BIODIVERSITY DEVELOPMENT ASSESSMENT REPORT (BDAR)
Streamlined Assessment

Shoalhaven City Council

Danjera Dam Camping Area Formalisation

Executive Summary

Shoalhaven Water proposes to improve the recreational use of the Danjera Dam camping area, Yalwal Road, in the form of formalising the existing campground to 41 designated camping spaces, upgrading amenities and constructing a caretakers and or staff facilities, office and bushfire refuge/recreation space and modifying an area of native vegetation surrounding the campground as an asset protection zone (APZ).

This report has been prepared to inform and accompany a Planning Proposal application to the NSW Department of Planning and Environment seeking modifications to the permitted land uses within the existing zone to allow for the proposed works. Following the Planning Proposal and the finalisation of proposed works, the BDAR will be reviewed and provided as part of a subsequent Development Application (DA).

The proposal will require the removal of 0.82 hectares (ha) of native vegetation, which is above the clearing threshold for the lots (0.5 ha or more) and subsequently triggers entry into the Biodiversity Offset Scheme (BOS). As such, the assessment has been undertaken in accordance with the NSW *Biodiversity assessment Method* (BAM) (OEH 2017). The Streamlined Assessment Module has been applied as the proposal is a small area development in accordance with Table 1/Table 13 of the BAM.

Field investigation, undertaken in accordance with the BAM, recorded 0.82 ha of native vegetation within the study area representing Plant Community Type (PCT) 838 - *Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion*.

Targeted surveys were undertaken for a selection of threatened species (species credit species) predicted to occur within the study area including:

- Gang-gang Cockatoo *Callocephalon fimbriatum*
- Grey-headed Flying-fox *Pteropus poliocephalus*
- Koala *Phascolarctos cinereus*
- Square-tailed Kite *Lophoictinia isura*
- White-bellied Sea-Eagle *Haliaeetus leucogaster*

Presence was assumed for the remaining species credit species predicted to occur:

- Barking Owl *Ninox connivens*
- Glossy Black-Cockatoo *Calyptorhynchus lathami*
- Large-eared Pied Bat *Chalinolobus dwyeri*
- Little Eagle *Hieraaetus morphnoides*
- Masked Owl *Tyto novaehollandiae*
- Southern Myotis *Myotis Macropus*

Additional survey will be undertaken Barking Owl, Masked Owl, Glossy Black-Cockatoo and Large-eared Pied Bat prior to the DA. In the event that the surveys are not undertaken, Council will retire species credits by making a payment into the Biodiversity Conservation Fund (BCF) managed by the Biodiversity Conservation Trust (BCT).

The proposal has been located on the site to minimise direct impacts to native vegetation. As such, the development has been situated in already cleared areas used for camping and recreation. An asset protection zone (APZ) and minimal clearing is required to widen to access roads to allow for fire fighting vehicles and will require the removal of vegetation. A full summary of impact avoidance measure considered as part of this report is provided in *Section 2.1 Impact avoidance* herein.

An assessment of prescribed impacts was undertaken, with a focus on any prescribed impact on water quality, water bodies and hydrological process, given the proximity to Danjera Dam. The proposal is not likely to result in a prescribed impact.

Credit requirements arising from the proposed development are outlined below:

Plant Community Type (PCT) ID	PCT name	Serious and irreversible impact	Ecosystem credits required
838	Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion	No	7

While PCT 838 is not consistent with any threatened ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act), it is consistent with the approved conservation advice (incorporating listing advice) for the *Illawarra and south coast lowland forest and woodland* (DOE 2016), a critically endangered ecological community (CEEC) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). An assessment against the Significant Impact Criteria (Commonwealth of Australia 2013) has determined that the proposal would not result in a significant impact to the CEEC and referral to the Commonwealth Department of the Environment and Energy is not required.

Document Control

Item	Biodiversity Development Assessment Report – Streamlined Assessment
Project Name	Danjera Dam Camp Area Formalisation
Final date	29 March 2019
Project Manager	Jeff Bryant / Kylie Reed
Prepared by	Kylie Reed (BAM Assessor Accreditation No. BAAS18176)
Reviewed by	Michael Smith (1 March 2019)
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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BAMC	Biodiversity Assessment Method Credit Calculator
BC Act	NSW Biodiversity Conservation Act 2016
BDAR	Biodiversity Development Assessment Report
BSSAR	Biodiversity Stewardship Site Assessment Report
CEEC	Critically Endangered Ecological Community
DNG	Derived Native Grassland
DoEE	Commonwealth Department of Environment and Energy
DPE	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
EP&A Act	NSW Environmental Planning & Assessment Act 1979
EPBC Act	Commonwealth Environment Protection and Biodiversity Conservation Act1999
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
NSW	Local Land Services
NOW	New South Wales
OEH	NSW Office of Environment and Heritage
PCT	Plant Community Types
SEPP	State Environment Planning Policy
SSD	State Significant Development
SSI	State Significant Infrastructure
TEC	Threatened Ecological Community
VIS	Vegetation Information System
WM Act	NSW Water Management Act 2000

1.0 Stage 1: Biodiversity Assessment

1.1 Introduction

Shoalhaven City Council's Environmental Services team was commissioned by Shoalhaven Water to undertake a biodiversity assessment of the proposed formalisation of Danjera Dam (Yalwal Road, Yalwal) to improve the recreational use of the site in the form of camping, on-water dam use (non-motorised), heritage activities (former mining facilities) and nature-based recreation (bushwalks etc.).

The proposal will achieve the following:

- Formalise the existing campground to provide 40 designated camping spaces.
- Provide a one-way perimeter road approximately 4m wide.
- Construct a multipurpose building to contain the following:
    - Refuge/recreational area to house approximately 160 people in an emergency.
    - Caretakers lodging which will include an office, kitchen, amenities and sleeping quarters.
    - New amenities and showers. Existing amenities to be demolished.
- Upgrade the garbage collection area with firewood storage.
- Establish a central green area to be planted with fire resistant trees to provide shade and relief in the open campsite area.
- Installation of 3 steel picnic shelters 4 x 6m.
- Modification of 0.67ha of native vegetation surrounding the campground as an APZ.

The proposal also includes an upgrade to the creek crossing at the main entry to the campground along Yalwal Road as well as the existing secondary access to the south. Minor clearing works are required to achieve a six-metre wide corridor in order to enable access for fire fighting vehicles. As a precautionary measure it has been calculated that the proposal will require 1m of clearing for the length of the access road upgrade will be required resulting in 0.15ha of native vegetation clearing.

The land is owned by Council, zoned E2 (Environmental Conservation) and classified as Operational land. The area broadly incorporates the dam itself, the informal existing camping, picnic and day use areas to the east of the Dam. The proposed Planning Proposal seeking to modify the permissible land uses by an amendment to *Shoalhaven Local Environmental Plan (SLEP) 2014*.

Entry into the BOS was triggered by the area clearing threshold. The subject property has no minimum lot size (GIS layer - Shoalhaven Local Environment Plan, 2014), therefore the actual lot size of the smallest lot affected by the proposed works was used to determine the area clearing threshold trigger. This assessment has been provided in Table 1 below.

Table 1: Summary of proposal details including the area clearing threshold trigger into the BOS

Zones/Controls	Details
Lot	Lots 1,4 and 5 DP 252335, Yalwal Rd YALWAL 2540
Owner	Shoalhaven City Council
Area of lot	7.19 ha,14.08 ha, 7.19 ha
Minimum lot size associated with lot	No minimum lot size
Relevant area clearing threshold trigger into BOS	0.50 ha or more
Total development site	0.82 ha (0.67ha as APZ and 0.15ha along access roads)

The purpose of this assessment was to apply the NSW Biodiversity Assessment Methodology (BAM; OEH 2017) to the proposed development and provide Shoalhaven Water with a Biodiversity Development Assessment Report (BDAR). The BDAR will be submitted to the NSW Department of Planning and Environment as part of the Planning Proposal to rezone the land to allow for the camp ground. Following the Planning Proposal and the finalisation of proposed works, the BDAR must be reviewed and provided as part of a Development Application (DA).

The proposal meets the area limit for application of the small area development module in accordance with Table 1/Table 13 of the BAM (OEH 2017). As such the Streamlined Assessment Module has been applied.

1.1.1 Development site

The development site includes any areas that will be directly impacted by the development and includes the construction and operational footprints (Figure 1, Figure 2 and Figure 9). The Study Area includes any area that will be directly or indirectly impacted by the proposed works.

Figure 1: Proposed work/development site associated with the Danjera Dam camping area formalisation and access upgrade

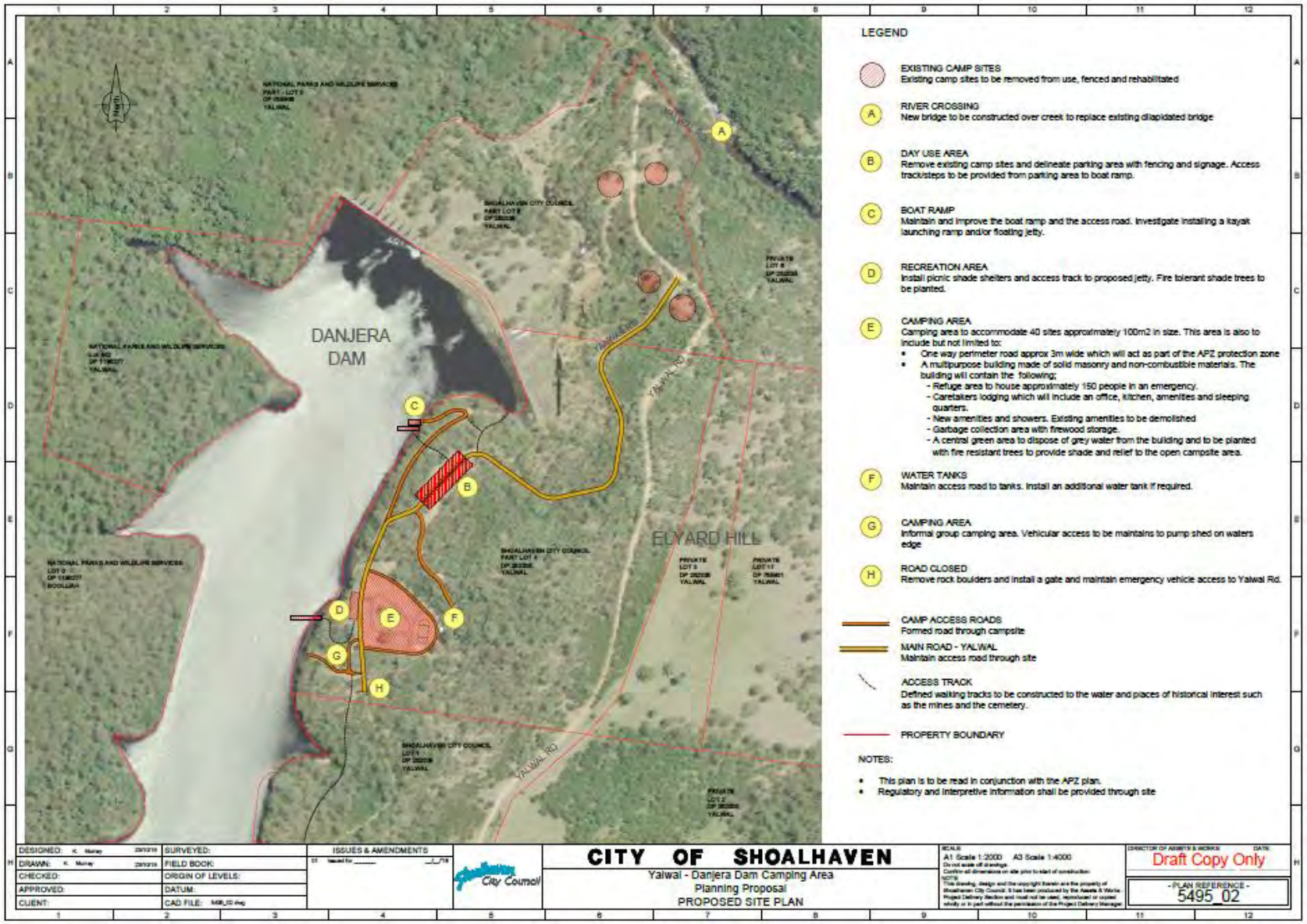


Figure 2: Proposed campground formalisation plan at Danjera Dam camping area

1.1.2 Impacts that do not require further assessment

This section provides an assessment of those areas that do not require an offset in accordance with Section 10.4.1.1 of the BAM (OEH 2017). These areas include the following and do not require further assessment (Photo 1):

- Bare ground
- Sealed roads
- Waterbodies
- Weeds and exotics
- Planted vegetation

Photo 1: Central area of development site that does not require further assessment

Areas not mapped as a PCT in Figure 5 are not assessed as native vegetation, and do not provide habitat for threatened species.

1.2 Sources of information used

Sources of information used in the assessment included relevant databases, spatial data, literature and previous site reports. In order to provide a context for the study area, records of flora and fauna from within 10 kilometres (the 'locality') were collated from the following databases and were reviewed:

- Commonwealth Department of the Environment and Energy (DEE) Protected Matters Search Tool for matters protected by the EPBC Act.

- NSW Office of Environment and Heritage (OEH) BioNet Atlas of NSW Wildlife, for species, populations and ecological communities listed under the *Biodiversity Conservation Act 2016* (BC Act).
- OEH Threatened Biodiversity Data Collection (OEH, 2019)
- PlantNET (The Royal Botanic Gardens and Domain Trust).
- BirdLife Australia, the New Atlas of Australian Birds 1998-2015.
- Biodiversity Assessment Methodology (BAM) Calculator.
- Other sources of biodiversity information relevant to the study area were sourced from:
    - The NSW Plant Community Types, as held within the BioNet Vegetation Classification database (OEH 2017).
    - Shoalhaven City Council Biometric Vegetation Mapping.

The following reports were also reviewed and relied on to provide additional information:

- Danjera Dam Strategic Environmental Constraints Report. Prepared by Planning and Development Services Group, Shoalhaven City Council (SCC 2017).

Base map data was obtained from LPI 1:25,000 digital topographic databases (DTDB), with cadastral data obtained from LPI digital cadastral database (DCDB).

The following spatial datasets were utilised during the development of this report:

- Mitchell Landscapes Version 3.0.
- Interim Biogeographic Regionalisation of Australia (IBRA) Version 7.
- Directory of Important Wetlands (DIWA).
- NSW Soil and Land Information System (SALIS).

Mapping has been produced using 'ArcGIS' Geographic Information System (GIS). In accordance with the BAM, the following maps and data have been provided:

- Digital mapping with aerial photography showing 1:1000 or finer.
- Site map as described in subsection 4.2.1.1 of the BAM (Figure 3).
- Location Map as described in subsection 4.2.1.2 of the BAM (Figure 4).
- Landscape map with features including 1500 metre buffer, as described in section 4.2.1.3 of the BAM.

1.3 Legislative context

The proposal has been assessed against relevant biodiversity legislation and government policy. The legislative context for the report is provided in Table 2.

Table 2: Legislative context

Name	Relevance to project	Report Section
Commonwealth		
Environmental Protection Biodiversity Conservation Act 1999 (EPBC Act)	The EPBC Act is the Australian Government's key piece of environmental legislation. The EPBC Act applies to developments and associated activities that have the potential to significantly impact on Matters of	Threatened species and ecological communities protected by the EPBC Act are outlined in

Name	Relevance to project	Report Section
	National Environmental Significance (MNES) protected under the Act. Under the EPBC Act, activities that have potential to result in significant impacts on MNES must be referred to the Commonwealth Minister for the Environment for assessment. MNES relevant to the current project include nationally threatened species and ecological communities, migratory species and Ramsar wetlands.	Section 2.4.1. An assessment of potential impacts to all MNES under the provisions of the EPBC Act is provided in *Appendix F*.
State		
Environmental Planning and Assessment Act 1979 (EP&A Act)	The EP&A Act provides the overarching structure for planning in NSW and is supported by other statutory environmental planning instruments.	Sections of the EP&A Act of primary relevance to the natural environment are outlined further below and in *Section 2.4.1*.
Biodiversity Conservation Act 2016 (BC Act)	The purpose of the BC Act is to maintain a healthy, productive and resilient environment for the greatest well-being of the community, now and into the future, consistent with the principles of ecologically sustainable development. The Act provides for the protection and conservation of biodiversity in NSW through the listing of threatened biota; key threatening processes; and critical habitat for threatened biota. The BC Act also establishes the Biodiversity Offset Scheme (Part 6) and biodiversity assessment and approvals.	This BDAR has been prepared in accordance with Appendix 12 of the BAM, as required by the BC Act.
Biosecurity Act 2015	The Biosecurity Act was enacted to provide for the identification, classification and control of Priority Weeds with the purpose of determining if a biosecurity risk is likely to occur, i.e.: • The introduction, presence, spread or increase of a pest into or within the State or any part of the State. • A pest plant has the potential to; harm or reduce biodiversity or out-compete other organisms for resources, including food, water, nutrients, habitat and sunlight. No Priority Weeds for South East Region which includes the Shoalhaven LGA, were recorded during the surveys.	No further assessment is required.
Fisheries Management Act 1994 (FM Act)	The object of the FM Act is to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. Under the concept design, the proposed activity would not: • affect declared aquatic reserves (Part 7, Division 2 of the Act) • involve dredging or reclamation (Part 7, Division 3) • involve blocking the passage of fish (s.219) • impact mangroves and marine vegetation (Part 7, Division 4) • involve disturbance to gravel beds where salmon or trout spawn (s.208 of the Act) • involve the release of live fish (Part 7, Division 7) • involve the construction of dams and weirs (s.218)	In the event that the works associated with the creek crossing along the main entry road is upgraded involves in-stream work, a Fisheries Permit may be required. This will be investigated during the detailed design phase.

