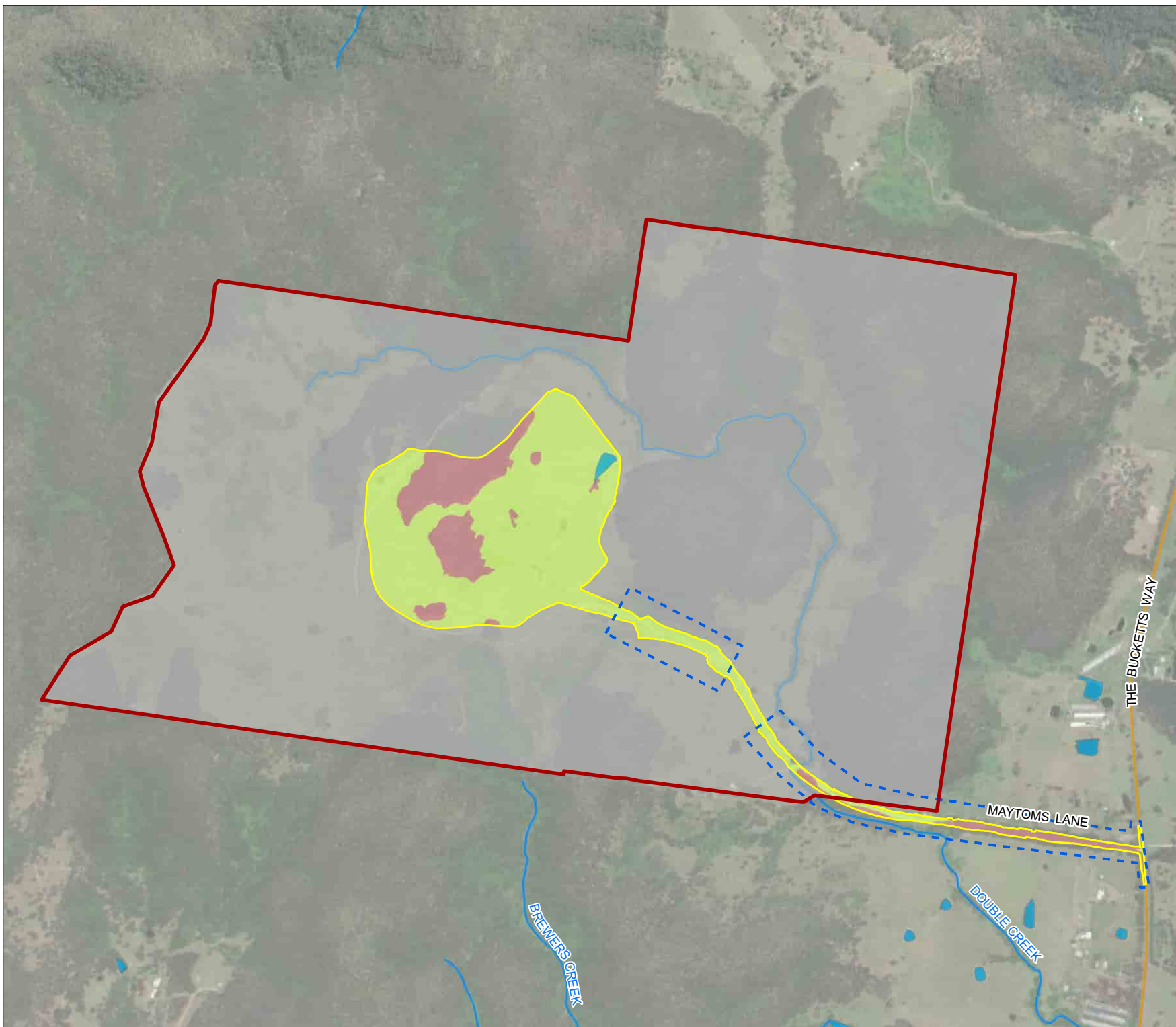
-  Project Site
-  Disturbance Footprint
-  Waterbody
-  Impacts not requiring offsets
-  Impacts requiring offsets
-  Areas not requiring assessment
-  Watercourse
-  Major Road
- Prescribed Impacts**
-  Vehicle Strike (zone of risk for native fauna)

Data Sources:
NSW Spatial Information Exchange. ESRI Basemap
world imagery (May 2023). IBRA Regions Australian
Government Department of Agriculture, Water and the
Environment. Native vegetation State Vegetation Type
Map 2022



0 250 500
m

Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:16,000 at A4
Project Number:	630.12117
Date:	25-Jun-2024
Drawn by:	JH



9.0 Biodiversity Credit Reports (Offset Requirements)

The Biodiversity Credit Reports produced in the BAM-C are as follows:

- 1 Credit Summary Report.
- 2 Biodiversity Credit Report (Like for like).
- 3 Biodiversity Credit Report (Variations).
- 4 Vegetation Zones Report.
- 5 Predicted Species Report.
- 6 Candidate Species Report.

The BAM Credit Reports for the Proposal are included in Appendix E.

Biodiversity credits that share the same attributes form a class of credits. The credit classes for ecosystem credits and species credits are presented in the following sections.

9.1 Ecosystem Credits

For ecosystems credits, the number and class of biodiversity credits to be retired to offset the Proposal are listed in the Biodiversity Credit Report (Like for like) and the Biodiversity Credit Report (Variations).

9.1.1 Summary of Ecosystem Credits

The ecosystem credits required to offset the impacts of the Proposal are summarised below in Table 34. The associated BAM Credit Summary Report is provided in Appendix E.

Table 34: Impacts that Require an Offset – Ecosystem Credits

Veg Zone	Veg Zone Code	PCT Name	TEC	Impact Area (Ha)	Ecosystem Credits
1	3241_Mod-good	Lower North White Mahogany-Spotted Gum Moist Forest	-	8.1	208
2	3254_Mod-good	Northern Hinterland Tallowwood-Forest Oak Grassy Forest		0.7	13
3	3436_Mod-good	Hunter Coast Sandy Creekflat Low Paperbark Scrub	-	1.3	17
4	3074_Mod-good	Hunter Coast Lowland Grey Myrtle Wet Forest	-	0.49	12
Total:				10.59	250

9.1.2 Offset Trading Group

The offset trading groups for the ecosystem credits required to offset the Proposal are listed below in Table 35.



Table 35: Ecosystem Credit Class and Matching Credit Profile

Ecosystem Credit	Attributes Shared with Matching Credits							
	PCT Name	Vegetation Class	Vegetation Formation	TEC Or EC	Offset Trading Group	Hollow Bearing Trees?	IBRA Subregion (In Which Proposal Is Located)	Credits
PCT 3074	Lower North White Mahogany-Spotted Gum Moist Forest	Dry Rainforests	Rainforests	No	Dry Rainforests <50%	Yes	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter.	208
PCT 3254	Northern Hinterland Tallowwood-Forest Oak Grassy Forest	Northern Hinterland Wet Sclerophyll Forests	Wet Sclerophyll Forests	No	Northern Hinterland Wet Sclerophyll Forests <50%	Yes	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter.	13
PCT 3436	Hunter Coast Sandy Creekflat Low Paperbark Scrub	Hunter-Macleay Dry Sclerophyll Forests	Dry Sclerophyll Forests	No	Hunter-Macleay Dry Sclerophyll Forests >=50% and <70%	No	Liverpool Range	17
PCT 3074	Hunter Coast Lowland Grey Myrtle Wet Forest	Dry Rainforests	Rainforests	No	Dry Rainforests <50%	Yes	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter.	12
Total Credits								250



9.2 Species Credits

The species credits required to offset the impacts of the Proposal are summarised below in Table 36. The associated BAM Credit Summary Report is provided in Appendix E.

Table 36: Species Credits for Threatened Species

Species Credit	Species Name	Species Credits
South-eastern Glossy Black-Cockatoo (Fauna)	<i>Calyptrorhynchus lathamii lathamii</i>	331
Red Helmet Orchid (Flora)	<i>Corybas dowlingii</i>	331
Barking Owl (Fauna)	<i>Ninox connivens</i>	331
Powerful Owl (Fauna)	<i>Ninox strenua</i>	331
Squirrel Glider (Fauna)	<i>Petaurus norfolcensis</i>	331
Brush-tailed Phascogale (Fauna)	<i>Phascogale tapoatafa</i>	331
Koala (Fauna)	<i>Phascolarctos cinereus</i>	331
Common Planigale (Fauna)	<i>Planigale maculata</i>	331
Long-nosed Potoroo (Fauna)	<i>Potorous tridactylus</i>	331
Masked Owl (Fauna)	<i>Tyto novaehollandiae</i>	331
Sooty Owl (Fauna)	<i>Tyto tenebricosa</i>	496



10.0 Matters of National Environmental Significance

10.1 Overview

Under the EPBC Act an action will require approval from the Australian Government Environment Minister (the ‘minister’) if the action has, will have, or is likely to have, a significant impact on a Matter of National Environmental Significance (MNES). The general test for significance is whether an impact is ‘important, notable or of consequence, having regard to its context or intensity’.

The following section provides an overview of the MNES that are or could be relevant to the project site. A preliminary assessment (or self-assessment) of impacts on EPBC Act matters is provided below in Section 10.3 with consideration of the impact criteria listed in *Significant Impact Guidelines 1.1* (DoE 2013) with respect to threatened species, threatened communities and migratory species that could utilise the subject land. This assessment aims to assist the applicant to decide whether or not they should submit a referral to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for a decision on whether assessment and approval is required under the EPBC Act.

10.2 Relevant Matters

10.2.1 Overview

A search of the Protected Matters Search Tool (PMST) was conducted as part of the current update to the BDAR on 13 February 2024. The results of the search are summarised in Table 37 below. The full PMST report is provided in Appendix H.

Table 37: EPBC Act Matters within the Locality

EPBC Act Matter	Record within 10 km
World Heritage Properties	None
National Heritage Places	None
Wetlands of International Importance (Ramsar)	2
Great Barrier Reef Marine Park	None
Commonwealth Marine Area	None
Listed Threatened Ecological Communities	7
Listed Threatened Species	82
Listed Migratory Species	43

The PMST reveals that 82 threatened species, 43 migratory species (and/or their habitats), seven threatened ecological communities and two wetlands of international importance listed under the EPBC Act are predicted to occur within a 10 km radius (see Appendix H). On this basis, the MNES listed under the EPBC Act that are considered potentially relevant to the subject land are:

- Listed threatened species.
- Listed migratory species.
- Threatened ecological communities.
- Wetlands of International Importance (Ramsar).



Other matters of NES protected under the Act, being World Heritage Properties, National Heritage Places, Great Barrier Reef Marine Park, Commonwealth Marine Areas and World Heritage Properties do not occur within the subject land or on adjacent lands and are not considered relevant.

10.2.2 Threatened Species

10.2.2.1 Overview

A total of 11 threatened species listed under the EPBC Act (and their habitats) are predicted to occur within the 10 km search area. The subject land contains suitable foraging habitat for several of these species. The assessment of the likelihood of occurrence of threatened species is provided in Appendix H. The EPBC Act listed threatened flora species assessed as likely to occur on site or recorded on site include:

- Scrub Turpentine - *Rhodamnia rubescens* (recorded on site).
- Magenta Lilly Pilly - *Syzygium paniculatum*.
- Trailing Woodruff *Asperula asthenes*.
- White-flowered Wax Plant *Cynanchum elegans*.

However, despite targeted surveys for these (and other) threatened plant species during the appropriate season, only one species, Scrub Turpentine, was recorded (see discussion below).

Threatened species of fauna that are considered likely to occur or have been recorded on site include:

- Green and Golden Bell Frog.
- Large-eared Pied Bat.
- Spotted-tailed Quoll.
- Grey-headed Flying Fox.
- Koala (recorded on site).

Although the subject land contains suitable habitat for the above listed threatened species, only one species, the Koala, listed as 'Endangered' under the EPBC Act, was recorded on site (see discussion below). Individuals of other threatened fauna species could be expected to occur on the subject land periodically as part of their foraging activity and dispersal movements. However, none of these species is likely to inhabit the site on a permanent basis.

10.2.2.2 Scrub Turpentine

Approximately 21 individuals of Scrub Turpentine were recorded within a gully supporting dry rainforest (PCT 3076) located to the north of the subject land, as shown in Figure 8. All individuals recorded showed evidence of infection from Myrtle Rust. Potential impacts on Scrub Turpentine are addressed in terms of EPBC Act criteria in Section 10.3.1.

10.2.2.3 Koala

One individual was recorded on site and the forest habitats (PCTs) on the subject land contain feed tree species for the Koala and therefore constitute suitable habitat for this species. Potential impacts on the Koala have been addressed in Section 10.3.1.



10.2.3 Listed Migratory Species

A total of 43 migratory species are listed in the PMST, comprising the following types of species:

- Migratory Marine Birds.
- Migratory Marine Species.
- Migratory Terrestrial species.
- Migratory Wetlands Species.

Migratory marine birds and marine species are not likely to occur on (or above) the subject land, being mainly pelagic or located in marine environments.

Individuals of some migratory terrestrial species that utilise forest habitats on mainland Australia, such as Black-faced Monarch, Spectacled Monarch and Rufous Fantail, could occur on the site from time to time as part of a larger network of habitats within the region during their wide-ranging dispersive movements and nomadic habits. Additionally, the Black-faced Monarch (*Monarcha melanopsis*) was previously recorded in 2017. However, these species are unlikely to reside on the project site on a permanent basis.

Additionally, individuals of some of the more common migratory wetland species could be expected to utilise the modified wetland habitats within the farm dams on the subject land. In this regard, one EPBC Act listed migratory species, Latham's Snipe (*Gallinago hardwickii*) was recorded on site during field surveys: Details of migratory bird records are listed in Table 38.

Table 38: EPBC Act Migratory Species Recorded On Site

Common Name	Species Name	EPBC Act Status	Nature of record
Latham's Snipe	<i>Gallinago hardwickii</i>	M	Sighted near dam
Black-faced Monarch	<i>Monarcha melanopsis</i>	M	Previous record (Keystone 2017)

M Migratory species, as listed under the schedules of the EPBC Act

10.2.4 Threatened Ecological Communities

A total of seven listed TECs are predicted to occur within the locality on the PMST report (Appendix H). Of these, TECs potentially occurring on the subject land, based on geographical distribution, edaphic factors (soils and geology) and species composition, are:

- Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland endangered community.
- Lowland Rainforest of Subtropical Australia Critically endangered community.
- River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria critically endangered community.
- Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions endangered community.



With consideration of the definitions of these TECs, their potential occurrence on the subject land is discussed as follows:

10.2.4.1 Coastal Swamp Sclerophyll Forest

The subject land does not occupy estuarine (or near-estuarine) areas and the vegetation in the low-lying parts of the site does not contain Swamp Mahogany *Eucalyptus robusta* as the dominant canopy tree. Therefore, Coastal Swamp Sclerophyll Forest Endangered Community is not present.

10.2.4.2 Lowland Rainforest of Subtropical Australia

The 0.9 ha patch of dry rainforest (PCT 3076) located north of the subject land that constitutes Lower Hunter Valley Dry Rainforest VEC under the BC Act (see Figure 6) does not meet the condition thresholds for *Lowland Rainforest of Subtropical Australia Critically Endangered Community* (having less than 40 native woody species), as defined in the Listing Advice (TSSC 2011). In any case, the patch of rainforest lies outside the development footprint and will not be directly affected by the Proposal.

10.2.4.3 River-Flat Eucalypt Forest on Coastal Floodplains of Southern New South Wales and Eastern Victoria

The patches of vegetation mapped within the subject land as River-Flat Eucalypt Forest on Coastal Floodplains, as listed under the BC Act (see Figure 6), do not lie within the Sydney Basin or South East Corner bioregions, and therefore do not meet the geographical limitations of *River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria*, as defined in the Conservation Advice (DAWE 2020). The subject land lies within the North Coast bioregion and therefore this TEC is not present on site.

10.2.4.4 Subtropical Eucalypt Floodplain Forest and Woodland

PCT 3436 Hunter Coast Sandy Creekflat Low Paperbark Scrub is associated with the TEC *Subtropical eucalypt floodplain forest and woodland* endangered community according to the Conservation Advice (DCCEEW 2022). The minimum patch size that can be included in this TEC is 0.5 ha. The total mapped area of PCT 3436 within the subject land is 1.32 ha, with one small patch of 0.07 ha in the centre of the site (Figure 7b) and a narrow linear patch of 1.25 ha along Maytoms Lane (Figure 7a). Accordingly, only the larger patch along Maytoms Lane meets the condition thresholds for the TEC.

With regard to the condition categories, classes and thresholds in Table 2 of the Conservation Advice, the 1.25 ha patch of PCT 3436 along Maytoms Lane is contiguous with PCT 3436 vegetation immediately adjoining the subject land boundary (and along Double Creek) and therefore would qualify as a “Small contiguous patch ≥ 0.5 ha, within a larger area of native vegetation ≥ 5 ha”. Additionally, the plot data for this PCT indicates that it would be Class C2, being ‘Moderate Condition’ (Ground cover richness ≥ 4 native species per sample plot and at least one of: ≥ 6 very large native trees per ha and/or $\geq 30\%$ of its total perennial understorey vegetation cover comprises native species”. Class C2 patches are included in the TEC.

In other aspects, including geographical location, landscape position, soils, floristics and structure, the patch of PCT 3436 along Maytoms Lane meets the definition of this TEC under the EPBC Act.

Impacts on this TEC are assessed in Section 10.3.3.



10.2.5 Ramsar Wetlands

Two wetlands of international importance are listed in the PMST as occurring within the locality (10 km search area), as follows:

- Hunter estuary wetlands, with the subject land located 20 - 30km upstream from the 'buffer area' of the Ramsar site.
- Myall lakes, with the site noted as located within the 'feature area'.

However, both Ramsar wetlands are located remote from the subject land (multiple kilometres of distance) and the site does not fall within the Hunter estuary catchment or the Myall River catchment (being located within the Karuah River catchment). As such, the Hunter estuary and Myall Lakes Ramsar wetlands are not considered relevant to the subject land.

10.3 Impacts on EPBC Matters

10.3.1 Listed Threatened Species

The threatened species identified in Section 10.2.2 have been considered in accordance with the 'significant impact criteria' for 'vulnerable' and 'endangered' species in the *Matters of National Environmental Significance Significant Impact Guidelines 1.1* (DoE 2013).

When taking into consideration all stages and components of the Proposal, and all related activities and infrastructure, there is the potential for impacts, including indirect impacts, on MNES, being mainly loss of a potential foraging habitat for mobile threatened fauna species, including birds, bats and mammals. However, it is highly unlikely that any of such species will be adversely impacted by the Proposal, because:

- Suitable breeding habitat for most of the species is absent within the subject land. For those species that have either been recorded or could utilise the habitats within the subject land, there are not likely to be local populations present wholly within the subject land or reliant on the subject land for their survival in isolation. Any such populations present within the locality will not be rendered locally extinct by the Proposal. This is based on the large ranges of these species and the small area of habitat, and the nature and condition of the habitats present within the subject land.
- The subject land is not assessed as likely to contain 'habitat critical to the survival' of a species.
- The subject land is not likely to support an 'important population' (as defined by DoE 2013) of any threatened species.
- The proposed mitigation measures (see Section 7.3) will mitigate or reduce impacts on threatened species.

With reference to the criteria for vulnerable and endangered species, the proposal is not likely to:

- Lead to a long-term decrease in the size of an important population of a species.
- Reduce the area of occupancy of an important population.
- Fragment an existing important population into two or more populations.
- Adversely affect habitat critical to the survival of a species.
- 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 a species is likely to decline.
- Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.
- Introduce disease that may cause a species to decline.
- Interfere substantially with the recovery of any of these species.

An assessment of significance for the Koala has been prepared and is attached in Appendix I. The assessment concludes that the Proposal is not 'likely' to have a 'significant impact' on the Koala, on the basis that the species is likely to occur on site in low densities and that substantial foraging habitat will be retained around the periphery of the subject land, which is contiguous with similar habitat on adjoining lands.

No other threatened species listed under the EPBC Act were recorded on the project site during any site investigations to date. However, the native vegetation to be removed as part of the Proposal would represent potential foraging habitat for some EPBC Act fauna species, should they be present in the locality. Examples include Grey-headed Flying Fox, Spotted-tailed Quoll and Large-eared Pied Bat. As these species are also listed as threatened in NSW under the BC Act, impacts on these species, namely removal of potential foraging habitat for mobile threatened fauna, has been addressed through application of the BAM Credit Calculator and calculation of ecosystem credit offset requirement, which is discussed in Section 0.

Given the lack of evidence for EPBC Act listed threatened fauna, it is concluded the Proposal would not have a significant impact on any listed threatened species.

10.3.2 Listed Migratory Species

In regard to the terrestrial migratory species (including the Black-faced Monarch, which was recorded on the project site), the forested and open areas of the subject land represent potential foraging habitat. It is theoretically possible that these highly mobile species could utilise these habitats temporarily during foraging, dispersal or migration. Conversely, the subject land constitutes only a relatively small proportion of the large ranges of these species and does not contain breeding habitat for these species.

In relation to potential impacts on migratory species, the removal of forest habitats as part of the Proposal will remove potential foraging habitat. These forest habitats could be utilised (transiently or seasonally) by individuals of these species, as part of their foraging and dispersal movements through the wider landscape.

Notably according to the significant impact criteria for migratory species (in the *Significant Impact Guidelines 1.1*), the subject land would not constitute 'important habitat' for migratory species, as the subject land is not utilised by a migratory species occasionally or periodically that supports an 'ecologically significant proportion' of the population of the species. Similarly, the subject land:

- Does not contain 'habitat that is of critical importance' to any migratory species.
- Would not be utilised by migratory species that are at the limit of their range.
- Does not contain habitat within an area where the species is declining.

In terms of migratory wetland species, the farms dams within the subject land would not constitute 'important habitat' for any such species, including the Latham's Snipe, which was recorded on site. No important wetlands or other such breeding habitat is present.



Therefore, the wetland or forest habitats to be removed are not considered to be important to the long-term survival of listed migratory species. The Proposal, with consideration of the significance criteria in the *Significant Impact Guidelines 1.1*, is not considered likely to have a significant impact on migratory species.

10.3.3 Threatened Ecological Communities

One TEC listed under the EPBC Act, Subtropical eucalypt floodplain forest, is present on the subject land and will be affected by construction of the Proposal.

No other EPBC Act listed TECs are present on the subject land and hence no other TECs will be directly affected by the Proposal.

10.3.3.1 Subtropical eucalypt floodplain forest and woodland

The Proposal will require the removal of a 1.25 ha patch of the TEC as part of the proposed construction of the haul road off the Bucketts Way (being a patch of PCT 3436 along Maytoms Lane). Accordingly, an assessment of impacts on this TEC with respect to significance criteria for 'endangered ecological communities' in the *Significant Impact Guidelines 1.1* is provided below in Table 39. The assessment concludes that the Proposal is unlikely to have a significant impact on Subtropical eucalypt floodplain forest and woodland TEC.

Table 39: Assessment of Significance - Subtropical Eucalypt Floodplain Forest and Woodland

EPBC Act Significant Impact Criteria	Impact Assessment
<i>Is there a real chance or possibility that the action will reduce the extent of an ecological community</i>	The Proposal will reduce the extent of Subtropical eucalypt floodplain forest and woodland TEC by 1.25 ha.
<i>Is there a real chance or possibility that the action will fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines</i>	The Proposal will increase fragmentation of the community to a minor degree as it will remove small narrow bands of vegetation along Double Creek and Maytoms Lane and create a gap in the riparian belt of vegetation that occurs along Double Creek upstream and downstream of the site.
<i>Is there a real chance or possibility that the action will adversely affect habitat critical to the survival of an ecological community</i>	The occurrence of the TEC on the subject land could not be considered habitat critical to the survival of the TEC, as it too small and degraded. The Proposal will not adversely affect habitat critical to the survival of the TEC.
<i>Is there a real chance or possibility that the action will 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</i>	The Proposal will not modify or destroy abiotic factors necessary for survival of the retained areas of the TEC. The Proposal will include stormwater features that will be designed to maintain existing water flows within the sub-catchment. Proposed crossings of Double Creek via the haul road will not disrupt flows with Double Creek.
<i>Is there a real chance or possibility that the action 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</i>	The Proposal will not cause a substantial change in species composition of the TEC. The retained areas of vegetation will be subject to a detailed Flora and Fauna Management Plan including a monitoring program designed to detect any change in vegetation composition.



EPBC Act Significant Impact Criteria	Impact Assessment
<i>species, for example through regular burning or flora or fauna harvesting</i>	
<i>Is there a real chance or possibility that the action will cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to:</i> <i>assisting invasive species, that are harmful to the listed ecological community, to become established, or</i> <i>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</i>	The Proposal will not cause a substantial reduction in the quality or integrity the retained areas of Subtropical eucalypt floodplain forest and woodland TEC. The retained patches of will be subject to a detailed Flora and Fauna Management Plan where: • Vegetation maintenance will reduce weed invasion. • Monitoring would detect any changes to vegetation integrity and facilitate corrective action.
<i>Is there a real chance or possibility that the action will interfere with the recovery of an ecological community</i>	The Proposal will not interfere with recovery of Subtropical eucalypt floodplain forest and woodland TEC

10.3.4 Conclusion

The potential impacts of the Proposal on EPBC Act matters are considered above. Considering the nature and duration of the potential impacts, the presence or likely occurrence of threatened and migratory species on the project site and the nature and condition of the habitats for the TEC present on the project site, the Proposal is not likely to have a significant impact on:

- Listed threatened species.
- Listed migratory species.
- Listed threatened ecological communities.

Notwithstanding this assessment, referral of the development application to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW) is recommended.



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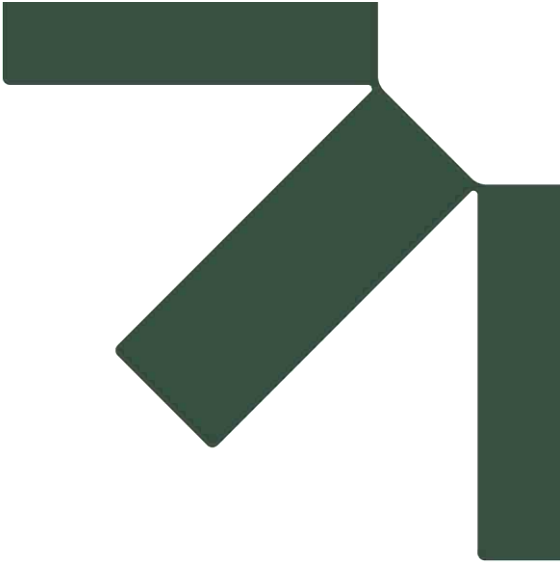


12.0 Feedback

At SLR, we are committed to delivering professional quality service to our clients. We are constantly looking for ways to improve the quality of our deliverables and our service to our clients. Client feedback is a valuable tool in helping us prioritise services and resources according to our client needs.

To achieve this, your feedback on the team's performance, deliverables and service are valuable and SLR welcome all feedback via <https://www.slrconsulting.com/en/feedback>. We recognise the value of your time and we will make a \$10 donation to our 2023 Charity Partner - Lifeline, for every completed form.