Name	Relevance to project	Report Section
	• result in the blocking of the passage of fish • would not impact declared threatened species of endangered ecological communities (Part 7A) • constitute a declared key threatening process (Part 7A) • use explosives or electrical devices in a watercourse (Clauses 70 to 73 of the Fisheries Management (General) Regulation 2010).	
Local Land Services Amendment Act 2016	Clearing of vegetation will be undertaken within E2 zoned land. Therefore, the *Local Land Services Amendment Act* 2016 does not apply to the proposal.	Not relevant to the proposal and no further assessment required.
Water Management Act 2000 (WM Act)	The objects of the WM Act are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. An approval is required to undertake controlled activities on waterfront land, unless that activity is otherwise exempt (WM Act, section 91E). Waterfront land includes the bed and bank of any river, lake or estuary and all land within 40 metres of the highest bank of the river, lake or estuary. Approximately 0.031 ha of the proposal will be within "waterfront land" as defined by the WM Act. The proposal will require the thinning of vegetation within this area for APZ purposes and the finalisation of the existing campground. The proposal is unlikely to worsen current conditions of the riparian corridor due to the 'unregulated' nature of clearing and firewood collection within the area. Due to the minimal nature of works, a controlled activity permit is unlikely to be required for the proposal.	No further assessment required.
Planning Instruments		
Shoalhaven Local Environmental Plan 2014 (SLEP)	The study area is subject to the Shoalhaven LEP and is zoned E2 (Environmental Conservation) and classified as Operational land. The objectives of E2 zoning is to Protects land that has high conservation value and a number of land uses considered to be inappropriate for this zone have been mandated as prohibited uses. The proposal is not permitted in the E2 zone, therefore formalising the current use requires a Planning Proposal to be progressed. This BDAR will accompany the Planning Proposal to demonstrate that biodiversity has be adequately considered as part of the application. The BDAR will then be used to accompany a development application for the proposal once the Planning Proposal is approved. The banks of Danjera Dam are mapped as a Watercourse Category 1 (Environmental Corridor) in accordance with the Shoalhaven LEP and requires a 50 m riparian corridor.	An assessment of the direct and indirect impacts to the riparian corridor in accordance with Clause 7.6 of the Shoalhaven LEP is provided in *Section 2.4.2.*
State Environmental Planning Policy 44 – Koala Habitat Protection	SEPP No. 44 aims to encourage the conservation and management of natural vegetation areas that provide habitat for koalas to ensure permanent free-living	SEPP No. 44 is relevant to the current assessment and is

Name	Relevance to project	Report Section
	populations will be maintained over their present range and to reverse the current trend of koala-population decline. It applies to areas of native vegetation greater than one hectare and in councils listed in Schedule 1 to the SEPP. The study area is located within the Shoalhaven LGA, a Schedule 1 listed Council. One feed tree species listed in Schedule 2 of the SEPP is present within the proposal area, being Forest Red Gum *Eucalyptus tereticornis*. An additonal feed tree Grey Gum *Eucalyptus punctata* is present in the surrounding landscape. Therefore SEPP 44 is relevant to the assessment.	discussed further in *Section 2.4.3.*

1.4 Site context

This section describes the landscape and site context of the study area, describing the landscape features present within the study area and within a 1500 metre buffer to the development site, as required by the BAM (OEH 2017).

1.4.1 Summary

Table 3 provides a summary of the site context data used in the current assessment and input into the BAM Calculator.

Table 3: Site context

Landscape feature	Description
IBRA bioregion	Sydney Basin bioregion
IBRA subregion	Ettrema subregion
NSW Landscape	Yalwal – Tallowal Tableland
Rivers and streams	Danjera Dam
Wetlands	N/A
Connectivity features	N/A
Areas of geological significance and soil hazard features	N/A
Native vegetation cover in the landscape (1500m buffer)	• 100% vegetation cover = 900.59Ha (87.9%) • 15% vegetation cover (farm land, campgrounds, roads etc) = 78.71Ha (1.2%) • 0% vegetation cover (water, infrastructure etc.) = 44.86Ha (0%) Average vegetation cover (within 1500m buffer) = **89.1%**
Patch size	>100 Ha

1.4.2 Changes to the mapped native vegetation extent

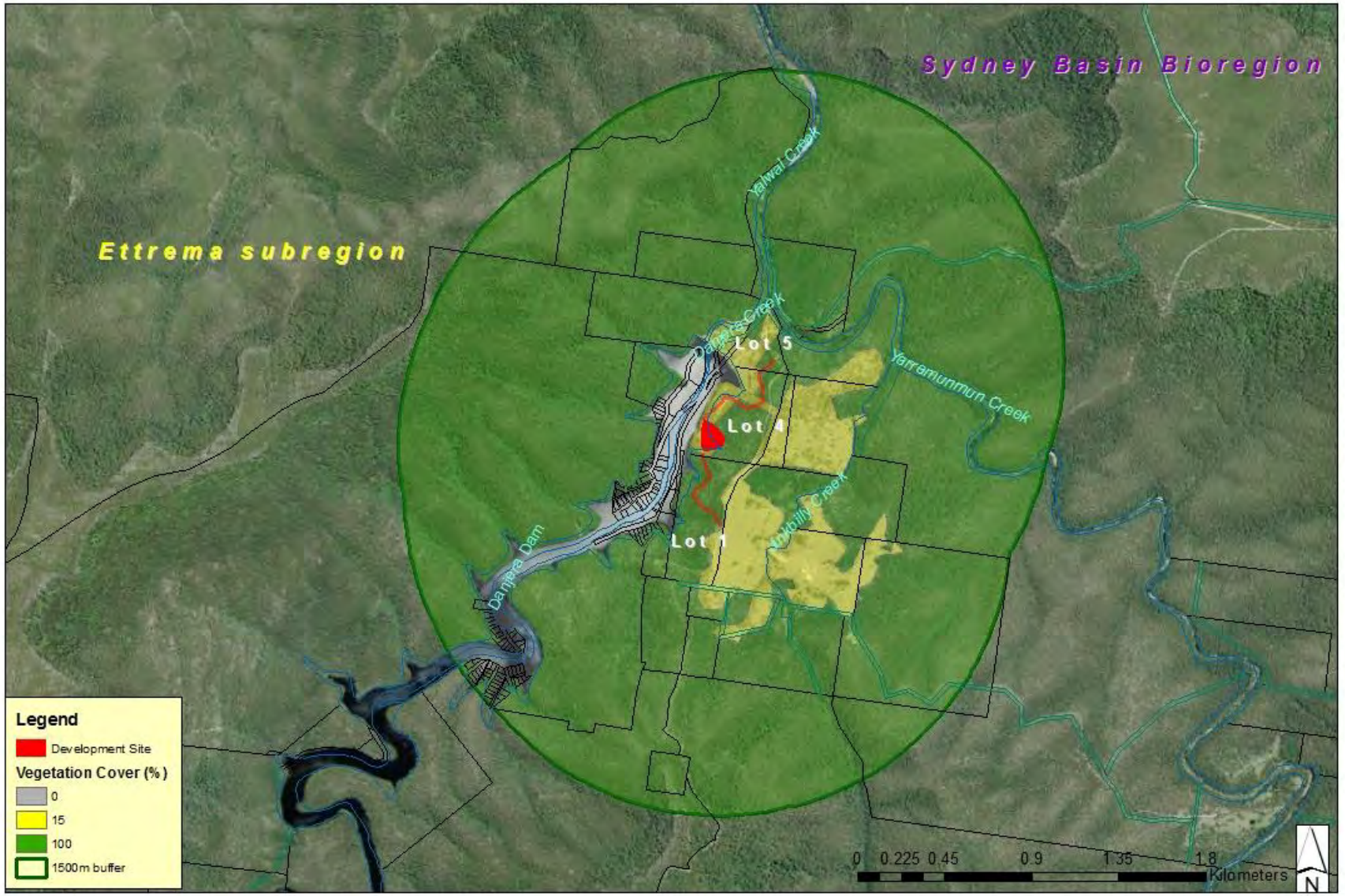
In accordance with Section 5.1.1.6 of the BAM (OEH 2017), the native vegetation extent was mapped within the area of a 1500m buffer surrounding the proposal. The Shoalhaven Biometric mapping dataset was used as a base layer to determine native vegetation extent. It was noted that several areas within the central portion of the 1500m buffer are not been mapped by the Biometric dataset, however a field assessment determined that this area does contain areas of 100% native vegetation

cover and scattered occurrences of native vegetation of approximately 15% native vegetation cover. This mapping has been provided in Figure 4.

Figure 5 provides a map of the native vegetation extent recorded within the study area and impact area, as assessed during field investigations undertaken in November and December 2018, and January 2019. The figure includes all areas of native vegetation (native ground cover and areas with canopy). Areas not shown as native vegetation cover within Figure 5 are not included for further assessment in accordance with Section 10.4.1.1 of the BAM) (OEH 2017).

Figure 3: Site Map

Figure 4: Location Map



1.5 Native vegetation

The development site supports 0.82 ha of native vegetation with varying levels of disturbance.

Native vegetation within the study area varied in composition and condition as a result of previous and current land uses associated with the campground and recreational area. The central portion of the development site, primarily the existing campground, consists of bare soil and camp fire pits with areas of exotic grasses.

Vegetation surrounding the existing campground was in varying condition pending the associated edges effects generated through the collection of firewood, encroachment of camping into bushland areas, grazing by goats and cows and the construction of a number of bunds to slow and divert runoff from the campground.

Vegetation located in the eastern portion of the study area was in better condition than that located to the north and south. This vegetation contained a mid-storey layer and higher diversity, likely to be the result of the terrain (steep and rocky) and it being located further away from the main campground (experiencing less trampling/firewood collection).

1.5.1 Plant Community Types present

One PCT was assessed as present within the study area:

- PCT 838 Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion.

Table 4 provides a detailed description of the PCT and summarises the BAM plot survey effort.

Table 4: PCT 838 Forest Red Gum - Thin-leaved Stringybark grassy woodland description

PCT 838 Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion	
Plant species scientific name	*Eucalyptus eugenioides , Eucalyptus tereticornis / Breynia oblongifolia , Eustrephus latifolius , Geitonoplesium cymosum , Myrsine variabilis / Carex longebrachiata , Commelina cyanea , Desmodium gunnii , Dichondra repens*
Vegetation Formation	Grassy Woodlands
Vegetation Class	Coastal Valley Grassy Woodlands
Extent within study area	0.82
PCT % Cleared	85%
Vegetation zones and plots	• 838_VZ1_Good = 0.17 ha in good condition (Photo 2) • 838_VZ2_Medium = 0.13 ha in medium condition (Photo 3) • 838_VZ3_low = 0.52 ha in low condition (Photo 4)
Survey effort	• 838_VZ1_Good = 1 BAM plot (Plot ID: DD1) • 838_VZ2_Medium = 1 BAM plot (Plot ID: DD3) • 838_VZ3_low = 1 BAM plot (Plot ID: DD2)

PCT 838 Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion	
Description	The vegetation is dominated by Rough-barked Apple *Angophora floribunda* and Forest Red Gum *Eucalyptus terericornis*, with a patch of Thin-leaved Stringybark *Eucalyptus eugenioides* at the eastern extent of the development site. Canopy species reached a height of approximately 20 meters and a number of trees contained hollows. The mid-stratum layer was generally dominated by Fern-leaved Wattle *Acacia filicifolia* in moderate density and reaching a height of approximately 10 meters. Scattered occurrences of Black Wattle *Acacia mearnsii* and white sally wattle *Acacia floribunda* also make up the mid-stratum, reaching up to 6m in height. The shrub layer was relatively sparse in most areas. Where present (generally in the eastern portion of the development site) it supported native species such as Boxthorn *Bursaria spinosa*, Wallaby Weed *Olearia viscidula* and Tree Violet *Melicytus dentatus*. Native groundcover was dominated across the entire development site by native grasses, ferns and forbs, including Weeping Grass *Microlaena stipoides*, Kidney Weed *Dichondra repens* and Australian Basket Grass *Oplismenus aemulus*. A dense patch of Sickle Fern *Pellaea falcata* was also present in the eastern portion of the development site.
Condition	Along the eastern boundary of the study area this community is generally in good condition with all three canopy species present, moderate diversity through the mid, shrub and groundcover layers. Exotic species were generally in low abundance and limited to Paddy's Lucerne *Sida rhombifolia* and Madeira Winter *Solanum pseudocapsicum*. Vegetation in the northern portion of the site and extending along the access track to the north, was in medium condition, containing two of the three canopy species, Rough-barked Apple and Forest Red Gum in relatively high density but lacking a shrub layer. Vegetation in southern portion was in a lower condition to that elsewhere in the development site, with high density of regenerating mid-stratum species likely to have been cleared to create the runoff diversion from the campground. The area has also experienced ongoing disturbance from trampling, collection of firewood, grazing, and encroachment from the recreational area/campground. The high threat weed, Cobblers Pegs *Bidens pilosa*, was recorded in both medium and low condition vegetation.
Justification of PCT	Following an assessment of vegetation in the field, an investigation of the PCTs listed within the BioNet Vegetation Classification (OEH 2019) was completed by exporting the entire dataset into Excel and refining data using a pivot table. A search based on the dominate canopy species (*Eucalyptus tereticornis*, *Angophora floribunda* and *Eucalyptus punctata*) was completed to access a long list of candidate PCTs, being: 829, 834, 838, 840, 858, 1119, 1557 and 1622. From this list, it was determined that given the species recorded in the mid and ground stratum, that PCTs 838 and 840 were best matched to the vegetation of the development site. It was determined that the PCT of the site most reflected PCT 840 based on the following: • Vegetation formation: Grassy Woodlands • Vegetation class: Coastal Velley Grassy Woodlands • IBRA Bioregion: South East Corner • IBRA Subregion: Ettrema
TEC Status	Commonwealth EPBC Act: The PCT is consistent with the listing advice for *Illawarra and south coast lowland forest and woodland* critically endangered ecological community (CEEC). • Justification – an assessment against the key diagnostic characteristics indicates that the PCT is consistent with the EPBC Act CEEC as it occurs within the Ettrema subregion of the Sydney Basin Bioregion, is below 350m ASL, is a forest with a shrubby understorey and at least 10% foliage cover, contains

PCT 838 Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion	
	dominant canopy species (Forest Red Gum, Rough-barked Apple and Thin-leaved Stringybark), contains tree sized Acacias and is characterised by (some of) the plant species described in Appendix A of the Approved conservation advice (incorporating listing advice) for the Illawarra and south coast lowland forest and woodland ecological community (DOE 2016). NSW BC Act: Not listed. • Justification – The NSW BC Act listed endangered ecological community (EEC), Illawarra Lowlands Grassy Woodland in the Sydney Basin Bioregion does not occur within the Ettrema subregion. The Scientific Committee provided advice to Shoalhaven Council that it does occur in the Shoalhaven in the Berry to Shoalhaven Heads area.

Photo 2: Vegetation zone 838_VZ1_Good in good condition (Plot DD1)

Photo 3: Vegetation zone 838_VZ2_Medium in medium condition (Plot DD3)

Photo 4: Vegetation zone 838_VZ3_low in low condition (Plot DD2)

Figure 5: Plant Community Type and extent of native vegetation

1.5.2 Vegetation integrity assessment

PCTs within the impact area were assessed and stratified, based on broad condition state, into vegetation zones. This resulted in three vegetation zones for PCT838 in good, medium and low condition as detailed in Table 5 below and Figure 6.