Appendix A BDAR Requirements Compliance

Biodiversity Development Assessment Report

Hillview Hard Rock Quarry

Coastwide Materials Pty Ltd

SLR Project No.: 630.V12117.00600

27 March 2025

Table A-1: Introduction Chapter (BAM Chapters 2 and 3)

3	BAM Requirement	Section in BDAR
Information	Introduction to the biodiversity assessment including:	-
	☑ brief description of the proposal	1.1
	☑ identification of subject land boundary, including: ☑ operational footprint ☑ construction footprint indicating clearing associated with temporary/ancillary construction facilities and infrastructure	1.1
	☑ general description of the subject land	1.1.2
	☑ sources of information used in the assessment, including reports and spatial data	1.4
	☑ identification and justification for entering the BOS	1.2
Maps and Table	Map of the subject land boundary showing the final proposal footprint, including the construction footprint for any clearing associated with temporary/ancillary construction facilities and infrastructure	Figure 1

Table A-2: Landscape Chapter (BAM Sections 3.1 and 3.2, Appendix E)

Information Type	BAM Requirement	Section in BDAR
Information	Identification of site context components and landscape features, including:	—
	☑ general description of subject land topographic and hydrological setting, geology and soils	3.0
	☑ per cent native vegetation cover in the assessment area (as described in BAM Section 3.2)	4.1
	☑ IBRA bioregions and subregions (as described in BAM Subsection 3.1.3(2.))	3.1
	☑ rivers and streams classified according to stream order (as described in BAM Subsection 3.1.3(3.) and Appendix E)	3.2
	☑ wetlands within, adjacent to and downstream of the site (as described in BAM Subsection 3.1.3(3.))	3.2
	☑ connectivity of different areas of habitat (as described in BAM Subsection 3.1.3(5–6.))	3.3
	☑ karst, caves, crevices, cliffs, rocks and other geological features of significance and for vegetation clearing proposals, soil hazard features (as described in BAM Subsections 3.1.3(7.) and 3.1.3(12.))	3.4
	☑ areas of outstanding biodiversity value occurring on the subject land and assessment area (as described in BAM Subsection 3.1.3(8–9.))	3.5
	☑ any additional landscape features identified in any SEARs for the proposal	3.7
	☑ NSW (Mitchell) landscape on which the subject land occurs	3.6



Information Type	BAM Requirement	Section in BDAR
	☒ details of field reconnaissance undertaken to confirm the extent and condition of landscape features and native vegetation cover (as described in Operational Manual Stage 1 Section 2.4)	4.1
Maps and tables	☒ Site Map ☒ Property boundary ☒ Boundary of subject land ☒ Cadastre of subject land (including labelling of Lot and DP or section plan if relevant) ☒ Landscape features identified in BAM Subsection 3.1.3	Figure 2
	☒ Location Map ☒ Digital aerial photography at 1:1,000 scale or finer ☒ Boundary of subject land ☒ Assessment area (i.e. the subject land and either 1500 m buffer area or 500 m buffer for linear development) ☒ Landscape features identified in BAM Subsection 3.1.3 ☒ Additional detail (e.g. local government area boundaries) relevant at this scale	Figure 3
	Landscape features identified in BAM Subsection 3.1.3 and to be shown on the Site Map and/or Location Map include: ☒ IBRA bioregions and subregions ☒ rivers, streams and estuaries ☒ wetlands and important wetlands ☒ connectivity of different areas of habitat ☒ karst, caves, crevices, cliffs, rocks and other geological features of significance and if required, soil hazard features ☒ areas of outstanding biodiversity value occurring on the subject land and assessment area ☒ any additional landscape features identified in any SEARs for the proposal ☒ NSW (Mitchell) landscape on which the subject land occurs	Figure 2 Figure 3
Data	☒ All report maps as separate jpeg files	-
	Individual digital shape files of:	-
	☒ subject land boundary	-
	☒ assessment area (i.e. subject land and 1500 m buffer area) boundary	-
	☒ cadastral boundary of subject land	-
	☒ areas of native vegetation cover	-
	☒ landscape features	-



Table A-3: Native Vegetation Chapter (BAM Chapter 4, Appendix A and Appendix H)

Information Type	BAM Requirement	Section in BDAR
Information	☒ Identify native vegetation extent within the subject land, including cleared areas and evidence to support differences between mapped vegetation extent and aerial imagery (as described in BAM Section 4.1(1-3.) and Subsection 4.1.1)	Figure 6 4.2
	☒ Provide justification for all parts of the subject land that do not contain native vegetation (as described in BAM Subsection 4.1.2)	4.1
	☒ Review of existing information on native vegetation including references to previous vegetation maps of the subject land and assessment area (described in BAM Section 4.1(3.) and Subsection 4.1.1)	4.1.1
	☒ Describe the systematic field-based floristic vegetation survey undertaken in accordance with BAM Section 4.2	2.2
	☒ Where relevant, describe the use of more appropriate local data, provide reasons that support the use of more appropriate local data and include the written confirmation from the decision-maker that they support the use of more appropriate local data (as described in BAM Subsection 1.4.2 and Appendix A)	5.5
	For each PCT within the subject land, describe:	-
	☒ PCT name and ID	4.2
	☒ vegetation class	4.2
	☒ extent (ha) within subject land	4.2
	☒ evidence used to identify a PCT including any analyses undertaken, references/sources, existing vegetation maps (BAM Section 4.2(1-3.))	4.2
	☒ plant species relied upon for identification of the PCT and relative abundance of each species	4.2
	☒ if relevant, TEC status including evidence used to determine vegetation is the TEC (BAM Subsection 4.2.2(1-2.))	4.2
	☒ estimate of per cent cleared value of PCT (BAM Subsection 4.2.1(5.))	4.2
	Describe the vegetation integrity assessment of the subject land, including:	-
	☐ identification and mapping of vegetation zones (as described in BAM Subsection 4.3.1)	4.4.1
	☒ description of vegetation zones within the subject land (as described in Operational Manual Stage 1 Table 2 and Subsection 3.3.2)	4.4.1
	☒ area (ha) of each vegetation zone	4.4.1
	☒ assessment of patch size (as described in BAM Subsection 4.3.2)	4.4.2
	☒ survey effort (i.e. number of vegetation integrity survey plots) as described in BAM Subsection 4.3.4(1-2.)	Table 14



Information Type	BAM Requirement	Section in BDAR
	☒ use of relevant benchmark data from BioNet Vegetation Classification (as described in BAM Subsection 4.3.3(5.))	4.5.3
	Where use of more appropriate local benchmark data is proposed (as described in BAM Subsection 1.4.2, BAM Subsection 4.3.3(5.) and BAM Appendix A): ☒ identify the PCT or vegetation class for which local benchmark data will be applied ☒ identify published sources of local benchmark data (if benchmarks obtained from published sources) ☒ describe methods of local benchmark data collection (if reference plots used to determine local benchmark data)	n/a
	☒ provide justification for use of local data rather than BioNet Vegetation Classification benchmark values	n/a
	☒ provide written confirmation from the decision-maker that they support the use of local benchmark data	n/a
Maps and tables	☒ Map of native vegetation extent within the subject land at scale not greater than 1:10,000 including identification of all areas of native vegetation including areas that are ground cover only, cleared areas (as described in BAM Section 4.1(1–3.)) and all parts of the subject land that do not contain native vegetation (BAM Subsection 4.1.2)	Figure 4
	☒ Map of PCTs within the subject land (as described in BAM Section 4.2(1.))	Figure 5
	☒ Map of vegetation zones within the subject land (as described in BAM Subsection 4.3.1)	Figure 7
	☒ Map the location of floristic vegetation survey plots and vegetation integrity survey plots relative to PCT boundaries	Figure 7
	☒ Map of TEC distribution on the subject land and table of TEC listing, status and area (ha)	Figure 6
	☒ Map of patch size locations for each native vegetation zone and table of patch size areas (as described in BAM Subsection 4.3.2)	Figure 7
	Table of current vegetation integrity scores for each vegetation zone within the site and including: ☒ composition condition score ☒ structure condition score ☒ function condition score ☒ presence of hollow bearing trees	Table 15
Data	☒ All report maps as separate jpeg files	-
	☒ Plot field data (MS Excel format)	Appendix D
	☐ Plot field datasheets	n/a
	Digital shape files of:	-
	☒ PCT boundaries within subject land	-



Information Type	BAM Requirement	Section in BDAR
	☒ TEC boundaries within subject land	-
	☒ vegetation zone boundaries within subject land	-
	☒ floristic vegetation survey and vegetation integrity plot locations	-

Table A-4: Threatened Species Chapter (BAM Chapter 5)

Information Type	BAM Requirement	Section in BDAR
Information	Identify ecosystem credit species likely to occur on the subject land, including:	-
	☒ list of ecosystem credit species derived from the BAM-C (as described in BAM Subsection 5.1.1 and Section 5.2(1.))	Table 16
	☒ justification and supporting evidence for exclusion of any ecosystem credit species based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	5.1.1
	☒ justification for addition of any ecosystem credit species to the list	5.1.1
	Identify species credit species likely to occur on the subject land, including:	-
	☒ list of species credit species derived from the BAM-C (as described in BAM Subsection 5.1.1)	Table 17 Table 18
	☒ justification and supporting evidence for exclusions based on geographic limitations, habitat constraints or vagrancy (as described in BAM Subsections 5.2.1 and 5.2.2)	5.1.2
	☒ justification and supporting evidence for exclusions based on degraded habitat constraints and/or microhabitats on which the species depends (as described in BAM Subsection 5.2.2)	5.1.2
	☒ justification for addition of any species credit species to the list	5.1.2
	From the list of candidate species credit species, identify:	Table 19 Table 20
	☒ species assumed present within the subject land (if relevant) (as described in BAM Subsection 5.2.4(2.a.)	
	☒ species present within the subject land on the basis of being identified on an important habitat map for a species (as described in BAM Subsection 5.2.4(2.d.)	
	☒ species for which targeted surveys are to be completed to determine species presence (BAM Subsection 5.2.4(2.b.)	
	☒ species for which an expert report is to be used to determine species presence (BAM Subsection 5.2.4(2.c.)	
	Present the outcomes of species credit species assessments from:	-
	☒ threatened species survey (as described in BAM Section 5.2.4)	5.3
	☒ expert reports (if relevant) including justification for presence of the species and information used to make this determination (as described in BAM Subsection 5.2.4, Section 5.3, Box 3)	5.4



Information Type	BAM Requirement	Section in BDAR
	Where survey has been undertaken include detailed information on:	-
	☒ survey method and effort (as described in BAM Section 5.3)	5.3
	☒ justification of survey method and effort (e.g. citation of peer-reviewed literature) if approach differs from the department's taxa-specific survey guides or where no relevant guideline has been published	5.3
	☒ timing of survey in relation to requirements in the TBDC or the department's taxa-specific survey guides. Where survey was undertaken outside these guides include justification for the timing of surveys	5.3
	☒ survey personnel and relevant experience	Declaration
	☒ describe any limitations to surveys and how these were addressed/overcome	2.7
	Where an expert report has been used in place of survey (as described in BAM Section 5.3, Box 3), include:	-
	☒ justification of the use of an expert report	n/a
	☒ identify the expert, provide evidence of their expert credentials and departmental approval of expert status	
	☒ all requirements of Box 3 have been addressed in the expert report	
	Where use of local data is proposed (BAM Subsection 1.4.2):	-
	☒ identify relevant species	n/a
	☒ identify data to be amended	
	☒ identify source of information for local data, e.g. published literature, additional survey data, etc.	
	☒ justify use of local data in preference to VIS Classification or TBDC data	
	☒ provide written confirmation from the decision-maker that they support the use of local data	n/a
	Species polygon completed for species credit species present within the subject land (assumed present or determined on the basis of survey, expert report or important habitat map) ensuring that:	-
	☒ the unit of measure for each species is documented	Table 24
	for species assessed by area:	-
	☒ the polygon includes the extent of suitable habitat for the target species within the subject land (as described in BAM Subsection 5.2.5)	Figure 8Figure 1
	☒ a description of, and evidence-based justification for, the habitat constraints, features or microhabitats used to map the species polygon including reference to information in the TBDC for that species and any buffers applied	775.6
	for species assessed by counts of individuals:	-
	☒ the number of individual plants present on the subject land (as described in BAM Subsection 5.2.5(3.))	n/a



Information Type	BAM Requirement	Section in BDAR
	☒ the method used to derive this number (i.e. threatened species survey or expert report) and evidence-based justification for the approach taken	n/a
	☒ the polygon includes all individuals located on the subject land with a buffer of 30 m around the individuals or groups of individuals on the subject land	n/a
	☒ Identify the biodiversity risk weighting for each species credit species identified as present within the subject land (as described in BAM Section 5.4)	n/a
Maps and tables	☒ Table showing ecosystem credit species in accordance with BAM Subsection 5.1.1, and identifying:	-
	☒ the ecosystem credit species removed from the list	Table 16
	☒ the sensitivity to gain class of each species	Table 16
	☒ Table detailing species credit species in accordance with BAM Section 5.2 and identifying:	
	☒ the species credit species removed from the list of species because the species is considered vagrant, out of geographic range or the habitat or microhabitat features are not present	5.1.2
	☒ the candidate species credit species not recorded on the subject land as determined by targeted survey, expert report or important habitat map	5.3
	☒ Table detailing species credit species recorded or assumed as present within the subject land, habitat constraints or microhabitats associated with the species, counts of individuals (flora)/extent of suitable habitat (flora and fauna) (as described in BAM Subsection 5.2.6) and biodiversity risk weighting (BAM Section 5.4)	Table 22 Table 23
Data	☒ Map indicating the GPS coordinates of all individuals of each species recorded within the subject land and the species polygon for each species (as described in BAM Subsection 5.2.5)	Figure 8
	☒ Digital shape files of suitable habitat identified for survey for each candidate species credit species	-
	☒ Survey locations including GPS coordinates of any plots, transects, grids	-
	☒ Digital shape files of each species polygon including GPS coordinates of located individuals	-
	☒ Species polygon map in jpeg format	-
	☒ Expert reports and any supporting data used to support conclusions of the expert report	-
	☒ Field datasheets detailing survey information including prevailing conditions, date, time, equipment used, etc.	-



Table A-5: Prescribed Impacts Chapter (BAM Chapter 6)

Information Type	BAM Requirement	Section in BDAR
Information	Identify potential prescribed biodiversity impacts on threatened entities, including:	-
	☒ karst, caves, crevices, cliffs, rocks and other geological features of significance (as described in BAM Subsection 6.1.1) ☒ occurrences of human-made structures and non-native vegetation (as described in BAM Subsection 6.1.2) ☒ corridors or other areas of connectivity linking habitat for threatened entities (as described in BAM Subsection 6.1.3) ☒ waterbodies or any hydrological processes that sustain threatened entities (as described in BAM Subsection 6.1.4)	6.0, Table 25
	☒ protected animals that may use the proposed wind farm development site as a flyway or migration route (as described in BAM Subsection 6.1.5)	n/a
	☒ where the proposed development may result in vehicle strike on threatened fauna or on animals that are part of a threatened ecological community (as described in BAM Subsection 6.1.6)	6.0
	☒ Identify a list of threatened entities that may be dependent upon or may use habitat features associated with any of the prescribed impacts	Table 25
	☒ Describe the importance of habitat features to the species including, where relevant, impacts on life cycle or movement patterns (e.g. Subsection 6.1.3)	6.0
	Where the proposed development is for a wind farm:	-
	☒ identify a candidate list of protected animals that may use the development site as a flyway or migration route, including resident threatened aerial species, resident raptor species and nomadic and migratory species that are likely to fly over the proposal area (as described in BAM Subsection 6.1.5)	n/a
	☒ provide details of targeted survey for candidate species of wind farm developments undertaken in accordance with BAM Subsection 6.1.5(2–3.)	n/a
	☒ predict the habitual flight paths for nomadic and migratory species likely to fly over the subject land and map the likely habitat for resident threatened aerial and raptor species (BAM Subsection 6.1.5(4.))	n/a
	Where the proposal may result in vehicle strike:	-
	☒ identify a list of threatened fauna or protected fauna species that are part of a TEC and at risk of vehicle strike due to the proposal	6.0
Maps and tables	☒ Map showing location of any prescribed impact features (i.e. karst, caves, crevices, cliffs, rocks, human-made structures, etc.)	n/a
	☒ Map showing location of potential vehicle strike locations	n/a
	☒ Maps of habitual flight paths for nomadic and migratory species likely to fly over the site and maps of likely habitat for threatened aerial species resident on the site (for wind farm developments only)	n/a
Data	☒ Digital shape files of prescribed impact feature locations	-



Information Type	BAM Requirement	Section in BDAR
	☒ Prescribed impact features map in jpeg format	-

Table A-6: Avoid and Minimise Impacts (BAM Chapter 7)

Information Type	BAM Requirement	Section in BDAR
Information	Demonstration of efforts to avoid and minimise impacts on biodiversity values (including prescribed impacts) associated with the proposal location in accordance with Chapter 7, including an analysis of alternative:	-
	☒ modes or technologies that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed mode or technology	n/a
	☒ routes that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed route	7.1
	☒ alternative locations that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed location	7.1
	☒ alternative sites within a property on which the proposal is located that would avoid or minimise impacts on biodiversity values and justification for selecting the proposed site	7.1
	☒ Describe efforts to avoid and minimise impacts (including prescribed impacts) to biodiversity values through proposal design (as described in BAM Sections 7.1 and 7.2)	7.1
	☒ Identification of any other site constraints that the proponent has considered in determining the location and design of the proposal (as described in BAM Subsection 7.2.1(3.))	7.1
	☒ Detail measures or options considered but not implemented because they are not feasible and/or practical (e.g. due to site constraints)	7.1
Maps and tables	☒ Table of measures to be implemented to avoid and minimise the impacts of the proposal, including action, outcome, timing and responsibility	7.0
	☒ Map of alternative footprints considered to avoid or minimise impacts on biodiversity values; and of the final proposal footprint, including construction and operation	Figure 9
	☒ Maps demonstrating indirect impact zones where applicable	n/a
Data	Digital shape files of:	-
	☒ alternative and final proposal footprint	-
	☒ direct and indirect impact zones	-
	☒ Maps in jpeg format	-



Table A-7: Assessment of Impacts Chapter (BAM Chapter 8, Sections 8.1 and 8.2)

Information Type	BAM Requirement	Section in BDAR
Information	☒ Determine the impacts on native vegetation and threatened species habitat, including a description of direct impacts of clearing of native vegetation, threatened ecological communities and threatened species habitat (as described in BAM Section 8.1)	8.0
	Assessment of indirect impacts on vegetation and threatened species and their habitat including (as described in BAM Section 8.2):	8.4
	☒ description of the nature, extent, frequency, duration and timing of indirect impacts of the proposal	8.4
	☒ documenting the consequences to vegetation and threatened species and their habitat including evidence-based justifications	8.4
	☒ reporting any limitations or assumptions, etc. made during the assessment	8.4
	☒ identification of the threatened entities and their habitat likely to be affected	8.4
	Assessment of prescribed biodiversity impacts (as described in BAM Section 8.3) including:	-
	assessment of the nature, extent frequency, duration and timing of impacts on the habitat of threatened species or ecological communities associated with:	-
	☒ karst, caves, crevices, cliffs, rocks and other features of geological significance	8.5
	☒ human-made structures	8.5
	☒ non-native vegetation	8.5
	☒ connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range	8.5.1
	☒ movement of threatened species that maintains their life cycle	8.5.1
	☒ water quality, waterbodies and hydrological processes that sustain threatened species and threatened ecological communities	8.5.2
	☒ assessment of the impacts of wind turbine strikes on protected animals	n/a
	☒ assessment of the impacts of vehicle strikes on threatened species of animals or on animals that are part of a TEC	8.5.3
	☒ evaluate the consequences of prescribed impacts	8.5
	☒ describe impacts that are uncertain	8.5
	☒ document limitations to data, assumptions and predictions	2.7
Maps and tables	☒ Table showing change in vegetation integrity score for each vegetation zone as a result of identified impacts	n/a
Data	N/A	-



Table A-8: Mitigation and Management of Impacts Chapter (BAM Section 8.4 and 8.5)

Information Type	BAM Requirement	Section in BDAR
Information	Identification of measures to mitigate or manage impacts in accordance with the recommendations in BAM Sections 8.4 and 8.5 including:	-
	☒ techniques, timing, frequency and responsibility ☒ identify measures for which there is risk of failure ☒ evaluate the risk and consequence of any residual impacts	7.0
	☒ document any adaptive management strategy proposed	7.2.7
	Identification of measures for mitigating impacts related to:	-
	☒ displacement of resident fauna (as described in BAM Subsection 8.4.1(2.)) ☒ indirect impacts on native vegetation and habitat (as described in BAM Subsection 8.4.1(3.)) ☒ mitigating prescribed biodiversity impacts (as described in BAM Subsection 8.4.2)	7.2.5
	☒ Details of the adaptive management strategy proposed to monitor and respond to impacts on biodiversity values that are uncertain (BAM Section 8.5)	7.2.7
Maps and tables	☒ Table of measures to be implemented before, during and after construction to mitigate and manage impacts of the proposal, including action, outcome, timing and responsibility	Table 27
Data	N/A	

Table A-9: Impact Summary Chapter (BAM Chapter 9)

Information Type	BAM Requirement	Section in BDAR
Information	Identification and assessment of impacts on TECs and threatened species that are at risk of a serious and irreversible impacts (SAIL, in accordance with BAM Section 9.1) including:	-
	☒ addressing all criteria in Subsection 9.1.1 for each TEC listed as at risk of an SAIL present on the subject land	8.1
	☒ for each TEC, report the extent of the TEC in NSW	n/a
	☒ addressing all criteria in Subsection 9.1.2 for each threatened species at risk of an SAIL present on the subject land	8.1
	☒ for each threatened species, report the population size in NSW	8.1.2
	☒ documenting assumptions made and/or limitations to information ☒ documenting all sources of data, information, references used or consulted ☒ clearly justifying why any criteria could not be addressed	8.1.2
	☒ Identification of impacts requiring offset in accordance with BAM Section 9.2	8.3
	☒ Identification of impacts not requiring offset in accordance with BAM Subsection 9.2.1(3.)	8.6



Information Type	BAM Requirement	Section in BDAR
	☒ Identification of areas not requiring assessment in accordance with BAM Section 9.3	8.7
Maps and tables	☒ Map showing the extent of TECs at risk of an SAIL within the subject land	n/a
	☒ Map showing location of threatened species at risk of an SAIL within the subject land	Figure 10
	Map showing location of:	-
	☒ impacts requiring offset	Figure 10
	☒ impacts not requiring offset	Figure 10
	☒ areas not requiring assessment	Figure 10
Data	Digital shape files of:	-
	☒ extent of TECs at risk of an SAIL within the subject land	-
	☒ location of threatened species at risk of an SAIL within the subject land	-
	☒ boundary of impacts requiring offset	-
	☒ boundary of impacts not requiring offset	-
	☒ boundary of areas not requiring assessment	-
	☒ Maps in jpeg format	-

Table A-10: Impact Summary Chapter (BAM Chapter 10)

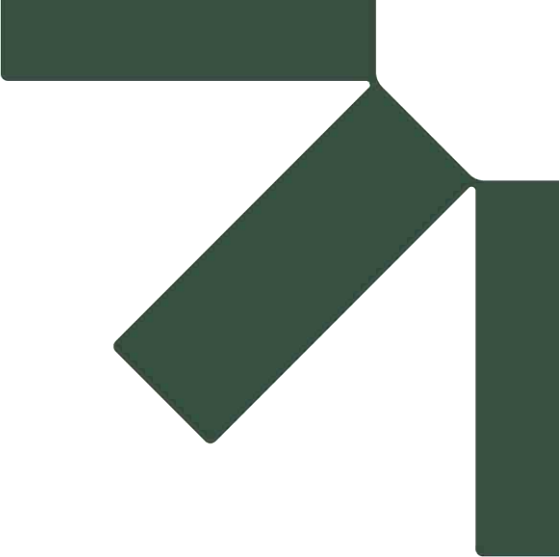
Information Type	BAM Requirement	Section in BDAR
Information	Ecosystem credits and species credits that measure the impact of the development on biodiversity values, including:	-
	☒ future vegetation integrity score for each vegetation zone within the subject land (Equation 25 and Equation 26 in BAM Appendix H)	Table 15 Table 31
	☒ change in vegetation integrity score (BAM Subsection 8.1.1)	
	☒ number of required ecosystem credits for the direct impacts of the proposal on each vegetation zone within the subject land (BAM Subsection 10.1.2)	
	☒ biodiversity risk weighting for each	Table 31
	☒ number of required species credits for each candidate threatened species that is directly impacted on by the proposal (BAM Subsection 10.1.3)	Table 32
Maps and tables	☒ Table of PCTs requiring offset and the number of ecosystem credits required	Table 31
	☒ Table of threatened species requiring offset and the number of species credits required	Table 32
Data	☒ Submitted proposal in the BAM Calculator	-



Table A-11: Biodiversity Credit Report Chapter (BAM Chapter 10)

Information Type	BAM Requirement	Section in BDAR
Information	☒ Description of credit classes for ecosystem credits and species credits at the development or clearing site or land to be biodiversity certified (BAM Section 10.2)	9.0
	☒ BAM credit report in pdf format	Appendix E
Maps and tables	☒ Table of credit class and matching credit profile	Table 35
Data	☒ BAM credit report in pdf format	Appendix E





Appendix B Methods Statement

Biodiversity Development Assessment Report

Hillview Hard Rock Quarry

Coastwide Materials Pty Ltd

SLR Project No.: 630.V12117.00600

27 March 2025

Hillview Quarry BDAR Method Statement

Vegetation Mapping

All plant species detected within the Project Site were identified to species level. Plant identification and nomenclature was based on species descriptions presented within *The Flora of New South Wales* Volumes 1 to 4 (Harden, 1993) and the taxonomic updates in PlantNET - The Plant Information Network System of Botanic Gardens Trust, Sydney, Australia (Botanic Gardens Trust, 2007).

Plant Community Types (PCTs) were identified based on dominant flora species present within each structural layer (i.e. canopy, shrub and ground layers) and by comparison with descriptions provided in the BioNet Vegetation Classification (OEH, 2019e). Exotic or highly modified native vegetation was defined based on structure and species composition.

Boundaries of vegetation types and communities were marked with a hand-held GPS and mapped using geographical information system (GIS) software. Plant Community Types were also assessed against identification criteria for State and Commonwealth listed threatened ecological communities (DoEE, 2019b; OEH, 2019f).

Vegetation Zones

In accordance with the BAM (OEH, 2017b), PCTs may be divided into vegetation zones based on vegetation condition. The BAM provides no definitions for how vegetation zones may be defined. For the purposes of this assessment, vegetation is defined as either low or moderate/ good based on the definitions presented in the table below.

Vegetation Condition Definitions

Vegetation Condition	Definition
Low	Vegetation retaining a native canopy with a modified understorey due to disturbance such as vegetation clearing. This condition class may also contain weed incursions.
Moderate/ Good	Vegetation retaining the species complement and structural characteristics of the pre-European equivalent. Such vegetation has changed very little over time and displays resilience to weed invasion due to intact groundcover, shrub and canopy layers.

Vegetation Survey Plots (BAM Plots)

Following delineation of vegetation zones within the Project Site, 12 floristic plot/transects (BAM Plots) were sampled in 2018, with an additional two plots sampled in 2020, totalling 14 BAM plots. Plot/ transects were positioned to sample areas that were most representative of the floristic characteristics of each PCT vegetation zone. The number of plot/transects sampled in each vegetation zone was based on the requirements of the BAM (OEH, 2017b), which are presented in the table below.

Minimum Number of Plots and Transects required per Zone Area

Vegetation Zone Area (ha)	Minimum Number of Plots/Transects
<2	1 plot/transect
>2-5	2 plot/transect
>5-20	3 plot/transect



Vegetation Zone Area (ha)	Minimum Number of Plots/Transects
>20-50	4 plot/transect
>50-100	5 plot/transect
>100-250	6 plot/transect
>250-1000	7 plot/transect
>1000	8 plot/transect

The locations of BAM survey plots are presented in Figure 1.

Vegetation Integrity

Vegetation integrity was determined using data collected from vegetation survey plot/transects (BAM Plots) by examining the vegetation composition, structure and function attributes as follows:

- The assessment of vegetation composition was based on the number of native plant species (richness) observed within a 400m² plot (standard 20m x 20m BAM Plot).
- The assessment of vegetation structure was based on the percentage foliage cover for each plant growth form group within the plot.
- The assessment of vegetation function was based on an assessment of the following attributes within the 1000m² plot (20m x 50m BAM plot):
 - Number of large trees.
 - Tree regeneration.
 - Tree stem size class.
 - Total length of fallen logs.
 - Litter cover (i.e. assessed using five 1m² quadrats along a 50m transect).
 - Number of hollow bearing trees.

For a more detailed description of how vegetation integrity was calculated, refer to the BAM (OEH, 2017b).

Patch Size

Patch size is defined by the BAM as an area of native vegetation that occurs on the Project Site and includes native vegetation that has a gap of less than 100m from the next area of moderate to good condition native vegetation (or ≤30m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the Project Site.

Patch size was calculated for the vegetation on the Project Site using the field validated map of vegetation types identified. Patch size is required to be assessed as one of four classes per vegetation zone mapped, being <5 ha, 5-24 ha, 25-100 ha or >100 ha. Based upon vegetation mapping and air photo interpretation, the total area of the main patch of native vegetation within the Project Site was calculated to be approximately 45,000 ha (connected to vegetation to the north). Patch size for all Plant Community Types (PCTs) connected to this patch is therefore within the >100 ha class.



Threatened Species Assessment

Survey Methodology

Database Searches and the Threatened Biodiversity Data Collection

Existing information on the threatened species relevant to the Project Site and the locality was obtained from:

- The NSW Office of Environment and Heritage *BioNet Atlas of NSW* for previous records of threatened species, populations and ecological communities (as listed under the BC Act) within a 10 kilometre radius of the site (OEH, 2019a).
- The Department of the Environment and Energy *Protected Matters Search Tool*, which involved a search for matters of national environmental significance within a 10 kilometre radius of the site (DoEE, 2019a).
- Department of the Environment and Energy (DoEE, 2019b). *Species Profile and Threats Database* (SPRAT).
- The NSW Office of Environment and Heritage (OEH, 2019f) *Threatened Species Profiles*.

Following collation of database records, the BAM Credit Calculator was used to return a list of predicted threatened species and candidate threatened species that are relevant to this assessment. Such species are returned based on species distribution (IBRA subregion), native vegetation cover, minimum patch size, geographic constraint, habitat constraints and past records.

A 'likelihood of occurrence' assessment was prepared with reference to the broad habitats contained within the Project Site and is attached at Appendix C. Additionally, a Protected Matters Search Report (DoEE, 2019a), which lists matters of national environmental significance listed under the EPBC Act that could potentially occur within the locality, is presented in Appendix D. The likelihood of occurrence was defined for each species using the criteria presented in the table below.

Key to Likelihood of Occurrence for Threatened Species

Likelihood	Criteria
Present	The species was observed in the Project Site during the current survey.
High	It is highly likely that the species inhabits the Project Site and is dependent on the available habitat (for breeding or important life cycle periods).
Moderate	Potential habitat is present in the Project Site; however, the species unlikely to maintain sedentary populations. The species may seasonally use resources within the Project Site opportunistically or during migration. The species is unlikely to be dependent (i.e. for breeding or important life cycle periods) on habitat within the Project Site. May include cryptic flowering flora species.
Low	There is only marginal or poor quality habitat for the species within the Project Site and the species has not been recorded recently in the locality (10 km); hence it is unlikely that the species inhabits the Project Site.
None	Suitable habitat for the species is absent within the Project Site.

Threatened Flora Survey

Targeted threatened flora surveys were conducted in accordance with the NSW Guide to Surveying Threatened Plants (OEH, 2016) over four days (23/10/2018, 30/10/2018, 31/10/2018 and 01/11/2018). The survey effort coincided with detectability for all threatened



flora with a moderate likelihood of occurrence within the Project Site. Based on Database Searches and the Threatened Biodiversity Data Collection (see **Section 4.1.1**), the following threatened plant species were determined to be relevant and therefore targeted during the assessment:

- *Asperula asthenes* (Trailing Woodruff).
- *Cynanchum elegans* (White-flowered Wax Plant).
- *Callistemon linearifolius* (Netted Bottle Brush).
- *Cryptostylis hunteriana* (Leafless Tongue Orchid).
- *Eucalyptus glaucina* (Slaty Red Gum).
- *Grevillea guthrieana* (Guthrie's Grevillea).
- *Grevillea parviflora* subsp. *parviflora* (Small-flower Grevillea).
- *Melaleuca biconvexa* (Biconvex Paperbark).
- *Pomaderris queenslandica* (Scant Pomaderris).
- *Pterostylis chaetophora*.
- *Rhizanthella slateri* (Eastern Australian Underground Orchid).
- *Senna acclinis* (Rainforest Cassia).
- *Tetradlea juncea* (Black-eyed Susan).
- *Thesium australe* (Austral Toadflax).

Threatened flora surveys consisted of a random meander in suitable habitats according to the *NSW Guide to Surveying Threatened Plants* (OEH, 2016).

Threatened Fauna Surveys

Threatened species surveys for fauna were undertaken over three days (30/10/2018, 31/10/2018 and 01/11/2018). to assess and map the presence of candidate species credit species in accordance with Section 6 of the BAM (OEH, 2017b). All fauna species detected were identified to species level.

In identifying threatened species survey requirements, the following key guidelines were considered:

- Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities, for threatened species (excluding frogs) listed under the BC Act (DEC, 2004).
- Amphibians - Threatened species survey and assessment guidelines: field survey methods for fauna – Amphibians (DECCW, 2009).
- Threatened bats - Survey Guidelines for Australia's Threatened Bats, Commonwealth of Australia (DEWHA, 2010a).
- Threatened birds - Survey Guidelines for Australia's Threatened Birds, Commonwealth of Australia (DEWHA, 2010b).
- Threatened reptiles - Survey Guidelines for Australia's Threatened Reptiles, Commonwealth of Australia (DEWHA, 2011b).
- Survey guidelines for Australia's threatened frogs: Guidelines for detecting frogs listed as threatened under the EPBC Act (DEWHA, 2010c).



- Threatened mammals - Survey Guidelines for Australia's Threatened Mammals, Commonwealth of Australia (DEWHA, 2011a).

Threatened Fauna Habitat Assessment

In accordance with 6.4 of the BAM (OEH, 2017b), the locations of important habitat features, such as breeding or roosting habitat for threatened fauna species, were captured with a handheld GPS unit and photographed where appropriate. Searches for potential habitat for threatened fauna species included but were not limited to:

- Foraging trees for threatened birds.
- Habitat trees (i.e. trees containing hollows and/or nests or other habitat features).
- Potential roosts for threatened *microchiropteran bats*.
- Vegetated ponds, riparian vegetation and drainage lines for threatened frogs and waterbirds.
- Woody debris and logs.