Vegetation integrity was assessed using data obtained from undertaking BAM plots, as per the methodology outlined in Section 5.3.4 of the BAM (OEH 2017). Plot data was collected via:

- A 20 metre x 50 metre quadrat and 50 metre transect for assessment of site attributes and function.
- A 20 metre x 20 metre quadrat, nested within the larger quadrat for full floristic survey to determine composition and structure of the PCT.

The minimum number of BAM plots per vegetation zone was determined using Table 4 of the BAM (OEH 2017). A total of three BAM plots were completed within the impact area at the following locations (Figure 6):

- Plot DD1 = 261173.42; 6132389.16 (bearing: 5º)
- Plot DD3 = 261156.08; 6132340.87 (bearing: 6º)
- Plot DD2 = 261076.53; 613245.83 (bearing: 102º)

As shown in Figure 6, the entirety of each plot was not located within the representative vegetation zone. This was largely due to the configuration of each zone and an attempt to place plots in randomly selected locations that best represented the zone. The streamlined assessment module of the BAM allows for some flexibility when assessing the vegetation integrity of a vegetation zone (Table 13 of Appendix 2). An assessment of vegetation integrity was undertaken using benchmark data collected as outlined in Subsection 5.3.3 of the BAM. No additional local data was used for this assessment.

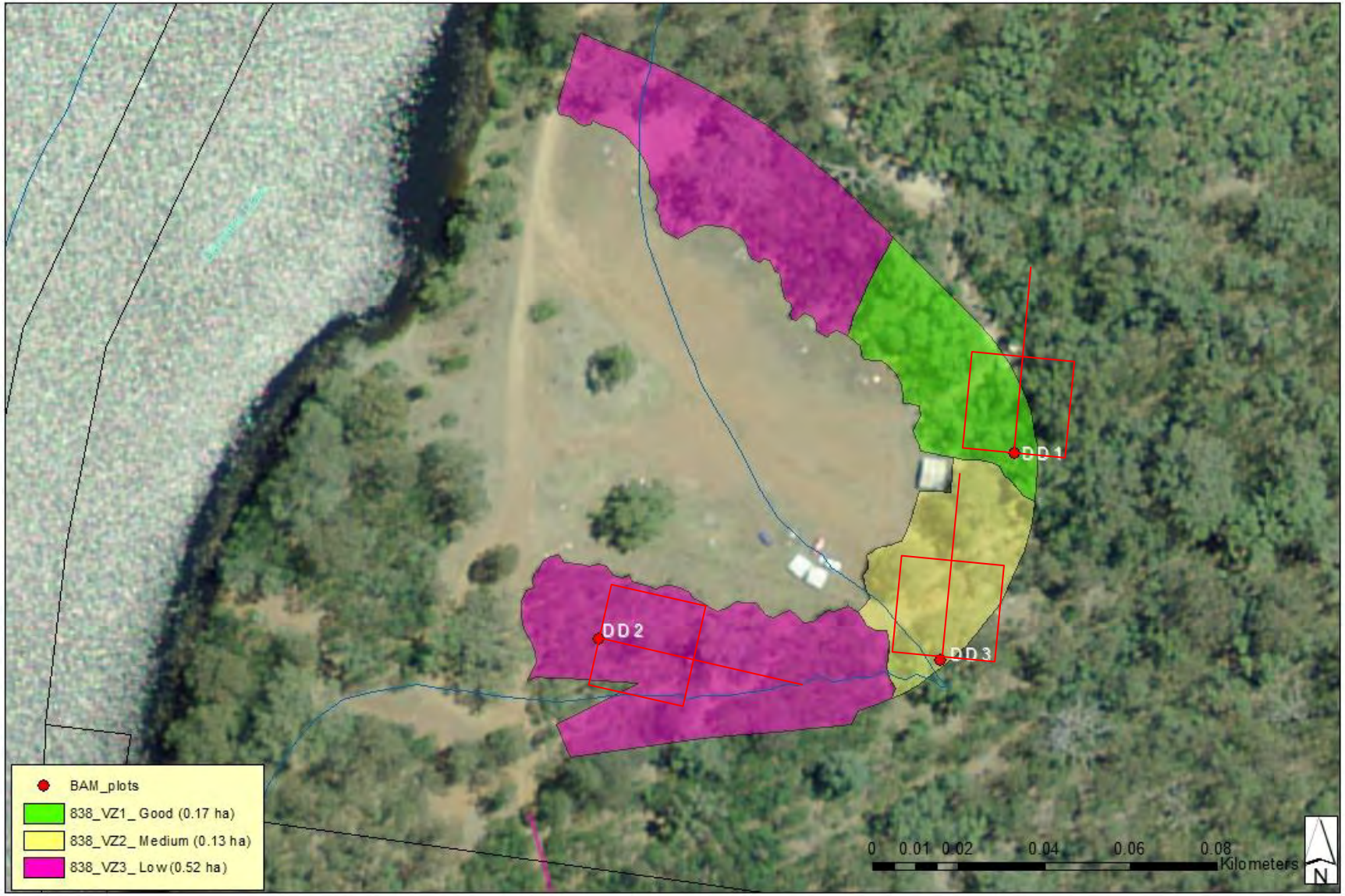
A list of flora species was compiled, and records of all flora species will be submitted to OEH for incorporation into the Atlas of NSW Wildlife. Plot data was entered into the BAM calculator to determine vegetation integrity score. Plot data is presented in Appendix B. Vegetation integrity scores for the vegetation zone in the study area is provided in Table 5.

Table 5: Vegetation integrity

Vegetation Zone	Plot ID	Condition	Patch size	Area (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Current vegetation integrity score
838_VZ1_ Good	DD1	Good	>101	0.17	77.7	30.7	65	**53.7**
838_VZ2_ Medium	DD3	Medium	>101	0.13	38.1	38.6	64.9	**45.7**
838_VZ3_ Low	DD2	Low	>101	0.52	34.5	34.2	64.1	**42.3**

No vegetation zones scored a vegetation integrity of <20, therefore offsets are required for each zone (Section 10.3.1 of the BAM).

Figure 6: Vegetation Zones and plot locations



1.6 Threatened species

1.6.1 Habitat assessment

An initial habitat-based fauna assessment was conducted on the 27 November 2019 to identify the fauna habitat features of the study area to inform the assessment of ecosystem credit species and species credit species. The following features were noted:

- Number of hollow-bearing trees and number and diameter of hollows.
- Habitat trees including availability of flowering shrubs and feed tree species including presence of listed Koala feed trees.
- Waterbodies.
- Quantity of ground litter and logs.
- Searches for indirect evidence.
- Condition of native vegetation and the presence of exotic species (i.e. goats and cattle).
- General degradation of the site as a result of past and current land management practices and lack of maintenance.

Fauna habitats within the development site were found to be substantially degraded due to impacts associated with grazing goats and cattle as evidenced through the presence of scat, firewood collection, trampling or removal of vegetation through the encroachment of the camping/recreational area into bushland and the creation of bunds to redirect runoff from the campground.

Habitats values increase with improved vegetation condition in the retained vegetation to the east of the development site (in vegetation zone 838_VZ1_ Good) and areas further away from the existing campground. While these areas are considered to provide a higher potential to support threatened fauna, to ensure indirect impacts and/or potential movement corridors through the impact areas have been adequately considered, all vegetation zones have been assessed as supporting threatened fauna habitat in Section 1.6.2 and 1.6.3 herein.

A total of 28 hollow-bearing trees were recorded both within the development site and within a 100m buffer of the site (Figure 7). A buffer was applied to ensure indirect impacts are adequately assessed. An assessment of the potential for the hollows to support nesting habitat for threatened species was completed (Table 6). Hollow size and formation (i.e. pipe hollow, trunk hollow or branch hollow), was taken into consideration in the assessment.

The remainder of the impact area (i.e. areas not mapped as a PCT) supports no fauna habitat of significance as described in Section 1.1.2.

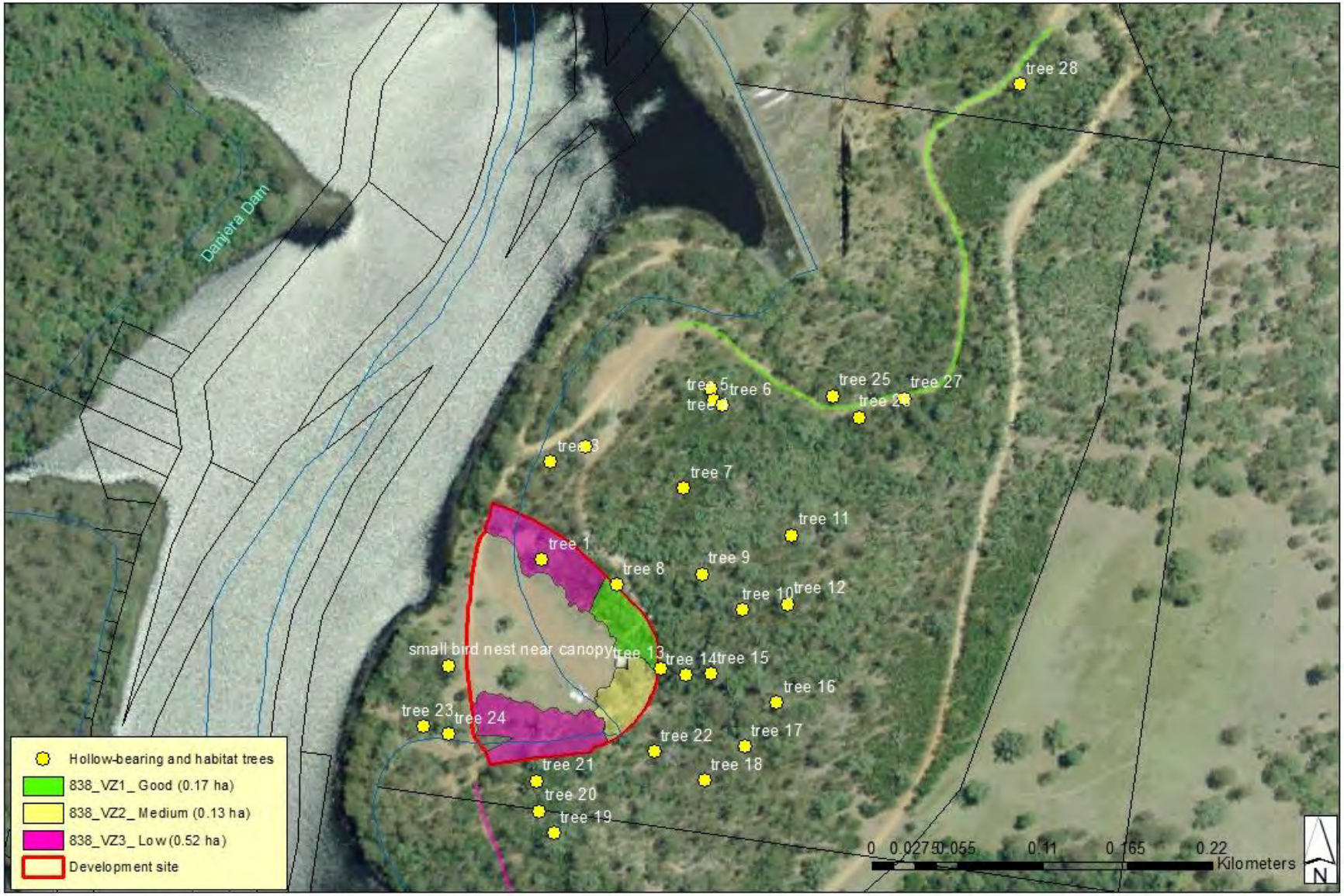
Subsequent targeted surveys were undertaken for a number of species. Survey effort and methodology is provided in *Section 1.6.3.1 Threatened flora habitat and survey* and *Section 1.6.3.2 Threatened fauna habitat and survey*.

Table 6: Hollow-bearing trees and habitat trees recorded within the study area

Tree number	Easting	Northing	Number of hollows	Size of hollows	Candidate species
Tree 1	260811	6132946	2	30, 40cm	Southern Myotis, Glossy Black-Cockatoo, Gang-gang Cockatoo, Barking and Masked Owl
Tree 2	260809	6132960	1	20cm	Southern Myotis
Tree 3	260821	6132946	1	10cm	Southern Myotis
Tree 4	260800	6132958	1	40cm	Glossy Black-Cockatoo, Gang-gang Cockatoo, Barking and Masked Owl
Tree 5	260830	6132958	1	60cm	Owl
Tree 6	260802	6132946	2	5, 50cm	Owl, Southern Myotis
Tree 7	260811	6132981	1	30cm	Glossy Black-Cockatoo, Gang-gang Cockatoo, Southern Myotis
Tree 8	260802	6132958	1	30cm	Southern Myotis
Tree 9	260802	6132948	1	20cm	Glossy Black-Cockatoo, Gang-gang Cockatoo, Southern Myotis
Tree 10	260811	6132960	2	15, 20cm	Glossy Black-Cockatoo, Gang-gang Cockatoo, Southern Myotis
Tree 11	260811	6132960	1	50cm	Southern Myotis, Glossy Black-Cockatoo, Gang-gang Cockatoo, Barking and Masked Owl
Tree 12	260802	6132972	1	40cm	Southern Myotis, Glossy Black-Cockatoo, Gang-gang Cockatoo, Barking and Masked Owl
Tree 13	260797	6132948	2	30, 50cm	Southern Myotis, Glossy Black-Cockatoo, Gang-gang Cockatoo, Barking and Masked Owl
Tree 14	260800	6132958	1	30cm	Glossy Black-Cockatoo, Gang-gang Cockatoo, Southern Myotis
Tree 15	260802	6132950	1	20cm	Southern Myotis
Tree 16	260795	6132958	2	20, 20cm	Glossy Black-Cockatoo, Gang-gang Cockatoo, Southern Myotis
Tree 17	260816	6132962	1	50cm	Owl, Southern Myotis
Tree 18	260807	6132958	1	15cm	Southern Myotis
Tree 19	260807	6132946	2	15, 30cm	Glossy Black-Cockatoo, Gang-gang Cockatoo, Southern Myotis
Tree 20	260800	6132953	1	40cm	Southern Myotis, Glossy Black-Cockatoo, Gang-gang Cockatoo, Barking and Masked Owl
Tree 21	260830	6132960	1	40cm	Southern Myotis, Glossy Black-Cockatoo, Gang-gang Cockatoo, Barking and Masked Owl
Tree 22	260802	6132979	3	15, 15, 20cm	Glossy Black-Cockatoo, Gang-gang Cockatoo, Southern Myotis
Tree 23	260809	6132960	2	3, 10cm	Southern Myotis

Tree number	Easting	Northing	Number of hollows	Size of hollows	Candidate species
Tree 24	260816	6132955	2	15, 20cm	Glossy Black-Cockatoo, Gang-gang Cockatoo, Southern Myotis
Tree 25	260749	6133063	3	15, 15, 20cm	Glossy Black-Cockatoo, Gang-gang Cockatoo, Southern Myotis
Tree 26	260737	6133039	1	10cm	Southern Myotis
Tree 27	260751	6133049	1	20cm	Southern Myotis
Tree 28	260756	6133027	4	10, 15, 20, 30cm	Southern Myotis, Glossy Black-Cockatoo, Gang-gang Cockatoo, Barking and Masked Owl
Small bird nest near canopy	260804	6132946	0	N/A	Likely to be an Australian Magpie or Australian Ravin nest.

Figure 7: Hollow-bearing trees located within the development site and within a 100m+ buffer



1.6.2 Ecosystem credit species

A list of predicted threatened species (ecosystem credit species) expected to occur within the study area, based on information obtained from the Threatened Biodiversity Data Collection, and refined as per Section 6 of the BAM is provided in Table 7 below. Impacts to these species require assessment, however targeted survey is not required.