Diurnal Opportunistic Fauna Surveys

Diurnal opportunistic and incidental observations of fauna species were recorded at all times during field surveys. These included opportunistic observation of fauna activity such as scats, tracks, burrows or other traces. Fauna species that were observed were recorded and identified to species level.

Threatened Bird Surveys

Dawn bird surveys were completed on foot using binoculars for a 30 minute period on three separate mornings (30/10/2018, 31/10/2018 and 01/11/2018). Bird species that were detected were recorded and identified to species level. Based on Database Searches and the Threatened Biodiversity Data Collection (see Section 4.1.1), the following threatened bird species were determined to be relevant and therefore targeted during the assessment:

- Glossy Black-Cockatoo (*Calyptorhynchus lathamii*).
- Barred Cuckoo-shrike (*Coracina lineata*).
- Varied Sittella (*Daphoenositta chrysoptera*).
- Black-necked Stork (*Ephippiorhynchus asiaticus*).
- Little Lorikeet (*Glossopsitta pusilla*).
- Masked Owl (*Tyto novaehollandiae*).
- Sooty Owl (*Tyto tenebricosa*).

The Sooty Owl (*Tyto tenebricosa*) is a candidate threatened bird species, as predicted by the BAM.

Threatened Amphibian and Reptile Surveys

Amphibians were searched for during nocturnal and diurnal fauna surveys on three separate nights: (30/10/2018, 31/10/2018 and 01/11/2018). Suitable habitat for threatened amphibians was targeted for survey using spotlights and head torches. Reptiles were surveyed for during diurnal opportunistic fauna surveys. Based on Database Searches and the Threatened Biodiversity Data Collection (see Section 4.1.1), the following threatened amphibian and reptile species were determined to be relevant and therefore targeted during the assessment:



- Green and Golden Bell Frog (*Litoria aurea*);
- Green-thighed Frog (*Litoria brevipalmata*);
- Pale-headed Snake (*Hoplocephalus bitorquatus*); and
- Stephens' Banded Snake (*Hoplocephalus stephensi*).

Nocturnal Spotlighting and Fauna Call Playback

Spotlighting was completed after dusk following the targeted nocturnal search transects for two hours on three separate nights (30/10/2018, 31/10/2018 and 01/11/2018). Nocturnal spotlighting surveys were completed on foot using high-powered spotlights. Spotlighting was used to target arboreal, flying and ground dwelling mammals, nocturnal birds, reptiles and amphibians. Based on Database Searches and the Threatened Biodiversity Data Collection (see Section 4.1.1), the following threatened fauna species were determined to be relevant and therefore targeted during the assessment:

- Eastern Pygmy Possum (*Cercartetus nanus*).
- Squirrel Glider (*Petaurus norfolcensis*).
- Brush-tailed Rock Wallaby (*Petrogale penicillata*).
- Brush-tailed Phascogale (*Phascogale tapoatafa*).
- Koala (*Phascolarctos cinereus*).
- Common Planigale (*Planigale maculata*).

Spotlighting was conducted to target each of these species. Additionally, fauna call playback was conducted to target the Squirrel Glider and the Koala using best practise methods (Debus, 1995; Debus & Rose, 1994). This involved broadcasting the calls of specific species through a megaphone to attract individuals or incite a response allowing identification. Recorded calls of each threatened species were played through a megaphone after dusk on the three separate nights (30/10/2018, 31/10/2018 and 01/11/2018). An initial listening period of 15 minutes was followed by a spotlighting search.

Fauna call playback was used to survey for the following threatened fauna species:

- Masked Owl (*Tyto novaehollandiae*).
- Sooty Owl (*Tyto tenebricosa*).
- Koala (*Phascolarctos cinereus*).

The Sooty Owl and the Koala are candidate threatened species, as predicted by the BAM.

Remote Camera Survey Methodologies

Remote camera surveys were conducted within each vegetation patch over a 10-week period (30/10/2018 to 17/12/2018) to detect relevant terrestrial threatened fauna species, as well as introduced (pest) species. Surveys specifically targeted exotic species (such as rabbits, foxes and cats) that are likely to impact native fauna present within each vegetation patch. A minimum of one remote camera was installed within each vegetation patch, directed towards a PVC bait station that contained a mixture of peanut butter, rolled oats and honey; or fish. Cameras are triggered to take photos when movement is detected using an infrared sensor. Photos were later analysed in-house to identify fauna species.

The locations of where the remote cameras were deployed during the assessment are presented in Figure B1.



Microbat Surveys

Harp traps were deployed for two consecutive nights (30/10/2018 – 31/10/2018) in two locations within the Project Site to capture microbats. Each harp trap was placed in 'flyways' where microbats were observed foraging for insects at night. The locations of where the harp traps were deployed are presented in Figure B1.

Anabat Express detectors (Titley Scientific) were deployed for two consecutive nights (30/10/2018 – 31/10/2018) in four locations within the Project Site to collect microbat call data for analysis.

Analysis of all bat calls was completed. Calls were identified using zero-crossing analysis and AnalookW software by visually comparing the time-frequency graph and call characteristics (e.g. characteristic frequency and call shape) with reference calls and/or species call descriptions from published guidelines.

The *Bat calls of NSW: Region based guide to the echolocation calls of microchiropteran bats* (Pennay, Law, & Reinhold, 2004) was used to assist call analysis. Call identification was also assisted by consulting distribution information for possible species (Churchill, 2009; Duffy, Lumsden, Caddle, Chick, & Newell, 2000; Pennay et al., 2004) and records from the Bionet Atlas (OEH, 2019a). No reference calls were collected during the survey.

A call (pass) was defined as a sequence of three or more consecutive pulses of similar frequency and shape. Calls with less than three defined consecutive pulses of similar frequency and shape were not identified to species level, but were used as part of the activity count for the survey area. Due to variability in the quality of calls and the difficulty in distinguishing some species the identification of each call was assigned a confidence rating (Duffy et al., 2000; Mills, Norton, Parnaby, Cunningham, & Nix, 1996) as summarised below.

Confidence Rating Applied to Anabat Calls

Identification	Description
D – Definite	Species identification not in doubt.
PR – Probable	Call most likely to represent a particular species, but there exists a low probability of confusion with species of similar call type or call lacks sufficient detail.
SG – Species Group	Call made by one of two or more species. Call characteristics overlap making it difficult to distinguish between species. For example, the calls of <i>Chalinolobus gouldii</i> and <i>Ozimops</i> species and various <i>Nyctophilus</i> species can be easily confused during the analysis process and are therefore grouped together.

Based on Database Searches and the Threatened Biodiversity Data Collection (see Section 4.1.1), the following threatened microbat species were determined to be relevant and therefore targeted during the assessment:

- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*).
- Large-eared Pied Bat (*Chalinolobus dwyeri*).
- Little bent-wing Bat (*Miniopterus australis*).
- Large Bentwing-bat (*Miniopterus schreibersii oceanensis*).
- Eastern Freetail-bat (*Mormopterus norfolkensis*).
- Greater Broad-nosed Bat (*Scoteanax rueppellii*).
- Eastern Cave Bat (*Vespadelus troughtoni*).
- Southern Myotis (*Myotis macropus*).



Figure B1: Threatened Species Survey Effort



The locations of where the Anabat detectors were deployed during the assessment are presented in **Figure B1**.

Weather Conditions³

Although no rainfall was received during the survey period, the temperatures were considered to be conducive to fauna activity (including target threatened fauna species). A summary of the weather conditions prior to and during the survey period are presented below.

Weather Conditions during the Survey Period

Date	Daily Rainfall (mm)	Daily Minimum Temp (°C)	Daily Maximum Temp (°C)	Daily Global Solar Exposure (kwh M ²)
23-10-2018	0	16.2	24.0	27.0
24-10-2018	0	18.4	27.6	8.5
25-10-2018	0	16.6	-	14.4
26-10-2018	0	-	24.4	25.2
27-10-2018	0	13.0	21.8	27.1
28-10-2018	0	6.3	25.0	9.3
29-10-2018	0.8	8.6	29.6	19.4
30-10-2018	0	13.0	30.2	27.9
31-10-2018	0	16.4	31.0	28.0
01-11-2018	0	12.0	25.9	26.0

Biodiversity Credit Calculations

The original BAM calculations were conducted by BAM Assessor Dr. Gilbert Whyte (BAAS18041) on 29/04/2019. Version 7 of the BAM calculator was used with BAM data updated 14/04/2019.

The BAM-C for this project (Assessment ID 00013689/BAAS17104/23/00038751) was updated by BAM Assessor Jeremy Pepper (BAAS17104) on 3rd April 2024, with BAM Data version 67 (BAM Data last updated 14th March 2024).

³ Weather conditions sourced from Bureau of Meteorology Weatherzone application. Weather Station: 061071 (Stroud Post Office). Note that no wind speed/direction data is available at this weather station.



Survey Effort Summary (Previous and Current Assessments)

A summary of the survey effort conducted for the Flora and Fauna Assessment completed by Keystone (2017) is presented below.

Survey Effort Summary – Keystone Flora and Fauna Assessment (2017)

Field Survey Technique	Target Species	Current Survey Effort	No. Units	Survey Dates	Timing
Threatened Flora Surveys	Unknown	5 days	-	9/03/2015 – 10/03/2015, 17/10/2016, 11/12/2016 and 12/12/2016	Unknown
Flora Survey Plot/Transects	All flora	5 days	8 Plots - Presence/absence data only.	9/03/2015 – 10/03/2015, 17/10/2016, 11/12/2016 and 12/12/2016	Unknown
Fauna Habitat Assessment	Completed for habitat trees and vegetation types although calculations of areas (ha) of each vegetation type has not been completed.	3 days	-	23/02/2015-25/02/2015	Unknown
Diurnal Opportunistic Fauna Surveys	All fauna species	3 days	-	23/02/2015-26/02/2015 and 11/12/2016	Unknown
Dawn Bird Surveys	All birds including the threatened bird species	3 mornings	-	23/02/2015-26/02/2015	6:40-7:00am
Amphibians (Audio recording, diurnal and nocturnal searches)	Unknown	6 days	-	09-10/03/2015, 23-25/02/2015 and 11-12/12/2016	4:30-5:30pm 7:30-8:15pm
Reptile Survey (Maze and Funnel Traps)	All reptiles.	3 days	1 Maze trap 2 Funnel traps	23/02/2015-25/02/2015	Unknown
Terrestrial Mammals (Cage Traps and Funnels)	Terrestrial mammals	3 days	10 Medium cage traps 1 Large cage trap 15 Funnels	23/02/2015-26/02/2015	



Field Survey Technique	Target Species	Current Survey Effort	No. Units	Survey Dates	Timing
Nocturnal Spotlighting	Nocturnal fauna species and relevant threatened species)	2 nights	-	23/02/2015-25/02/2015	8:30-10:00pm
Call Playback	Fauna call playback was used to survey for relevant threatened fauna species	2 nights	-	23/02/2015-25/02/2015	8:30-10:00pm
Camera Surveillance	All fauna (including pest species)	8 weeks	6 Cameras	17/10/2016 – 12/12/2016	Continuous
		2.5 weeks	10 Cameras	23/02/2015-10/03/2015	Unknown
Microbat Surveys (Anabat)	Microbat species and relevant threatened species	3 nights	2 Anabats	23/02/2015-25/02/2015	8:30-10:00pm

A summary of the survey effort conducted for the 2018 assessment is presented below.

Survey Effort Summary – 2018 Assessment

Field Survey Technique	Target Species	Current Survey Effort	No. Units	Survey Dates	Timing
Threatened Flora Surveys	All flora including threatened plant species	4 days	-	23/10/2018 and 30/10/2018 – 01/11/2018 and 03/04/2019	9am-5pm
Flora Survey Plot/Transects	All flora	3 days	12 BAM Plots	30/10/2018 – 01/11/2018 & 03/04/2019	9am-5pm
Fauna Habitat Assessment	All fauna species	3 days	-	30/10/2018 – 01/11/2018	9am-5pm
Diurnal Opportunistic Fauna Surveys	All fauna species	3 days	-	30/10/2018 – 01/11/2018	9am-5pm



Field Survey Technique	Target Species	Current Survey Effort	No. Units	Survey Dates	Timing
Dawn Bird Surveys	All birds including the threatened bird species	2 mornings	-	31/10/2018 – 01/11/2018	5:30-6:30am
Amphibian Survey	All amphibians	2 nights	Two head-torches	30/10/2018 – 31/10/2018	7:30-9:30pm
Reptile Survey	All reptiles	3 days	-	30/10/2018 – 01/11/2018	9:00-5:00pm
Nocturnal Spotlighting	Nocturnal fauna species and relevant threatened species)	2 nights	Two head-torches	30/10/2018 – 31/10/2018	7:30-9:30pm
Call Playback	Fauna call playback was used to survey for relevant threatened fauna species	2 nights	One megaphone with MP3 player	30/10/2018 – 31/10/2018	7:30-9:30pm
Camera Surveillance	All fauna (including pest species)	10 weeks	4 cameras	30/10/2018-17/12/2018	Continuous
Microbat Surveys	Microbat species and relevant threatened species	2 nights	2 Anabats	30/10/2018 – 31/10/2018	6:00pm -6:00am
			2 harp Traps		



Survey Methodology – 2020 Supplement

Additional Flora Surveys

Additional threatened flora surveys, targeting species that have only been listed as critically endangered in February 2019 and therefore not targeted or recorded with in the 2018 surveys were conducted in accordance with the *NSW Guide to Surveying Threatened Plants* (OEH, 2016) over two consecutive days (22/10/2020 and 23/10/2020). The following critically endangered plant species were determined to be relevant based on Database Searches and the Threatened Biodiversity Data Collective (see Section 4.1.1) and therefore targeted during this assessment:

- *Rhodamnia rubescens* (Scrub Turpentine).
- *Rhodomyrtus psidioides* (Native guava).

Further new information regarding the suitable habitat of the threatened plant species, *Pterostylis chaetophora* was made available since the 2018 survey that indicated that the species has a greater variable habitat range than first thought. Given the new information, an additional threatened flora survey was conducted over two consecutive days (22/10/2020 and 23/10/2020) targeting this species within the transitional areas between open paddocks and wood vegetation where it is known for this species to occur.

Threatened flora surveys consisted of transitional parallel transects in suitable habitats according to the *NSW Guide to Surveying Threatened Plants* (OEH, 2016).

Additional Fauna Survey

Weather Conditions

The temperatures were considered to be conducive to fauna activity (including targeted fauna threatened fauna species). Rainfall was recorded during the dates in which the AnaBat detectors were active. A summary of the weather conditions during the survey period are presented below.

Weather Conditions during the Survey Period

Date	Daily Rainfall (mm)	Daily Minimum Temp (°C)	Daily Maximum Temp (°C)	Daily Global Solar Exposure (kwh M ²)
22-10-2020	0	27.6	14.1	5.2
23-10-2020	0	30.6	12.5	7.3
24-10-2020	4.0	22.4	18.4	1.7
25-10-2020	12.0	16.0	15.1	1.6
26-10-2020	13.0	16.4	13.3	2.1

Fauna Habitat Assessment

An additional habitat assessment for important fauna habitat trees, for suitable breeding/roosting and foraging locations for threatened fauna species across the Project Site was undertaken across one day (22/10/2020). Habitat feature locations were captured with a handheld GPS unit and hollow-bearing trees tagged at breast height. Searches for potential threatened fauna habitat included but not limited to:

- Hollow-bearing trees with hollows of a minimum diameter of >5-centimetres diameter and located at least 1 meter from the ground.



- Foraging locations, targeting stands of *Casuarina* and *Allocasuarina* trees species.
- Search for chew-cones at the base of *Casuarina* and *Allocasuarina* tree species to identify evidence of threatened bird activity.

Threatened Bird Survey

Stag watching survey for the observation of threatened bird species on the Project Site occurred across three evenings (22/10/2020, 23/10/2020, 24/10/2020). Hollow-bearing trees with hollow/s of > 20 cm diameter were observed for 30 minutes prior to sunset and a further one hour after sunset with all observations of threatened bird activity recorded.

Dusk Bird Census occurred at the Project Site on foot with the aid of binoculars over three evenings (22/10/2020, 23/10/2020, 24/10/2020). Each survey occurred over a 60-minute session during dusk. Visual and song-based observations of threatened birds were recorded and identified down to species level.

Based on Database Searches and the Threatened Biodiversity Data Collection (see Section 4.1.1) the following threatened bird species were targeted within survey:

- Glossy Black Cockatoo (*Calyptorhynchus lathamii*).
- Gang-Gang Cockatoo (*Callocephalon fimbriatum*).

Microbat Surveys

Anabat Express detectors (Titley Scientific) were deployed at the edge of four constructed dams located within the Project Site over four consecutive nights (22/10/2020 to the 26/10/2020) to collect microbat call data for analysis. Based on Database Searches and the Threatened Biodiversity Data Collection, the following threatened microbat species were determined to be relevant and therefore targeted during the assessment:

- Eastern False Pipistrelle (*Falsistrellus tasmaniensis*).
- Large-eared Pied Bat (*Chalinolobus dwyeri*).
- Little bent-wing Bat (*Miniopterus australis*).
- Large Bentwing-bat (*Miniopterus schreibersii oceanensis*).
- Eastern Freetail-bat (*Mormopterus norfolkensis*).
- Greater Broad-nosed Bat (*Scoteanax rueppellii*).
- Eastern Cave Bat (*Vespadelus troughtoni*).
- Southern Myotis (*Myotis macropus*).

The locations of where the Anabat detectors were deployed during the assessment are presented in Figure 10.

Survey Effort Summary (2020 Assessments)

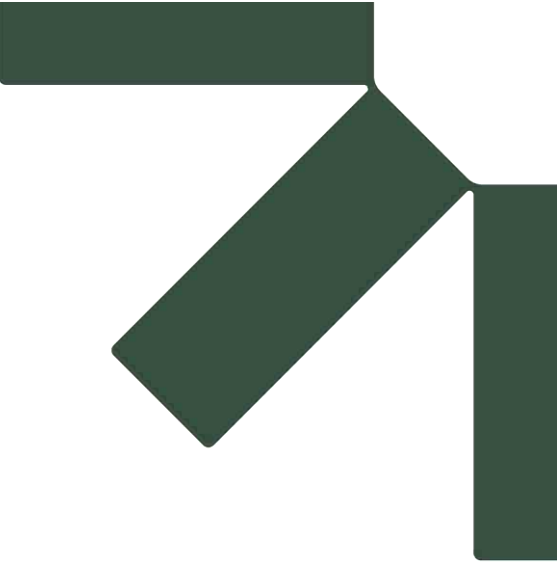
A summary of the 2020 survey effort conducted for the Flora and Fauna Assessment presented below.



Survey effort Summary – 2020 Assessments

Field Survey Technique	Target Species	Current Survey Effort	No. Units	Survey Dates	Timing
Threatened Flora Surveys	<i>Rhodamnia rubescens</i> (Scrub Turpentine) <i>Rhodomyrtus psidioides</i> (Native Guava) <i>Pterostylis chaetophora</i>	2 days	-	22/10/2020 and 23/10/2020	9am-5pm
Flora Survey Plot/Transects	All flora	2 days		22/10/2020 and 23/10/2020	9am-5pm
Fauna Habitat Assessment	Threatened bird species	1 days	-	22/10/2020, 12/11/2020	9am-5pm
Dusk Bird Census	All birds including the threatened bird species	2 mornings	-		6pm-8pm
Stag watching	Threatened bird species	3 evenings		22/10/2020, 12/11/2020	6:30pm-8:30pm
Microbat Surveys	Microbat species and relevant threatened species	4 nights	4 Anabats	22/10/2020 – 26/10/2020	6:00pm - 6:00am





Appendix C PCT Descriptions

Biodiversity Development Assessment Report

Hillview Hard Rock Quarry

Coastwide Materials Pty Ltd

SLR Project No.: 630.V12117.00600

27 March 2025

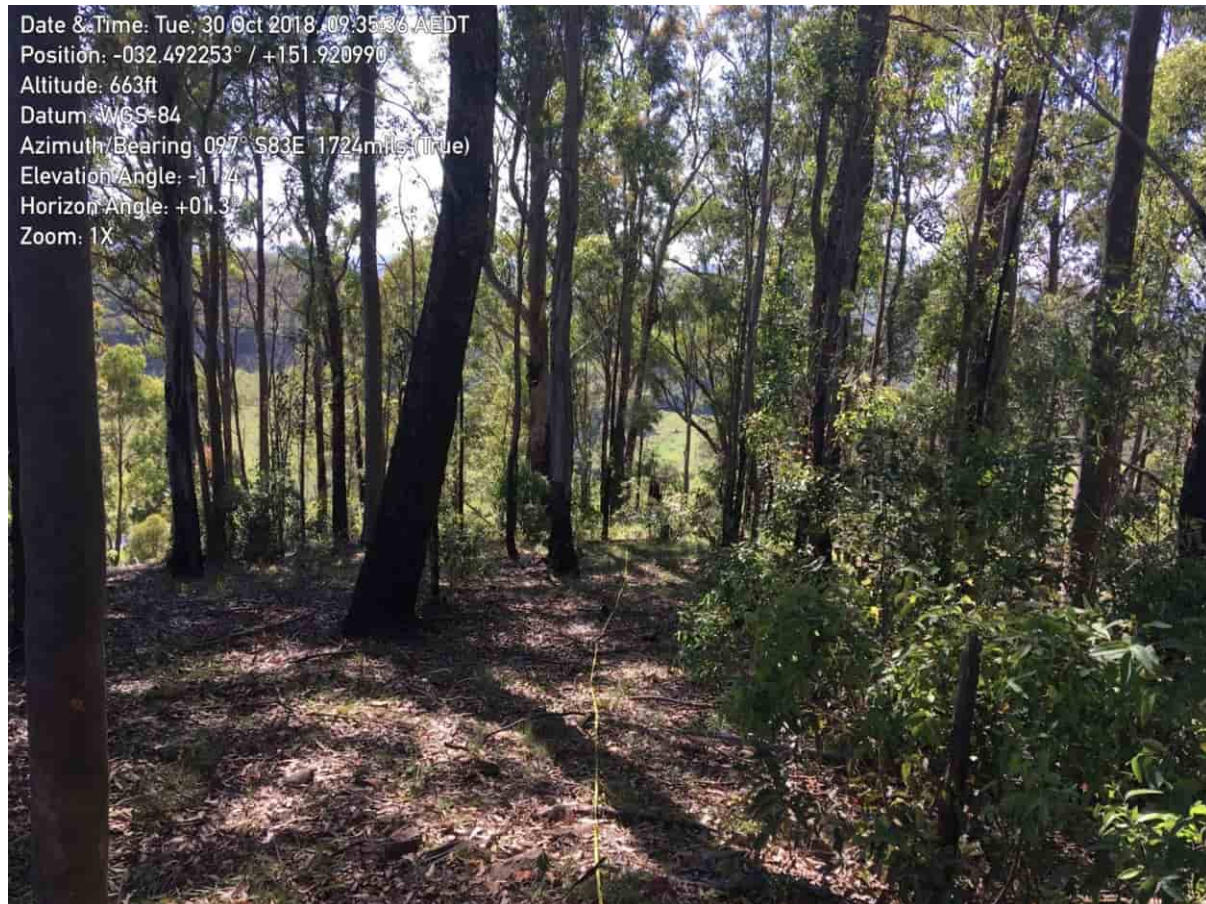
Lower North White Mahogany-Spotted Gum Moist Forest (PCT 3241)

Vegetation Community	Floristic Structure and Composition
Vegetation Formation (Keith, 2004)	Wet Sclerophyll Forests (Grassy sub-formation)
Vegetation Class (Keith, 2004)	Northern Hinterland Wet Sclerophyll Forests
PCT 3241	Lower North White Mahogany-Spotted Gum Moist Forest
Former PCT Equivalent (PCT Code) (OEH, 2019e)	Spotted Gum - Broad-leaved Mahogany - Grey Gum grass - shrub open forest on Coastal Lowlands of the Central Coast (PCT 1589)
PCT Scientific Name (OEH, 2019e)	<i>Corymbia maculata</i> , <i>Eucalyptus umbra</i> , <i>Eucalyptus punctata</i> / <i>Daviesia ulicifolia</i> , <i>Pultenaea villosa</i> , <i>Breynia oblongifolia</i> , <i>Podolobium illicifolium</i> , <i>Persoonia linearis</i> , <i>Notelaea longifolia</i> , <i>Pandorea pandorana</i> , <i>Billardiera scandens</i> , <i>Hardenbergia violacea</i> / <i>Themeda australis</i> , <i>Poa affinis</i> , <i>Rytidosperma pallidus</i> , <i>Imperata cylindrica</i> , <i>Lomandra confertifolia</i> , <i>Dianella caerulea</i> , <i>Lepidosperma neesii</i> , <i>Lomandra longifolia</i> , <i>Desmodium rhytidophyllum</i> , <i>Glycine clandestina</i>
Conservation Status (BC Act and EPBC Act)	Not listed.
Cleared Status (BioNet)	31%
Approximate area (ha)	Approximately 8.09 ha mapped within the development footprint.
General Vegetation Structure	Open forest to tall open forest, with a sparse shrub layer and a groundcover dominated by grasses and forbs.
PCT Justification (Floristic Composition)	The dominant canopy species are <i>Corymbia maculata</i> (Spotted Gum), <i>Eucalyptus umbra</i> (White Mahogany), <i>Eucalyptus fergusonii</i> (Ferguson's Ironbark), <i>Eucalyptus paniculata</i> (Grey Ironbark) and <i>Eucalyptus acmenoides</i> (White Mahogany). Other canopy species that occur to a lesser extent include <i>Eucalyptus canaliculata</i> (Large-fruited Grey Gum). A midstorey of smaller trees is also present and includes <i>Allocasuarina torulosa</i> (Forest Oak) and <i>Glochidion ferdinandi</i> (Cheese Tree). A large diversity of shrub species is present. The dominant species are <i>Exocarpos cupressiformis</i> (Native Cherry), <i>Persoonia linearis</i> (Narrow-leaved Geebung), <i>Clerodendron tomentosum</i> (Hairy Clerodendron), <i>Bursaria spinosa</i> (Blackthorn) and <i>Acacia longifolia</i> (Sydney Golden Wattle). The groundcover is dominated by grasses, forbs, sedges and vines. The dominant grasses include <i>Oplismenus aemulus</i> (Australian Basket Grass), <i>Imperata cylindrica</i> (Blady Grass), <i>Entolasia stricta</i> (Wiry Panic), <i>Poa labillardierei</i> , <i>Themeda triandra</i> (Kangaroo Grass) and <i>Entolasia marginata</i> . The dominant forbs include <i>Dichondra repens</i> (Kidney Weed), <i>Plectranthus parviflorus</i> (Cockspur Flower), <i>Geranium solanderi</i> (Native Geranium) and <i>Hardenbergia violacea</i> (Native Violet). The dominant sedges are <i>Lomandra filiformis</i> (Wattle Matt-rush) and <i>Lomandra longifolia</i> (Spiny-headed Matt Rush). The dominant vines are <i>Desmodium rhytidophyllum</i> , <i>Desmodium gunnii</i> (Slender Tick Trefoil), <i>Eustrephus latifolius</i> (Wombat Berry) and <i>Geitonoplesium cymosum</i> (Scrambling Lily).



Vegetation Community	Floristic Structure and Composition
Evidence of Disturbance	Minor weed encroachment. The most common exotic species recorded is <i>Senecio madagascariensis</i> (Fireweed).
Vegetation Zones	Zone 1, 3241_Mod-good
BAM Plots/transects	P1, P3, P4 and P5.