Table 7: Summary of ecosystem credit species within the study area

Species	Habitat type	Sensitivity to gain class	Veg Zone	Listing status	Justification for exclusion
Regent Honeyeater *Anthochaera phrygia*	Foraging	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – CE EPBC Act – CE	Retained in assessment
Gang-gang Cockatoo *Callocephalon fimbriatum*	Foraging	Moderate	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Glossy Black-Cockatoo *Calyptorhynchus lathami*	Foraging	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Varied Sittella *Daphoenositta chrysoptera*	-	Moderate	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Spotted-tailed Quoll *Dasyurus maculatus*	-	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – E	Retained in assessment
Eastern False Pipistrelle *Falsistrellus tasmaniensis*	-	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Little Lorikeet *Glossopsitta pusilla*	-	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
White-bellied Sea-Eagle *Haliaeetus leucogaster*	Foraging	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Little Eagle *Hieraaetus morphnoides*	Foraging	Moderate	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Square-tailed Kite *Lophoictinia isura*	Foraging	Moderate	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*	Foraging	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Eastern Freetail-bat *Mormopterus norfolkensis*	-	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Turquoise Parrot *Neophema pulchella*	-	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Barking Owl *Ninox connivens*	Foraging	High	838_VZ1_ Good 838_VZ2_ Medium	BC Act – V EPBC Act – N/A	Retained in assessment

Species	Habitat type	Sensitivity to gain class	Veg Zone	Listing status	Justification for exclusion
			838_VZ3_ Low		
Scarlet Robin *Petroica boodang*	-	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Flame Robin *Petroica phoenicea*	-	Moderate	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Koala *Phascolarctos cinereus*	Foraging	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – V	Retained in assessment
Grey-headed Flying-fox *Pteropus poliocephalus*	Foraging	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – V	Retained in assessment
Yellow-bellied Sheathtail-bat *Saccolaimus flaviventris*	-	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Greater Broad-nosed Bat *Scoteanax rueppellii*	-	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment
Masked Owl *Tyto novaehollandiae*	Foraging	High	838_VZ1_ Good 838_VZ2_ Medium 838_VZ3_ Low	BC Act – V EPBC Act – N/A	Retained in assessment

The presence of these species could not be discounted using the methodology outlined in Step 1, Section 6.4 of the BAM. It was therefore assumed that these species may occur within the study area.

1.6.3 Species credit species

Table 8 provides a list of species credit species predicted to occur within the study area, based on information obtained from the Threatened Biodiversity Data Collection. An assessment of whether suitable habitat occurs within the study area, and therefore targeted survey is required, is also provided. The potential for a species to occur within the study area was assessed in accordance with Sections 6.3 and 6.4 of the BAM.

Table 8: Summary of species credit species within the study area

Common name	Habitat type	Habitat Constraints/ Geographic Limitations	Threatened Biodiversity Data Collection (TBDC) habitats and assessment notes (OEH 2019)	Sensitivity to gain class/Risk weighting	Listing status	Confirmed candidate species and justification	Species presence
Regent Honeyeater *Anthochaera phrygia*	Breeding	Breeding habitat as per mapped important areas.	**Serious and Irreversible Impacts (Breeding) = Yes** The species inhabits dry open forest and woodland, particularly Box-Ironbark woodland, and riparian forests of River Sheoak. It is a dual credit species with mapped 'important areas' being a species credit, these areas do not require survey and any impact from development could be potentially serious and irreversible.	High/3	BC Act – CE EPBC Act – CE	**No**. The prescribed habitat constraints identified by the TBDC are not present within the study area, i.e. no areas of mapped habitat occur within the study area.	N/A
Gang-gang Cockatoo *Callocephalon fimbriatum*	Breeding	Breeds in Eucalypt tree species with hollows greater than 9 cm diameter.	**Serious and Irreversible Impacts (Breeding) = No** Found in tall mountain forests and woodlands. Favours old growth forest and woodland attributes for nesting and roosting. Nests in hollows that are 10 cm in diameter or larger and at least 9 m above the ground in eucalypts. Breeding should be identified by the presence of suitable habitat AND 1. presence of nest OR; 2. observation indicates a pair of birds on site.	High/2	BC Act – V EPBC Act – N/A	Yes. Note: BAM survey timetable Oct-Jan	No (surveyed). Survey undertaken on 15 & 30 January 2019.
Glossy Black-Cockatoo *Calyptorhynchus lathami*	Breeding	Breeds in living or dead trees with hollows greater than 15cm diameter and	**Serious and Irreversible Impacts (Breeding) = No** Inhabits open forest and woodlands where stands of sheoak occur. Black Sheoak *Allocasuarina littoralis*	High/2	BC Act – V EPBC Act – N/A	Yes. Note: BAM survey timetable Mar-Aug	**Yes (assumed presence) in 838_VZ1_low due to**

		greater than 5m above ground.	and Forest Sheoak *A. torulosa* are important foods. Dependent on large hollow-bearing eucalypts for nest sites. The species may need larger patches and more intact landscapes for breeding.				**location of potential breeding hollows (0.52ha).**
Eastern Pygmy-possum *Cercartetus nanus*	All	-	**Serious and Irreversible Impacts = No** 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. Feeds largely on nectar and pollen collected from banksias, eucalypts and bottlebrushes. Shelters in tree hollows, rotten stumps, holes in the ground, abandoned bird-nests, Ringtail Possum *Pseudocheirus peregrinus* dreys or thickets of vegetation, (e.g. grass-tree skirts). Nests preferably in tree hollows but spherical nests have been found under the bark of eucalypts and in shredded bark in tree forks.	High/2	BC Act – V EPBC Act – N/A	**No**. In accordance with Section 6.4.1.17 of the BAM, it has been determined that t*he habitat is substantially degraded such that the species is unlikely to utilise the development site*. Due to ongoing unauthorised clearing of native vegetation associated with the campground, suitable habitat has been largely modified (particularly in the ground and mid-storey) now lacking nectar producing shrubs such as banksias and bottlebrushes for foraging and ground timber for sheltering.	N/A

Large-eared Pied Bat *Chalinolobus dwyeri*	All	Cliffs - Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices, or within two kilometres of old mines or tunnels.	**Serious and Irreversible Impacts = Yes*** Found in well-timbered areas containing gullies and likely to forage for small, flying insects below the forest canopy. The species is a full species credit because it cannot be reliably predicted to occur on a site based on vegetation and other landscape features (either foraging or breeding). All breeding habitat on or within 100m of the subject land and the area immediately surrounding the feature must be identified. All habitat on the subject land should also be mapped if present. **Breeding habitat as identified by survey*	Very High/3	BC Act – V EPBC Act – V	Yes Note: BAM survey timetable Dec-Mar	**Yes (assumed presence) potential foraging habitat in all vegetation zones.**
White-bellied Sea-Eagle *Haliaeetus leucogaster*	Breeding	Living or dead mature trees within suitable vegetation within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	**Serious and Irreversible Impacts (Breeding) = No** The species is highly selective in nesting locations. Breeding habitat is live large old trees within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines AND the presence of a large stick nest within tree canopy; or an adult with nest material; or adults observed duetting within breeding period. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures	High/2	BC Act – V EPBC Act – N/A	Yes Note: BAM survey timetable Jul-Dec	No (surveyed). Survey undertaken on 6 & 14 December 2019.

			built from sticks and lined with leaves or grass.				
Giant Burrowing Frog *Heleioporus australiacus*	All	-	**Serious and Irreversible Impacts = No** Species is dependent on hanging swamps on the top of sandstone plateaus and deeply dissected gullies that occur as erosion features in the Sydney Basin. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites. Breeding habitat of this species is generally soaks or pools within first or second order streams.	Moderate/1.5	BC Act – V EPBC Act – V	**No.** In accordance with Section 6.4.1.17 of the BAM, it has been determined that the "habitat is substantially degraded such that the species is unlikely to utilise the development site". Due to damming of Danjera Creek, no suitable breeding habitat for the species occurs within the study area or within 300 m of the study area.	N/A
Little Eagle *Hieraaetus morphnoides*	Breeding	Nest trees - live (occasionally dead) large old trees within vegetation.	**Serious and Irreversible Impacts (Breeding) = No** Occupies open eucalypt forest, woodland or open woodland. Breeding habitat is live (occasionally dead) large old trees within suitable vegetation AND the presence of a male and female; or female with nesting material; or an individual on a large stick nest in the top half of the tree canopy.	Moderate/1.5	BC Act – V EPBC Act – N/A	Yes Note: BAM survey timetable Aug-Oct	**Yes (assumed presence) potential nesting in all vegetation zones.**
Square-tailed Kite *Lophoictinia isura*	Breeding	Nest trees	**Serious and Irreversible Impacts (Breeding) = No**	Moderate/1.5	BC Act – V	Yes	No (surveyed).

			Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered watercourses. The species is allocated to dual credit because they tend to be sensitive to disturbance around nests. It will be difficult to identify a Kite nest (there are lots of comparable sized stick nests built by other species), especially given Kites have large territories and other stick nesters will undoubtedly also be nesting where Kites might be recorded. Kites will need be in attendance to confirm breeding sites.		EPBC Act – N/A	Note: BAM survey timetable Sept-Jan	Survey undertaken in 6 & 14 December 2019.
Eastern Bentwing-bat *Miniopterus schreibersii oceanensis*	Breeding	Caves - Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave;" observation type code "E nest-roost;" with numbers of individuals >500.	**Serious and Irreversible Impacts (Breeding) = Yes** Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. Breeding or roosting colonies can number from 100 to 150,000 individuals. At other times of the year, populations disperse within about 300 km range of maternity caves.	Very High/3	BC Act – V EPBC Act – N/A	**No**. The prescribed habitat constraints identified by the TBDC are not present within the study area, i.e. no caves, tunnels, mines, culverts or other structures used for breeding.	N/A
Southern Myotis *Myotis macropus*	All	Hollow bearing trees within 200	**Serious and Irreversible Impacts = No**	High/2	BC Act – V	Yes	**Yes (assumed**

		m of riparian zone. Bridges, caves or artificial structures within 200 m of riparian zone.	Generally roost in groups of 10 - 15 close to water in caves, mine shafts, hollow-bearing trees, storm water channels, buildings, under bridges and in dense foliage. Forages over streams and pools catching insects and small fish by raking their feet across the water surface. Allocated to species credit species because it is dependent on waterways with pools of 3m wide or greater for foraging, habitat surrounding waterways is used for breeding and roosting. All habitat on the subject land where the subject land is within 200m of a waterbody with pools/ stretches 3m or wider including rivers, creeks, billabongs, lagoons, dams and other waterbodies on the subject land must be mapped.		EPBC Act – N/A	Note: BAM survey timetable Nov-Mar	**presence) potential habitat in all vegetation zones in accordance with Threatened Biodiversity Data Collection (OEH 2019).**
Barking Owl *Ninox connivens*	Breeding	Hollow bearing trees - Living or dead trees with hollows greater than 20 cm diameter and greater than 4m above the ground.	**Serious and Irreversible Impacts (Breeding) = No** Inhabits woodland and open forest, including fragmented remnants and partly cleared farmland. Nest sites are used repeatedly over years by a pair, but they may switch sites if disturbed by predators (e.g. goannas). Breeding can be identified by suitable habitat AND 1. presence of male and female or 2. calling to each other (duetting) or 3. find nest or 4. existing breeding habitat identified. Uses paddock trees to extend foraging area from	High/2	BC Act – V EPBC Act – N/A	Yes Note: BAM survey timetable May-Dec	**Yes (assumed presence) in all vegetation zones as potential nesting hollows are located within 100m of each zone.**

			intact woodland. A species polygon should be established by providing a circular buffer of 100m around the nest tree.				
Koala *Phascolarctos cinereus*	Breeding	Areas identified via survey as important habitat. Important habitat is defined by the density of koalas and quality of habitat determined by on-site survey.	**Serious and Irreversible Impacts (Breeding) = No** Feed on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species. Home range size varies with quality of habitat, ranging from less than two ha to several hundred hectares in size. normally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery.	High/2	BC Act – V EPBC Act – V	Yes Note: BAM survey timetable Jan-Dec	No (surveyed). Survey undertaken on 6 & 14 December 2019.
Grey-headed Flying-fox *Pteropus poliocephalus*	Breeding	Breeding camps	**Serious and Irreversible Impacts (Breeding) = No** Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Individual camps may have tens of thousands of animals and are used for mating, and for giving birth and rearing young. Site fidelity to camps is high; some camps have been used for over a century. The initial search for camps should encompass any recorded camps and roosting habitat likely to occur	High/2	BC Act – V EPBC Act – V	Yes Note: BAM survey timetable Oct-Dec	No (surveyed). Survey undertaken in 6 & 14 December 2019.

			on the subject land. Camps used for breeding must be mapped.				
White-footed Dunnart *Sminthopsis leucopus*	All	-	**Serious and Irreversible Impacts = No** Found in a range of different habitats across its distribution, including coastal dune vegetation, coastal forest, tussock grassland and sedgeland, heathland, woodland and forest. Seems to favour vegetation communities with an open understorey structure and shelters in bark nests in hollows under standing or fallen timber, burrows in the ground, piles of logging debris, in the 'skirts' of grass trees *Xanthorrhoea* spp., cycads *Macrozamia* spp. and rock crevices.	Moderate/2	BC Act – V EPBC Act – N/A	**No**. In accordance with Section 6.4.1.17 of the BAM, it has been determined that the "habitat is substantially degraded such that the species is unlikely to utilise the development site". Due to ongoing unauthorised clearing of native vegetation associated with the campground, suitable habitat has been largely modified (particularly in the ground and mid-storey) now lacking suitable sheltering sites such as fallen timber.	N/A
Masked Owl *Tyto novaehollandiae*	Breeding	Living or dead trees with hollows greater than 20cm diameter.	**Serious and Irreversible Impacts (Breeding) = No** Roosts and breeds in moist eucalypt forested gullies, using large tree hollows or sometimes caves for nesting. Dead stags are especially popular for roosting/breeding habitat	High/2	BC Act – V EPBC Act – N/A	Yes Note: BAM survey timetable May-Aug	**Yes (assumed presence) in all vegetation zones as potential**

			and are a limited resource due to natural attrition. A species polygon should be established by providing a circular buffer of 100m around the nest tree.				**nesting hollows are located within 100m of each zone.**

1.6.3.1 Threatened flora habitat and survey

Despite no candidate threatened flora species identified by the BAM Calculator for the development site, a targeted survey and habitat assessment was undertaken on 6 December 2018 for *Solanum celatum, Hibbertia stricta* subsp. *furcatula, Eucalyptus sturgissiana, Pterostylis ventricosa* and Villous Mint-bush *Prostanthera densa*.

Transects were walked approximately 10m apart covering the APZ area and beyond, with particular focus given to less disturbed areas containing more intact vegetation and potential habitat for target species.

No threatened flora species were detected nor any suitable habitat for target species.

1.6.3.2 Threatened fauna habitat and survey

This section addressed the requirements set out in Section 6.5 of the BAM, undertaken a threatened species survey.

Based on the assessment undertaken in Table 8, detailed fauna field surveys were conducted throughout the development site between the 27 November 2018 and 30 January 2019. A summary of fauna survey effort is provided in Table 9 and in Figure 13.

Table 9: Summary of threatened species targeted survey effort

Species	Date	Survey effort	Methodology	Results
Gang-gang Cockatoo	14 December 15 & 30 January 2019	(3hrs x 2ppl) + (2hrs x 3 ppl x2) = 18 person hours	*Survey of potential nest locations* – Search for hollows containing diameter >9cm across the development site over 3hr period. *Dusk bird survey* – survey for Gang-gang Cockatoo 1.5hrs before dusk and over dusk (2hrs total) to identify any individuals returning to their nests for the evening. Direct observations and aural calls were identified and recorded. Surveys were undertaken by three ecologists on two separate occasions. Each ecologist was positioned to directly view potential nest sites (i.e. hollows >9cm diameter). Eight hollow-bearing trees (HBTs) within the prescribed APZ (trees: 1, 8, 13, 14, 15, 21, 23, 24) were surveyed.	On both occasions, numerous Lace Monitors *Varanus varius* were observed, some climbing high into trees and at least two lace monitors entering a large chimney hollow. No bird species were observed utilising tree hollows. No Gang-gang Cockatoos were detected, nor any other threatened bird during targeted surveys.
White-bellied Sea-Eagle and Square-tailed Kite	6 & 14 December 2019 15 & 30 January 2019	(1hr x 2ppl) + (2hrs x 3 ppl x 2) = 14 person hours	*Survey of potential nest locations* – Search for stick nests across the development site over 1hr period. *Dusk bird survey* – survey for White-bellied Sea-Eagle and Square-tailed Kite 1.5hrs before dusk and over dusk (2hrs total) to identify any individuals returning to their nests for the evening. Direct observations and aural calls were	No nests that might be attributed to White-bellied Sea-Eagle and Square-tailed Kite were observed during any survey. Neither species were detected during dusk bird surveys or

Species	Date	Survey effort	Methodology	Results
			identified and recorded. Surveys were undertaken by three ecologists on two separate occasions.	incidentally in any other survey.
Koala	6 & 14 December 2019	9 person hours	*Scat search* – The base of feed trees, Forest Red Gum and Grey Gum, were searched to determine the presence of Koala scats. Using the methodology outlined in Section 6 of Commonwealth of Australia (2014), searches included raking back the leaf litter around the base of tree extending to the drip zone. Searching for Koala scats focused on areas in the northern and western sections of the development site where Forest Red Gum is at the highest density. Surveys were undertaken by three ecologists over a 3hr period. *Opportunistic surveys* – direct observation of Koala during all surveys.	No Koala scats were detected during the scat survey around the base of known feed trees. No Koalas were directly observed in any other survey undertaken between November 2018 and January 2019.
Grey-headed Flying-fox	6 & 14 December 2019	1hr x 2ppl = 2 person hours	*Roost search* – Roost sites are easily identified and fairly well documented in NSW. No roost sites are known to occur within or in the vicinity of the proposal. A 1hr search of the development site was completed to identify Grey-headed Flying-foxes roosts.	No roosts are present within the development site and no Grey-headed Flying-fox were detected incidentally in any survey.

No threatened fauna species were recorded during the filed survey as detailed above.

2.0 Stage 2: Impact assessment (biodiversity values)

2.1 Impact avoidance

This section identifies the potential impacts of the proposal on the biodiversity values of the study area and includes measures taken to date and additional recommendations to assist the final design of the development to further avoid and minimise impacts on biodiversity within and surrounding the study area.

The assessment is based on the modification and clearing of native vegetation and fauna habitat. It includes an assessment of all potential impacts arising from the project, including those that may have arisen during the initial concept stage. The proposal has been designed in a way to utilise the existing informal camping areas by consolidating new designated camp sites within already cleared areas and restrict unauthorised trampling or clearing of vegetation within surrounding bushland. The proposal also addresses the unauthorised collection of firewood and clearing in surrounding bushland through the formal management of the campground by a caretaker and/or adequate staff resources and by providing firewood to guests. While some thinning of vegetation is required to achieve the APZ, the proposal will result in an overall positive impact to the surrounding bushland through the reduction and management of current disturbance regimes.

The principal means to reduce impacts on biodiversity values within the study area are to avoid and minimise removal of native vegetation and fauna habitat. Additional recommendations provided herein include measures to mitigate residual impacts after all measures to avoid and minimise impacts have been considered.

Steps taken are broken down into initial options and planning phase, construction and operation.

2.1.1 Initial options and planning phase

During the concept stage of the proposal, Planning, Environment and Development Services Group, Shoalhaven City Council, were engaged to undertake a Strategic Environmental Constraints Report (SCC 2017) that reviewed three options for the formalisation of the campground and associated asset protection.

The three options considered were as follows and shown in Figure 8:

- **Option 1:** Build a community bushfire refuge which would require a small asset protection zone. This would result in the modification of 0.46ha (4631m^2) of native vegetation.
- **Option 2:** Implement an open-air refuge. This would require 11.5ha of clearing to achieve the requirements of the Rural Fire Service.
- **Option 3:** Build a hardstand open air refuge area on the lake edge. The APZ for this is 167mts and results in clearing approximately 4ha of native vegetation.

The report concluded that both Option 2 and 3 would result in a significant impact to the EPBC Act listed *Illawarra and South Coast Lowland Forest and Woodland* CEEC and would require a referral to the Commonwealth for assessment.

An amended version of Option 1 was chosen in line with the recommendations of the Strategic Environmental Constraints Report (SCC 2017). This version of the proposal required a revision

following an amendment for a 30 APZ in the eastern portion of the development site and a 40m APZ in the northern and southern portions of the site. The APZ also extended to the dam edge (Figure 8).

2.1.2 Current plan and process of impact avoidance/minimisation

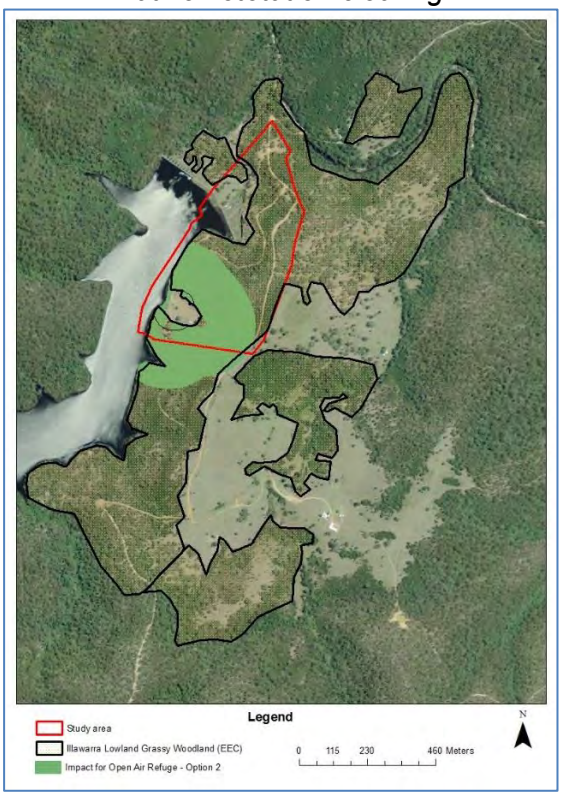
The current APZ plan has been selected, in part, to minimise impacts to the native vegetation and flora and fauna habitats present within the broader study area. In summary, measures to avoid impacts are as follows:

- The APZ area has been reduced from 40m to 30m, resulting in less native vegetation requiring modification compared to the concept phase option.
- The reduction in the size of the APZ along the edge of the dam, introducing a setback of 30-40m, allowing for the maintenance of the vegetated riparian corridor.
- The Bushfire Assessment (Peterson Bushfire 2018) states that tree canopy is to be discontinuous with gaps between crowns of at least 2 to 5 m. Due to the existing nature of PCT838, the APZ can be achieved without requiring the removal of any hollow-bearing trees. While some canopy trees will require removal, the majority will be able to be retained.

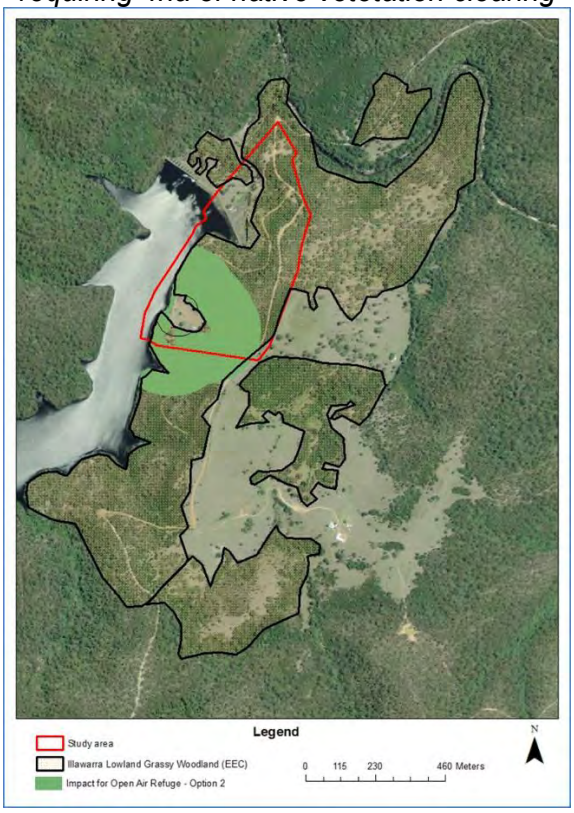
Figure 8: Options for asset protection considered in concept stage

Option 1: *Bushfire refuge shelter requiring 0.46ha of native vetetation clearing*

Option 2: *Open air refuge approximately 11.5ha of native vetetation clearing*



Option 3: *Hardstand open air refuge at dam edge requiring 4ha of native vetetation clearing*



Chosen option *following concept stage requiring approximately 1.3ha of native vegetation clearing*

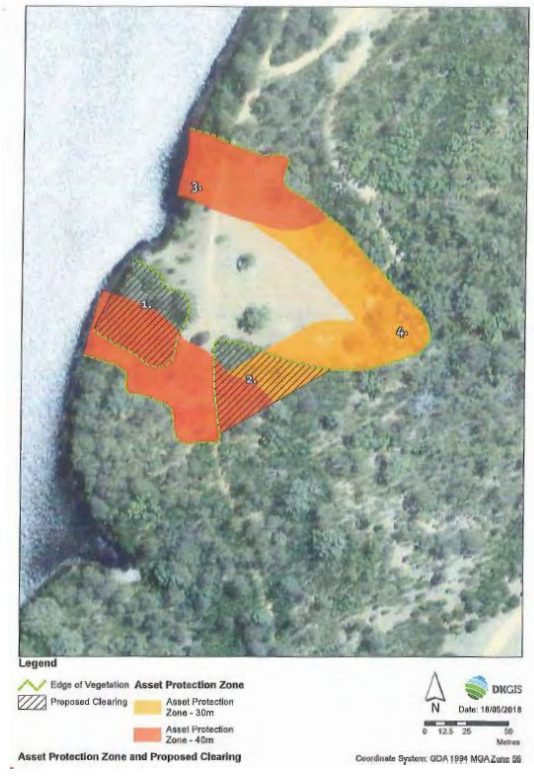
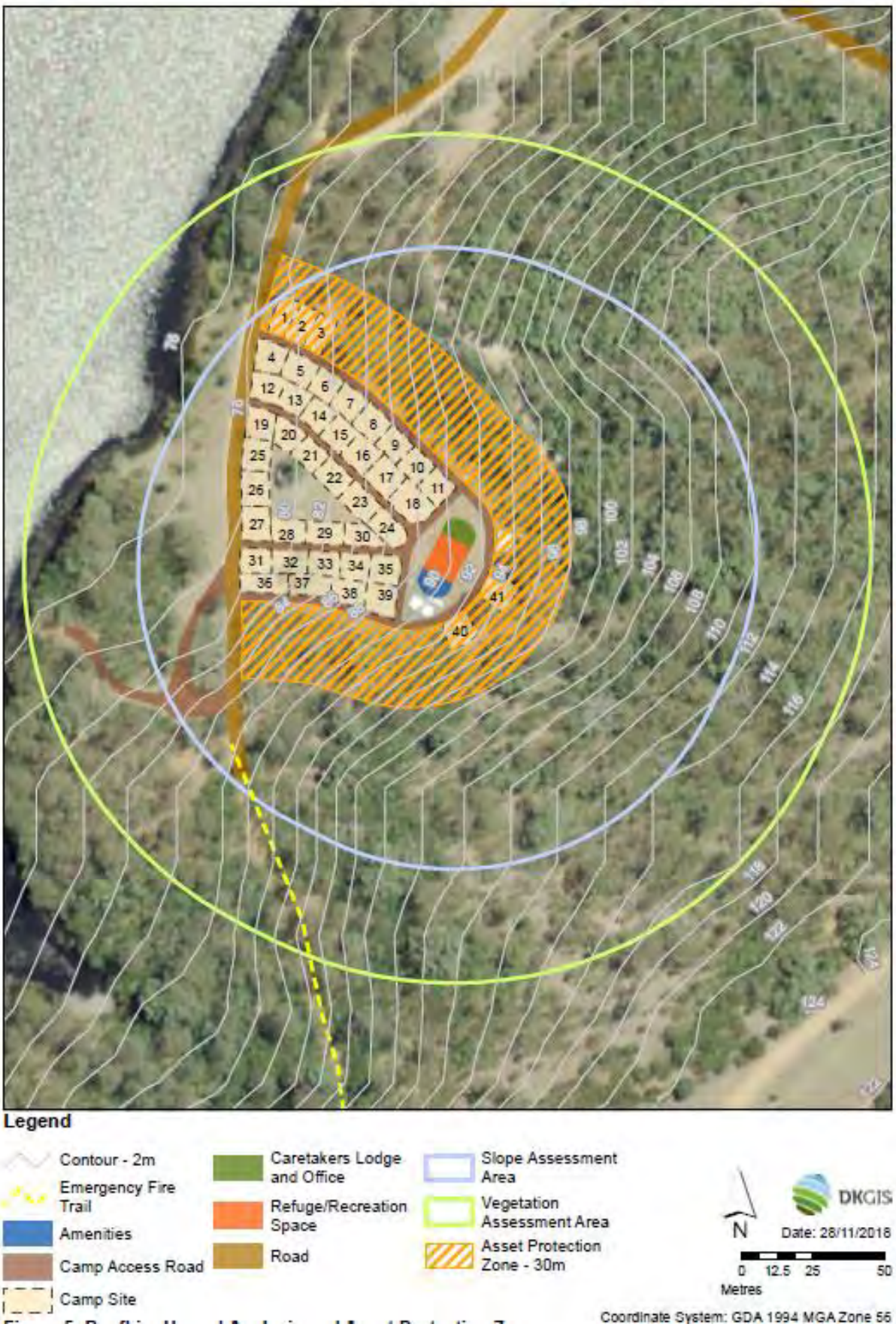


Figure 9: Final APZ plan used in this assessment (orange hatching) requiring 0.67ha of native vegetation clearing



2.1.3 Recommended mitigation measures

Measures proposed to mitigate and manage impacts at the site during and after construction are outlined below.

Construction

No additional direct impacts are expected to occur as a result of the construction phase. However, indirect impacts to retained biodiversity values have the potential to occur. Additional mitigation measures recommended to avoid and minimise impacts include:

- Installation of appropriate exclusion fencing around trees and vegetation to be retained in the study area including appropriate signage such as 'No Go Zone' or 'Environmental Protection Area'.
- Although the reduction in Vegetation Integrity has been determined using the Planning for Bush Fire Protection 2018 guidelines, any vegetation to be removed shall be identified by an Accredited Assessor in the BOS to ensure that the interpretation of change in VI (and subsequent credit obligation) is done correctly.
- Given the presence of sheltering wildlife including Lace Monitors and wallabies, all vegetation clearing works shall be supervised by a suitably qualified ecologist.
- All material stockpiles, vehicle parking and machinery storage will be located within the existing cleared areas, and not in areas of native vegetation that are to be retained.
- No hollow-bearing trees are to be removed.
- Where appropriate native vegetation cleared from the study area should be mulched for re-use on the site, to stabilise bare ground.
- Wet down areas to reduce dust generation during construction.
- Implementation of temporary stormwater controls during construction and to ensure that discharges to the drainage channels are consistent with existing conditions.
- Sediment and erosion control measures should be implemented prior to construction works commencing (e.g. silt fences, sediment traps), to protect the drainage into Danjera Dam to the west. These should conform to relevant guidelines, should be maintained throughout the construction period and should be carefully removed following the completion of works.

Prescriptions for mitigation of potential impacts of construction activities in retained native vegetation and habitat should be addressed in a site-specific Construction Environmental Management Plan (CEMP) or similar. The plan should include all measures outlined above.

Operation

The proposal has been designed to address the existing impacts associated with the recreational area including no control of camping location or firewood collection. The proposal includes provision of caretakers and/or staff facilities in which personnel will be responsible for the active management of the campground. The campground itself will be formalised as per the plan in Figure 2 to prevent campers from setting up in bushland sites or directly at the dam edge. Firewood will also be provided to deter campers from collecting firewood from surrounding bushland.

Due to the presence of EPBC Act listed *Illawarra and South Coast Lowland Forest and Woodland* CEEC and ongoing impacts including grazing by goats and cattle and unauthorised access, it is recommended that the broader area surrounding the development site be investigated for establishment and management as a Biodiversity Stewardship site in accordance with the BC Act.

2.2 Assessment of unavoidable impacts

Assessment of direct and indirect impacts unable to be avoided has been undertaken in accordance with the BAM (OEH 2017). The following direct and indirect impacts are unable to be avoided in progressing the proposed development.

2.2.1 Direct impacts

Direct impacts arising from the project include:

- Modification of all native vegetation within the development site comprising 0.82 ha of PCT 838 Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion.
- Removal of habitat associated with the following threatened species where presence has been assumed:
    - Glossy Black-Cockatoo breeding habitat = 0.52 ha of habitat around one hollow-bearing tree (Note: all hollows will be retained).
    - Large-eared Pied Bat = 0.82 ha of potential foraging habitat.
    - Southern Myotis = 0.82 ha of potential foraging habitat around three hollow-bearing trees (Note: all hollows will be retained).
    - Barking Owl breeding habitat = 0.82 ha of habitat once 100m buffer is applied around four hollow-bearing trees (Note: all hollows will be retained).
    - Masked Owl breeding habitat = 0.82 ha of habitat once 100m buffer is applied around four hollow-bearing trees (Note: all hollows will be retained).