Photo C-1: Lower North White Mahogany-Spotted Gum Moist Forest



Northern Hinterland Tallowwood-Forest Oak Grassy Forest (PCT 3254)

Vegetation Community	Floristic Structure and Composition
Vegetation Formation (Keith, 2004)	KF-CH2A – Wet Sclerophyll Forests (Grassy sub-formation)
Vegetation Class (Keith, 2004)	Northern Hinterland Wet Sclerophyll Forests
PCT 3254	Northern Hinterland Tallowwood-Forest Oak Grassy Forest
Former PCT Equivalent (BioNet)	Tallowwood - Spotted Gum - Grey Gum grassy tall open forest of the lower North Coast (PCT 1549)
PCT Scientific Name (OEH, 2019e)	<i>Eucalyptus microcorys</i> , <i>Corymbia maculata</i> , <i>Eucalyptus punctata</i> / <i>Allocasuarina torulosa</i> , <i>Hibbertia scandens</i> , <i>Breynia oblongifolia</i> , <i>Acacia longifolia</i> / <i>Imperata cylindrica</i> , <i>Themeda triandra</i> , <i>Oplismenus imbecillis</i> , <i>Lomandra longifolia</i>
Conservation Status (BC Act and EPBC Act)	Not listed
Cleared Status (OEH, 2019e)	5%
Approximate area (ha) within the Project Site	Approximately 0.70 ha of the community occurs within the development footprint of the Project Site.
General Vegetation Structure	The community has a tall forest structure with a sparse shrub layer and a groundcover dominated by grasses and forbs.
PCT Justification (Floristic Composition)	The dominant canopy species is <i>Eucalyptus microcorys</i> (Tallowwood). Other canopy species that occur to a lesser extent include <i>Corymbia maculata</i> (Spotted Gum), <i>Eucalyptus canaliculata</i> (Large-fruited Grey Gum) and <i>Eucalyptus umbra</i> (Broad-leaved Mahogany). A midstorey of smaller trees is also present and includes <i>Allocasuarina torulosa</i> (Forest Oak) and <i>Glochidion ferdinandi</i> (Cheese Tree). The dominant shrub species are comprised of mesic species, including <i>Diploglottis australis</i> (Native Tamarind), <i>Notelaea ovata</i> , <i>Trema tomentosa</i> (Poison Peach), <i>Alectryon subcinereus</i> (Native Quince), <i>Guioa semiglauca</i> , <i>Notelaea longifolia</i> (Large Mock Olive). Other shrubs that occur to a lesser extent include <i>Breynia oblongifolia</i> (Coffee Bush) and <i>Acacia longifolia</i> (Sydney Golden Wattle). The groundcover is dominated by grasses, forbs, vines and ferns. The dominant grasses include <i>Oplismenus aemulus</i> (Australian Basket Grass), <i>Entolasia marginata</i> (Bordered Panic), <i>Imperata cylindrica</i> (Blady Grass) and <i>Themeda triandra</i> (Kangaroo Grass). The dominant forbs include <i>Dichondra repens</i> (Kidney Weed), <i>Plectranthus parviflorus</i> (Cockspur Flower), <i>Geranium solanderi</i> (Native Geranium) and <i>Centella asiatica</i> (Indian Pennywort). The dominant vines are <i>Cissus hypoglauca</i> (Water Vine), <i>Aphanopetalum resinosum</i> (Gum Vine) and <i>Geitonoplesium cymosum</i> (Scrambling Lily). The dominant ferns include <i>Adiantum aethiopicum</i> (Maidenhair Fern), <i>Pellaea paradoxa</i> , <i>Blechnum neohollandicum</i> (Rasp Fern) and <i>Cheilanthes sieberi</i> (Poison Rock Fern).
Evidence of Disturbance	Vegetation clearing and major weed encroachment (Lantana).
Vegetation Zones	Zone 2, 3254_Mod-good
BAM Plots/transects	P2 and P12



Photo C-2: Northern Hinterland Tallowwood-Forest Oak Grassy Forest



Hunter Coast Sandy Creekflat Low Paperbark Scrub (PCT 3436)

Vegetation Community	Floristic Structure and Composition
Vegetation Formation (Keith, 2004)	Dry Sclerophyll Forests (Shrub/grass subformation)
Vegetation Class (Keith, 2004)	Hunter Macleay Dry Sclerophyll Forests
PCT 3436	Hunter Coast Sandy Creekflat Low Paperbark Scrub
Former PCT Equivalent	Grey Gum - Red Gum - Paperbark shrubby open forest on coastal lowlands of the Northern Sydney Basin and Lower North Coast (PCT 1749)
PCT Scientific Name (OEH, 2019e)	<i>Eucalyptus punctata</i> , <i>Eucalyptus tereticornis</i> , <i>Angophora floribunda</i> / <i>Melaleuca linariifolia</i> , <i>Bursaria spinosa</i> , <i>Babingtonia pluriflora</i> / <i>Imperata cylindrica</i> , <i>Echinopogon ovatus</i> , <i>Entolasia marginata</i> , <i>Cymbopogon refractus</i> , <i>Baumea juncea</i> , <i>Gahnia aspera</i> , <i>Oxalis perennans</i> , <i>Pratia purpurascens</i> , <i>Lomandra longifolia</i>
Conservation Status (BC Act and EPBC Act)	River Flat Eucalypt Forest on Coastal Floodplains (PCT not linked in BioNet) under BC Act Not listed under EPBC Act
Cleared Status (BioNet)	52%
Approximate area (ha) within the Project Site	Approximately 1.32 ha of the community occurs within the development footprint.
General Vegetation Structure	Open forest but highly modified, lacking a mid-canopy layer in places. The groundcover dominated by exotic grasses and forbs.
PCT Justification (Floristic Composition)	The vegetation community has been modified by vegetation clearing (agricultural development) and consists of a small patch of trees and shrubs with a low diversity of native groundcover species. In the small, isolated patch, one canopy species is present: <i>Eucalyptus tereticornis</i> (Forest Redgum). Other canopy species are present along Maytoms Lane. Shrub species comprise <i>Callistemon salignus</i> (Willow Bottlebrush), <i>Melaleuca linearifolia</i> (Narrow-leaved Paperbark) and <i>Acacia irrorata</i> (Green Wattle). Native groundcover species include <i>Cheilanthes sieberi</i> (Poison Rock Fern), <i>Lobelia purpurascens</i> (White Root), <i>Centella asiatica</i> (Indian Pennywort), <i>Juncus bufonius</i> , <i>Lomandra longifolia</i> (Spiny-headed Matt-rush) and <i>Kennedia rubicunda</i> (Dusky Coral Pea).
Evidence of Disturbance	Previous land clearing and grazing activities.
Vegetation Zones	Zone 3, 3436_Mod-good
BAM Plots/transects	P10, P14



Photo C-3: Hunter Coast Sandy Creekflat Low Paperbark Scrub



Vegetation Community Characteristics – Exotic Grassland

Vegetation Community	Floristic Structure and Composition
Vegetation Formation (Keith, 2004)	N/A
Vegetation Class (Keith, 2004)	N/A
PCT Equivalent (PCT Code) (OEH, 2019e)	N/A
PCT Scientific Name (OEH, 2019e)	N/A
Conservation Status (BC Act and EPBC Act)	Not listed
Cleared Status (OEH, 2019e)	N/A
Approximate area (ha) within the Project Site	Approximately 2.21 ha of the community occurs within the development footprint of the Project Site.
General Vegetation Structure	The community has a grassland structure.
PCT Justification (Floristic Composition)	The grassland is dominated by exotic grasses including <i>Cynodon dactylon</i> (Australian Couch) and <i>Cenchrus clandestinus</i> (Kikuyu). Some areas also contain dense patches of <i>Imperata cylindrica</i> (Blady Grass). The dominant forbs are exotic species including <i>Gamochaeta americana</i> (Cudweed), <i>Trifolium dubium</i> (Yellow Suckling Clover), <i>Plantago lanceolata</i> (Lamb's Tongues), <i>Hypochaeris radicata</i> (Cat's Ear), <i>Centaurea erythraea</i> and <i>Senecio madagascariensis</i> (Fireweed). Regrowth of native shrubs occurs in some areas, particularly in drainage lines where cattle grazing is less severe. Native shrubs in these areas include <i>Bursaria spinosa</i> (Black Thorn), <i>Acacia ulicifolia</i> (Prickly Moses) and <i>Acacia implexa</i> (Hickory Wattle).
Evidence of Disturbance	Vegetation clearing, major weed encroachment and cattle grazing.
Vegetation Zones	N/A
BAM Plots/transects sampled within each vegetation zone	P7, P8, P9



Photo C-4: Exotic Grassland within the Project Site

Date & Time: Wed, 31 Oct 2018, 18:55:50 AEDT
Position: -032.491897° / +151.924599°
Altitude: 357ft
Datum: WGS-84
Azimuth/Bearing: 019° N19E 0338mils (True)
Elevation Angle: -12.0°
Horizon Angle: +00.5°
Zoom: 1X



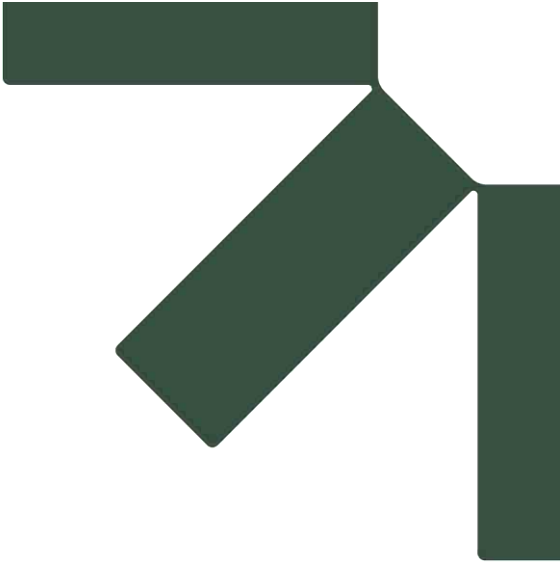
Vegetation Community Characteristics – Whalebone Tree – Red Kamala Dry Subtropical Rainforest of the Lower Hunter River (PCT 1541)

Vegetation Community	Floristic Structure and Composition
Vegetation Formation (Keith, 2004)	KF-CH1 – Rainforests
Vegetation Class (Keith, 2004)	Dry Rainforests
PCT Equivalent (PCT Code) (OEH, 2019e)	Whalebone Tree - Red Kamala dry subtropical rainforest of the lower Hunter River(PCT 1541)
PCT Scientific Name (OEH, 2019e)	<i>Streblus brunonianus</i> , <i>Mallotus philippensis</i> , <i>Planchonella australis</i> , <i>Olea paniculata</i> , <i>Elaeocarpus obovatus</i> , <i>Dysoxylum fraserianum</i> , <i>Dendrocnide excelsa</i> / <i>Pittosporum multiflorum</i> , <i>Alectryon subcinereus</i> , <i>Notelaea longifolia</i> , <i>Diospyros australis</i> , <i>Claoxylon australe</i> , <i>Clerodendron tomentosum</i> , <i>Capparis arborea</i> , <i>Cissus antarctica</i> , <i>Dioscorea transversa</i> , <i>Cayratia clematidea</i> / <i>Oplismenus aemulus</i> , <i>Pseuderanthemum variabile</i> , <i>Adiantum formosum</i> , <i>Gymnostachys anceps</i>
Conservation Status (BC Act and EPBC Act)	An endangered ecological community listed under the BC Act as 'Lower Hunter Valley Dry Rainforests in the Sydney Basin and NSW North Coast Bioregions'.
Cleared Status (OEH, 2019e)	68%
Approximate area (ha) within the Project Site	Approximately 0.90 ha of the community occurs within the development footprint of the Project Site.
General Vegetation Structure	The community has a closed rainforest structure with a dense shrub and midstorey layer with emergent trees.
PCT Justification (Floristic Composition)	Emergent canopy species include <i>Eucalyptus microcorys</i> (Tallowwood), <i>Eucalyptus canaliculata</i> (Large-fruited Grey Gum) and <i>Eucalyptus acmenoides</i> (White Mahogany). The dominant midstorey species is <i>Backhousia myrtifolia</i> (Grey Myrtle). A large diversity of rainforest shrubs are present including <i>Streblus brunonianus</i> (Whalebone Tree), <i>Elaeodendron australis</i> , <i>Croton verreauxii</i> (Green Native Cascarilla), <i>Notelaea longifolia</i> (Large Mock Olive), <i>Scolopia braunii</i> (Flintwood), <i>Diospyros australis</i> (Native Tamarind), <i>Pittosporum multiflorum</i> (Large Fruited Orange Thorn), <i>Hibiscus heterophyllus</i> (Native Rosella), <i>Mallotus philippensis</i> (Red Kamala), <i>Eupomatia laurina</i> , <i>Wilkiea huegeliana</i> (Veiny Wilkiea) and <i>Pittosporum revolutum</i> (Rough Fruited Pittosporum). The groundcover is dominated by ferns and vines. The dominant ferns are <i>Adiantum hispidulum</i> (Maidenhair Fern), <i>Blechnum neohollandicum</i> (Rasp Fern) and <i>Pellaea paradoxa</i> . The dominant vines include <i>Aphanopetalum resinosum</i> (Gum Vine), <i>Parsonsia straminea</i> (Monkey Rope), <i>Cissus antarctica</i> (Water Vine), <i>Dioscorea transversa</i> (Native Yam), <i>Gynochthodes jasminoides</i> (Sweet Morinda) and <i>Smilax australis</i> (Native Sarsaparilla).
Evidence of Disturbance	Vegetation clearing and minor encroachment of <i>Lantana camara</i> (Lantana) and <i>Ageratina adenophora</i> (Crofton Weed).
Vegetation Zones	Zone 1
BAM Plots/transects	P6 and P11



Photo G-5: Whalebone Tree – Red Kamala Dry Subtropical Rainforest of the Lower Hunter River (PCT 1541)





Appendix D Flora Species List and BAM plot data

Biodiversity Development Assessment Report

Hillview Hard Rock Quarry

Coastwide Materials Pty Ltd

SLR Project No.: 630.V12117.00600

27 March 2025

Table D-1: Flora Species List

Growth Form/HTE	Scientific Name	P01		P02		P03		P04		P05		P06		P07		P08		P09		P10		P11		P12		P13		P14		RM
		Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	
SG	<i>Acacia elongata</i>	0.1	1							0.5	10																			
SG	<i>Acacia falcata</i>					0.1	1	0.5	1																					
SG	<i>Acacia fimbriata</i>																													x
SG	<i>Acacia implexa</i>																	3	5											x
SG	<i>Acacia irrorata</i>																			0.25	2									
SG	<i>Acacia linifolia</i>																							5	4					
SG	<i>Acacia longifolia</i>	1	1																											x
SG	<i>Acacia longissima</i>					0.1	1					0.1	1																	
SG	<i>Acacia ulicifolia</i>	0.1	1	1	1			0.5	2	1	10			2	5			2	2											
TG	<i>Acmena smithii</i>																													x
SG	<i>Acrornychia oblongifolia</i>							0.1	1	0.25	1																			
EG	<i>Adiantum aethiopicum</i>			0.5	500													0.5	10							0.1	2			
EG	<i>Adiantum formosum</i>																				5	100								
EG	<i>Adiantum hispidulum</i>			5	50	0.5	100					0.5	10								20	1000			0.2	10				
HTE	<i>Ageratina adenophora</i>			2	200	2	50							0.1	10			2	50					2	20					
HTE	<i>Ageratina riparia</i>			0.1	10															0.1	1	1	50			5	100			
-	<i>Aira sp.</i>																	1	50											
SG	<i>Alchornea ilicifolia</i>											0.1	1								0.2	1				5	3			
SG	<i>Alectryon subcinereus</i>			1	1							0.5	1								0.25	1								
TG	<i>Allocasuarina littoralis</i>							5	1																					
TG	<i>Allocasuarina torulosa</i>			5	5	5	2																							x
TG	<i>Alphitonia excelsa</i>			10	5																			2	1					X
-	<i>Ambrosia tenuifolia</i>																													x
FG	<i>Aneilema acuminatum</i>																				1	50								
TG	<i>Angophora costata</i>																										5	1		x
TG	<i>Angophora floribunda</i>																							10	2					x
OG	<i>Aphanopetalum resinosum</i>			10	1000							1	5								2	10								
GG	<i>Aristida vagans</i>									0.1	5																			
FG	<i>Arthropodium minus</i>	2	20	0.1	1					0.1	5																			x
FG	<i>Asperula conferta</i>																													x
EG	<i>Asplenium australasicum</i>											0.5	5																	
-	<i>Aster subulata</i>																													x
GG	<i>Austrostipa scabra</i>	2	1000																											
-	<i>Avena barbata</i>																													x
SG	<i>Backhousia myrtifolia</i>											80	50								50	30			20	15				
HTE	<i>Bidens pilosa</i>																							1	10			25	100	x
OG	<i>Billardiera scandens</i>	0.1	10	0.5	500					0.1	10																			X
EG	<i>Blechnum neohollandicum</i>			1	50	0.5	50														20	1000								
GG	<i>Bothriochloa macra</i>			0.1	1			0.1	1					0.1	10															



Growth Form/HTE	Scientific Name	P01		P02		P03		P04		P05		P06		P07		P08		P09		P10		P11		P12		P13		P14		RM
		Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	
FG	<i>Daucus glochidiatus</i>			0.1	1	1	1000																							
SG	<i>Daviesia genistifolia</i>																													x
SG	<i>Daviesia ulicifolia</i>																													x
OG	<i>Dendrobium speciosum</i>																													x
TG	<i>Dendrocnide excelsa</i>																				2	1								
SG	<i>Denhamia silvestris</i>			0.1	1							0.1	1													0.5	2			
FG	<i>Desmodium gunnii</i>	2	1000			0.5	1000	0.5	50	0.5	50										0.5	1000								
FG	<i>Desmodium rhytidophyllum</i>	0.1	1			0.5	500	5	500	1	100																			
OG	<i>Desmodium varians</i>																													x
FG	<i>Dianella caerulea</i> var. <i>caerulea</i>			0.1	5			0.1	5	0.5	10															0.5	15	0.1	1	x
FG	<i>Dianella caerulea</i> var. <i>producta</i>					0.5	50					0.1	1																	
GG	<i>Dichelachne crinita</i>	0.1	5	1	50	0.5	100							0.5	100					0.1	10									
GG	<i>Dichelachne micrantha</i>	1	50							0.5	50																			
GG	<i>Dichelachne rara</i>																	0.1	50											
FG	<i>Dichondra repens</i>	20	1000	2	1000					0.1	10																			x
-	<i>Dietes grandiflora</i>																													x
OG	<i>Dioscorea transversa</i>	0.1	1			0.5	50					0.5	20								0.1	20				0.1	2			
SG	<i>Diospyros australis</i>											1	1								1	2								
TG	<i>Diploglottis australis</i>			5	2																									
SG	<i>Dodonaea triquetra</i>																										0.5	4		x
-	<i>Dysphania pumilio</i>																													x
GG	<i>Echinopogon caespitosus</i>																													x
GG	<i>Echinopogon ovatus</i>	1	500																								0.1	1		
HTE	<i>Ehrharta erecta</i>																									0.1	20	10	500	x
-	<i>Ehrharta longiflora</i>																										1	100		x
FG	<i>Einadia hastata</i>																													x
FG	<i>Einadia trigonos</i>																													x
SG	<i>Elaeodendron australe</i>																				5	1								
GG	<i>Entolasia marginata</i>	0.5	20	10	1000			2	100	0.1	10	5	1000																	
GG	<i>Entolasia stricta</i>	2	500							10	1000															20	300			x
HTE	<i>Eragrostis curvula</i>																			0.1	10									
TG	<i>Eucalyptus acmenoides</i>	10	10			20	5	20	30	10											10	2								
TG	<i>Eucalyptus crebra</i>																													x
TG	<i>Eucalyptus eugenioides</i>																													x
TG	<i>Eucalyptus fergusonii/paniculata</i>	20	20			10	2	10	10	30	11																			
TG	<i>Eucalyptus fibrosa</i>																													x



Growth Form/HTE	Scientific Name	P01		P02		P03		P04		P05		P06		P07		P08		P09		P10		P11		P12		P13		P14		RM
		Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	
TG	<i>Eucalyptus microcorys</i>			20	10							5	1											20	4	5	2			
TG	<i>Eucalyptus moluccana</i>																										5	1	x	
TG	<i>Eucalyptus paniculata</i>																									5	2	25	7	x
TG	<i>Eucalyptus punctata/canaliculata</i>	10	10			20	5			10												5	1	20	2					
TG	<i>Eucalyptus resinifera</i>																													x
TG	<i>Eucalyptus sideroxylon</i>																					30	4							
TG	<i>Eucalyptus tereticornis</i>																			30	20			20	2			5	1	x
TG	<i>Eucalyptus umbra</i>							5	1																					
FG	<i>Euchiton sphaericus</i>																													x
SG	<i>Eupomatia laurina</i>																					2	2							
OG	<i>Eustrephus latifolius</i>	1	1000	2	500	1	1000	1	500	0.1	1	0.1	5																	
SG	<i>Exocarpos cupressiformis</i>	0.5	1			1	1			0.1	1																			x
SG	<i>Exocarpos strictus</i>			0.5	2			0.5	1																					
SG	<i>Ficus coronata</i>																					0.25	1							
TG	<i>Ficus obliqua</i>																													x
TG	<i>Ficus rubiginosa</i>																													x
-	<i>Fraxinus angustifolia</i>																													x
GG	<i>Gahnia aspera</i>																									1	4	0.1	1	x
GG	<i>Gahnia melanocarpa</i>																		0.25	1										
FG	<i>Galium binifolium</i>																									0.1	1			x
FG	<i>Galium sp.</i>	0.1	50	0.1	1																									
-	<i>Gamochaeta americana</i>													10	1000			1	50	2	500									
OG	<i>Geitonoplesium cymosum</i>	1	500	10	1000	0.5	500			1	50															1	10			x
FG	<i>Geranium solanderi</i>	5	1000	2	1000	0.5	50																							
TG	<i>Glochidion ferdinandi</i>			15	20	0.1	1											0.5	1							10	5			x
OG	<i>Glycine clandestina</i>	1	100					0.5	50	0.1	5																			
OG	<i>Glycine tabacina</i>			0.1	20																									x
-	<i>Gomphocarpus fruticosus</i>	0.1	1															0.1	1											
FG	<i>Gonocarpus teucrioides</i>																													x
FG	<i>Goodenia hederacea</i>																													x
EG	<i>Grammitis stenophylla</i>											0.1	20																	
TG	<i>Guioa semiglauca</i>			1	5																									
FG	<i>Gymnostachys anceps</i>			0.5	2	0.5	10					0.2	1																	
OG	<i>Gynochthodes jasminoides</i>			0.1	5	0.1	1					0.5	10													0.5	3	1	2	x
OG	<i>Hardenbergia violacea</i>	2	500	0.5	20			2	500	1	50																			x
SG	<i>Hibbertia aspera</i>									0.1	10																			
OG	<i>Hibbertia dentata</i>			2	50																									



Growth Form/HTE	Scientific Name	P01		P02		P03		P04		P05		P06		P07		P08		P09		P10		P11		P12		P13		P14		RM	
		Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun		
SG	<i>Hibbertia obtusifolia</i>																													x	
OG	<i>Hibbertia scandens</i>													0.1	1			0.1	1												
SG	<i>Hibiscus heterophyllus</i>																				2	1					0.1	1			
SG	<i>Homalanthus populifolius</i>											0.1	1																		
FG	<i>Hydrocotyle geraniifolia</i>			0.5	1000																										
FG	<i>Hydrocotyle tripartita</i>																													x	
SG	<i>Hymenosporum flavum</i>											0.5	1																		
HTE	<i>Hyparrhenia hirta</i>																													x	
-	<i>Hypochoaeris radicata</i>	0.1	50											5	1000			1	500	5	1000									x	
EG	<i>Hypolepis muelleri</i>																	0.5	12												
GG	<i>Imperata cylindrica</i>	2	500	1	100	2	500	5	1000	10	1000			5	1000			20	1000					5	50						
-	<i>Juncus bufonius</i>																			0.1	10										
-	<i>Juncus cognatus</i>															0.5	100														
-	<i>Juncus effusus</i>															0.2	10			2	1000										
-	<i>Juncus microcephalus</i>																			0.1	10										
OG	<i>Kennedia rubicunda</i>	0.1	1	0.5	10	1	100													0.1	10										
GG	<i>Lachnagrostis filiformis</i>																													x	
FG	<i>Lagenophora stipitata</i>									0.1	10																				
HTE	<i>Lantana camara</i>	1	2	70	1000	0.1	2					1	2	0.1	1			1	2			2	20	10	50	5	15	40	20		
FG	<i>Laxmannia gracilis</i>	0.1	1																												
-	<i>Lepidium bonariense</i>																													x	
GG	<i>Lepidosperma elatius</i>																													x	
GG	<i>Lepidosperma laterale</i>									0.1	10																				
SG	<i>Leptospermum polygalifolium</i>									0.25	1																				
HTE	<i>Ligustrum sinense</i>																													x	
-	<i>Linum trigynum</i>			0.1	10									0.1	50	0.5	50														
FG	<i>Lobelia purpurascens</i>	1	1000	1	100			0.1	20	0.5	1000									0.1	10					1	200			x	
-	<i>Lolium perenne</i>																											20	1000	x	
GG	<i>Lomandra sp.</i>	0.1	10																												
GG	<i>Lomandra confertifolia</i>									0.5	10																				
GG	<i>Lomandra filiformis</i>					0.1	5			2	200																			x	
GG	<i>Lomandra longifolia</i>			1	1			1	10					0.1	1					0.1	1					2	10	0.3	3	x	
GG	<i>Lomandra multiflora</i>							1	100																	0.1	2			x	
TG	<i>Lophostemon confertus</i>																													x	
FG	<i>Ludwigia peploides</i>																													x	
-	<i>Lysimachia arvensis</i>			0.1	50											0.1	50	0.1	100												
OG	<i>Maclura cochinchinensis</i>																					0.1	1								
TG	<i>Mallotus philippensis</i>																					2	1								
-	<i>Malva parviflora</i>																													x	



Growth Form/HTE	Scientific Name	P01		P02		P03		P04		P05		P06		P07		P08		P09		P10		P11		P12		P13		P14		RM
		Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	
-	Megathyrsus maximus																			1	1			5	1					x
SG	Melaleuca linariifolia																			1	1			5	1					x
SG	Melaleuca styphelioides																													x
TG	Melia azedarach																													x
SG	Melicope micrococca																					1	1							
-	Melinis repens																													x
GG	Microlaena stipoides													0.1	20															
FG	Microtis parviflora																													x
HTE	Myriophyllum aquaticum																													x
SG	Myrsine variabilis											0.5	10																	
TG	Notelaea longifolia	1	1	1	5							2	10									2	5			0.1	1	0.1	1	
SG	Notelaea ovata			2	5																									x
HTE	Ochna serrulata																									0.1	1			
HTE	Olea europaea subsp. cuspidata																											1	2	
FG	Opercularia diphylla			1	50			0.1	10																					
FG	Opercularia hispida			0.1	20																									
GG	Oplismenus aemulus	5	1000	20	1000	10	1000	10	1000	2	500															0.3	50			
GG	Oplismenus imbecillis																													x
FG	Ottelia ovalifolia																													x
FG	Oxalis perennans	1	1000	1	1000					0.1	10					0.1	50													
SG	Ozothamnus diosmifolius			0.5	5					0.5	1																			x
OG	Pandorea pandorana	0.1	2			0.5	50	0.1	10	0.1	1															1	5	1	3	x
GG	Panicum simile							0.1	1	0.1	10																			
TG	Pararchidendron pruinatum											0.5	1																	
OG	Parsonsia straminea											1	20									0.2	1					25	20	x
HTE	Paspalum dilatatum																							1	100					x
-	Paspalum mandiocanum																							1	50					
-	Paspalum urvillei																							5	500					x
OG	Passiflora cinnabarina					0.1	1	0.1	2			0.1	1																	
EG	Pellaea paradoxa	0.5	10	0.5	50	0.5	500					0.5	20								5	100								
FG	Peperomia blanda											1	100																	
FG	Persicaria decipiens																			1	100									
FG	Persicaria lapathifolia																			2	5000									
SG	Persoonia linearis	0.5	2					1	2																					x
-	Petrorhagia dubia													0.5	500															
-	Petrorhagia nanteuillii																													x
SG	Phyllanthus gunnii			0.5	10	1	10	0.5	10	2	10																			
SG	Phyllanthus hirtellus																													x



Growth Form/HTE	Scientific Name	P01		P02		P03		P04		P05		P06		P07		P08		P09		P10		P11		P12		P13		P14		RM
		Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	
SG	<i>Pittosporum multiflorum</i>											2	10																	
SG	<i>Pittosporum revolutum</i>					0.1	1	0.1	1			1	20									0.25	1							x
SG	<i>Pittosporum undulatum</i>																					0.25	1							
FG	<i>Plantago debilis</i>					0.1	1																							
-	<i>Plantago lanceolata</i>	0.1	50	0.1	50									2	500	2	500	2	500									0.4	50	x
-	<i>Plantago myosuros</i>															0.1	10	0.1	10											x
EG	<i>Platycerium bifurcatum</i>											1	10									0.1	1							
FG	<i>Plectranthus parviflorus</i>	2	1000	20	1000	5	1000	2	100	1	200	2	100									0.1	2	5	50	0.1	1			
-	<i>Poa annua</i>																			0.1	10									
GG	<i>Poa labillardierei</i>	5	100	0.5	50	5	500			1	20			0.5	10			0.1	50											
SG	<i>Podolobium ilicifolium</i>	1	10					1	10	5	50																			
OG	<i>Archontophoenix cunninghamiana</i>											5	20																	
TG	<i>Polyscias elegans</i>																					0.25	1							
SG	<i>Polyscias sambucifolia</i>	0.5	5																											x
Shrub	<i>Pomaderris sp.</i>																													x
FG	<i>Pomax umbellata</i>							0.5	100	0.1	10																			
FG	<i>Poranthera microphylla</i>																													x
FG	<i>Pseuderanthemum variable</i>	0.5	50			0.1	20	0.1	10	0.5	20																			
EG	<i>Pteridium esculentum</i>					2	20							0.5	500			5	50											
EG	<i>Pteris tremula</i>																					1	1							
SG	<i>Pultenaea villosa</i>							0.1	1																					x
EG	<i>Pyrrosia rupestris</i>											5	1000																	
GG	<i>Rytidosperma pallidum</i>																													x
OG	<i>Ripogonum album</i>																													x
-	<i>Roldana petasitis</i>			0.1	5																									
-	<i>Romulea rosea</i>																													x
HTE	<i>Rubus anglocandicans</i>													0.1	1			0.1	1											
SG	<i>Rubus moluccanus</i>			0.1	10																									
SG	<i>Rubus parvifolius</i>	0.5	2	0.5	50	5	1000							0.1	10			0.1	10											
FG	<i>Rumex brownii</i>			0.1	1															2	100									
-	<i>Rumex conglomeratus</i>																													x
-	<i>Rumex crispus</i>																													x
OG	<i>Sarcopetalum harveyanum</i>					0.1	1															0.1	1							
GG	<i>Schoenoplectiella mucronata</i>																													x
GG	<i>Schoenus apogon</i>																													x
TG	<i>Scolopia braunii</i>											2	10										0.5	1						
FG	<i>Senecio hispidulus</i>	1	10			0.5	50																							

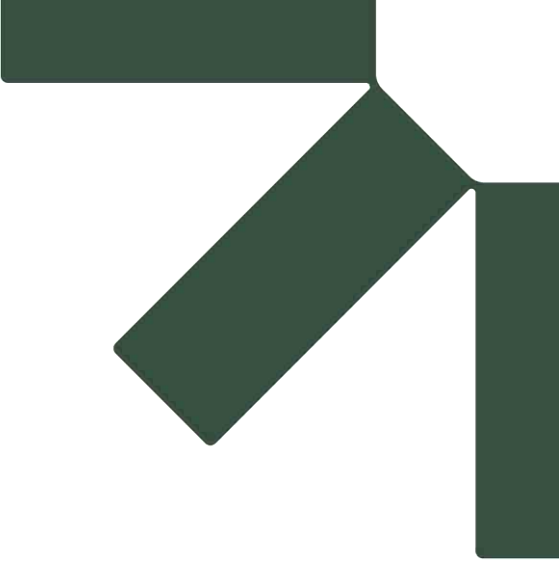


Growth Form/HTE	Scientific Name	P01		P02		P03		P04		P05		P06		P07		P08		P09		P10		P11		P12		P13		P14		RM
		Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	
HTE	<i>Senecio madagascariensis</i>	1	500	0.5	20			0.5	50	0.1	5			2	500	0.1	20	1	100	2	100					0.1	5	0.1	5	x
-	<i>Sida rhombifolia</i>	0.1	2	0.1	50									0.1	20					0.5	100			1	100			10	1000	x
FG	<i>Sigesbeckia orientalis</i>	0.5	20	1	100					0.1	5																			
-	<i>Silene gallica</i>																													x
OG	<i>Smilax australis</i>			0.5	10																	0.5	1							
OG	<i>Smilax glycyphylla</i>																													x
-	<i>Solanum mauritianum</i>																							2	2					x
-	<i>Solanum nigrum</i>																													x
FG	<i>Solanum prinophyllum</i>							0.1	2																					x
-	<i>Solanum pseudocapsicum</i>																										0.1	1		x
FG	<i>Solanum sp.</i>																													x
-	<i>Sonchus aspera</i>			0.1	1																									
-	<i>Sonchus oleraceus</i>	0.1	1	0.1	1																									x
GG	<i>Sparganium subglobosum</i>																													x
-	<i>Sporobolus africanus</i>	0.1	1																	0.5	50									
-	<i>Stellaria media</i>			0.1	50											0.5	50													
HTE	<i>Stenotaphrum secundatum</i>																													x
OG	<i>Stephania japonica</i>			2	50																									
TG	<i>Streblus brunonianus</i>											2	10									20	10							
TG	<i>Syncarpia glomulifera</i>																													x
SG	<i>Synoum glandulosum</i>																					0.1	1							
-	<i>Taraxacum officinale</i>																													x
GG	<i>Themeda triandra</i>	0.1	10	1	500	1	50	2	20	5	1000							0.5	100											
HTE	<i>Tradescantia fluminensis</i>			0.1	50																									
SG	<i>Trema tomentosa</i>			2	5																									
-	<i>Trifolium arvense</i>															0.1	50													x
-	<i>Trifolium campestre</i>															0.1	50													x
-	<i>Trifolium dubium</i>															0.5	50	0.5	500											
-	<i>Trifolium repens</i>															0.1	50													x
FG	<i>Triglochin procera</i>																													x
TG	<i>Tristaniopsis laurina</i>																									10	5			x
GG	<i>Typha domingensis</i>																			1	500									
GG	<i>Typha orientalis</i>																													x
FG	<i>Urtica incisa</i>																									0.1	1			
-	<i>Verbena bonariensis</i>	0.1	10	0.5	50	1	10																				0.1	1		x
-	<i>Verbena rigida</i>	0.5	5											1	200	0.1	5	0.1	100	2	100									
FG	<i>Vernonia cinerea</i>	1	500	0.1	100	2	200																							
FG	<i>Viola hederacea</i>																													x