These impacts will be permanent and will occur from the outset of the development. Mitigation measures outlined in *Section 2.1 Impact avoidance* above will help to minimise the potential impacts to biodiversity values that remain present within the study area.

2.2.2 Prescribed biodiversity impacts

Assessment of prescribed biodiversity impacts are outlined and addressed in Table 10 below.

Table 10: Assessment of prescribed impacts

Prescribed impact	Assessment
Impacts of development on the following habitat of threatened species or ecological communities associated with karst, caves, crevices, cliffs and other geological features of geological significance.	No karst, caves, crevices, cliffs and other features of geological significance will be impacted by the proposed works.
Impacts of development on the following habitat of threatened species or ecological communities associated with rocks.	No bush rock will be impacted by the proposed works. A rocky drainage line extends beyond the eastern extent of the development site. All rock will be retained as part of the proposal.

Prescribed impact	Assessment
Impacts of development on the following habitat of threatened species or ecological communities associated with human made structures.	The existing amenities block will be demolished as part of the proposal. Due to the open structure of the building, it is highly unlikely that any threatened species are associated with this habitat feature. No evidence of threatened species was detected during the field survey however a Lace Monitor was recorded climbing on the roof on one occasion. This species does not form part of a BC Act listed threatened community within the site.
Impacts of development on the following habitat of threatened species or ecological communities associated with non-native vegetation.	Non-native vegetation was recorded within the study area. No threatened species that rely on this non-native vegetation as a habitat resources were recorded or predicted to occur within the study area during the assessment.
The impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range.	The subject site is surrounded by areas mapped in the Illawarra-Shoalhaven Regional Plan (DPE 2015) as high biodiversity value. Vegetation surrounding the development site is connected to a large expanse of vegetation eventually joining the Morton National Park and Sydney Drinking Water Catchment land.
The impacts of development on movement of threatened species that maintains their lifecycle.	The vegetation within the development site however is highly degraded and will not be further fragmented. Given the small size of the site and ongoing disturbance regimes associated with the unregulated camp ground, the site contributes very little to the surrounding vegetated corridor/s.
The impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development).	Ephemeral unnamed drainage line present. The riparian corridor will largely be retained along the banks of Danjera Dam. Provided the mitigation and management actions provided herein are adhered to, the proposal will not result in a change in water quality or existing hydrological processes associated with Danjera Dam.
The impacts of wind turbine strikes on protected animals.	Not applicable.
The impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.	It is highly unlikely that ground-dwelling threatened species occur within the development site or any animals forming part of a BC Act listed threatened community within the site. Not applicable.

2.2.3 Serious and Irreversible Impacts (SAII)

The Large-eared Pied Bat and Eastern Bentwing-bat are both listed as candidate serious and irreversible impacts. The Threatened Biodiversity Data Collection (OEH 2019) states that the threshold for a serious and irreversible impact to both of these species is as follows:

- *Breeding habitat as identified by survey.*

No breeding habitat in the form of rocky areas containing caves, overhangs, escarpments, outcrops, or crevices is present within the development site, nor will it be directly or indirectly impacted by the development. Similarly, no old mines or tunnels are located within the study area nor will they be impacted by the proposal.

Eastern Bentwing-bat form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young (OEH 2019). No maternity caves are located

within the vicinity of the study area therefore it is unlikely that lactating females will be impacted by the proposal.

Given that the broader landscape surrounding the development site contains potential maternity sites for the Large-eared Pied Bat, (for example in the Danjera Dam wall, clifflines or in abandoned mines) further investigation was completed to determine the significance of the development site for lactating females or breeding individuals in terms of foraging and dispersal habitat. An ultrasonic bat call detector was placed within the bushland located in the eastern portion of the development site for two nights during the active period for the species. The aim of the survey was to obtain an indication of species presence and the frequency to which the subject site is used by the Large-eared Pied Bat.

No Large-eared Pied Bat calls were detected during the survey. It is therefore concluded that while the species may forage within or move through the development site on occasion, the bushland to be modified does not form a critical dispersal corridor for the species nor does it provide an important foraging resource. The proposal will not result in a serious and irreversible impact to Large-eared Pied Bat breed habitat or individuals.

2.2.4 Indirect impacts

The indirect impacts of the development are outlined in Table 11.

Table 11: Assessment of indirect impacts

Indirect impact	Assessment
Inadvertent impacts on adjacent habitat or vegetation	The proposal has the potential to result in inadvertent impacts on adjacent retained habitat or vegetation. However, the mitigation measures described in *Section 2.1.3* will minimise the likelihood of occurrence of this indirect impact during the construction and operations phases of the project. For example, vegetation to be cleared and retained will be identified by an Accredited Assessor in accordance with the change in VI assessed herein. Vegetation clearing works will also be supervised by an experience ecologist to ensure no accidental damage or removal of vegetation occurs.
Reduced viability of adjacent habitat due to edge effects	Due to the existing unregulated nature of the campground and recreational area, habitats adjacent to the areas are subject to high levels of disturbance. The proposal will ensure recreational activities are managed through the presence of a caretaker and/or adequate staff resources and current impacts associated with vegetation removal including the collection of firewood and trampling are minimised through the provision of firewood. Any edge effects of the proposal are therefore expected to result in negligible impacts to adjacent habitat.
Reduced breeding capacity of hollow-nesting fauna due to noise, dust or light spill	Due to the current nature of the study area, it is unlikely that the existing conditions will change. Minor noise and dust will result from the clearing of surrounding vegetation to establish the APZ, however this work is temporary in nature and an experienced ecologist will be onsite supervising clearing works and will be able to respond to any distressed animals. During operation, there is likely to be an increase in the capacity the campground. The formalisation of camp sites and the presence of a caretaker

Indirect impact	Assessment
	and/or adequate staff resources will regulate the evening noise and activity. Mitigation measures outlined in *Section 2.1.3* standard construction environmental controls will ensure potential impacts are minimised.
Transport of weeds and pathogens from the site to adjacent vegetation	This in unlikely to occur outside the construction phase of the project and the land use of the site is not changing. Mitigation measures outlined in *Section 2.1.3* and standard construction environmental controls will ensure potential impacts are minimised.
Removal or trampling of threatened flora species	No threatened flora species were recorded within the study area.
Rubbish dumping	The aim of the proposal is to formalise and regulate recreational activities in the study area. The presence of a caretaker and/or adequate staff resources and provision of additional garbage disposal will deter the dumping of rubbish in adjacent bushland.
Firewood collection	Impacts associated with the collection of firewood in bushland adjoining the campground will be minimised through the provision of firewood and the presence of a caretaker and/or adequate staff resources.
Increase in predatory species populations or grazing herbivores	There is no proposed change to land use that will likely lead to an increase in predatory species populations or grazing herbivores.
Increased risk of fire	The APZ will reduce the immediate risk of fire within the campground. The proposal will not change existing conditions in the surrounding landscape.

2.2.5 Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 12. Each vegetation zone has been assigned a management zone.

Table 12: Change in vegetation integrity for each vegetation/management zone

Veg Zone	PCT	Management zone	Biodiversity risk weighting	BC Act listing status	Condition	Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
838_VZ1_ Good	**PCT 838 Forest Red Gum - Thin-leaved Stringybark grassy woodland**	MZ1	2	Not listed	Good	0.17	**53.7**	**36.4**	-17.4
838_VZ2_ Medium	**PCT 838 Forest Red Gum - Thin-leaved Stringybark grassy woodland**	MZ2	2	Not listed	Medium	0.13	**45.7**	**26**	-19.7
838_VZ3_ Low	**PCT 838 Forest Red Gum - Thin-leaved Stringybark grassy woodland**	MZ3	2	Not listed	Low	0.52	**42.3**	**24.9**	-17.4

2.3 Biodiversity credits

Following the implementation of the BAM and the BAM Calculator, the following credits have been determined. The number of ecosystem credits required for the development are outlined in Table 13.The number of species credits required for the development are outlined in Table 14. A biodiversity credit report is included in Appendix F.

Table 13: Ecosystem credits required

Management zone	PCT ID/Name	Vegetation zone name	Direct impact (rounded by Calculator)	Credits required
1	838 – Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion	838_VZ1_High	0.2 ha	**1**
2	838 – Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion	838_VZ1_Moderate	0.1 ha	**1**
3	838 – Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion	838_VZ1_low	0.5 ha	**5**
Total number of ecosystem credits required				**7**

Table 14: Species credit summary

Common Name	Species	Vegetation zone name	Area (ha)	Credits required
Glossy Black-Cockatoo	*Calyptorhynchus lathami*	838_VZ1_low	0.5 ha	**5**
Large-eared Pied Bat	*Chalinolobus dwyeri*	838_VZ1_High 838_VZ1_Moderate 838_VZ1_low	0.8 ha	**11**
Little Eagle	*Hieraaetus morphnoides*	838_VZ1_High 838_VZ1_Moderate 838_VZ1_low	0.8 ha	**5**
Southern Myotis	*Myotis macropus*	838_VZ1_High 838_VZ1_Moderate 838_VZ1_low	0.8 ha	**7**
Barking Owl	*Ninox connivens*	838_VZ1_High 838_VZ1_Moderate 838_VZ1_low	0.8 ha	**7**
Masked Owl	*Tyto novaehollandiae*	838_VZ1_High 838_VZ1_Moderate 838_VZ1_low	0.8 ha	**7**

Figure 10: Impacts requiring offset (in blue)

2.4 Assessment of biodiversity legislation

Following the initial review of the proposal against biodiversity legislation provided in Section 1.3, this section provides further details of assessment of the proposal in relation to relevant legislation that has not been addressed elsewhere in this BDAR.

2.4.1 Environmental Protection and Biodiversity Conservation Act 1999(EPBC Act)

An assessment of the impacts of the proposed development on MNES, against heads of consideration outlined in *Matters of National Environmental Significance - Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth of Australia 2013), was prepared to determine whether referral of the project to the Commonwealth Minister for the Environment is required.

The Protected Matters Search Tool was used to generate a report (Commonwealth of Australia 2019) to determine the MNES or other matters protected by the EPBC Act are likely to occur within 5 km of the development site. MNES relevant to the project are summarised in Table 15.

Table 15: Assessment of the project against the EPBC Act MNES

Criterion	Assessment
Threatened species (flora and fauna)	14 flora species and 23 fauna species have been recorded or are predicted to occur in the locality (Appendix E). Of these, based on the availability of habitat within the development site, the Grey-headed Flying-fox, Koala, Regent Honeyeater (foraging habitat), Spotted-tailed Quoll and Large-eared Pied Bat (foraging habitat) are considered to have a medium or high likelihood of occurring. No other threatened species are considered likely to occur within the study area. Targeted surveys were completed for the following: • Grey-headed Flying-fox; and, • Koala. The study area provides occasional foraging habitat for the Grey-headed Flying-fox and the risk of a significant impact to the species is considered negligible. No camps occur within or adjacent to the study area as determined in targeted surveys. Targeted Koala surveys were completed in accordance with the methodology outlined in Section 6 of Commonwealth of Australia (2014). No evidence of Koala was detected during the survey and the site does not contain habitat critical to the survival of the species (Appendix D). Presence of the following EPBC Act listed species has been assumed: • Regent Honeyeater (foraging habitat only as breeding habitat features are absent from the site); • Spotted-tailed Quoll; and • Large-eared Pied Bat (foraging habitat only as breeding habitat features are absent from the site). Due to the availability of protected habitat in the surrounding landscape, the minimal impacts associated with the proposal and the highly mobile nature of the above species, a significant impact to listed threatened species is unlikely to result from the proposed development.
Threatened ecological communities	Four Threatened ecological communities were predicted to occur within the search area (Appendix E). The EPBC Act listed critically endangered *Illawarra and South Coast Lowlands Grassy Woodland Ecological Community* occurs within the development site. The proposal will result in the modification of 0.82 ha of this

Criterion	Assessment
	CEEC for APZ and emergency vehicle access purposes. An assessment against the EPBC Act MNES Significant Impact Criteria is provided in Appendix E. A significant impact to the CEEC is unlikely to result from the proposed development.
Migratory species	15 migratory species have been recorded or are predicted to occur in the locality. The study area does not provide important habitat for an ecologically significant proportion of any of these species. A significant impact to listed migratory species is unlikely to result from the proposed development.
Wetlands of international importance (Ramsar sites)	There are 12 Ramsar sites in NSW, the closest one being the Towra Point Nature Reserve on the Kurnell Peninsula in Sydney. The study area does not flow directly into a Ramsar site and the development is not likely to result in a significant impact. A significant impact to Ramsar sites is unlikely to result from the proposed development.

2.4.2 Shoalhaven Local Environmental Plan 2014

An assessment of the direct and indirect impacts to the riparian corridor in accordance with the following sub-clauses of Clause 7.6 of the *Shoalhaven Local Environmental Plan 2014* is provided

Relevant sub-clause	Assessment
(3) Before determining a development application for development on land to which this clause applies, the consent authority must consider:	
(a) whether or not the development is likely to have any adverse impact on the following: *(i) the water quality and flows within the watercourse,* *(ii) aquatic and riparian species, habitats and ecosystems of the watercourse,* *(iii) the stability of the bed and banks of the watercourse,* *(iv) the free passage of fish and other aquatic organisms within or along the watercourse,* *(v) any future rehabilitation of the watercourse and its riparian areas, and*	Clearing works are limited to vegetation at least 30m from the banks of Danjera Dam. No clearing is proposed on the bank itself. The proposal will formalise the current camping and recreational facilities which will have a positive impact to aquatic and riparian habitats. Water runoff will remain in the current condition as it is diverted from the campground by the established bunds on the surrounding slopes.
(b) whether or not the development is likely to increase water extraction from the watercourse, and	The development will not increase water extraction from the watercourse.
(c) any appropriate measures proposed to avoid, minimise or mitigate the impacts of the development	Clearing of mapped riparian buffer vegetation is restricted to that immediately adjacent to the campground, acting as an APZ. All measures to avoid, minimise and mitigate impacts are provided in Section 2.1 herein.
(4) Development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:	
(a) the development is designed, sited and will be managed to avoid any significant adverse environmental impact, or	The proposal will not result in a significant adverse environmental impact as assessed in this BDAR.
(b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or	See Section 2.1 herein.
(c) if that impact cannot be minimised—the development will be managed to mitigate that impact.	See Section 2.1-2.3 herein.

2.4.3 State Environmental Planning Policy 44 – Koala Habitat Protection

The study area is located within the Shoalhaven LGA, a Schedule 1 listed Council. The study area contained two feed species listed as preferred species in accordance with SEPP 44. Grey Gum and Forest Red Gum constitute 15% of the overstorey tree species. In addition, there is a growing body of evidence that identifies the importance of shelter (non-food) trees to koalas. On this basis, surveys for the Koala were included as a part of targeted, including tree assessment and opportunistic searching around the base of trees for scats.

Using the methodology outlined in Section 6 of Commonwealth of Australia (2014) the study area does not contain habitat critical to the survival of the koala (see Appendix D for assessment and scoring).

A Koala management plan in accordance with the SEPP is not required.