Growth Form/HTE	Scientific Name	P01		P02		P03		P04		P05		P06		P07		P08		P09		P10		P11		P12		P13		P14		RM
		Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	Cov	Abun	
FG	<i>Vittadinia cuneata</i>									0.1	10																			
-	<i>Vulpia bromoides</i>															1	500													
FG	<i>Wahlenbergia gracilis</i>									0.1	10																			
SG	<i>Wilkiea huegeliana</i>											0.5	2									1	1							
SG	<i>Zieria smithii</i>																													x





Appendix E BAM Credit Reports

Biodiversity Development Assessment Report

Hillview Hard Rock Quarry

Coastwide Materials Pty Ltd

SLR Project No.: 630.V12117.00600

27 March 2025

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00013689/BAAS17104/23/00038751	Hillview BDAR	28/10/2024
Assessor Name	Report Created	BAM Data version *
Gilbert Whyte	27/03/2025	Current classification (live - default) (80)
Assessor Number	BAM Case Status	Date Finalised
BAAS18041	Finalised	27/03/2025
Assessment Revision		Assessment Type
0		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 SAI	Ecosystem credits
Hunter Coast Lowland Grey Myrtle Wet Forest												
4	3074_Mod-good	Not a TEC	67.6	67.6	0.49	PCT Cleared - 39%	High Sensitivity to Gain			1.50		12
											Subtotal	12

BAM Credit Summary Report

Hunter Coast Sandy Creekflat Low Paperbark Scrub												
3	3436_Mod -good	Not a TEC	28.7	28.7	1.3	PCT Cleared - 52%	High Sensitivity to Gain			1.75		17
											Subtotal	17
Lower North White Mahogany-Spotted Gum Moist Forest												
1	3241_Mod -good	Not a TEC	68.7	68.7	8.1	PCT Cleared - 31%	High Sensitivity to Gain			1.50		208
											Subtotal	208
Northern Hinterland Tallowwood-Forest Oak Grassy Forest												
2	3254_Mod -good	Not a TEC	48.7	48.7	0.7	PCT Cleared - 5%	High Sensitivity to Gain			1.50		13
											Subtotal	13
											Total	250

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 SAIL	Species credits

BAM Credit Summary Report

<i>Calyptrorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo (Fauna)</i>									
3241_Mod-good	68.7	68.7	8.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	278
3254_Mod-good	48.7	48.7	0.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	17
3436_Mod-good	28.7	28.7	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	19
3074_Mod-good	67.6	67.6	0.49	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Vulnerable	False	17
								Subtotal	331
<i>Corybas dowlingii / Red Helmet Orchid (Flora)</i>									
3241_Mod-good	68.7	68.7	8.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	278
3254_Mod-good	48.7	48.7	0.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	17

BAM Credit Summary Report

3436_Mod-good	28.7	28.7	1.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	19
3074_Mod-good	67.6	67.6	0.49	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Not Listed	False	17
								Subtotal	331
<i>Ninox connivens / Barking Owl (Fauna)</i>									
3241_Mod-good	68.7	68.7	8.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	278
3254_Mod-good	48.7	48.7	0.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
3436_Mod-good	28.7	28.7	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	19
3074_Mod-good	67.6	67.6	0.49	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
								Subtotal	331

BAM Credit Summary Report

<i>Ninox strenua</i> / Powerful Owl (Fauna)									
3241_Mod-good	68.7	68.7	8.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	278
3254_Mod-good	48.7	48.7	0.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
3436_Mod-good	28.7	28.7	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	19
3074_Mod-good	67.6	67.6	0.49	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
								Subtotal	331
<i>Petaurus norfolcensis</i> / Squirrel Glider (Fauna)									
3241_Mod-good	68.7	68.7	8.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	278
3254_Mod-good	48.7	48.7	0.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17

BAM Credit Summary Report

3436_Mod-good	28.7	28.7	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	19
3074_Mod-good	67.6	67.6	0.49	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
								Subtotal	331
<i>Phascogale tapoatafa / Brush-tailed Phascogale (Fauna)</i>									
3241_Mod-good	68.7	68.7	8.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	278
3254_Mod-good	48.7	48.7	0.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
3436_Mod-good	28.7	28.7	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	19
3074_Mod-good	67.6	67.6	0.49	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
								Subtotal	331

BAM Credit Summary Report

<i>Phascolarctos cinereus / Koala (Fauna)</i>									
3241_Mod-good	68.7	68.7	8.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	278
3254_Mod-good	48.7	48.7	0.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	17
3436_Mod-good	28.7	28.7	1.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	19
3074_Mod-good	67.6	67.6	0.49	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Endangered	False	17
								Subtotal	331
<i>Planigale maculata / Common Planigale (Fauna)</i>									
3241_Mod-good	68.7	68.7	8.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	278

BAM Credit Summary Report

3254_Mod-good	48.7	48.7	0.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	17
3436_Mod-good	28.7	28.7	1.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	19
3074_Mod-good	67.6	67.6	0.49	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	17
								Subtotal	331
<i>Potorous tridactylus / Long-nosed Potoroo (Fauna)</i>									
3241_Mod-good	68.7	68.7	8.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	278
3254_Mod-good	48.7	48.7	0.7	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	17

BAM Credit Summary Report

3436_Mod-good	28.7	28.7	1.3	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	19
3074_Mod-good	67.6	67.6	0.49	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Vulnerable	False	17
								Subtotal	331
<i>Tyto novaehollandiae / Masked Owl (Fauna)</i>									
3241_Mod-good	68.7	68.7	8.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	278
3254_Mod-good	48.7	48.7	0.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
3436_Mod-good	28.7	28.7	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	19
3074_Mod-good	67.6	67.6	0.49	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	17
								Subtotal	331

BAM Credit Summary Report

Tyto tenebricosa / Sooty Owl (Fauna)									
3241_Mod-good	68.7	68.7	8.1	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	417
3254_Mod-good	48.7	48.7	0.7	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	26
3436_Mod-good	28.7	28.7	1.3	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	28
3074_Mod-good	67.6	67.6	0.49	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	True	25
								Subtotal	496

BAM Candidate Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00013689/BAAS17104/23/00038751	Hillview BDAR	28/10/2024
Assessor Name	Report Created	BAM Data version *
Gilbert Whyte	27/03/2025	Current classification (live - default) (80)
Assessor Number	Assessment Type	BAM Case Status
BAAS18041	Major Projects	Finalised
Assessment Revision		Date Finalised
0		27/03/2025

* 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
<i>Angophora inopina</i> Charmhaven Apple	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Asperula asthenes</i> Trailing Woodruff	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Burhinus grallarius</i> Bush Stone-curlew	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

<i>Callistemon linearifolius</i> Netted Bottle Brush	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Callocephalon fimbriatum</i> Gang-gang Cockatoo	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Calyptorhynchus lathami lathami</i> South-eastern Glossy Black-Cockatoo	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Cercartetus nanus</i> Eastern Pygmy-possum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Chalinolobus dwyeri</i> Large-eared Pied Bat	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Corybas dowlingii</i> Red Helmet Orchid	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

<i>Crinia tinnula</i> Wallum Froglet	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Cynanchum elegans</i> White-flowered Wax Plant	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Diuris flavescens</i> Pale Yellow Doubletail	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Dromaius novaehollandiae</i> - endangered population Emu population in the New South Wales North Coast Bioregion and Port Stephens local government area	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Eucalyptus glaucina</i> Slaty Red Gum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Eucalyptus largeana</i> Craven Grey Box	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

<i>Grevillea guthrieana</i> Guthrie's Grevillea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Grevillea parviflora subsp. parviflora</i> Small-flower Grevillea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Haliaeetus leucogaster</i> White-bellied Sea-Eagle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Hoplocephalus stephensii</i> Stephens' Banded Snake	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Lindernia alsinoides</i> Noah's False Chickweed	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Litoria aurea</i> Green and Golden Bell Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

<i>Litoria brevipalmata</i> Green-thighed Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Melaleuca biconvexa</i> Biconvex Paperbark	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Melaleuca groveana</i> Grove's Paperbark	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Mixophyes balbus</i> Stuttering Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Mixophyes iteratus</i> Giant Barred Frog	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Myotis macropus</i> Southern Myotis	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

<i>Ninox connivens</i> Barking Owl	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Ninox strenua</i> Powerful Owl	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Notamacropus parma</i> Parma Wallaby	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Petauroides volans</i> Southern Greater Glider	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Petaurus norfolcensis</i> Squirrel Glider	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Petrogale penicillata</i> Brush-tailed Rock-wallaby	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

<i>Phascogale tapoatafa</i> Brush-tailed Phascogale	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Phascolarctos cinereus</i> Koala	Yes (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Planigale maculata</i> Common Planigale	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Pomaderris queenslandica</i> Scant Pomaderris	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Potorous tridactylus</i> Long-nosed Potoroo	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Pterostylis chaetophora</i> Pterostylis chaetophora	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

<i>Rhizanthella slateri</i> Eastern Australian Underground Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Rhizanthella slateri - endangered population</i> Rhizanthella slateri (Rupp) M.A. Clem. & Cribb in the Great Lakes local government area	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Rhodamnia rubescens</i> Scrub Turpentine	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Rhodomyrtus psidioides</i> Native Guava	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Solanum sulphureum</i> Manning Yellow Solanum	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Syzygium paniculatum</i> Magenta Lilly Pilly	No (surveyed) *Survey months are outside of the months specified in Bionet.	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☒ Survey month outside the specified months?

BAM Candidate Species Report

<i>Tetratheca juncea</i> Black-eyed Susan	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Turnix maculosus</i> Red-backed Button-quail	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Tyto novaehollandiae</i> Masked Owl	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Tyto tenebricosa</i> Sooty Owl	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Uperoleia mahonyi</i> Mahony's Toadlet	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☒ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?
<i>Vespadelus trougtoni</i> Eastern Cave Bat	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☒ Nov ☐ Dec ☐ Survey month outside the specified months?

BAM Candidate Species Report

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
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	Habitat constraints
Coast Groundsel	<i>Senecio spathulatus</i>	Habitat constraints
Eastern Osprey	<i>Pandion cristatus</i>	Habitat constraints
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Habitat constraints
Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	Habitat constraints
Little Bent-winged Bat	<i>Miniopterus australis</i>	Habitat constraints
Little Eagle	<i>Hieraaetus morphnoides</i>	Habitat constraints
Regent Honeyeater	<i>Anthochaera phrygia</i>	Habitat constraints
Rufous Bettong	<i>Aepyprymnus rufescens</i>	Refer to BAR
Square-tailed Kite	<i>Lophoictinia isura</i>	Habitat constraints
Swift Parrot	<i>Lathamus discolor</i>	Habitat constraints



BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00013689/BAAS17104/23/00038751	Hillview BDAR	28/10/2024
Assessor Name	Report Created	BAM Data version *
Gilbert Whyte	27/03/2025	Current classification (live - default) (80)
Assessor Number	Assessment Type	BAM Case Status
BAAS18041	Major Projects	Finalised
Assessment Revision		Date Finalised
0		27/03/2025

* 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)
Barred Cuckoo-shrike	Coracina lineata	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
Black Bittern	Ixobrychus flavicollis	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Black-necked Stork	Ephippiorhynchus asiaticus	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest

BAM Predicted Species Report

Black-necked Stork	<i>Ephippiorhynchus asiaticus</i>	3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Brown Treecreeper (eastern subspecies)	<i>Climacteris picumnus victoriae</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Common Blossom-bat	<i>Syconycteris australis</i>	3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Diamond Firetail	<i>Stagonopleura guttata</i>	3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
Dusky Woodswallow	<i>Artamus cyanopterus cyanopterus</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Eastern Chestnut Mouse	<i>Pseudomys gracilicaudatus</i>	3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Eastern Coastal Free-tailed Bat	<i>Micronomus norfolkensis</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Eastern Osprey	<i>Pandion cristatus</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest

BAM Predicted Species Report

Eastern Osprey	<i>Pandion cristatus</i>	3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Flame Robin	<i>Petroica phoenicea</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Gang-gang Cockatoo	<i>Callocephalon fimbriatum</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Golden-tipped Bat	<i>Phoniscus papuensis</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Grey-crowned Babbler (eastern subspecies)	<i>Pomatostomus temporalis</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest

BAM Predicted Species Report

Large Bent-winged Bat	<i>Miniopterus orianae oceanensis</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Little Bent-winged Bat	<i>Miniopterus australis</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Little Eagle	<i>Hieraaetus morphnoides</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Little Lorikeet	<i>Glossopsitta pusilla</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
New Holland Mouse	<i>Pseudomys novaehollandiae</i>	3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Red-legged Pademelon	<i>Thylogale stigmatica</i>	3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
Regent Honeyeater	<i>Anthochaera phrygia</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Rose-crowned Fruit-Dove	<i>Ptilinopus regina</i>	3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
Scarlet Robin	<i>Petroica boodang</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest

BAM Predicted Species Report

Scarlet Robin	<i>Petroica boodang</i>	3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
South-eastern Glossy Black-Cockatoo	<i>Calyptrorhynchus lathami lathami</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
South-eastern Hooded Robin	<i>Melanodryas cucullata cucullata</i>	3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
Speckled Warbler	<i>Chthonicola sagittata</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Spotted Harrier	<i>Circus assimilis</i>	3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Spotted-tailed Quoll	<i>Dasyurus maculatus</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Square-tailed Kite	<i>Lophoictinia isura</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Superb Fruit-Dove	<i>Ptilinopus superbus</i>	3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
Swift Parrot	<i>Lathamus discolor</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Turquoise Parrot	<i>Neophema pulchella</i>	3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
Varied Sittella	<i>Daphoenositta chrysoptera</i>	3241-Lower North White Mahogany-Spotted Gum Moist Forest

BAM Predicted Species Report

Varied Sittella	Daphoenositta chrysoptera	3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
White-bellied Sea-Eagle	Haliaeetus leucogaster	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
White-throated Needle-tail	Hirundapus caudacutus	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Wompoo Fruit-Dove	Ptilinopus magnificus	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Yellow-bellied Glider	Petaurus australis	3241-Lower North White Mahogany-Spotted Gum Moist Forest
		3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest
		3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest
Yellow-bellied Sheath-tail-bat	Saccolaimus flaviventris	3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub
		3074-Hunter Coast Lowland Grey Myrtle Wet Forest

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	Assessment name	BAM data last updated *
00013689/BAAS17104/23/00038751	Hillview BDAR	28/10/2024
Assessor Name	Report Created	BAM Data version *
Gilbert Whyte	27/03/2025	Current classification (live - default) (80)
Assessor Number	Assessment Type	BAM Case Status
BAAS18041	Major Projects	Finalised
Assessment Revision		Date Finalised
0		27/03/2025

* 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	3241_Mod-good	3241-Lower North White Mahogany-Spotted Gum Moist Forest	Mod-good	8.09	3	MZ01 (8.09 ha)

BAM Vegetation Zones Report

2	3254_Mod-good	3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest	Mod-good	0.7	1	MZ02 (0.7 ha)
3	3436_Mod-good	3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub	Mod-good	1.32	1	MZ3 (1.32 ha)
4	3074_Mod-good	3074-Hunter Coast Lowland Grey Myrtle Wet Forest	Mod-good	0.49	1	MZ4 (0.49 ha)



BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00013689/BAAS17104/23/00038751	Hillview BDAR	28/10/2024
Assessor Name	Assessor Number	BAM Data version *
Gilbert Whyte	BAAS18041	Current classification (live - default) (80)
Proponent Names	Report Created	BAM Case Status
Michael Tripolone	27/03/2025	Finalised
Assessment Revision		Assessment Type
0		Major Projects
Date Finalised	* 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.	
27/03/2025		

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Tyto tenebricosa / Sooty Owl		

Additional Information for Approval

Assessment Id	Proposal Name	Page 1 of 9
00013689/BAAS17104/23/00038751	Hillview BDAR	



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
3241-Lower North White Mahogany-Spotted Gum Moist Forest	Not a TEC	8.1	208	0	208
3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest	Not a TEC	0.7	13	0	13
3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub	Not a TEC	1.3	0	17	17
3074-Hunter Coast Lowland Grey Myrtle Wet Forest	Not a TEC	0.5	12	0	12

BAM Biodiversity Credit Report (Like for like)

3074-Hunter Coast Lowland Grey Myrtle Wet Forest	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Dry Rainforests This includes PCT's: 388, 547, 616, 627, 1124, 1539, 1540, 1543, 2068, 2079, 3010, 3014, 3055, 3056, 3057, 3059, 3061, 3062, 3064, 3065, 3066, 3068, 3070, 3072, 3074, 3075, 3076, 3077, 3079, 3080, 3082, 3083, 3086, 3089, 3091, 3092, 3093, 3095, 3096, 3097, 3098, 3099, 3101, 3103, 3104, 3105, 3106, 3109, 3110, 3111, 3112, 3113, 3114, 3116, 3117, 3118, 3120, 3151, 3469, 4110, 4111, 4112, 4143, 4144	Dry Rainforests <50%	3074_Mod-good	Yes	12	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

3241-Lower North White Mahogany-Spotted Gum Moist Forest	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region
	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3241_Mod-good	Yes	208	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Like for like)

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3254_Mod-good	Yes	13	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Like for like)

	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 3431, 3433, 3436, 3437, 3439, 3442, 3444, 3446	Hunter-Macleay Dry Sclerophyll Forests >=50% and <70%	3436_Mod-good	No	17	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. 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
Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Corybas dowlingii / Red Helmet Orchid	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Ninox connivens / Barking Owl	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00

BAM Biodiversity Credit Report (Like for like)

Ninox strenua / Powerful Owl	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Petaurus norfolcensis / Squirrel Glider	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Phascogale tapoatafa / Brush-tailed Phascogale	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Phascolarctos cinereus / Koala	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Planigale maculata / Common Planigale	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Potorous tridactylus / Long-nosed Potoroo	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Tyto novaehollandiae / Masked Owl	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Tyto tenebricosa / Sooty Owl	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	496.00

BAM Biodiversity Credit Report (Like for like)

Credit Retirement Options		Like-for-like credit retirement options
Calyptrorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	Spp	IBRA subregion
	Calyptrorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	Any in NSW
Corybas dowlingii / Red Helmet Orchid	Spp	IBRA subregion
	Corybas dowlingii / Red Helmet Orchid	Any in NSW
Ninox connivens / Barking Owl	Spp	IBRA subregion
	Ninox connivens / Barking Owl	Any in NSW
Ninox strenua / Powerful Owl	Spp	IBRA subregion
	Ninox strenua / Powerful Owl	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW
Phascogale tapoatafa / Brush-tailed Phascogale	Spp	IBRA subregion
	Phascogale tapoatafa / Brush-tailed Phascogale	Any in NSW

BAM Biodiversity Credit Report (Like for like)

Phascolarctos cinereus / Koala	Spp	IBRA subregion
	Phascolarctos cinereus / Koala	Any in NSW
Planigale maculata / Common Planigale	Spp	IBRA subregion
	Planigale maculata / Common Planigale	Any in NSW
Potorous tridactylus / Long-nosed Potoroo	Spp	IBRA subregion
	Potorous tridactylus / Long-nosed Potoroo	Any in NSW
Tyto novaehollandiae / Masked Owl	Spp	IBRA subregion
	Tyto novaehollandiae / Masked Owl	Any in NSW
Tyto tenebricosa / Sooty Owl	Spp	IBRA subregion
	Tyto tenebricosa / Sooty Owl	Any in NSW



BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id

00013689/BAAS17104/23/00038751

Assessor Name

Gilbert Whyte

Proponent Name(s)

Michael Tripolone

Assessment Revision

0

Date Finalised

27/03/2025

Proposal Name

Hillview BDAR

Assessor Number

BAAS18041

Report Created

27/03/2025

BAM data last updated *

28/10/2024

BAM Data version *

Current classification (live - default) (80)

BAM Case Status

Finalised

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.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		
Species		
Tyto tenebricosa / Sooty Owl		

Additional Information for Approval

PCT Outside Ibra Added

None added

BAM Biodiversity Credit Report (Variations)

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
3241-Lower North White Mahogany-Spotted Gum Moist Forest	Not a TEC	8.1	208	0	208.00
3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest	Not a TEC	0.7	13	0	13.00
3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub	Not a TEC	1.3	0	17	17.00
3074-Hunter Coast Lowland Grey Myrtle Wet Forest	Not a TEC	0.5	12	0	12.00

3074-Hunter Coast Lowland Grey Myrtle Wet Forest	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Variations)

	Dry Rainforests This includes PCT's: 388, 547, 616, 627, 1124, 1539, 1540, 1543, 2068, 2079, 3010, 3014, 3055, 3056, 3057, 3059, 3061, 3062, 3064, 3065, 3066, 3068, 3070, 3072, 3074, 3075, 3076, 3077, 3079, 3080, 3082, 3083, 3086, 3089, 3091, 3092, 3093, 3095, 3096, 3097, 3098, 3099, 3101, 3103, 3104, 3105, 3106, 3109, 3110, 3111, 3112, 3113, 3114, 3116, 3117, 3118, 3120, 3151, 3469, 4110, 4111, 4112, 4143, 4144	Dry Rainforests <50%	3074_Mod-good	Yes	12	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Rainforests	Tier 4 or higher threat status	3074_Mod-good	Yes (including artificial)	12	IBRA Region: NSW North Coast, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3241-Lower North White Mahogany-Spotted Gum Moist Forest	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Variations)

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3241_Mod-good	Yes	208	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Wet Sclerophyll Forests (Grassy sub-formation)	Tier 4 or higher threat status	3241_Mod-good	Yes (including artificial)	208	IBRA Region: NSW North Coast, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3254-Northern Hinterland Tallowwood-Forest Oak Grassy Forest	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Variations)

	Northern Hinterland Wet Sclerophyll Forests This includes PCT's: 3063, 3069, 3094, 3115, 3144, 3152, 3155, 3167, 3170, 3179, 3230, 3231, 3232, 3233, 3234, 3235, 3236, 3237, 3238, 3239, 3240, 3241, 3242, 3243, 3244, 3245, 3246, 3247, 3248, 3249, 3250, 3251, 3252, 3253, 3254, 3255, 3256, 3257, 3258, 3259, 3260, 3261, 3262, 3263, 3264, 3285, 4109	Northern Hinterland Wet Sclerophyll Forests <50%	3254_Mod-good	Yes	13	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options					
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Wet Sclerophyll Forests (Grassy sub-formation)	Tier 4 or higher threat status	3254_Mod-good	Yes (including artificial)	13	IBRA Region: NSW North Coast, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
3436-Hunter Coast Sandy Creekflat Low Paperbark Scrub	Like-for-like credit retirement options					
	Class	Trading group	Zone	HBT	Credits	IBRA region

BAM Biodiversity Credit Report (Variations)

	Hunter-Macleay Dry Sclerophyll Forests This includes PCT's: 1608, 3431, 3433, 3436, 3437, 3439, 3442, 3444, 3446	Hunter-Macleay Dry Sclerophyll Forests >=50% and <70%	3436_Mod-good	No	17	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Variation options						
	Formation	Trading group	Zone	HBT	Credits	IBRA region
	Dry Sclerophyll Forests (Shrub/grass sub-formation)	Tier 3 or higher threat status	3436_Mod-good	No	17	IBRA Region: NSW North Coast, 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
Calyptrorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Corybas dowlingii / Red Helmet Orchid	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Ninox connivens / Barking Owl	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Ninox strenua / Powerful Owl	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00

BAM Biodiversity Credit Report (Variations)

Petaurus norfolcensis / Squirrel Glider	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Phascogale tapoatafa / Brush-tailed Phascogale	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Phascolarctos cinereus / Koala	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Planigale maculata / Common Planigale	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Potorous tridactylus / Long-nosed Potoroo	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Tyto novaehollandiae / Masked Owl	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	331.00
Tyto tenebricosa / Sooty Owl	3241_Mod-good, 3254_Mod-good, 3436_Mod-good, 3074_Mod-good	10.6	496.00

Credit Retirement Options

Like-for-like options

Calyptorhynchus lathami lathami / South-eastern Glossy Black-Cockatoo	Spp	IBRA region
	Calyptorhynchus lathami lathami /South-eastern Glossy Black-Cockatoo	Any in NSW

BAM Biodiversity Credit Report (Variations)

Calyptrorhynchus lathami lathami/ South-eastern Glossy Black-Cockatoo	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Corybas dowlingii/ Red Helmet Orchid	Spp		IBRA region
	Corybas dowlingii/ Red Helmet Orchid		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Flora	Endangered	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Variations)

Ninox connivens/ Barking Owl	Spp		IBRA region
	Ninox connivens /Barking Owl		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox strenua/ Powerful Owl	Spp		IBRA region
	Ninox strenua /Powerful Owl		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

BAM Biodiversity Credit Report (Variations)

	Fauna	Vulnerable	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Petaurus norfolcensis / Squirrel Glider	Spp		IBRA region
	Petaurus norfolcensis /Squirrel Glider		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Phascogale tapoatafa / Brush-tailed Phascogale	Spp		IBRA region
	Phascogale tapoatafa /Brush-tailed Phascogale		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing	IBRA region

BAM Biodiversity Credit Report (Variations)

		under Part 4 of the BC Act shown below	
	Fauna	Vulnerable	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Phascolarctos cinereus/ Koala	Spp		IBRA region
	Phascolarctos cinereus /Koala		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Endangered	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Planigale maculata/ Common Planigale	Spp		IBRA region
	Planigale maculata /Common Planigale		Any in NSW
	Variation options		

BAM Biodiversity Credit Report (Variations)

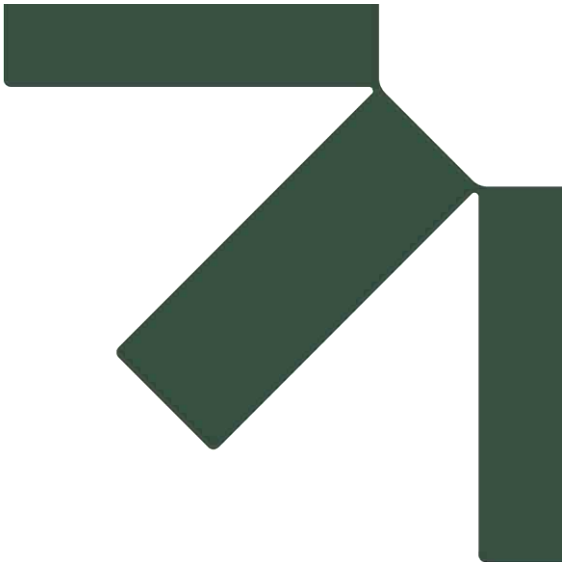
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Potorous tridactylus / Long-nosed Potoroo	Spp		IBRA region
	Potorous tridactylus /Long-nosed Potoroo		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tyto novaehollandiae / Masked Owl	Spp		IBRA region

BAM Biodiversity Credit Report (Variations)

	Tyto novaehollandiae /Masked Owl		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region
	Fauna	Vulnerable	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tyto tenebricosa / Sooty Owl	Spp		IBRA region
	Tyto tenebricosa /Sooty Owl		Any in NSW
	Variation options		
	Kingdom	Any species with same or higher category of listing under Part 4 of the BC Act shown below	IBRA region

BAM Biodiversity Credit Report (Variations)

	Fauna	Vulnerable	Karuah Manning, Hunter, Macleay Hastings, Mummel Escarpment and Upper Hunter. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.



Appendix F Threatened Biota – Likelihood of Occurrence

Biodiversity Development Assessment Report

Hillview Hard Rock Quarry

Coastwide Materials Pty Ltd

SLR Project No.: 630.V12117.00600

27 March 2025

KEY	Description
Status	The “ <i>threatened species</i> ” or “ <i>endangered ecological community</i> ” listing in the <i>Biodiversity Conservation Act 2016</i>
V	Species listed as “ <i>Vulnerable</i> ”
E1	Species listed as “ <i>Endangered</i> ”
E4A	Species listed as “ <i>Critically Endangered</i> ”
E2	An “ <i>endangered population</i> ”
E	An EEC listed as “ <i>endangered</i> ”
CE	An EEC listed as “ <i>critically endangered</i> ”
PE	Presumed Extinct
Status	The “ <i>threatened species</i> ” or “ <i>endangered ecological community</i> ” listing under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>
V	Species listed as “ <i>Vulnerable</i> ”
E	Species listed as “ <i>Endangered</i> ”
CE	Species listed as “ <i>Critically Endangered</i> ”
M	Species listed as “ <i>Migratory</i> ”
MR	Species listed as “ <i>Marine</i> ”
On site	Yes/No
LoO	Likelihood or Occurrence - the probability of a threatened species occurring on the site
P	Present or recorded on the Project Site
H	High likelihood of occurrence
M	Moderate likelihood of occurrence
L	Low likelihood of occurrence
N	No potential relevance
Source	Data Source
BAM	Sourced from the BAM tool (Candidate threatened species)
BioNet	Sourced from OEH Wildlife Atlas
PMST	Sourced from Protected Matters Search Tool
SLR	Sourced from SLR field data and reports
The table below contains data from the Biodiversity Data Collection, retrieved from the BAM Credit Calculator and data obtained from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°; ^^ rounded to 0.01°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Licensed Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed Entities in selected area [North: -33.76 West: 147.28 East: 147.38 South: -33.86] returned a total of 11 records of 5 species. Migratory wetland species and listed marine species have been excluded given that these are not relevant to the assessment (lack of available habitat within the Project Site). Report generated on 22/11/2018 13:33 AM.	