3.0 References

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Appendix A: Definitions

Terminology	Definition
Biodiversity credit report	The report produced by the Credit Calculator that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site.
BioNet Atlas	The OEH database of flora and fauna records (formerly known as the NSW Wildlife Atlas). The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails listed under the TSC Act) and some fish.
Broad condition state	Areas of the same PCT that are in relatively homogenous condition. Broad condition is used for stratifying areas of the same PCT into a vegetation zone for the purpose of determining the vegetation integrity score.
Connectivity	The measure of the degree to which an area(s) of native vegetation is linked with other areas of vegetation.
Credit Calculator	The computer program that provides decision support to assessors and proponents by applying the BAM, in particular by using the data required to be entered and the equations in Appendix 6 and Appendix 9 to calculate the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	An area of land that is subject to a proposed development application, application for approval, or activity within the meaning of Part 5 of the EP&A Act. The term development is also taken to include clearing, except where the reference is to a small area development or a major project development.
Development site	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials. The term development site is also taken to include clearing footprint except where the reference is to a small area development or a major project development.
Ecosystem credits	A measurement of the value of threatened ecological communities, threatened species habitat for species that can be reliably predicted to occur with a PCT, and PCTs generally. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biodiversity stewardship site.
High threat exotic plant cover	Plant cover composed of vascular plants not native to Australia that if not controlled will invade and outcompete native plant species. Also referred to as high threat weeds.
Hollow bearing tree	A living or dead tree that has at least one hollow. A tree is considered to contain a hollow if: (a) the entrance can be seen; (b) the entrance width is at least 5cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1m above the ground. Trees must be examined from all angles.
Important wetland	a) a wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) from time to time, and b) for the purposes of all paragraphs except 4.2.1.6 the actual location on the ground that corresponds to a SEPP 14 Coastal wetland c) for the purposes of Paragraph 4.2.1.6: (i) a SEPP 14 Coastal Wetland, and

Terminology	Definition
	(ii) the actual location on the ground that corresponds to a SEPP 14 Coastal Wetland.
Linear shaped development	Development that is generally narrow in width and extends across the landscape for a distance greater than 3.5 kilometres in length.
Local population	The population that occurs in the study area. In cases where multiple populations occur in the study area or a population occupies part of the study area, impacts on each subpopulation must be assessed separately.
Local wetland	Any wetland that is not identified as an important wetland (refer to definition of Important wetland).
Mitchell landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000.
Multiple fragmentation impact development	Developments such as wind farms and coal seam gas extraction that require multiple extraction points (wells) or turbines and a network of associated development including roads, tracks, gathering systems/flow lines, transmission lines.
Operation Manual	The Operational Manual published from time to time by OEH, which is a guide to assist assessors when using the BAM.
Patch size	An area of intact native vegetation that: a) occurs on the development site or biodiversity stewardship site, and b) 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).
Proponent	A person who intends to apply for consent or approval to carry out development, clearing, biodiversity certification or for approval for infrastructure.
Reference sites	The relatively unmodified sites that are assessed to obtain local benchmark information when benchmarks in the Vegetation Benchmarks Database are too broad or otherwise incorrect for the PCT and/or local situation. Benchmarks can also be obtained from published sources.
Regeneration	The proportion of over-storey species characteristic of the PCT that are naturally regenerating and have a diameter at breast height <5cm within a vegetation zone.
Remaining impact	An impact on biodiversity values after all reasonable measures have been taken to avoid and minimise the impacts of development. Under the BAM, an offset requirement is calculated for the remaining impacts on biodiversity values.
Retirement of credits	The retirement of biodiversity credits from a biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
Riparian buffer	An area of land determined according to Appendix 3.
Sensitive biodiversity value land map	Development within an area identified on the map requires assessment using the BAM.
Site attributes	The matters assessed to determine vegetation integrity. They include: native plant species richness, native over-storey cover, native mid-storey cover, native ground cover (grasses), native ground cover (shrubs), native ground cover (other), exotic plant cover (as a percentage of total ground and mid-storey cover), number of trees with hollows, proportion of over-storey species occurring as regeneration, and total length of fallen logs.

Terminology	Definition
Site-based development	A development other than a linear shaped development, or a multiple fragmentation impact development.
Species credits	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection.
Study area	The area directly and indirectly impacted by the proposed development.
Threatened Biodiversity Data Collection	Part of the BioNet database, published by OEH and accessible from the BioNet website.
Threatened species	Critically endangered, endangered or vulnerable threatened species as defined by Schedule 1 of the BC Act, or any additional threatened species listed under Part 13 of the EPBC Act as critically endangered, endangered or vulnerable.
Vegetation Benchmarks Database	A database of benchmarks for vegetation classes and some PCTs. The Vegetation Benchmarks Database is published by OEH and is part of the BioNet Vegetation Classification.
Vegetation zone	A relatively homogenous area of native vegetation on a development site, land to be biodiversity certified or a biodiversity stewardship site that is the same PCT and broad condition state.
Wetland	An area of land that is wet by surface water or ground water, or both, for long enough periods that the plants and animals in it are adapted to, and depend on, moist conditions for at least part of their life cycle. Wetlands may exhibit wet and dry phases and may be wet permanently, cyclically or intermittently with fresh, brackish or saline water (see also Important wetland and Local wetland).
Woody native vegetation	Native vegetation that contains an over-storey and/or mid-storey that predominantly consists of trees and/or shrubs.

Appendix B: Vegetation plot data

DD - Danjera Dam

BAM Site – Field Survey Form	Site Sheet no:

		Survey Name	Zone ID	Recorders			
Date	09 11 18	Danjera Dam BDAR	VZ1 - Good	JB / KR			
Zone 56	Datum	Plot ID	DD1	Plot dimensions	20 x 50	Photo #	103-0477 103-0478
Easting	Northing	IBRA region	Sydney Basin	Midline bearing from 0 m	54° (NE)		
Vegetation Class		Coastal Valley Grassy Woodland, Ettrema Subregion				Confidence: H M L	
Plant Community Type		PCT 838			EEC: EPBC	Confidence: H (M) L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

Not BC Act

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	4
	Shrubs	17
	Grasses etc.	5
	Forbs	9
	Ferns	3
	Other	5
Sum of Cover of native vascular plants by growth form group	Trees	17.2
	Shrubs	18
	Grasses etc.	10.5
	Forbs	5.8
	Ferns	8.2
	Other	1.5
High Threat Weed cover		0

DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	I	I
50 – 79 cm	III	
30 – 49 cm	✓	
20 – 29 cm	✓	
10 – 19 cm	✓	
5 – 9 cm	✓	
< 5 cm		n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0.6m	

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30 … 100, 200, 300 …). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	60	20	45	50	75			
Average of the 5 subplots	50%							

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

(840) Forest Red Gum ... Woodland ...

PCT 621 : Euc. punctata, Angophora floribunda, Euc. fibrosa ...

835

1197

B38 Forest PCT ...

838 ... grassy woodland, coastal ...

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging)	P-1		Some smaller trees (<15cm dbh) cut down & left as stumps - about 3-5 ind.
Cultivation (inc. pasture)	A-0		
Soil erosion	P-1		
Firewood / CWD removal	P-3		Very few logs / fallen timber due to proximity to campground
Grazing (identify native/exotic)	P-1		Kangaroo, Wombat, Wallaby
Fire damage	A-0		
Storm damage	A-0		
Weediness	A-0		
Other – rubbish	P-1		Isolated occurances of rubbish - blown in or dump from campground

Severity: 0=no evidence, 1=slight, 2=moderate, 3=severe Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 9 11 18	Danjera Dam	DDI	KR/JB.

VI 1 - Good

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	Exc. terpacornis		+		T	
	Bursaria spinosa		5		S	
	Acacia irrorata		0.5	1	S	
	Acacia filicifolia		8		S	
	~~Calotis sp.?~~					
	Exocarpus cupressiformis		0.2	1	S	
	Olearia viscidula		0.2	5	S	
	Dichondra repens		5		F	
	Oplismanus aemulus		5		G	
	Microlena stipoides		5		G	
	Pellaea falcata		8		E	
	Einadia hastata		0.1	10	F	
	Hymantinera dentata		3	10	S	
	Glycine sp.? clandestina		0.1	5	O	
	Euc. sp. (Stringybark) globoidea ?exiguides		5		T	
	Adiantum aethiopicum		0.1	5	E	
	Notelaea longifolia		0.2	3	T	
	Oxalis sp.		0.1	10	F	
	Austronoplesium sp. cymosum		0.1	3	O	
	Acacia sp. ? floribunda		0.5	3	S	
	Clematis glycinoides		1	5	O	
	Tylophora barbata		0.2	10	O	

DD1

		Cover	Abund	Stat	
Rapanea variabilis		0.1	2	S	
Carex sp.?		0.2	5	G/G	
Gahnia aspera		0.2	5	G/G	
Angophora floribunda		8		T	
~~Lindsaea linearis~~ ? Asplenium flabellifolium		0.1	10	E	Fern
Urtica incisa		0.1	2	F	Forb
Solanum pseudocapsicum	E	0.1	5	–	
Solanum ~~pinnatifidum?~~ pungetium		0.1	5	F	Forb
Comaline ~~dianella~~ cyanea		0.1	5	F	
Leucopogon juniperinus		0.2	5	S	
Pratia purpurescens		0.1	2	F	
Sida rhombifolia	E	0.1	5	–	
Diospyros sp.		0.1	1	S	
~~Elaeocarpus~~ sp. Austrostipa		0.1	1	G	
Veronica plebeia		0.1	5	F	
Dodonea sp. triquetra?		0.1	1	S	
Eustrephus latifolius		0.1	2	O	
Rubus parvifolius		0.1	1	S	
Arthropodium sp. Vanilla lily		0.1	1	F	

GF Code: see Growth Form definitions in Appendix 1 N: native, E: exotic, HTE: high threat exotic GF – circle code if 'top 3'. Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); *Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

, Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

BAM Site – Field Survey Form

Site Sheet no:

Survey Name	Zone ID	Recorders
Danjera Dam BDAR	V21 - Med	JB / KR

Date		Zone	Datum	Plot ID	Plot dimensions	Photo #
09 11 18		56	GDA94	DD3	20x50	IMG_0481 IMG_0482

Easting	Northing	IBRA region	Midline bearing from 0 m
		Ethnemo	354° N

		Confidence
Vegetation Class	Coastal Valley Grassy Woodland	H M L
Plant Community Type	PCT 838 EEC: EBC	Confidence: H (M) L

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	2
	Shrubs	5
	Grasses etc.	4
	Forbs	3
	Ferns	1
	Other	3
Sum of Cover of native vascular plants by growth form group	Trees	35
	Shrubs	4
	Grasses etc.	10.4
	Forbs	5.6
	Ferns	0.1
	Other	0.4
High Threat Weed cover		0.1

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm		
50 – 79 cm	111	
30 – 49 cm	✓	
20 – 29 cm	✓	
10 – 19 cm	✓	
5 – 9 cm	✓	
< 5 cm	–	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0	

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30 ..., 100, 200, 300 ...). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)	Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	80 60 10 1 15			
Average of the 5 subplots	33.2			

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging)	2		Some Eucs. have been cleared to stump - 2 ind.
Cultivation (inc. pasture)	0		
Soil erosion	1		
Firewood / CWD removal	3		No logs present.
Grazing (rabbits) (kangaroos)	3		Cow scat / Kangaroo / Wombat
Fire damage	0		
Storm damage	0		
Weediness	1		
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date			

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	Angophora floribunda		15		T	
	Eucl. tereticornis		20		T	
	Acacia fusiformis		1	2	S	
	Hymenanthera dentata		0.5	3	S	
	Olearia viscidula		2	15	S	
	Carex sp.		0.2	5	G/G	
	Microlaena stipoides		10		G	
	Dichondra repens		5		F	
	Oplismenus aemenulus		0.1	20	G	
	Bidens pilosa	HTE	0.1	3		
	Glycine ~~sp~~ tabacina		0.2	20	O	
	Gahnia aspera		0.1	5	G	
	Leucopogon sp.		0.2	3	S	
	Acacia irrivata		0.3	1	S	
	Cheilanthes sp.		0.1	3	E	Fern
	Eustrephus sp. lat		0.1	1	O	
	Einadia hastata		0.5	40	F	
	Sida rombifolia		0.1	10		
	Oxalis sp.		0.1	3	F	
	Prunella volgaris	E	0.2	20		
	Solanum pseudocapsicum	E	0.1	1		
	Clematis glycinoides		0.1	1	O	

BAM Site – Field Survey Form

Site Sheet no:

		Survey Name	Zone ID	Recorders			
Date	09 11 18	Danjera Dam BDAR	V21 - Low	JB / KR			
Zone 56	Datum GDA94	Plot ID	DD2	Plot dimensions	20 x 50	Photo #	135-0477 103-0480
Easting	Northing	IBRA region	Sydney Basin	Midline bearing from 0 m	94° E		
Vegetation Class		TBC - Coastal Valley Grassy Woodland (Ettrema)				Confidence: H M L	
Plant Community Type		PCT 838			EEC: EPBC Not BC Act	Confidence: H M L	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m² plot)		Sum values
Count of Native Richness	Trees	2
	Shrubs	8
	Grasses etc.	4
	Forbs	3
	Ferns	1
	Other	1
Sum of Cover of native vascular plants by growth form group	Trees	11
	Shrubs	13.6
	Grasses etc.	26.3
	Forbs	1.6
	Ferns	0.1
	Other	0.2
High Threat Weed cover		0.1

BAM Attribute (1000 m² plot)		
DBH	# Tree Stems Count	# Stems with Hollows
80 + cm	1	Nay
50 – 79 cm	1	
30 – 49 cm	0	
20 – 29 cm	0	
10 – 19 cm	✓	
5 – 9 cm	✓	
< 5 cm	✓	n/a
Length of logs (m) (≥10 cm diameter, >50 cm in length)	0	

Counts apply when the number of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30 … 100, 200, 300 …). For a multi-stemmed tree, only the largest living stem is included in the count/estimate. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)					Bare ground cover (%)	Cryptogam cover (%)	Rock cover (%)
Subplot score (% in each)	25	20	15	20	20			
Average of the 5 subplots	20							

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography + site features that may help in determining PCT and Management Zone (optional)

Morphological Type		Landform Element		Landform Pattern		Microrelief	
Lithology		Soil Surface Texture		Soil Colour		Soil Depth	
Slope		Aspect		Site Drainage		Distance to nearest water and type	

Plot Disturbance	Severity code	Age code	Observational evidence
Clearing (inc. logging)	3		Acacia has been cleared! Every 2nd stem thinned
Cultivation (inc. pasture)	0		
Soil erosion	1		Scattered areas of bare earth. No obvious scouring
Firewood / CWD removal	3		No logs remaining despite large trees.
Grazing (identify native/stock)	2		Native - wombat, Wallaby scat present Intra-cont
Fire damage	0		
Storm damage	0		
Weediness			
Other			

Severity: 0=no evidence, 1=light, 2=moderate, 3=severe

Age: R=recent (<3yrs), NR=not recent (3-10yrs), O=old (>10yrs)

400 m² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders
Date	9 11 18			

GF Code	Top 3 native species in each growth form group: Full species name mandatory. All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	Euc. tereticorni		8		T	
	Angophora floribunda		3	5	T	
	Acacia filisifolia ?		8		S	
	Olearia viscidula		3	30	S	
	Dicondera repens		1	50	P	
	Glycine sp. tabacina		0.2	30	O	
	Microlena stipoides		25		G	
	Sida rombafolia	E	0.1	5		
	Einadia hastata		0.5	50	F	
	Bursaria spinosa		0.1	2	S	
	Cheilanthes sp. sieberi ssp sieberi		0.1	5	E	
	Gahnia aspera		1	20	G	
	Carex sp.		0.2	10	G	
	Oplismenus aemulus		0.1	5	G	
	Comelena cyanea		0.1	2	F	
	Bidens pilosa	HTE	0.1	3		
	~~Sida rombafolia~~	~~E~~	~~0.1~~	~~5~~		previously recorded
	~~Veronica?~~ Dysphania sp.	E	0.1	10		
	Exocarpus cupresiformis		0.2	30	S	
	Leucopogan ? juniperinus		0.2	3	S	
	Dyospodus sp.		0.1	1	S	
	Hymenanthera dentata		0.5	5	S	
	Acacia mearnsii		2	5	S	

idea for fire wood collection mgmt — collection zones along entry road.

Appendix C: Vegetation integrity data (Composition, Structure and Function)

Table 16 through to Table 18 show the current and future VI scores for all three vegetation zones within the development site along with a justification of how the score was modified in accordance with the Planning for Bush Fire Protection 2018 guidelines.

VI scores were adjusted to comply with the following requirements for establishing and maintaining an inner protection area:

Trees:

- Canopy cover should be less than 15% (at maturity).
- Trees (at maturity) should not touch or overhang the building.
- Lower limbs should be removed up to a height of 2m above ground.
- Canopies should be separated by 2 to 5m.
- Preference should be given to smooth barked and evergreen trees.

Shrubs:

- Create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings.
- Shrubs should not be located under trees.
- Shrubs should not form more than 10% ground cover.
- Clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.

Grass:

- Should be kept mown (as a guide grass should be kept to no more than 100mm in height).
- Leaves and vegetation debris should be removed.