Threatened Ecological Communities

Scientific Name	BC Act	EPBC Act	Habitat Association	Presence/Absence	Source
Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions	EEC	V	Occurs on landward side of mangrove stands in intertidal zones along the shores of estuaries and lagoons that are permanently or intermittently open to the sea. Characterised by <i>Baumea juncea</i> , <i>Juncus kraussii</i> , <i>Sarcocornia quinqueflora</i> , <i>Sporobolus virginicus</i> , <i>Triglochin striata</i> , <i>Isolepis nodosa</i> , <i>Samolus repens</i> , <i>Selliera radicans</i> , <i>Suaeda australis</i> and <i>Zoysia macrantha</i> , with occasional scattered mangroves occurring throughout the saltmarsh. Saltpans and tall reeds may also occur.	N - Absent within Project Site	BioNet
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	Occurs in coastal areas subject to periodic flooding with standing fresh water for at least part of the year. Typically, on silts, muds or humic loams below 20 m elevation in low-lying parts of floodplains, alluvial flats, depressions, drainage lines, backswamps, lagoons and lakes. Structure and composition varies spatially and temporally depending on the water regime, though is usually dominated by herbaceous plants and has few woody species.	N - Absent within Project Site. Note that the dams within the Project Site are constructed	BioNet
Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	EEC	-	Occurs in the lower Hunter Valley, growing on Permian sediments on gentle slopes of depressions and drainage flats of the valley floor. Open forest dominated by <i>Eucalyptus tereticornis</i> and <i>E. punctata</i> , over an open shrub layer commonly including <i>Breynia oblongifolia</i> , <i>Leucopogon juniperinus</i> , <i>Daviesia ulicifolia</i> and <i>Jacksonia scoparia</i> . Ground cover comprises grasses and herbs.	Absent within Project Site	BioNet
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	EEC	CEEC	Occurs along the NSW coast, usually within 2 km of the ocean on a variety of substrates. Variable structure and composition, typically with closed canopy.	Absent within Project Site	BioNet



Scientific Name	BC Act	EPBC Act	Habitat Association	Presence/Absence	Source
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	EEC	CEEC	The Hawkesbury River notionally marks the southern limit of Lowland Rainforest in the NSW North Coast and Sydney Basin bioregions. South of the Sydney metropolitan area, Lowland Rainforest is replaced by Illawarra Subtropical Rainforest of the Sydney Basin Bioregion, which is listed as an endangered ecological community. Milton Ulladulla Subtropical Rainforest is also a related rainforest endangered ecological community that occurs still further south in the South East Corner Bioregion. Lowland Rainforest, in a relatively undisturbed state, has a closed canopy, characterised by a high diversity of trees whose leaves may be mesophyllous and encompass a wide variety of shapes and sizes. Typically, the trees form three major strata: emergents, canopy and sub-canopy which, combined with variations in crown shapes and sizes results in an irregular canopy appearance. The trees are taxonomically diverse at the genus and family levels, and some may have buttressed roots. A range of plant growth forms are present in Lowland Rainforest, including palms, vines and vascular epiphytes. In disturbed stands of this community the canopy cover may be broken, or the canopy may be smothered by exotic vines.	Absent within Project Site	BioNet
Lowland Rainforest on Floodplain in the NSW North Coast Bioregion	EEC	CEEC	Lowland Rainforest on Floodplain generally occupies riverine corridors and alluvial flats with rich, moist silts often in sub-catchments dominated by basic volcanic substrates. Major examples once occurred, and remnants remain, on the floodplains of the Tweed, Richmond, Clarence, Bellinger, Macleay, Hastings, Manning, and Hunter Rivers. Other minor river systems also support the community. Lowland Rainforest on Floodplain is a rainforest community which now occurs only as small remnants in scattered localities on the NSW north coast, with less than 1000ha in total thought to remain. Larger stands of the community typically have a dense canopy, which blocks most light from reaching the ground, creating cool, moist conditions within. Lowland Rainforest on Floodplain supports a rich diversity of plants and animals.	Absent within Project Site	BioNet



Scientific Name	BC Act	EPBC Act	Habitat Association	Presence/Absence	Source
River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	EEC	-	Occurs on flats, drainage lines and river terraces of coastal floodplains where flooding is periodic and soils generally rich in silt, lack deep humic layers and have little or no saline (salt) influence. Occurs south from Port Stephens in the NSW North Coast, Sydney Basin and South East Corner bioregions. Characterised by a tall open canopy layer of eucalypts with variable species composition.	Absent within Project Site	BioNet
Subtropical Coastal Floodplain Forest of the New South Wales North Coast Bioregion	EEC	-	This subtropical forest occurs on the coastal floodplains of the North Coast of NSW. It has a tall open tree layer of eucalypts, angophoras, melaleucas and bloodwoods, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. Occupies central or marginal parts of floodplains and sandy flats, including Pleistocene back-barrier flats; habitats where flooding is periodic and soils are rich in silt and sand, sometimes humic, and show little influence of saline ground water. Associated with clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. Generally occurs below 50 m, but may occur on localised river flats up to 250 m elevation.	Absent within Project Site	BioNet
Swamp Oak Floodplain Forest of the NSW North Coast, Sydney basin and South East Corner Bioregions	EEC	EEC	Typically occurs below 20m asl on waterlogged or periodically inundated flats, drainage lines, lake margins and estuarine fringes on coastal floodplains of NSW. Associated with grey-black clay-loams and sandy loams, saline or sub-saline groundwater. Structure variable from open forests to scrubs or reedlands with scattered trees. Canopy dominated by <i>Casuarina glauca</i> (north of Bermagui) or <i>Melaleuca ericifolia</i> (south of Bermagui). Understorey characterised by frequent occurrences of vines, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter.	Absent within Project Site	BioNet



Scientific Name	BC Act	EPBC Act	Habitat Association	Presence/Absence	Source
Swamp Sclerophyll Forest on Coastal floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions	EEC	-	Usually occurs below 20m asl (sometimes up to 50m). Associated with humic clay loams and sandy loams, on waterlogged or periodically inundated alluvial flats and drainage lines associated with coastal floodplains. Characterised by open to dense tree layer of eucalypts and paperbarks, with trees up to or higher than 25 m. Includes areas of fern land and tall reed or sedge land, where trees are sparse or absent.	Absent within Project Site	BioNet
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	EEC	-	Themeda Grassland on seacliffs and coastal headlands is found on a range of substrates in the NSW North Coast, Sydney Basin and South East Corner bioregions. The community is found on a range of substrates, although stands on sandstone are infrequent and small. Larger stands are found on old sand dunes above cliffs, for example at Cape Banks and Henry Head in Botany Bay National Park, and on metasedimentary are rarely adamellite headlands on the north coast. Individual stands of the community are often very small, a few square metres, but at some sites larger stands of up to several hectares or tens of hectares occur. Overall, the community therefore has a highly restricted geographic distribution comprising small, but widely scattered patches.	Absent within Project Site	BioNet



Threatened Flora

Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
<i>Asperula asthenes</i>	Trailing Woodruff	V	V	A small herb that only occurs in NSW. Found scattered from Bulahdelah to Kempsey further north. It is often found in damp sites along riverbanks.	M – suitable habitat present; however, not detected during field surveys.	BioNet (6 records)
<i>Cynanchum elegans</i>	White-flowered Wax Plant	E	E	Occurs from Gerroa (Illawarra) to Brunswick Heads and West to Merriwa in the Upper Hunter. Most common near Kempsey. Usually occurs on the edge of dry rainforest or littoral rainforest, but also occurs in Coastal banksia Scrub, open forest and woodland, and Melaleuca scrub. Soil and geology types are not limiting.	M – Project Site contains dry rainforest; however, not detected during field surveys and no local records.	BAM (Candidate Species)
<i>Callistemon linearifolius</i>	Netted Bottle Brush	V	-	Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. Grows in dry sclerophyll forest on the coast and adjacent ranges.	L – A readily identifiable species that was not detected within the Project Site.	BAM (Candidate Species) BioNet (13 record).
<i>Cryptostylis hunteriana</i>	Leafless Tongue Orchid	V	V	Does not appear to have well defined habitat preferences and is known from a range of communities, including swamp-heath and woodland. The larger populations typically occur in woodland dominated by Scribbly Gum (<i>Eucalyptus sclerophylla</i>), Silvertop Ash (<i>E. sieberi</i>), Red Bloodwood (<i>Corymbia gummifera</i>) and Black She oak (<i>Allocasuarina littoralis</i>); appears to prefer open areas in the understorey of this community and is often found in association with the Large Tongue Orchid (<i>C. subulata</i>) and the Tartan Tongue Orchid (<i>C. erecta</i>).	L – No suitable habitat present and no local records.	BAM (Candidate Species)
<i>Eucalyptus glaucina</i>	Slaty Red Gum	V	V	Distribution restricted to the North coast of NSW. Grows in grassy woodland and dry eucalypt forest, on deep, fertile and well-watered soils.	L – A readily identifiable species that was not detected within the Project Site.	BAM (Candidate Species) BioNet (2 records).



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
<i>Grevillea guthrieana</i>	Guthrie's Grevillea	E	E	Known from the north coast of NSW, at Booral near Bulahdelah and on the Carrai Plateau, south-west of Kempsey. Grows along creeks and cliff lines in eucalypt forest, on granitic or sedimentary soil.	L – A readily identifiable species that was not detected within the Project Site.	BAM (Candidate Species) BioNet (6 records).
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Small-flower Grevillea	V	V	Grows in sandy or light clay soils usually over thin shales, often with lateritic ironstone gravels and nodules. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. In Sydney it has been recorded from Shale Sandstone Transition Forest and in the Hunter in Kurri Sand Swamp Woodland. However, other communities occupied include <i>Corymbia maculata</i> - <i>Angophora costata</i> open forest in the Dooralong area, in Sydney Sandstone Ridgetop Woodland at Wedderburn and in Cooks River / Castlereagh Ironbark Forest at Kemps Creek.	L – A readily identifiable species when in flower. Was not detected within the Project Site and no local records.	BAM (Candidate Species)
<i>Melaleuca biconvexa</i>	Biconvex Paperbark	V	V	Biconvex Paperbark is only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	L – A readily identifiable species that was not detected within the Project Site and no local records.	BAM (Candidate Species)
<i>Pomaderris queenslandica</i>	Scant Pomaderris	E	-	This species has a scattered distribution in north-east NSW and Queensland. The species is found in moist eucalypt forest and sheltered woodlands with a shrubby understorey. Occasionally found along creeks also.	M – Project Site contains suitable habitat; however, not detected during field surveys and no local records.	BAM (Candidate Species)
<i>Pterostylis chaetophora</i>	-	V	-	The preferred habitat is seasonally moist, dry sclerophyll forest with a grass and shrub understorey. Flowers from September to November.	L – suitable habitat within the Project Site, but no local	BAM (Candidate Species)



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
					records; not recorded on site.	
<i>Rhizanthella slateri</i>	Eastern Australian Underground Orchid	V	E	Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed.	M – Project Site contains suitable habitat; however, not detected during field surveys and no local records.	BAM (Candidate Species)
<i>Senna acclinis</i>	Rainforest Cassia	E	-	Grows on the margins of subtropical, littoral and dry rainforests. Often found as a gap phase shrub.	M –suitable dry rainforest habitat; however, not detected during field surveys and no local records.	BAM (Candidate Species)
<i>Tetradlea juncea</i>	Black-eyed Susan	V	V	It is usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However, it has also been recorded in heathland and moist forest. The majority of populations occur on low nutrient soils associated with the Awaba Soil Landscape.	L – some suitable habitat present; readily identifiable during flowering; not detected within Project Site.	BAM (Candidate Species) BioNet
<i>Thesium australe</i>	Austral Toadflax	V	V	Found in small, scattered populations along the east coast, northern and southern tablelands. Occurs in grassland or grassy woodland, and is often found in association with Kangaroo Grass (<i>Themeda australis</i>).	L – No suitable habitat identified within the Project Site and no local records.	BAM (Candidate Species)
<i>Allocasuarina defungens</i>	Dwarf Heath Casuarina	E	E	Grows in a humid warm-temperate sub-tropical climate. Often found in coastal areas of wet to dry, dense, low, closed heathland.	M – no suitable habitat; not detected during field surveys.	BioNet (2 records)
<i>Grammitis stenophylla</i>	Narrow-leaf Finger Fern	E	-	Usually in mid to upper montane rainforest and wet-sclerophyll forest.	M –limited wet sclerophyll habitat	BioNet (1 record)



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
					present ; however, not detected during field surveys.	
<i>Angophora inopina</i>	Charmhaven Apple	V	V	This species is locally frequent in open, dry sclerophyll woodland, on deep, white, sandy loam to clay-loam soils on sandstone with some gravelly laterite.	L – A readily identifiable species that was not detected within the Project Site.	BAM (Candidate Species), BioNet (1 record)
<i>Rhodamnia rubescens</i>	Scrub Turpentine	E	CE	Subtropical rainforest, dry rainforest and on margins of rainforest and open forest.	L - No suitable habitat identified within the Project Site.	BAM (Candidate Species), BioNet (2 record)
<i>Syzygium paniculatum</i>	Magenta Lilly Pilly	E	V	Grows along the coast of NSW, in subtropical and littoral rainforest, as well as dunes behind the beach.	L – A readily identifiable species that was not detected within the Project Site.	BAM (Candidate Species), BioNet (1 record)



Threatened Fauna

Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
Aves						
<i>Anthochaera phrygia</i>	Regent Honeyeater	CE	E	In NSW confined to two known breeding areas: the Capertee Valley and Bundarra-Barraba region. Non-breeding flocks occasionally seen in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests, presumably in response to drought. Inhabits dry open forest and woodlands, particularly Box-Ironbark woodland and riparian forests of River She-oak, with an abundance of mature trees, high canopy cover and abundance of mistletoes.	L – Foraging habitat identified within the Project Site, but no individuals identified during the field assessment and no local records.	BAM (Candidate Species)
<i>Burhinus grallarius</i>	Bush Stone-curlew	E	-	Inhabits open forests and woodlands with a sparse grassy ground layer and fallen timber. Largely nocturnal, being especially active on moonlit nights.	L – Foraging habitat identified within the Project Site, but no individuals identified during the field assessment and no local records.	BAM (Candidate Species)
<i>Calyptorhynchus lathamii</i>	Glossy Black-Cockatoo	V	-	Widespread but uncommon from coast to southern tablelands and central western plains. Feeds almost exclusively on the seeds of Allocasuarina species. Prefers woodland and open forests, rarely away from Allocasuarina. Roost in leafy canopy trees, preferably eucalypts, usually <1 km from feeding site. Nests in large (approx. 20 cm) hollows in trees, stumps or limbs, usually in Eucalypts.	P – Foraging habitat identified within the Project Site. Individuals also identified during the previous field assessment by Keystone (2017).	BioNet



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
<i>Coracina lineata</i>	Barred Cuckoo-shrike	V	-	Rainforest, eucalypt forests and woodlands, clearings in secondary growth, swamp woodlands and timber along watercourses. They are usually seen in pairs or small flocks foraging among foliage of trees for insects and fruit. They are active birds, frequently moving from tree to tree.	M – Foraging habitat identified within the Project Site, but no individuals identified during the field assessment.	BioNet
<i>Daphoenositta chrysoptera</i>	Varied Sittella	V	-	Sedentary, occurs across NSW from the coast to the far west. Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Sensitive to habitat isolation and loss of structural complexity, and adversely affected by dominance of Noisy Miners. Cleared agricultural land is potentially a barrier to movement. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	P – Habitat identified within the Project Site. Individuals also identified during the field assessment	BioNet
<i>Ephippiorhynchus asiaticus</i>	Black-necked Stork	E	-	Primarily inhabits permanent freshwater wetlands and surrounding vegetation including swamps, floodplains, watercourses and billabongs, freshwater meadows, wet heathland, farm dams and shallow floodwaters. Will also forage in intertidal shorelines, mangrove margins and estuaries. Feeds in shallow, still water. This species breeds during summer, nesting in or near a freshwater swamp	M- Foraging habitat identified within the Project Site (constructed dams may provide feeding opportunities).	BioNet
<i>Glossopsitta pusilla</i>	Little Lorikeet	V	-	Occurs from coast to western slopes of the Great Dividing Range. Inhabits dry, open eucalypt forests and woodlands. Occurrence is positively associated with patch size, and with components	P – Habitat identified within the Project Site. Individuals also	Survey



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
				of habitat complexity including canopy cover, shrub cover, ground cover, logs, fallen branches and litter. Feed primarily on profusely-flowering eucalypts and a variety of other species including melaleucas and mistletoes. On the western slopes and tablelands <i>Eucalyptus albens</i> and <i>E. melliodora</i> are particularly important food sources for pollen and nectar, respectively. Mostly nests in small (opening approx. 3cm) hollows in living, smooth-barked eucalypts, especially <i>Eucalyptus viminalis</i> , <i>E. blakelyi</i> and <i>E. dealbata</i> . Most breeding records are from the western slopes.	identified during the field assessment.	
<i>Haliaeetus leucogaster</i>	White-bellied Sea-Eagle	V	-	Habitats are characterised by the presence of large areas of open water including larger rivers, swamps, lakes, and the sea. Occurs at sites near the sea or sea-shore, such as around bays and inlets, beaches, reefs, lagoons, estuaries and mangroves; and at, or in the vicinity of freshwater swamps, lakes, reservoirs, billabongs and saltmarsh.	L – No suitable habitat identified within the Project Site.	BAM (Candidate Species) BioNet
<i>Hieraaetus morphnoides</i>	Little Eagle	V	-	Occurs throughout NSW except most densely forested parts of the Dividing Range escarpment. Occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. She-oak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.	L – Hunting habitat identified within the Project Site, but no individuals identified during the field assessment and no local records.	BAM (Candidate Species)
<i>Lophoictinia isura</i>	Square-tailed Kite	V	V	Occurs across NSW, resident in North, northeast and along west-flowing rivers. Summer breeding migrant to southeast of state. Inhabits a variety of habitats including woodlands and open forests,	L – Hunting habitat identified within the Project Site, but	BAM (Candidate Species)



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
				with preference for timbered watercourses. Favours productive forests on the coastal plain, box-ironbark-gum woodlands on the inland slopes, and Coolibah/River Red Gum on the inland plains. In Sydney area nests in mature living trees within 100m of ephemeral/permanent watercourse. Large home range > 100 km.	no individuals identified during the field assessment and no local records.	
<i>Thinornis rubricollis</i>	Hooded Plover	E	V	In south-eastern Australia Hooded Plovers prefer sandy ocean beaches, especially those that are broad and flat, with a wide wave-wash zone for feeding, much beachcast seaweed, and backed by sparsely vegetated sand-dunes for shelter and nesting. Occasionally Hooded Plovers are found on tidal bays and estuaries, rock platforms and rocky or sand-covered reefs near sandy beaches, and small beaches in lines of cliffs. They regularly use near-coastal saline and freshwater lakes and lagoons, often with saltmarsh.	N -No suitable habitat identified within the Project Site.	BioNet
<i>Turnix maculosus</i>	Red-backed Button Quail	V	-	Over their Australian range, Red-backed Button-quail inhabit grasslands, open and savannah woodlands with grassy ground layer, pastures and crops of warm temperate areas, typically only in regions subject to annual summer rainfall greater than 400 mm. In NSW, said to occur in grasslands, heath and crops. Said to prefer sites close to water, especially when breeding. The species has been observed associated with the following grasses (in various vegetation formations): Speargrass <i>Heteropogon</i> , Blady Grass <i>Imperata cylindrica</i> , <i>Triodia</i> , <i>Sorghum</i> , and Buffel Grass <i>Cenchrus ciliaris</i> .	L – No suitable habitat identified within the Project Site and no local records.	BAM (Candidate Species)
<i>Tyto longimembris</i>	Grass Owl	V	-	Eastern Grass Owls have been recorded occasionally in all mainland states of Australia but	L – No suitable habitat identified	BioNet



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
				are most common in northern and north-eastern Australia. In NSW they are more likely to be resident in the north-east. Eastern Grass Owl numbers can fluctuate greatly, increasing especially during rodent plagues. Eastern Grass Owls are found in areas of tall grass, including grass tussocks, in swampy areas, grassy plains, swampy heath, and in cane grass or sedges on flood plains.	within the Project Site.	
<i>Tyto novaehollandiae</i>	Masked Owl	V	-	Occurs across NSW except NW corner. Most common on the coast. Inhabits dry eucalypt woodlands from sea level to 1100 m. Roosts and breeds in large (>40cm) hollows and sometime caves in moist eucalypt forested gullies. Hunts along the edges of forests and roadsides. Home range between 500 ha and 1000 ha. Prey mostly terrestrial mammals but arboreal species may also be taken.	M – Hunting habitat identified within the Project Site, but no individuals identified during the field assessment.	BioNet
<i>Tyto tenebricosa</i>	Sooty Owl	V	-	Occurs in the coastal, escarpment and tablelands regions of NSW. More common in the north and absent from the western tablelands and further west. Inhabits tall, moist eucalypt forests and rainforests, and are strongly associated with sheltered gullies, particularly those with tall rainforest understorey. Roosts in tree hollows, amongst dense foliage in gullies or in caves, recesses or ledges of cliffs or banks. Nest in large (>40cm wide, 100cm deep) tree hollows in unlogged/unburnt gullies within 100m of streams or in caves.	M – Hunting habitat identified within the Project Site, but no individuals identified during the field assessment and no local records.	BAM (Candidate Species)



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
Mammals						
<i>Aepyprymnus rufescens</i>	Rufous Bettong	V	-	Rufous Bettongs inhabit a variety of forests from tall, moist eucalypt forest to open woodland, with a tussock grass understorey. A dense cover of tall native grasses is the preferred shelter.	L – Habitat identified within the Project Site, but no individuals identified during the field assessment and no local records.	BAM (Candidate Species)
<i>Cercartetus nanus</i>	Eastern Pygmy-possum	V	-	Found in a broad range of habitats from rainforest through sclerophyll (including Box-Ironbark) forest and woodland to heath, but in most areas woodlands and heath appear to be preferred, except in north-eastern NSW where they are most frequently encountered in rainforest. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes; an important pollinator of heathland plants such as banksias; soft fruits are eaten when flowers are unavailable.	M – Habitat identified within the Project Site, but no individuals identified during the field assessment and no local records	BAM (Candidate Species)
<i>Chalinolobus dwyeri</i>	Large-eared Pied Bat	V	V	Occurs from the coast to the western slopes of the divide. Largest numbers of records from sandstone escarpment country in the Sydney Basin and Hunter Valley (Hoye and Schulz 2008). Roosts in caves and mines and most commonly recorded from dry sclerophyll forests and woodlands. An insectivorous species that flies over the canopy or along creek beds (Churchill 2008). In southern Sydney appears to be largely restricted to the interface between sandstone escarpments and fertile valleys.	M – Foraging habitat identified within the Project Site, but no individuals identified during the field assessment and no local records.	BAM (Candidate Species)



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
<i>Dasyurus maculatus</i>	Spotted-tailed Quoll	V	E	Inhabits a range of environments including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline. Den sites are in hollow-bearing trees, fallen logs, small caves, rock crevices, boulder fields and rocky-cliff faces. Females occupy home ranges of up to 750 ha and males up to 3,500 ha, which are usually traversed along densely vegetated creek lines.	M -Habitat identified within the Project Site, but no individuals identified during the field assessment.	BioNet (3 records)
<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	V	-	Occurs on southeast coast and ranges. Prefers tall (>20m) and wet forest with dense understorey. Absent from small remnants, preferring continuous forest but can move through cleared landscapes and may forage in open areas. Roosts in hollow trunks of Eucalypts, underneath bark or in buildings. Forages in gaps and spaces within forest, with large foraging range (12km foraging movements recorded) (Churchill 2008, Law et al 2008).	P – Habitat identified within the Project Site. Individuals also identified during the field assessment.	BioNet (1 record)
<i>Macropus parma</i>	Parma Wallaby	V	-	Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. Typically feed at night on grasses and herbs in more open eucalypt forest and the edges of nearby grassy areas.	L – No suitable habitat identified within the Project Site and no local records.	BAM (Candidate Species)
<i>Miniopterus australis</i>	Little bent-wing Bat	V		Occurs from Cape York to Sydney. Inhabits rainforests, wet and dry sclerophyll forests, paperbark swamps and vine thickets. Only one maternity cave known in NSW, shared with Eastern Bentwing-bats at Willi Willi, near Kempsey. Outside breeding season roosts in caves, tunnels and mines and has been recorded in a tree hollow on one occasion. Forages for insects beneath the	M –Foraging habitat identified within the Project Site, but no individuals identified during	BioNet (3 records)



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
				canopy of well-timbered habitats (Churchill 2008, Hoyer and Hall 2008).	the field assessment.	
<i>Miniopterus schreibersii oceanensis</i>	Eastern Bentwing-bat	V	-	Generally, occurs east of the Great Dividing Range along NSW coast (Churchill 2008). Inhabits various habitats from open grasslands to woodlands, wet and dry sclerophyll forests and rainforest. Essentially a cave bat but may also roost in road culverts, stormwater tunnels and other man-made structures. Only 4 known maternity caves in NSW, near Wee Jasper, Bungonia, Kempsey and Texas. Females may travel hundreds of kilometres to the nearest maternal colony (Churchill 2008).	M –Foraging habitat identified within the Project Site, but no individuals identified during the field assessment.	BioNet (1 record)
<i>Mormopterus norfolkensis</i>	Eastern Freetail-bat	V	-	Occurs in dry sclerophyll forest and woodland east of the Great Dividing Range. Forages in natural and artificial openings in vegetation, typically within a few kilometres of its roost. Roosts primarily in tree hollows but also recorded from man-made structures or under bark (Churchill 2008).	M –Foraging habitat identified within the Project Site, but no individuals identified during the field assessment.	BioNet (1 record)
<i>Myotis macropus</i>	Southern Myotis	V		Mainly coastal but may occur inland along large river systems. Usually associated with permanent waterways at low elevations in flat/undulating country, usually in vegetated areas. Forages over streams and watercourses feeding on fish and insects from the water surface. Roosts in a variety of habitats including caves, mine shafts, hollow-bearing trees, stormwater channels, buildings, under bridges and in dense foliage, typically in close proximity to water (Campbell 2011). Breeds November or December (Churchill 2008)	M –Foraging habitat identified within the Project Site, but no individuals identified during the field assessment.	BioNet (1 record)



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
<i>Petaurus norfolcensis</i>	Squirrel Glider	V		Occurs along the drier inland slopes as well as coastal habitats. Inhabits woodland and open forest with a Eucalyptus, Corymbia or Angophora overstorey and a shrubby understorey of Acacia or Banksia. Key habitat components include reliable winter and early-spring flowering Eucalypts, Banksia or other nectar sources, and hollow-bearing trees for roost and nest sites (Quin, 1995; van der Ree, 2002), with social groups moving between multiple hollows. Social groups include one or two adult males and females with offspring, and have home ranges of 5-10ha within NSW (van der Ree, 2002)	P – Habitat identified within the Project Site. Individuals also identified during the field assessment	BAM (Candidate Species) BioNet (1 record)
<i>Petaurus australis</i>	Yellow-bellied Glider	V	-	The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. It occurs in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils.	P – Foraging habitat identified within the Project Site. Individuals also identified during the previous field assessment by Keystone (2017).	BioNet (1 record)
<i>Petrogale penicillata</i>	Brush-tailed Rock-wallaby	E	V	Occurs from the Shoalhaven north to the Queensland border. Now mostly extinct west of the Great Dividing Range, except in the Warrumbungles and Mt Kaputar. Occurs on rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges facing north. Diet consists of vegetation in adjacent to rocky areas eating grasses and forbs as well as the foliage and fruits of shrubs and trees.	L – No suitable habitat identified within the Project Site and no local records.	BAM (Candidate Species)



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
<i>Phascogale tapoatafa</i>	Brush-tailed Phascogale			Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. An agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater.	M –Habitat identified within the Project Site, but no individuals identified during the field assessment and no local records.	BAM (Candidate Species)
<i>Phascolarctos cinereus</i>	Koala	V	-	Occurs from coast to inland slopes and plains. Restricted to areas of preferred feed trees in eucalypt woodlands and forests. Home range varies depending on habitat quality, from < 2 to several hundred hectares.	L – No suitable habitat identified within the Project Site (Koala feed tree species comprise less than 15% of the canopy of most forested areas).	BAM (Candidate Species) BioNet (24 records)
<i>Planigale maculata</i>	Common Planigale	V	-	Common Planigales inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is surface cover, and usually close to water. They are active at night and during the day shelter in saucer-shaped nests built in crevices, hollow logs, beneath bark or under rocks.	M –Habitat identified within the Project Site, but no individuals identified during the field assessment and no local records.	BAM (Candidate Species)
<i>Scoteanax rueppellii</i>	Greater Broad-nosed Bat	V	-	Occurs on the east coast and Great Dividing Range. Inhabits a variety of habitats from woodland to wet and dry sclerophyll forests and rainforest, also remnant paddock trees and timber-lined creeks, typically below 500m asl. Forages in	M –Foraging habitat identified within the Project Site, but no individuals	BioNet (1 record)

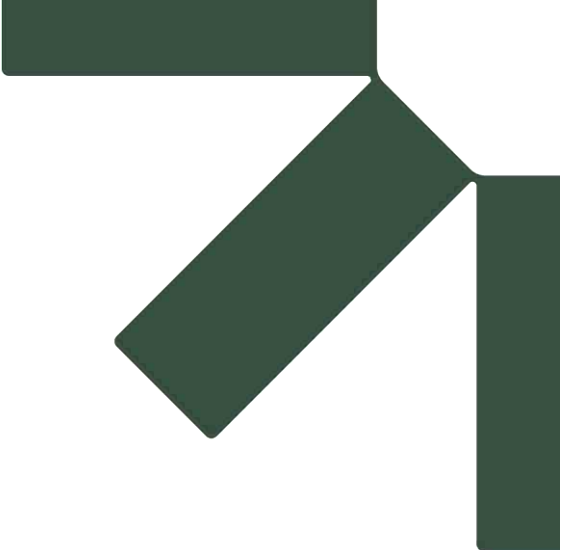


Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
				relatively uncluttered areas, using natural or man-made openings in denser habitats. Usually roosts in tree hollows or fissures but also under exfoliating bark or in the roofs of old buildings. Females congregate in maternal roosts in suitable hollow trees (Hoye and Richards 2008, Churchill 2008).	identified during the field assessment.	
<i>Vespadelus troughtoni</i>	Eastern Cave Bat	V	-	The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals.	M –Foraging habitat identified within the Project Site, but no individuals identified during the field assessment.	BioNet (1 record)
Frogs						
<i>Litoria aurea</i>	Green and Golden Bell Frog	E	V	Formerly occurred from Brunswick Heads to Victoria, but >80% populations now extinct. Inhabits marshes, natural and artificial freshwater to brackish wetlands, dams and in stream wetlands. Prefers sites containing Cumbungi (<i>Typha</i> spp.) or spike rushes (<i>Eleocharis</i> spp.), which are unshaded and have a grassy area and/or rubble as shelter/refuge habitat nearby. <i>Gambusia holbrooki</i> is a key threat as they feed on green and Golden Bell Frog eggs and tadpoles.	L – No suitable habitat identified within the Project Site and no local records.	BAM (Candidate Species)
<i>Litoria brevipalmata</i>	Green-thighed Frog	V	-	Green-thighed Frogs occur in a range of habitats from rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where	L – No suitable habitat identified within the	BAM (Candidate Species)



Scientific name	Common name	BC Act	EPBC Act	Habitat Association	Likelihood of occurrence	Source
				surface water gathers after rain. It prefers wetter forests in the south of its range, but extends into drier forests in northern NSW and southern Queensland. Breeding occurs following heavy rainfall from spring to autumn, with larger temporary pools and flooded areas preferred. Frogs may aggregate around breeding sites and eggs are laid in loose clumps among water plants, including water weeds. The larvae are free swimming. The frogs are thought to forage in leaf-litter.	Project Site and no local records.	
Reptiles						
<i>Hoplocephalus bitorquatus</i>	Pale-headed Snake	V	-	The Pale-headed Snake is a highly cryptic species that can spend weeks at a time hidden in tree hollows. Found mainly in dry eucalypt forests and woodlands, cypress forest and occasionally in rainforest or moist eucalypt forest. In drier environments, it appears to favour habitats close to riparian areas. Shelter during the day between loose bark and tree-trunks, or in hollow trunks and limbs of dead trees.	L – No suitable habitat identified within the Project Site and no local records	BAM (Candidate Species)
<i>Hoplocephalus stephensii</i>	Stephens' Banded Snake	V	-	Rainforest and eucalypt forests and rocky areas up to 950 m in altitude. Stephens' Banded Snake is nocturnal, and shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day.	L – No suitable habitat identified within the Project Site and no local records.	BAM (Candidate Species)





Appendix G Fauna Data

Biodiversity Development Assessment Report

Hillview Hard Rock Quarry

Coastwide Materials Pty Ltd

SLR Project No.: 630.V12117.00600

27 March 2025

Class	Scientific Name	Common Name	Anabat	Bird Survey Opportunistic	Bird Survey WP733	Bird Survey WP734	Bird Survey WP735	Bird Survey WP736	Bird Survey WP733	Bird Survey WP734	Bird Survey WP735	Bird Survey WP736	Bird Survey Dams	Reptile Survey	Nocturnal Survey 1	Nocturnal Survey 2
Actinopterygii	<i>Anguilla reinhardtii</i>	Longfin Eel														x
Amphibian	<i>Adelotus brevis</i>	Tusked Frog														x
Amphibian	<i>Crinia signifera</i>	Common Eastern Froglet														x
Amphibian	<i>Limnodynastes peronii</i>	Brown-striped Frog														x
Amphibian	<i>Litoria fallax</i>	Eastern Dwarf Tree Frog													x	x
Amphibian	<i>Litoria latopalmata</i>	Broad-palmed Frog													x	x
Amphibian	<i>Litoria peronii</i>	Peron's Tree Frog													x	x
Amphibian	<i>Litoria tyleri</i>	Tyler's Tree Frog														x
Amphibian	<i>Pseudophryne coriacea</i>	Red-backed Toadlet													x	x
Amphibian	<i>Uperoleia sp.</i>														x	
Aves	<i>Acanthiza lineata</i>	Striated Thornbill						x		x		x				
Aves	<i>Acanthiza nana</i>	Yellow Thornbill		x												
Aves	<i>Acanthiza pusilla</i>	Brown Thornbill				x	x				x					
Aves	<i>Acanthorhynchus tenuirostris</i>	Eastern Spinebill					x									
Aves	<i>Accipiter novaehollandiae</i>	Grey Goshawk		x												
Aves	<i>Alisterus scapularis</i>	Australian King-Parrot				x	x	x			x					
Aves	<i>Anas superciliosa</i>	Pacific Black Duck											x			
Aves	<i>Anthochaera carunculata</i>	Red Wattlebird			x				x		x	x				
Aves	<i>Anthus novaeseelandiae</i>	Australian Pipit			x				x							
Aves	<i>Aquila audax</i>	Wedge-tailed Eagle		x												
Aves	<i>Ardea ibis</i>	Cattle Egret											x			
Aves	<i>Ardea pacifica</i>	White-necked Heron											x			
Aves	<i>Cacatua galerita</i>	Sulphur-crested Cockatoo		x												
Aves	<i>Cacomantis flabelliformis</i>	Fan-tailed Cuckoo			x		x	x	x			x				
Aves	<i>Cacomantis variolosus</i>	Brush Cuckoo		x												
Aves	<i>Caligavis chrysops</i>	Yellow-faced Honeyeater				x	x	x		x	x	x				
Aves	<i>Centropus phasianinus</i>	Pheasant Coucal			x											
Aves	<i>Chenonetta jubata</i>	Australian Wood Duck											x			
Aves	<i>Columba leucomela</i>	White-headed Pigeon		x												
Aves	<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike								x		x				
Aves	<i>Coracina tenuirostris</i>	Cicadabird							x							
Aves	<i>Cormobates leucophaea</i>	White-throated Treecreeper				x	x	x		x						



Class	Scientific Name	Common Name	Anabat	Bird Survey Opportunistic	Bird Survey WP733	Bird Survey WP734	Bird Survey WP735	Bird Survey WP736	Bird Survey WP733	Bird Survey WP734	Bird Survey WP735	Bird Survey WP736	Bird Survey Dams	Reptile Survey	Nocturnal Survey 1	Nocturnal Survey 2
Aves	<i>Corvus coronoides</i>	Australian Raven										x				
Aves	<i>Coturnix ypsilophora</i>	Brown Quail						x								
Aves	<i>Cracticus nigrogularis</i>	Pied Butcherbird			x	x		x	x	x		x				
Aves	<i>Cracticus tibicen</i>	Australian Magpie			x				x							
Aves	<i>Cracticus torquatus</i>	Grey Butcherbird			x				x							
Aves	<i>Dacelo novaeguineae</i>	Laughing Kookaburra					x	x		x						
Aves	<i>Daphoenositta chrysoptera</i>	Varied Sittella								x						
Aves	<i>Egretta novaehollandiae</i>	White-faced Heron											x			
Aves	<i>Eolophus roseicapillus</i>	Galah			x	x										
Aves	<i>Eopsaltria australis</i>	Eastern Yellow Robin				x	x									
Aves	<i>Eudynamys orientalis</i>	Eastern Koel				x	x	x				x				
Aves	<i>Gallinago hardwickii</i>	Latham's Snipe											x			
Aves	<i>Gerygone olivacea</i>	White-throated Gerygone		x												
Aves	<i>Glossopsitta pusilla</i>	Little Lorikeet		x												
Aves	<i>Grallina cyanoleuca</i>	Magpie-lark				x										
Aves	<i>Hirundo neoxena</i>	Welcome Swallow			x											
Aves	<i>Leucosarcia melanoleuca</i>	Wonga Pigeon				x		x		x	x					
Aves	<i>Malurus cyaneus</i>	Superb Fairy-wren						x	x							
Aves	<i>Malurus lamberti</i>	Variegated Fairy-wren		x												
Aves	<i>Manorina melanocephala</i>	Noisy Miner			x	x			x	x						
Aves	<i>Meliphaga lewinii</i>	Lewin's Honeyeater					x	x			x					
Aves	<i>Melithreptus brevirostris</i>	Brown-headed Honeyeater								x						
Aves	<i>Melithreptus lunatus</i>	White-naped Honeyeater								x		x				
Aves	<i>Microcarbo melanoleucos</i>	Little Pied Cormorant											x			
Aves	<i>Microeca fascinans</i>	Jacky Winter										x				
Aves	<i>Myzomela sanguinolenta</i>	Scarlet Honeyeater			x	x	x	x	x	x	x	x				
Aves	<i>Neochmia temporalis</i>	Red-browed Finch		x												
Aves	<i>Oriolus sagittatus</i>	Olive-backed Oriole			x	x			x	x	x					
Aves	<i>Pachycephala pectoralis</i>	Golden Whistler				x	x	x		x	x					
Aves	<i>Pachycephala rufiventris</i>	Rufous Whistler						x								
Aves	<i>Pardalotus punctatus</i>	Spotted Pardalote			x	x	x		x	x	x	x				
Aves	<i>Phaps chalcoptera</i>	Common Bronzewing				x	x	x			x					

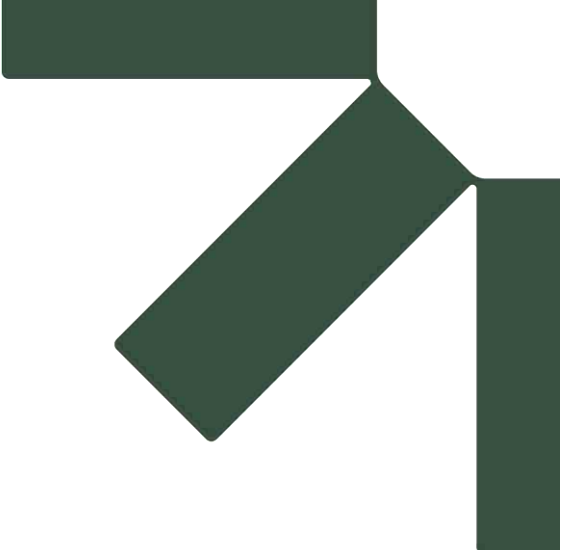


Class	Scientific Name	Common Name	Anabat	Bird Survey Opportunistic	Bird Survey WP733	Bird Survey WP734	Bird Survey WP735	Bird Survey WP736	Bird Survey WP733	Bird Survey WP734	Bird Survey WP735	Bird Survey WP736	Bird Survey Dams	Reptile Survey	Nocturnal Survey 1	Nocturnal Survey 2
Aves	<i>Philemon corniculatus</i>	Noisy Friarbird						x				x				
Aves	<i>Platycercus eximius</i>	Eastern Rosella			x	x		x	x	x						
Aves	<i>Podargus strigoides</i>	Tawny Frogmouth													x	
Aves	<i>Porphyrio porphyrio</i>	Purple Swamphe											x			
Aves	<i>Psophodes olivaceus</i>	Eastern Whipbird						x		x	x	x				
Aves	<i>Ptilonorhynchus violaceus</i>	Satin Bowerbird					x				x					
Aves	<i>Rhipidura albiscapa</i>	Grey Fantail			x	x	x	x		x	x	x				
Aves	<i>Rhipidura leucophrys</i>	Willie Wagtail				x						x				
Aves	<i>Scythrops novaehollandiae</i>	Channel-billed Cuckoo			x		x	x	x	x						
Aves	<i>Sericornis citreogularis</i>	Yellow-throated Scrubwren					x				x					
Aves	<i>Sericornis frontalis</i>	White-browed Scrubwren					x				x					
Aves	<i>Strepera graculina</i>	Pied Currawong					x									
Aves	<i>Tachybaptus novaehollandiae</i>	Australasian Grebe											x			
Aves	<i>Todiramphus sanctus</i>	Sacred Kingfisher			x		x									
Aves	<i>Trichoglossus haematodus</i>	Rainbow Lorikeet		x												
Aves	<i>Vanellus miles</i>	Masked Lapwing							x				x			
Aves	<i>Zosterops lateralis</i>	Silvereye						x								
Crustacea	<i>Cherax destructor</i>	Dam Yabby													x	x
Mammalia	<i>Auromomus australis</i>	White-striped Free-tail Bat	x													
Mammalia	<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	x													
Mammalia	<i>Chalinolobus morio</i>	Chocolate Wattled Bat	x													
Mammalia	<i>Falsistrellus tasmaniensis</i>	Eastern False Pipistrelle	x													
Mammalia	<i>Macropus giganteus</i>	Eastern Grey Kangaroo														x
Mammalia	<i>Macropus rufogriseus</i>	Red-necked Wallaby													x	
Mammalia	<i>Mormopterus ridei</i>	Ride's Free-tailed Bat	x													
Mammalia	<i>Mormopterus sp.</i>	Unidentified Free-tailed Bat	x													
Mammalia	<i>Petaurus norfolcensis</i>	Squirrel Glider														x
Mammalia	<i>Phascogaleos cinereus</i>	Koala														x
Mammalia	<i>Vespadelus vulturnus</i>	Little Forest Bat	x													
Reptilia	<i>Amphibolurus muricatus</i>	Jacky Lizard												x		
Reptilia	<i>Chelodina longicollis</i>	Eastern Snake-necked Turtle														x



Class	Scientific Name	Common Name	Anabat	Bird Survey Opportunistic	Bird Survey WP733	Bird Survey WP734	Bird Survey WP735	Bird Survey WP736	Bird Survey WP733	Bird Survey WP734	Bird Survey WP735	Bird Survey WP736	Bird Survey Dams	Reptile Survey	Nocturnal Survey 1	Nocturnal Survey 2
Reptilia	<i>Ctenotus robustus</i>	Robust Ctenotus												x		
Reptilia	<i>Eulamprus quoyii</i>	Eastern Water-skink												x		
Reptilia	<i>Intellagama lesueurii</i>	Eastern Water Dragon												x		
Reptilia	<i>Lampropholis delicata</i>	Dark-flecked Garden Sunskink												x		
Reptilia	<i>Pseudonaja textilis</i>	Eastern Brown Snake												x		





Appendix H EPBC Act Protected Matters Search Report (PMST)

Biodiversity Development Assessment Report

Hillview Hard Rock Quarry

Coastwide Materials Pty Ltd

SLR Project No.: 630.V12117.00600

27 March 2025



Australian Government

Department of Climate Change, Energy,
the Environment and Water

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 13-Feb-2024

[Summary](#)

[Details](#)

[Matters of NES](#)

[Other Matters Protected by the EPBC Act](#)

[Extra Information](#)

[Caveat](#)

[Acknowledgements](#)

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	2
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	7
Listed Threatened Species:	82
Listed Migratory Species:	43

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <https://www.dcceew.gov.au/parks-heritage/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	1
Commonwealth Heritage Places:	None
Listed Marine Species:	51
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	5
Regional Forest Agreements:	1
Nationally Important Wetlands:	1
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	2
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar Wetlands)		[Resource Information]
Ramsar Site Name	Proximity	Buffer Status
Hunter estuary wetlands	20 - 30km upstream from Ramsar site	In buffer area only
Myall lakes	Within Ramsar site	In feature area

Listed Threatened Ecological Communities

[Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community may occur within area	In buffer area only
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community likely to occur within area	In feature area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area	In feature area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area	In buffer area only
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area	In buffer area only
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species			[<u>Resource Information</u>]
Status of Conservation Dependent and Extinct are not MNES under the EPBC Act. Number is the current name ID.			
Scientific Name	Threatened Category	Presence Text	Buffer Status

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area	In feature area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat likely to occur within area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only
FISH			
Epinephelus daemeli Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
FROG			
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat may occur within area	In feature area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Uperoleia mahonyi Mahony's Toadlet [89189]	Endangered	Species or species habitat known to occur within area	In feature area
MAMMAL			
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat likely to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Notamacropus parma Parma Wallaby [89289]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petauroides volans Greater Glider (southern and central) [254]	Endangered	Species or species habitat known to occur within area	In feature area
Petaurus australis australis Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat known to occur within area	In feature area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Potorous tridactylus tridactylus Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
Angophora inopina Charmhaven Apple [64832]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Arthraxon hispidus Hairy-joint Grass [9338]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Asperula asthenes Trailing Woodruff [14004]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area	In feature area
Dichanthium setosum bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Diuris praecox Newcastle Doubletail [55086]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Eucalyptus glaucina Slaty Red Gum [5670]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area	In feature area
Grevillea guthrieana [64521]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Grevillea parviflora subsp. parviflora Small-flower Grevillea [64910]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat may occur within area	In feature area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat may occur within area	In feature area
Prasophyllum sp. Wybong (C.Phelps ORG 5269) a leek-orchid [81964]	Critically Endangered	Species or species habitat may occur within area	In buffer area only
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area	In feature area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Tetratheca juncea Black-eyed Susan [21407]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Vincetoxicum woollsii listed as Tylophora woollsii [40080]	Endangered	Species or species habitat may occur within area	In buffer area only

REPTILE

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only

SHARK			
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Ardenna grisea Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]		Vulnerable	Foraging, feeding or related behaviour known to occur within area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat likely to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Commonwealth Lands	[Resource Information]
The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.	
Commonwealth Land Name	State
Communications, Information Technology and the Arts - Telstra Corporation Limited	

Commonwealth Land Name	State	Buffer Status
Commonwealth Land - Australian Telecommunications Commission [11369]	NSW	In buffer area only

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Ardenna grisea as Puffinus griseus Sooty Shearwater [82651]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea antipodensis gibsoni as Diomedea gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area	In buffer area only
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In buffer area only
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area	In buffer area only
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In feature area
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Sterna striata White-fronted Tern [799]		Migration route may occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat likely to occur within area overfly marine area	In feature area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche bulleri platei as Thalassarche sp. nov. Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat may occur within area overfly marine area	In buffer area only
Reptile			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Natator depressus			
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In buffer area only

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Karuah	National Park	NSW	In buffer area only
Karuah	State Conservation Area	NSW	In buffer area only
Karuah	Nature Reserve	NSW	In buffer area only
Myall Lakes	National Park	NSW	In buffer area only
Port Stephens - Great Lakes	Marine Park	NSW	In buffer area only

Regional Forest Agreements	[Resource Information]
Note that all areas with completed RFAs have been included. Please see the associated resource information for specific caveats and use limitations associated with RFA boundary information.	

RFA Name	State	Buffer Status
North East NSW RFA	New South Wales	In feature area

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Port Stephens Estuary	NSW	In buffer area only

EPBC Act Referrals	[Resource Information]			
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Deep Creek Quarry, The Bucketts Way Road	2020/8823		Assessment	In buffer area only
Controlled action				
Gloucester Coal Seam Methane Gas Project	2008/4432	Controlled Action	Post-Approval	In buffer area only
Not controlled action				
Hard Rock Quarry Extension, Lot 11 DP 1025664 Pacific Highway	2004/1358	Not Controlled Action	Completed	In buffer area only

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area

Bioregional Assessments				
SubRegion	BioRegion	Website		Buffer Status
Gloucester	Northern Sydney Basin	BA website		In buffer area only
Hunter	Northern Sydney Basin	BA website		In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Department of Land and Resource Management, Northern Territory](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
- [-Museum Victoria](#)
- [-Australian Museum](#)
- [-South Australian Museum](#)
- [-Queensland Museum](#)
- [-Online Zoological Collections of Australian Museums](#)
- [-Queensland Herbarium](#)
- [-National Herbarium of NSW](#)
- [-Royal Botanic Gardens and National Herbarium of Victoria](#)
- [-Tasmanian Herbarium](#)
- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- [-Australian Tropical Herbarium, Cairns](#)
- [-eBird Australia](#)
- [-Australian Government – Australian Antarctic Data Centre](#)
- [-Museum and Art Gallery of the Northern Territory](#)
- [-Australian Government National Environmental Science Program](#)
- [-Australian Institute of Marine Science](#)
- [-Reef Life Survey Australia](#)
- [-American Museum of Natural History](#)
- [-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania](#)
- [-Tasmanian Museum and Art Gallery, Hobart, Tasmania](#)
- [-Other groups and individuals](#)

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact us](#) page.

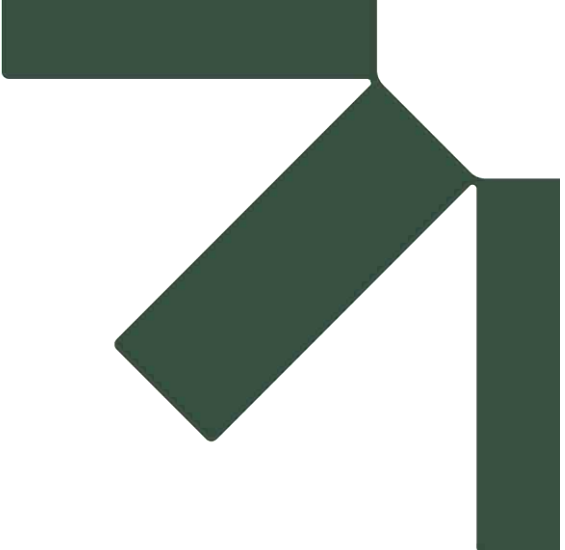
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Appendix I EPBC Act Assessments of Significance

Biodiversity Development Assessment Report

Hillview Hard Rock Quarry

Coastwide Materials Pty Ltd

SLR Project No.: 630.V12117.00600

27 March 2025

EPBC Act Assessments of Significance – Hillview Quarry

1 Overview

The following Assessments of Significance have been prepared according to the criteria listed in the *Significant Impact Guidelines 1.1* (DoE 2013) for the following Matters of National Environmental Significance (NES) listed under the EPBC Act of relevance to the Proposal:

- Listed threatened species, being those species recorded on site or highly likely to occur:
 - Scrub Turpentine *Rhodamnia rubescens*, listed as ‘Critically Endangered’.
 - Koala (*Phascolarctos cinereus*), listed as ‘Endangered’.
 - Grey-headed Flying-fox (*Pteropus poliocephalus*) listed as ‘Vulnerable’.
- Listed threatened communities, with one TEC recorded on site:
 - Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions (‘Subtropical eucalypt floodplain forest’) threatened ecological community (TEC), listed as ‘Endangered’.
- Listed migratory species, being:
 - Latham’s Snipe, which was recorded on site; and
 - other terrestrial or wetland migratory bird species could occur within the subject land on a transient or seasonal basis given the presence of suitable habitats.

No other matters of NES are likely to be directly affected by the Proposal.

2 Listed Threatened Species

2.1 Scrub Turpentine *Rhodamnia rubescens* (CE)

Scrub Turpentine *Rhodamnia rubescens* is described as a shrub or small tree to 25 m high, with reddish/brown, fissured bark. Young stems are densely covered in fine hairs. Leaves are 5–10 cm long, 2–5 cm wide, with the upper surface green and sparsely hairy. Leaves are strongly three-veined from the base, with moderately dense, translucent oil dots. White-flowered and a red globular fruit, which turns black.

Scrub Turpentine occurs in coastal districts north from Batemans Bay in New South Wales to areas inland of Bundaberg in Queensland. Populations typically occur in coastal regions and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000-1,600 mm. The species is found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest, usually on volcanic and sedimentary soils.

This species is characterised as highly to extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts. The individuals recorded within the study area at Hillview all showed evidence of Myrtle Rust (when observed in November 2020).

Scrub Turpentine is listed as 'critically endangered' under both the BC Act and the EPBC Act.

With respect to the criteria listed in the *Significant Impact Guidelines 1.1* (DoE 2013), an action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

1) Lead to a long-term decrease in the size of a population

Under the *Significant Impact Guidelines 1.1* a 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- a geographically distinct regional population, or collection of local populations, or
- a population, or collection of local populations, that occurs within a particular bioregion.

The number of distinct populations of Scrub Turpentine is unknown, but is expected to be large given the wide distribution of the species. Occurrences of Scrub Turpentine are contiguous along the entire range of the species, with no significant disjunctions.

A small population of approximately 21 individuals was recorded within a gully supporting dry rainforest (mapped as PCT 3076), located north of the subject land. The locations of the individual Scrub Turpentine plants are shown in the attached **Figure 1B**. Additionally, there are two previous records of the species within a 5 km radius of the subject land) (BioNet Atlas report generated on the 3/04/2024). For the purposes of the EPBC Act and this Assessment of Significance, it is assumed that the individuals recorded on site at Hillview constitute a 'population' as per the definition in the *Significant Impact Guidelines 1.1*.

The Proposal will not result in the loss of habitat for the Scrub Turpentine population, as the occurrence of the population lies outside of the development footprint (see **Figure 1B**). Therefore, it is unlikely that the Proposal will lead to a long-term decrease in the size of an important population of the species. It is noted, however, that the population is subject to infection from Myrtle Rust and this pathogen is likely to be the key threat to the survival of the population.

2) Reduce the area of occupancy of the species

The Proposal will have no direct effects on habitat or individuals of Scrub Turpentine, with the population located outside of the development footprint (see **Figure 1B**). The Proposal will not, therefore, reduce the 'area of occupancy' of the species.

3) Fragment an existing population into two or more populations

The Proposal will have no direct effects on habitat or individuals of Scrub Turpentine, with the population located outside of the development footprint (see **Figure 1B**). The Proposal will not, therefore, fragment the population into two or more populations.

4) Adversely affect habitat critical to the survival of a species

Suitable habitat for Scrub Turpentine is likely to occur in subtropical rainforests, warm temperate rainforests, littoral rainforests, and wet sclerophyll forests. It may also occur as a pioneer in adjacent areas of dry sclerophyll and grassy woodland associations (Threatened Species Scientific Committee 2020). Within the study area at Hillview, the population occurs within a small patch of dry rainforest (PCT 3076).

No habitat critical to the survival of Scrub Turpentine is listed in the Conservation Advice and there is no published Recovery Plan or Threat Abatement Plan. Notwithstanding, the habitat currently supporting the population of Scrub Turpentine within the study area could be considered critical to the survival of the local population. In this regard, the Proposal has been designed to avoid this patch of habitat and as such, will not have any direct impacts on the population. Provided that indirect impacts on the population (e.g. dust, changes to groundwater) can be appropriately managed and monitored during construction and operation of the Proposal, there should be no adverse effects on the survival of the local population.

On the basis of the above considerations, it is unlikely that the Proposal will adversely affect habitat that is critical to the survival of Scrub Turpentine.

5) Disrupt the breeding cycle of a population

The Proposal will have no direct effects on habitat or individuals of Scrub Turpentine located within the study area, with the population located outside of the development footprint (see **Figure 1B**). The Proposal will not, therefore, affect the breeding cycle (e.g. pollination, seed dispersal, etc) of the population.

6) Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The Proposal will not destroy, remove, isolate or decrease the availability of habitat for Scrub Turpentine within the study area, with the population located outside of the development footprint (see **Figure 1B**).

Groundwater modelling (SLR 2024) indicates that there could be lowering of the water table in some parts of the Hillview study area, which could affect the availability of soil water for the Scrub Turpentine population within the dry rainforest patch. The level of dependence of the population on groundwater is not known, but it could be inferred that the population is at least partially reliant on groundwater. The population could also be affected by dust generated during the establishment and operation of the quarry. To mitigate these potential indirect impacts, a suitable monitoring program will be outlined in a management plan, which will allow for periodic checks and data collection to monitoring the health of the population at the site and where changes are observed, a 'trigger-action-response-plan' ('TARP') will be implemented to allow for adaptive management of the population to assist with its survival.

With the implementation of suitable management and monitoring (during construction and operation of the quarry), the Proposal is not likely to modify the quality of habitat for the Scrub Turpentine population. On this basis, the Proposal is unlikely to affect the habitat for the species such that the species is likely to decline.

7) Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat

An 'invasive species' is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation.

Notably, 'Degradation of habitat and competition from transformer weed species' is listed as a threat to the species (OEH 2022) . At the time of the field survey, no transformer weed species were identified within the population. However, given that the Proposed activity involves vegetation clearing and earth movement, there is the potential for the introduction of invasive plant species. For the population of Scrub Turpentine at Hillview, this might include shade tolerant herbs and grasses that could establish in the dry rainforest patch that forms the habitat for this species on the site. Accordingly, suitable weed management measures will be required prior to and during the construction phase of the quarry, which will be set out in a suitable management plan.

With the implementation of suitable weed control measures, as proposed, it is unlikely that the Proposal will result in an invasive species becoming established in the habitat for Scrub Turpentine.

8) Introduce disease that may cause the species to decline

The existing population of Scrub Turpentine within the study area at Hillview is already subject to infection from Myrtle Rust. The 'Introduction and establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae' is listed as a Key Threatening Process under the BC Act .

Accordingly, the Proposal is not likely to introduce or cause other diseases (plant pathogens) to become established that may cause the Scrub Turpentine population to decline. The Myrtle Rust infection of the existing population is likely to be placing the survival of the population at risk.

9) interfere substantially with the recovery of the species.

The Proposed activity will not have any direct adverse effects on the extant population of Scrub Turpentine. Provided that potential indirect impacts (eg changes to water table and groundwater flows, weeds, dust, etc) can be appropriately managed, the Proposal is not likely to interfere with the recovery of the species.

The Conservation Advice (Threatened Species Scientific Committee 2020) states that surviving plants and populations of Scrub Turpentine will continue to be subject to spore load (whether as wind-borne spores or by other vectors) from Myrtle Rust (and other pathogens), which severely reduces the likelihood of population recovery. Additionally, there are currently (at time of writing) no effective or practical chemical, biological or management controls available for protecting populations of Scrub Turpentine in natural ecosystems from Myrtle Rust infection.

Conclusion

Based on the consideration of the significant impact criteria above, the Proposal is not "likely" to have a "significant impact" on Scrub Turpentine.

2.2 Koala (*Phascolarctos cinereus*) (Endangered)

The Koala is an arboreal mammal that has a fragmented distribution throughout eastern Australia, from the Eyre Peninsula in South Australia to Far North Queensland. Primary habitat of the Koala is within eucalypt woodlands and forests as they depend on selection of preferred feed trees comprising around 70 eucalypt species (OEH 2022). The species has recently been listed as Endangered under both the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Protection Act 1999* (EPBC Act).

The Koala has been recorded on the subject land at Allworth, with one individual recorded during spotlighting surveys in October 2020. In addition, Koala habitat exists within the site, in the form of Koala feed trees such as Forest Red Gum *Eucalyptus tereticornis*, Tallowwood *E. microcorys* and Spotted Gum *Corymbia maculata*. Additionally, there are 195 previous records of the Koala from the locality, as shown in the attached map. The Allworth locality is also mapped as containing Koala sightings and 'Occupied Habitat' for the Koala on the draft *MidCoast Koala Conservation Strategy* (MidCoast Council 2024).

Given the recent sighting of the Koala and the presence of suitable habitat within the subject land, an assessment of significance has been prepared for the Koala based on the criteria for 'endangered' species in the *Significant Impact Guidelines 1.1* (DoE 2013).

An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:

1) Lead to a long-term decrease in the size of a population.

Under the *Significant Impact Guidelines 1.1* (DoE 2013) an 'population' is defined as follows:

- A geographically distinct regional population, or collection of local populations, or
- A population, or collection of local population, that occurs within a particular bioregion

According to the National Koala Monitoring Program, the first data-driven population estimate of population size for the EPBC Act listed koala population, which includes QLD, ACT and NSW, is between 117,050 and 244,440. In terms of the local population that occurs within the Karuah Manning subregion (North Coast bioregion), there is very little data available.

There are approximately 195 previous records of the Koala from the locality (10 km radius), as shown in the attached **Figure 2**. It is likely that individuals utilise the subject land periodically and disperse between adjacent areas of habitat through the subject land. It can be surmised that the individual Koala recorded on subject land is part of a population that occurs throughout the wider locality; however, there currently is no current data available on the portion of the population (or number of individuals) that utilise the subject land.

Approximately 10.59 ha of suitable Koala habitat will be removed as part of the Proposal. Native vegetation will be retained (in a contiguous patch post-development) outside of the development footprint, across the adjacent lots to the north and south of the subject land. In this regard, around 210 ha of native vegetation will be retained within the project site outside of the development footprint. The removal of vegetation will also occur in stages, in accordance with the proposed staging plan for the quarry. This will lessen the intensity and severity of the impact and allow local Koalas to adapt to the changes in habitat availability at a landscape scale. Moreover, areas disturbed by quarrying activities will be progressively rehabilitated over time.

Mitigation measures will be in place to ensure no Koala is adversely affected as a direct impact of the clearing of native vegetation. These measures will include:

- Preclearance survey for Koalas within area to be cleared and translocating any Koalas spotted to a location of suitable habitat in an area outside of the impact area.
- Supervision of tree clearing by a Project Ecologist or Wildlife Carer, observing for Koalas within the area and translocating any Koalas found to a location of suitable habitat outside of the impact area.

The predicted loss of habitat associated with the Proposal is not likely to have an adverse effect on the local population, as the Koala is a mobile species and individuals will continue to be able utilise the retained habitat to disperse through the areas surrounding the subject land.

On the basis of the above considerations, the Proposal is not likely to lead to a long-term decrease in the size of a Koala population.

2) Reduce the area of occupancy of the species

The staged removal of suitable Koala habitat as part of the Proposal (10.59 ha in total) will result in the reduction of the area of occupancy of the Koala across the project site over the life of the project. However, as noted above, this impact will be mitigated by:

- clearing of vegetation in stages over operational life of the quarry, thereby allowing Koalas to adapt to the staged loss of habitat over time;
- progressive rehabilitation of disturbed land (according to an approved rehabilitation management plan); and
- The retention of large expanses of Koala habitat across the remainder of the project site, with 210 ha of forest habitat (interspersed with cleared pasture land) to be retained.

3) Fragment an existing population into two or more populations

No habitat will become fragmented as a result of the proposed activity. Habitat connectivity will remain around the pit and infrastructure areas providing north/south connectivity for Koalas. This area of retained vegetation will remain as an unfragmented corridor of Koala habitat and continue to allow Koalas movement across the project site and through the wider locality.

4) Adversely affect habitat critical to the survival of a species

Koala habitat includes both coastal and inland areas that are typically characterised by *Eucalyptus* forests and woodlands. The wide-ranging distribution of the koala has resulted in a diverse range of habitat associations across different bioregions, influenced by local climate, topographical and landscape associations.

Habitat critical to the survival of a species is defined under the EPBC Act as: the areas that the species relies on to avoid or halt decline and promote the recovery of the species. Habitat critical to the survival of a species is defined in general terms in the *Significant Impact Guidelines 1.1* as areas that are necessary:

- for activities such as foraging, breeding, roosting, or dispersal
- for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)
- to maintain genetic diversity and long term evolutionary development, or
- for the reintroduction of populations or recovery of the species or ecological community.

There is no data currently available on the usage of the subject land by the Koala. However, given the evidence that Koalas exist in the locality and the presence of Koala habitat (including feed trees), it can be assumed that the subject land forms part of a network of habitat that extends through the Allworth locality and elsewhere throughout MidCoast LGA and adjoining local government areas. Therefore it can be assumed that the habitats available on the subject land are used by individuals of the local Koala population at least periodically for foraging and dispersal. However, it is not possible to ascertain with available data whether or not the subject land contributes to maintenance of genetic diversity and long-term evolutionary development, or long-term maintenance of the species.

Factors considered important in the determination of 'habitat critical to the survival' of the Koala are loosely defined in the *Nation Recovery Plan* (DAWE 2022a), as follows:

- a) whether the habitat is used during periods of stress (examples flood, drought or fire)
- b) whether the habitat is used to meet essential life cycle requirements (e.g. foraging, breeding, social behaviour, dispersal)
- c) the extent to which the habitat is used by important populations
- d) whether the habitat is necessary to maintain genetic diversity and long-term evolutionary development
- e) whether the habitat is necessary for use as corridors to allow the species to move freely between sites used to meet essential life cycle requirements
- f) whether the habitat is necessary to ensure the long-term future of the species or ecological community through reintroduction or re-colonisation

- g) any other way in which habitat may be critical to the survival of a listed threatened species or a listed threatened ecological community (EPBC Act).

Although the habitats available on the subject land could conceivably be used by Koalas for foraging and dispersal (ie to 'meet essential life cycle requirements'), and possibly during periods of stress, it is unlikely that these habitats are important for maintaining genetic diversity, or ensuring long-term future of the species. It is therefore unlikely that the habitats available for the Koala on the site, in isolation, are critical to the survival to the Koala.

In addition, large expanses of similar Koala habitat are present within the locality as part of a larger patch of native vegetation to north, south, east and west, with 210 ha of suitable habitat to retained within the project site and 1766 ha of similar forest vegetation within the 1500 m buffer.

On the basis of the above information, the Proposal is not likely to adversely affect habitat critical to the survival of the Koala.

5) Disrupt the breeding cycle of a population

Vegetation clearing required as part of development of the quarry is to be staged over 30 years, with mitigation measures during the clearing of Koala habitat ensuring that clearing of vegetation will not resulting in the reduction of Koala population or direct impact on the breeding cycle of the local Koala population. Koalas will also be able to utilise the areas of retained habitat within the subject land.

As Koala habitat will be retained around the periphery of the Proposal footprint, Koalas opportunities for dispersal between adjoining areas of habitat to the north and south will remain available after development of the quarry. Hence, males will still have the means to move through areas of retained habitat to find females during breeding season. Accordingly, the Proposal will not disrupt the breeding cycle of a Koala population.

6) Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The Proposal will require the total of 10.59 ha of Koala habitat to be removed in stages over 30 years, with around 210 ha of Koala habitat to be retained within the subject land. Koalas will continue to utilise the habitats to be retained (which lie within the same vegetation patch). Additionally, the loss of habitat associated with the Proposal is therefore not likely to cause excessive competition from Koalas due to increased Koala population densities within retained habitats. A corridor of native vegetation will remain along the western side of the development footprint allowing Koala movement across all areas of the retained habitat.

Although the Proposal will decrease the availability of habitat for the local population of the Koala, is it not likely that this will lead to a decline in the local population.

7) Results in invasive species that are harmful to the endangered species becoming established in the endangered species' habitat

The vegetation within the study area is currently in moderate to good condition with a low diversity and cover of invasive weed species. Suitable weed control measures will ensure that no new weed infestations can establish within the retained vegetation of the subject land.

Additionally, it is unlikely that the Proposal will attract feral animals that could impact Koala populations, such as Fox and/or wild and domesticated dogs.

8) Introduce disease that may cause the species to decline

No disease that may cause Koala populations to decline will likely become established as a result of the Proposal. Koalas are adversely impacted by the disease chlamydia, however as the disease is highly infectious and currently widespread throughout Koala populations in NSW (CoA 2023 and DAWE 2022), it is unlikely that the Proposal will cause any introduction of the disease into uninfected populations.

9) Interfere substantially with the recovery of the species.

The *Draft National Recovery Plan for the Koala* (DAWE 2022) aims to “reverse the trend of decline in population size of the listed Koala, by having resilient, connected, and genetically healthy metapopulations across its range, and to increase the extent, quality and connectivity of habitat occupied...”. The Recovery Plan lists six strategies for the recovery of the Koala as follows:

- Strategy 1: Build and share knowledge
- Strategy 2: Strong community engagement and partnerships
- Strategy 3: Increase habitat protection
- Strategy 4: Koala conservation is integrated into policy, and statutory and land-use plans
- Strategy 5: Active metapopulation management
- Strategy 6: Strategic habitat restoration.

The Proposal is unlikely to interfere substantially with the goal and strategies as outlined in the Recovery Plan, as the Proposal will retain habitat connectivity between existing Koala populations, along with the utilisation of appropriate offsetting strategies to retain and improve areas of Koala habitat. On the closure of the quarry operations, areas of disturbance above the quarry void will be revegetated with native vegetation, including locally occurring Koala feed tree species, which will lead to long term habitat restoration of the subject land.

Conclusion

Based on the consideration of the significant criteria above, the Proposal is not “likely” to have a “significant impact” on the Koala.

2.3 Grey-headed Flying-fox (*Pteropus poliocephalus*) (Vulnerable)

The Grey-headed Flying-fox is large ('megachiropteran') bat species found within 200 km of the coast along the eastern coast of Australia from Rockhampton, Queensland to Adelaide, South Australia. The bats can be found within a broad range of habitats, including subtropical and temperate rainforests, tall sclerophyll forests and woodlands, mangroves, heaths and swamps, as well as urban gardens, with their primary food source being the nectar and pollen of *Eucalyptus*, *Melaleuca* and *Banksia* species.

Roosting camps are found within gullies, close to water and in vegetation with dense canopy and are generally located within 20 km of a food source. However, individuals can travel up to 50 km from their home camp to forage. Individual camps may have a population of tens of thousands of animals and are used for mating, birth and rearing young. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November.

1) Lead to a long-term decrease in the size of an important population of a species.

Under the *Significant impact guidelines 1.1* an important population is defined as the follow:

- Key source populations either for breeding or dispersal
- Population that are necessary for maintain genetic diversity, and/or
- Populations that are near the limit of the species range.

No individual Grey-headed Flying-foxes were recorded during field surveys for the BDAR; however, it is anticipated that they occur given the presence of suitable foraging habitat and previous records of the species in the locality (two records of the species within 5 km on BioNet Atlas).

No flying-fox camps have been recorded on the subject land. Based on the definition of an 'important population' in the *Significant Impact Guidelines 1.1* and given that the occurrence of this species on the east coast of Australia is considered to be one population, the individuals of the Grey-headed Flying-fox that might utilise the subject land do not constitute an important population.

The Proposal will result in the loss of 10.59 ha of potential Grey-headed Flying-fox foraging habitat, being eucalypt forest. The Grey-headed Flying-fox is a highly mobile species that can travel up 50 km to forage and is not impacted by movement barriers such as major roadways or waterbodies (OEH 2020). Approximately 137 ha of similar native vegetation is to be retained within the study area, providing retained foraging habitat suitable for the Grey-headed Flying-fox. In addition, a further 453 ha of foraging habitat occurs within a 1000 ha buffer of the subject land (SLR 2023). Therefore, it is unlikely that the Proposal will lead to a long-term decrease in the size of an important population of the species.

2) Reduce the area of occupancy of an important population

As described in assessment criteria 1, the presence of the Grey-headed Flying-fox on the subject land is not considered an important population, as defined under the *Significant Impact Guidelines 1.1*.

Approximately 10.59 ha of suitable foraging habitat for the Grey-headed Flying-fox will be removed in stages over 30 years. The total area of native vegetation currently within a 1500 m buffer of the subject land is 1766 ha. The clearing of 10.59 ha on subject land will reduce this total native vegetation within this buffer by 0.6 %. The Grey-headed Flying-fox is a highly mobile species and is not affected by movement barriers, such as major roadways or water bodies and can travel up to 50 km to forage. Therefore, it is unlikely that the removal of vegetation associated with the Proposal will reduce the area of occupancy of the east coast population of the Grey-headed Flying-fox.

3) Fragment an existing important population into two or more populations

The Grey-headed Flying-fox is a highly mobile species that is not affected by movement barriers and can utilise fragmented habitats (DPE 2023). Accordingly, the removal of habitat associated with the Proposal is not likely to fragment the east coast population of Grey-headed Flying-fox into two or more populations.

4) Adversely affect habitat critical to the survival of an important population

As described in assessment criteria 1, the occurrence of the Grey-headed Flying-fox on the subject land is not considered an important population, as defined under the *Significant Impact Guidelines 1.1*.

No Grey-headed Flying-fox camps are located on the proposed subject land. The proposed active will result in the removal of 10.59 ha of foraging habitat in the form of dry sclerophyll eucalypt forest. The species is highly mobile and is not reliant on the habitat within the development footprint for survival (OEH 2020). Therefore, it is unlikely that the Proposal will adversely affect any habitat that is critical to the survival of an important population.

5) Disrupt the breeding cycle of an important population

No Grey-headed Flying-fox camps are located on the subject land; therefore no breeding is occurring on the subject land. Accordingly, it is not conceivable that the Proposal will disrupt the breeding cycle of an important population of the Grey-headed Fly-fox.

6) Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline

The Proposal will lead to the removal approximately 10.59 ha of potential foraging habitat for the Grey-headed Flying-fox, which is to be removed in stages). This represents 0.6 % of the extent of native vegetation within 1500 m of the subject land. The Grey-headed Flying-fox is a highly mobile species and can travel up to 50 km to forage. Therefore, the habitat to be removed as part of the Proposal represents a small proportion of the total area of available habitat for this species in the locality. On this basis and given the absence of breeding habitat on the subject land, the removal of foraging habitat as part of the Proposal is unlikely to cause the decline of the species.

7) Results in invasive species that are harmful to the vulnerable species becoming established in the vulnerable species' habitat

The vegetation on the subject land is currently in moderate to good condition with only limited invasive weed species (mainly exotic perennial grasses within open paddocks). Suitable weed control measures implemented over the life of the quarry operation will ensure that no new weed infestations can establish within retained vegetation.

Additionally, it is unlikely that the Proposal will cause an increase to feral animal populations on subject land.

8) Introduce disease that may cause the species to decline

No diseases that may cause the species to decline are likely to become established as a result of the Proposal.

9) interfere substantially with the recovery of the species.

The *National Recovery Plan* (NRP) for the Grey-headed Flying-fox (CoA 2021) includes Recovery Objective 1: to identify, protect and increase native foraging habitat that is critical to the survival of the Grey-headed Flying-fox. The NRP notes that habitat critical for the survival of the Grey-headed Flying-fox is important winter and spring flowering vegetation communities.

The native plant communities present on the subject land (PCTs 3241, 3254 and 3436) contain winter and spring flowering tree species for the Grey-headed Flying-fox, including Spotted Gum *Corymbia maculata*, Forest Red Gum *Eucalyptus tereticornis* and Tallowwood *E. microcorys*. . However, it is important to note that these plant communities will be retained within the lands surrounding the subject land and will continue to offer similar foraging habitat for the Grey-headed Flying-fox. Individuals of the Grey-headed Flying-fox will continue to have access to retained vegetation surrounding the subject land and on adjoining land after completion of the Proposal.

On the basis of the above considerations, the Proposal is unlikely to substantially interfere with the recovery of the Grey-headed Flying-fox.

Conclusion

Based on the consideration of the significant impact criteria (for vulnerable species) above, the Proposal is not “likely” to have a “significant impact” on the Grey-headed Flying-fox.

3 Listed Threatened Communities

3.1 Subtropical eucalypt floodplain forest TEC (Endangered)

Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions (‘Subtropical eucalypt floodplain forest’) threatened ecological community (TEC) is listed as Endangered under the EPBC Act.

The community occurs in the North Coast and South Eastern Queensland IBRA bioregions. This encompasses an area from just north of Newcastle, NSW (around Raymond Terrace) in the south, to just north of Gladstone in Queensland (DCCEEW, 2022). The TEC generally occurs on alluvial soils, with more limited occurrences on *in-situ* soils within localised depressions, which may be at least occasionally saturated, water-logged or inundated. Alluvial soils are very diverse and usually reflect the properties of their parent material in the upper catchment, but they may include *in-situ* subsoils and colluvial deposits that overlay the alluvial floodplain (DCCEEW, 2022)

With respect to the criteria for threatened ecological communities in the *Significant Impact Guidelines 1.1*, an action is likely to have a significant impact on a threatened ecological community if there is a real chance or possibility that it will:

1) Reduce the extent of an ecological community

The current extent of the Subtropical eucalypt floodplain forest TEC within the subject land is 1.25 ha, which is the area of the vegetation zone PCT 3436 along Maytoms Lane (**Figure 1A**). This patch will be removed to allow construction of the proposed haul road within the road reserve of Maytoms Lane, which will involve widening the existing unsealed road from the site entrance at the Bucketts Way through to the interior of the site. Accordingly, the Proposal will reduce the extent of the Subtropical eucalypt floodplain forest TEC within the subject land by 1.25 ha.

The extent of clearing will be carefully managed to ensure impacts are kept to a minimum and mitigation measures during construction will reduce the risk of weed invasion for patches of PCT 3436 that will be retained within the wider study area. It is also important to note the clearing of the 1.25 ha patch of the TEC will not remove the occurrence of the TEC from the site or the locality, as the patch is contiguous with similar vegetation that extends north and south of the subject land along Double Creek.

2) fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines

The locality has undergone extensive historical land clearing for agriculture, industrial and urban development and the local road network. The vegetation within the subject land, including the patch of TEC along Maytoms Lane, is somewhat isolated and is located within a highly fragmented landscape with limited connectivity to larger more extensive areas of vegetation and habitat.

The Proposal will permanently clear approximately 1.25 ha of Subtropical eucalypt floodplain forest TEC. The patches of TEC to be impacted (identified as PCT 3436) are currently connected to vegetation to the north, west and south, which form part of a riparian corridor along Double Creek. This connectivity will be reduced to some extent by the construction of the haul road; however, there will still be limited canopy connection to similar patches of TEC to the north and south.

The Proposal will increase the fragmentation of the occurrence of TEC within the subject land. However, the patch of TEC vegetation (PCT 3436) is contiguous with similar vegetation that extends north and south of the subject land along Double Creek (**Figure 1A**). Overall, the loss of habitat for the TEC will not have a significant impact on the fragmentation of the community at the scale of the locality.

3) adversely affect habitat critical to the survival of an ecological community

According to the Conservation Advice (Threatened Species Scientific Committee 2022), the habitat or areas most critical to the survival of the ecological community are those patches that are in the best condition (i.e. classes A and B). These represent those parts of the ecological community that retain the highest diversity and most intact structure and ecological function and have the highest chance of persisting in the long-term. However areas that otherwise meet the minimum condition thresholds (i.e., Class C) are also important for the functioning and survival of the ecological community. These areas are critical to the survival of the ecological community: if they occur in locations or landscape positions that are particularly important for biodiversity or function; and/or contain suites of species, or habitat features, that are important in a regional or local context (see Section 2.5). They also have the potential to recover, or be restored, to a higher condition.

No Critical Habitat as defined under Section 207A of the EPBC Act has been identified for this TEC in a recovery plan, or included in the Register of Critical Habitat at this time.

The patch of Subtropical eucalypt floodplain forest TEC to be impacted by the Proposal qualifies as Class C2 according to the Condition classes, categories and thresholds in the Conservation Advice. The vegetation occurs as a narrow linear band of PCT 3076 alongside the existing entrance road within the road reserve of Maytoms Lane (**Figure 1A**). Although the vegetation is an important example of the TEC, it could not be construed that the patch of PCT 3076 within the subject land is 'habitat critical to the survival' of the TEC, noting:

- The vegetation on site is not classified as Class A or B under the Conservation Advice
- the patch of TEC does not occur in a location or landscape position that is important for biodiversity or function
- the vegetation does not contain a suites of species, or habitat features, that are important in a regional or local context
- similar vegetation occurs (and will be retained) on adjoining land within the study area and on adjacent properties.

In consideration of the above factors, the Proposal is not likely to adversely affect habitat critical to the survival of the TEC.

5) 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

The Proposal will require the removal of 1.25 ha of habitat for Subtropical eucalypt floodplain forest TEC. In relation to potential impacts on abiotic factors:

- The proposed haul road will be bridged over Double Creek and therefore will not affect surface flows or hydrology of this watercourse and the associated riparian vegetation (which includes the TEC)

- The excavation and operation of the quarry could lower the water table in some parts of the subcatchment, which is outlined in the groundwater assessment (SLR 2024). The assessment notes that “Drawdown is also expected along the footprint of the haul road, the 1 m drawdown is expected to extend 100 m north and south of the haul road”.

Given that construction of the proposed haul road will remove most of the patch of Subtropical floodplain eucalypt forest TEC (identified as PCT 3436) that exists along the road reserve of Maytoms Lane, any impacts on hydrology or groundwater drawdown will affect only those stands of PCT 3436 that are retained north and south of the haul road. It is not known whether the vegetation in this part of the subject land is ‘groundwater dependent’ and if so, to what degree the trees in PCT 3436 are reliant on groundwater. Accordingly, the proposed monitoring program to be implemented as part of an approved management will require monitoring of retained TEC vegetation and adaptive management in response to analysis of monitoring data.

In conclusion, the Proposal will modify abiotic factors, being mainly localised groundwater drawdown, which may affect the future condition of any retained TEC vegetation within the zone of influence of the drawdown.

6) 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

Construction and operation of the proposed quarry could affect species composition of the occurrence of Subtropical floodplain eucalypt forest (being those remnants of PCT 3436 that are retained on-site and on adjoining lands, as applicable) through changes to hydrology, physical disturbance and exposure to increased dust. All of these changes can be managed through appropriate weed control and erosion and sedimentation control. With the application of suitable site management practices, the Proposal is not likely to cause a ‘substantial change in the species composition’ of the occurrence of the Subtropical floodplain eucalypt forest TEC.

8) cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: (i) assisting invasive species, that are harmful to the listed ecological community, to become established, or (ii) 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 same factors associated with construction and operation of the Proposal that could affect species composition of retained vegetation could cause a substantial reduction in the quality of the of Subtropical floodplain eucalypt forest TEC (being those remnants of PCT 3436 that are retained on-site and on adjoining lands, as applicable) through assisting invasive species. However, with the implementation of suitable weed control and erosion and sedimentation control, the Proposal is not likely to cause a ‘substantial reduction in the quality or integrity’ of the occurrence of the Subtropical floodplain eucalypt forest TEC within the subject land.

9) interfere with the recovery of an ecological community

The Conservation Advice for Subtropical eucalypt floodplain forest TEC identifies priority conservation actions under the following key approaches:

- Protect the ecological community to prevent further losses
- Restore the ecological community by active abatement of threats, appropriate management, restoration, and other conservation initiatives
- Communicate, engage with and support people to increase understanding of the value and function of the ecological community and encourage their efforts in its protection and recovery
- Research and monitoring to improve our understanding of the ecological community and the best methods to aid its management and recovery

Points one and two are of relevance to the Proposal, for which the Conservation Advice identifies various management actions and mitigation measures to assist in the recovery of the TEC during the construction and post-construction phases of the Proposed Action, including:

- Preventing the introduction and spread of invasive exotic species, by implementing effective integrated control and management techniques for weeds, pests and diseases known to affect the TEC and manage proposed impact area to prevent the introduction, or the further spread, of invasive species.
- Manage hydrology by implementing and/or reinstating appropriate hydrological management regimes for the ecological community and the landscapes surrounding the ecological community.

The patch of Subtropical floodplain eucalypt forest TEC to be impacted by the Proposal (approximately 1.25 ha), displays some signs of weed incursion along edges and in the ground layers, with woody weed such as privet and lantana in the shrub layer. However, to the larger extent, the vegetation is free of invasive weed species or signs of threatening processes. Nonetheless, weed control measures are required during construction and operation and will be set out in an approved management for the site.

Similarly, the ecological community may be subject to functional changes in groundwater levels, as noted above. Monitoring and implementation of a TARP to allow adaptive management of the vegetation where changes are observed. Surface water can be returned to, or retained at, preexisting levels.

Taking into consideration the limited extent of the impact on the TEC and the proposed mitigation measures to be applied to retained vegetation (also limited in extent), the Proposal is not likely to interfere with the recovery of the Subtropical eucalypt floodplain forest TEC in areas adjacent to the subject land or at the local or regional scales.

Conclusion

Based on the consideration of the significant criteria above, the Proposal is not “likely” to have a “significant impact” on the Subtropical eucalypt floodplain forest TEC.

4 Listed Migratory Birds

Individuals of some migratory terrestrial species that utilise forest habitats on mainland Australia, such as Black-faced Monarch, Spectacled Monarch and Rufous Fantail, could occur on the site from time to time as part of a larger network of habitats within the region during their wide-ranging dispersive movements and nomadic habits. Additionally, the Black-faced Monarch (*Monarcha melanopsis*) was previously recorded in 2017. However, these species are unlikely to reside on the project site on a permanent basis.

Additionally, individuals of some of the more common migratory wetland species could be expected to utilise the modified wetland habitats within the farm dams on the subject land. In this regard, one EPBC Act listed migratory species, Latham's Snipe (*Gallinago hardwickii*) was recorded at one of the farm dams during field surveys.

With respect to the criteria for listed migratory species in the *Significant Impact Guidelines 1.1*, an action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

1) 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 definition of an area of 'important habitat' for a migratory species is:

- habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or
- habitat that is of critical importance to the species at particular life-cycle stages, and/or.
- habitat utilised by a migratory species which is at the limit of the species range, and/or
- habitat within an area where the species is declining.

Habitat for migratory wetlands species occurs within the subject land in the form of two farm dams. The farm dams are artificially constructed and do not form part of any natural wetland habitat or ecological community. Although they may provide limited seasonal foraging habitat for the Latham's Snipe and other wetland birds, it could not be concluded that the habitats present in these farms dams constitutes an 'area of important habitat' for these species. Importantly, these farm dams would not support an 'ecologically significant proportion of the population of the species'. In addition, the farm dams habitat would not be of critical importance to any migratory species at particular life-cycle stages; no migratory species that could utilise the site would be is at the limit of the species range, and the subject land is not within an area where any migratory species is declining.

Although the Proposal will remove the farm dams, they are relatively small and lack key habitat features, such as fringing native vegetation that could provide shelter and cover for wetland birds. The proposed removal of the farm dam represents removal of a small area of marginal habitat for migratory wetland birds.

The same principals apply to the areas of forest habitat available to terrestrial migratory species such as Black-faced Monarch, Spectacled Monarch and Rufous Fantail. Given the limited evidence for the presence of these species on the subject land in the locality, and the presence of larger areas of suitable foraging habitat throughout the locality, the Proposal is not likely to substantially modify, destroy or isolate an area of important habitat for a migratory species.

2) result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species

The subject land does not contain an area of important habitat for any listed migratory species, as defined under the *Significant Impact Guidelines 1.1*. In any case, the forest vegetation on the subject land that constitutes potential foraging habitat for terrestrial migratory species is currently in moderate to good condition with limited invasive weed species (mainly exotic perennial grasses within open paddocks). The farm dams containing marginal wetland habitat contain exotic pasture species and are already subject to weed invasion.

The implementation of suitable weed control measures during the construction phase (according to an approved management plan) mean the proposed development is not likely to introduce any invasive species that would be harmful to the habitat of any migratory species.

3) seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species.

Latham's Snipe often utilise artificial wetland habitats such as farm dams during their migration period, however the proposed development will result in the removal of a very small number of dams of which would be unlikely to be of importance to an ecologically significant proportion of the population. Additionally, other farm dams will be retained within the project site and surrounding locality. Latham's Snipe is a highly mobile species that migrates along the east coast of Australia; therefore an extensive amount of habitat will remain to the north, south, east and west for the species to utilise.

Latham's Snipe breeding period occurs outside of its Australian migration period therefore it is unlikely the proposed development will impact on the species breeding cycle.

Conclusion

Based on the consideration of the significant criteria above, the proposal is not likely to have a significant impact on listed migratory species.

5 References

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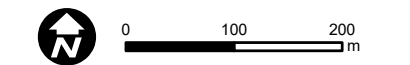
**HILLVIEW QUARRY SSD
EPBC ACT REFERRAL**

**EPBC Act Matters
Recorded on Site**

FIGURE 1A

-  Project Site
-  Disturbance Footprint
- Threatened Ecological Community**
 -  Subtropical eucalypt floodplain forest (E)

Data Sources:
ESRI Basemap world imagery (May 2023).



Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:7,000 at A4
Project Number:	630.12117
Date:	25-Jun-2024
Drawn by:	JH



HILLVIEW QUARRY SSD EPBC ACT REFERRAL

EPBC Act Matters Recorded on Site

FIGURE 1B

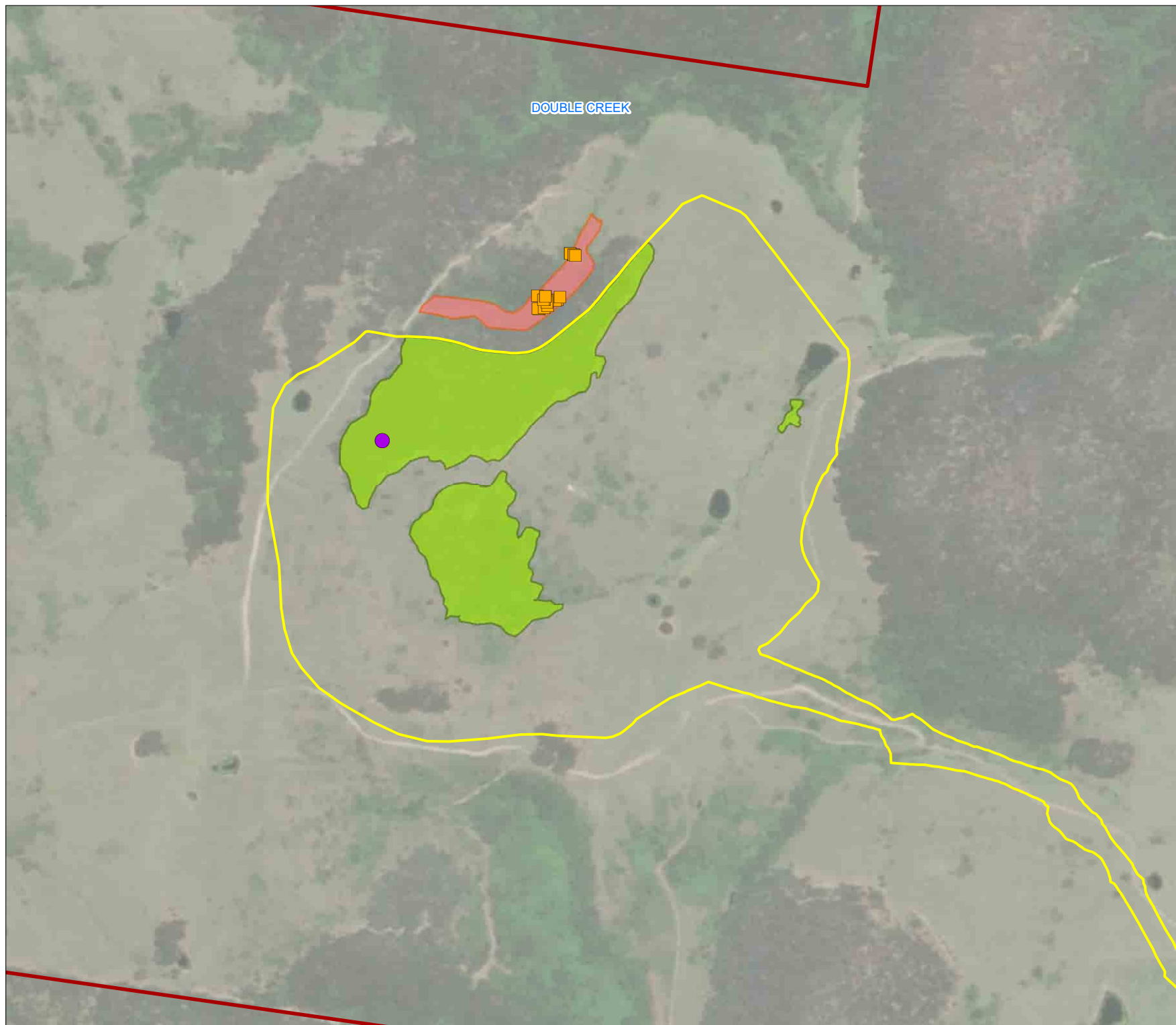
-  Project Site
-  Disturbance Footprint
- Threatened Species**
-  Scrub Turpentine (*Rhodamnia rubescens*) (CE)
-  Scrub Turpentine Habitat (PCT 3076)
-  Koala (*Phascolarctos cinereus*) (E)
-  Koala Habitat (PCTs 3241, 3254 & 3436)

Data Sources:
ESRI Basemap world imagery (May 2023).



0 100 200
m

Coordinate System:	GDA 1994 MGA Zone 56
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HILLVIEW QUARRY EIS BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT

Koala sightings within the Locality (BioNet 10km records)

FIGURE 2

-  Town
-  Koala Record (BioNet Atlas)
-  Project Site
-  10km Buffer
-  National Park

Data Sources:
NSW Spatial Information Exchange. ESRI Basemap
world imagery (May 2023).



Coordinate System:	GDA 1994 MGA Zone 56
Scale:	1:120,000 at A4
Project Number:	630.12117
Date:	26-Jun-2024
Drawn by:	JH