Table 16: Details of Plot 1 VI scoring and justification of total change in VI score of -17.4

Condition attribute	Current vegetation integrity score	Future vegetation integrity score
Composition		
Tree	14	4
Shrub	12	0
Grass & grass like	5	5
Forb	9	9
Fern	3	3
Other	5	5
Plots 1 composition totals	**77**	**60.2**
Structure		
Tree	17.2	15
Shrub	18	0
Grass & grass like	10.5	10.5
Forb	5.8	5.8
Fern	8.2	8.2
Other	1.5	1.5

Condition attribute	Current vegetation integrity score	Future vegetation integrity score
Plots 1 structure totals	**30.7**	**16**
Function		
Regeneration stems <5cm DBH	Absent	Absent
Stem classes present	5-9, 10-19, 20-29 & 30-49	4
Number of large trees* (>50cm DBHOB)	4	4
Hollow bearing trees	1	N/A
Litter cover	50	0
Coarse woody debris	0.6	0
High Threat Weed Cover	0	0
Plots 1 function totals	**65**	**50**
Vegetation integrity score	**53.7**	**36.4**

Table 17: Details of Plot 2 VI scoring and justification of total change in VI score of -19.7

Condition attribute	Current vegetation integrity score	Future vegetation integrity score
Composition		
Tree	2	2
Shrub	5	0
Grass & grass like	4	4
Forb	3	3
Fern	1	1
Other	3	3
Plots 2 composition totals	**38.1**	**24.6**
Structure		
Tree	35	15
Shrub	4	0
Grass & grass like	10.4	10.4
Forb	5.6	5.6
Fern	0.1	0.1
Other	0.4	0.4
Plots 2 structure totals	**38.6**	**14.3**
Function		
Regeneration stems <5cm DBH	Absent	Absent
Stem classes present	5-9, 10-19, 20-29 & 30-49	4
Number of large trees* (>50cm DBHOB)	3	3
Hollow bearing trees	1	N/A
Litter cover	33.2	0
Coarse woody debris	0	0
High Threat Weed Cover	0.1	0
Plots 2 function totals	**64.9**	**50**
Vegetation integrity score	**45.7**	**26**

Table 18: Details of Plot 3 VI scoring and justification of total change in VI score of -17.4

Condition attribute	Current vegetation integrity score	Future vegetation integrity score
Composition		
Tree	2	2
Shrub	8	0
Grass & grass like	4	4
Forb	3	3
Fern	1	1
Other	1	1
Plots 3 composition totals	**34.5**	**17.5**
Structure		
Tree	11	11
Shrub	13.6	0
Grass & grass like	26.3	26.3
Forb	1.6	1.6
Fern	0.1	0.1
Other	0.2	0.2
Plots 3 structure totals	**34.2**	**22.9**
Function		
Regeneration stems <5cm DBH	Present	Absent
Stem classes present	5-9 & 10-19	2
Number of large trees* (>50cm DBHOB)	2	2
Hollow bearing trees	0	N/A
Litter cover	20	0
Coarse woody debris	0	0
High Threat Weed Cover	0.1	0
Plots 3 function totals	**64.1**	**38.4**
Vegetation integrity score	**42.3**	**24.9**

Appendix D: Koala habitat assessment

Table 19: Koala habitat assessment in accordance with Commonwealth of Australia (2014)

Attribute	Score	Coastal	Score and justification
Koala occurrence	0 (low)	No evidence of one or more koalas within the last 2 years. No evidence of one or more koalas within 2 km of the edge of the impact area within the last 5 years.	Score: 0 No records of the Koala within 2 km of the study area on the Atlas of NSW Wildlife. No Koalas or direct evidence of koala habitation were found during targeted surveys. Although scratch marks were observed on several Forest Red Gum, these were not characteristic of Koala scratches and were identified as most Lace Monitors, which were observed in high numbers across the development site. No Koala scats were found at the base of the trees where scratch marks were found.
Vegetation composition	+2 (high)	Has forest or woodland with 2 or more known koala food tree species, OR 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	Score: 2 Two species of feed tree species were detected within the development site, being Grey Gum and Forest Red Gum.
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape ≥ 500 ha.	Score: 2 The study area is bordered to the west by an area of native vegetation >500 ha, that extends through to Morton National Park and drinking water catchment. Within the development site, native vegetation has been altered as a result in intense recreational activities.
Key existing threats	+1 (medium)	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence, **OR** Areas which score 0 for koala occurrence and are likely to have some degree dog or vehicle threat present.	Score: 1 The development site scores a 0 for Koala occurrence and contains several key threatening processes. Although there is no evidence of koala mortality in or associated with the study area, there is a risk of vehicle collision in the area, particularly in peak camping periods.

Attribute	Score	Coastal	Score and justification
Recovery value	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	Score: 0 Although the study area is connected to a larger area of habitat which may support Koalas, there is no evidence of Koala usage and no records in proximity to the development site. Therefore, the site is unlikely to help achieve the interim recovery objectives as outlined in Table 1.
FINAL SCORE			**Score: 5**

In accordance with the EPBC Act referral guidelines for the species (Commonwealth Australia, 2014), the loss of two hectares or less of marginal quality habitat critical to the survival (habitat score of 5) is highly unlikely to have a significant impact on the koala for the purposes of the EPBC Act.

Appendix E: EPBC Act Protected Matters Report results

Common name	Scientific name	EPBC Act listing status	Likelihood of occurrence
Listed Threatened Ecological Communities			
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	*N/A*	E	Low. PCT 838 does not align with this EEC.
Illawarra and south coast lowland forest and woodland ecological community	*N/A*	CE	High. Recorded on site. 0.82 ha of the CEEC will be impacted by the proposal. An assessment against EPBC MNES Significant Impact Criteria has been completed in Appendix F.
Natural Temperate Grassland of the South Eastern Highlands	*N/A*	CE	Low. PCT 838 does not align with this CEEC.
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	*N/A*	E	Low. PCT 838 does not align with this EEC.
Listed Threatened Species			
Birds			
Australian Painted-snipe	*Rostratula australis*	E	Low. No habitat for the species within development site.
Curlew Sandpiper	*Calidris ferruginea*	CE	Low. No habitat for the species within development site.
Eastern Bristlebird	*Dasyornis brachypterus*	E	Low. PCT 838 within the development site generally lacks the heathy, dense vegetation typically used by the species.
Eastern Curlew	*Numenius madagascariensis*	CE	Low. No intertidal mudflats or sandflat within the development site.
Painted Honeyeater	*Grantiella picta*	V	Low. Usually west of the Great Dividing Range and strongly associated with mistletoe.
Regent Honeyeater	*Anthochaera phrygia*	CE	Low. Rare visitor to the Shoalhaven. May utilise the development site for foraging purposes on occasion in response to flowering blossom. No breeding habitat present.

Common name	Scientific name	EPBC Act listing status	Likelihood of occurrence
Swift Parrot	*Lathamus discolor*	CE	Low. Rare visitor to the Shoalhaven. May utilise the development site for foraging purposes on occasion in response to flowering blossom. No breeding habitat present.
Fish			
Australian Grayling	*Prototroctes maraena*	V	Not applicable.
Macquarie Perch	*Macquaria australasica*	E	Not applicable.
Frogs			
Giant Burrowing Frog	*Heleioporus australiacus*	V	Low. Due to damming of Danjera Creek, no suitable breeding habitat for the species occurs within the study area or within 300 m of the study area. Given the distance to a suitable breeding location, the species is also unlikely to use the site for burrowing.
Green and Golden Bell Frog	*Litoria aurea*	V	Not applicable.
Littlejohn's Tree Frog	*Litoria littlejohni*	V	Not applicable.
Stuttering Frog	*Mixophyes balbus*	V	Not applicable.
Mammals			
Brush-tailed Rock-wallaby	*Petrogale penicillata*	V	Low. Targeted survey (scat) did not detect the presence of this species. No suitable sheltering habitat is present within the development site.
Greater Glider	*Petauroides volans*	V	Low. No indication of presence during targeted survey of suitable hollows over dusk.
Grey-headed Flying-fox	*Pteropus poliocephalus*	V	Moderate. Targeted survey did not detect any camps. Species may forage in the development site on occasion however given the widespread availability of habitat adjoining the site, the habitat to be impacted is not considered to be limiting.
Koala	*Phascolarctos cinereus*	V	Low. Targeted survey (scat) did not detect the presence of this species.
Large-eared Pied Bat	*Chalinolobus dwyeri*	V	Moderate. No breeding habitat present however the site does contain potential foraging habitat for the species. Due to the availability of protected habitat in the surrounding landscape, the minimal impacts associated with the proposal and the highly mobile nature of the species, a significant impact is unlikely to result from the proposed development.

Common name	Scientific name	EPBC Act listing status	Likelihood of occurrence
Long-nosed Potoroo (SE mainland)	*Potorous tridactylus tridactylus*	V	Low. PCT 838 within the development site generally lacks the dense understorey typically used by the species. No small holes indicating foraging present.
New Holland Mouse	*Pseudomys novaehollandiae*	V	Low. PCT 838 within the development site generally lacks the heathy understorey typically used by the species.
Southern Brown Bandicoot	*Isoodon obesulus obesulus*	E	Low. PCT 838 within the development site generally lacks the heathy understorey typically used by the species. No conical holes indicating foraging present. Not detected during targeted surveys over dusk.
Spotted-tailed Quoll	*Dasyurus maculatus maculatus*	E	Moderate. Given the connectivity to large expanse of habitat, the species may pass through the development site on occasion. No important latrine sites or other evidence of the species was detected during the surveys. Modification of 0.82 ha of habitat will not result in a significant impact to the species.
Plants			
Austral Toadflax	*Thesium australe*	V	Low. Not detected during targeted survey.
Bynoe's Wattle	*Acacia bynoeana*	V	Low. No habitat present and not detected during targeted survey.
Deane's Melaleuca	*Melaleuca deanei*	V	Low. No habitat present.
East Lynne Midge-orchid	*Genoplesium vernale*	V	Low. No habitat present.
Illawarra Greenhood	*Pterostylis gibbosa*	E	Low. Although PCT 838 contains canopy species the Illawarra Greenhood is associated with (Forest Red Gum), the understorey of the site is so degraded due to trampling, clearing of vegetation and encroachment of the camp ground, species is unlikely to be present.
Kangaloon Sun Orchid	*Thelymitra kangaloonica*	CE	Low. No habitat present. Restricted to the southern tablelands in the Moss Vale / Kangaloon / Fitzroy Falls area at 550-700 m above sea level.
Leafless Tongue-orchid	*Cryptostylis hunteriana*	V	Low. No habitat present.
Magenta Lilly Pilly	*Syzygium paniculatum*	V	Low. No habitat present. Associated with subtropical and littoral rainforest on sandy soils.
Nowra Heath-myrtle	*Triplarina nowraensis*	E	Low. Not detected during targeted survey.

Common name	Scientific name	EPBC Act listing status	Likelihood of occurrence
Thick-lipped Spider-orchid	*Caladenia tessellata*	V	Low. Not detected during targeted survey undertaken during the flowering period in November.
White-flowered Wax Plant	*Cynanchum elegans*	E	Low. Not detected during targeted survey.
Wingless Raspwort	*Haloragis exalata subsp. exalata*	V	Low. Not detected during targeted survey.
Yellow Gnat-orchid	*Genoplesium baueri*	E	Low. No habitat present.
	Triplarina imbricata	E	Low. Not detected during targeted survey.
Reptiles			
Broad-headed Snake	*Hoplocephalus bungaroides*	V	Low. No suitable habitat present and where there is suitable habitat in the broader landscape, it is >1.5km from the development site, likely to be too great of a distance for the species to travel from.

Appendix F: Assessment against EPBC MNES Significant Impact Criteria

Illawarra and South Coast Lowlands Grassy Woodland Ecological Community (CE)

An action is likely to have a significant impact on a critically endangered or endangered ecological community if there is a real chance or possibility that it will:

Matter to consider	Assessment
reduce the extent of an ecological community	The action involves the modification of 0.82 ha of CEEC in line with the Planning for Bush Fire Protection 2018 guidelines. While 0.82 ha will be affected by the proposal, the action is unlikely to significantly reduce the extent of the community.
fragment or increase fragmentation of an ecological community, for example by clearing vegetation for roads or transmission lines	The modification of the CEEC for APZ purposes will be undertaken surrounding an existing clearing and will be undertaken within an already disturbed area. Minor trimming or clearing of vegetation will also be required along the access tracks however will not exceed 1m from the existing road. The action is unlikely to fragment or increase fragmentation of the community.
adversely affect habitat critical to the survival of an ecological community	Action unlikely to adversely affect habitat critical to the survival of the community. Trees will be retained within the APZ, particularly mature trees and those with habitat potential for fauna (i.e. those with hollows). Habitat critical to the survival of an ecological community will not be impacted.
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 action will not alter surface water drainage patterns or abiotic necessary for an ecological community's survival.
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	Removal of the shrub layer, mid-storey layer and some canopy trees within a 0.82 ha area will be required to achieve the proposal. This will not substantially change the species composition of the community.
cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including, but not limited to: ***-- assisting invasive species, that are harmful to the listed ecological community, to become established, or*** ***-- causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community***	The formalisation of the campground and recreational area will result in a positive impact to the bushland surrounding the site as the ongoing disturbance regimes will be managed by an onsite caretaker. While 0.82 ha of vegetation will be modified for APZ and emergency vehicle access, this will be conducted in a controlled manner to ensure the quality or integrity of the community is not substantially compromised.
interfere with the recovery of an ecological community	The proposal is unlikely interfere with the recovery of an ecological community.

Large-eared Pied Bat (V)

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

Matter to consider	Assessment
lead to a long-term decrease in the size of an important population of a species	No breeding habitat or individuals will be directly impacted by the action; therefore, it is unlikely 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	The action involves the modification of 0.82 ha of potential foraging habitat in line with the Planning for Bush Fire Protection 2018 guidelines. Due to the extent of high-quality protected habitat in the surrounding landscape, the relatively small extent of the habitat to be impacted and the highly mobile nature of the species, it is unlikely to reduce the area of occupancy of an important population.
fragment an existing important population into two or more populations	The modification of the potential breeding habitat for APZ purposes will be undertaken surrounding an existing clearing and will be undertaken within an already disturbed area. Minor trimming or clearing of vegetation will also be required along the access tracks however will not exceed 1m from the existing road. The action is unlikely to fragment or increase fragmentation of potential foraging habitat.
adversely affect habitat critical to the survival of a species	Action unlikely to adversely affect habitat critical to the survival of the community. No breeding habitat will be affected, and trees will be retained within the APZ, particularly mature trees.
disrupt the breeding cycle of an important population	No breeding habitat is present within the development site and the breeding cycle would remaining unaffected if an important population is present in the locality and foraging within the site.
modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The removal of 0.82 ha of shrub, mid-layer and some canopy species is unlikely to change the foraging behaviour of the species. Due to the extent of high-quality protected habitat in the surrounding landscape, the relatively small extent of the habitat to be impacted is unlikely to affect the extent of habitat in the locality so that the species is likely to decline.
result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat	The formalisation of the campground and recreational area will result in a positive impact to the bushland surrounding the site as the ongoing disturbance regimes will be managed by an onsite caretaker. While 0.82 ha of vegetation will be modified for APZ and emergency vehicle access, this will be conducted in a controlled manner to ensure that invasive species or disease is not introduced.
introduce disease that may cause the species to decline, or	
interfere substantially with the recovery of the species.	The proposal is unlikely interfere with the recovery of the species.

Appendix G: Biodiversity Credit Reports

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00014304/BAAS18176/19/00014305

Proposal Name
Danjera Dam Campground - Streamlined Assessment

BAM data last updated *
04/01/2019

Assessor Name
Kylie Reed

Assessor Number
BAAS18176

BAM Data version *
6

Proponent Names

Report Created
26/02/2019

* 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.

Candidate Serious and Irreversible Impacts

Nil

Species
Chalinolobus dwyeri / Large-eared Pied Bat
Chalinolobus dwyeri / Large-eared Pied Bat
Chalinolobus dwyeri / Large-eared Pied Bat

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

BAM Biodiversity Credit Report (Like for like)

Predicted Threatened Species Not On Site

No Changes

Ecosystem Credit Summary

PCT	TEC	Area	Credits
838-Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion	Not a TEC	0.8	7.00

Credit classes for 838	**Like-for-like options**			
	Any PCT in the below Class	And in any of below trading groups	Containing HBT	In the below IBRA subregions
	Coastal Valley Grassy Woodlands (including PCT's 116, 618, 760, 761, 762, 830, 834, 838, 849, 850, 1326, 1395, 1603, 1604, 1691)	Coastal Valley Grassy Woodlands - ≥ 70% - <90% cleared group (including Tier 4 or higher).	Yes	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

Species Credit Summary

Species	Area	Credits
Calyptorhynchus lathami / Glossy Black-Cockatoo	0.5	5.00
Chalinolobus dwyeri / Large-eared Pied Bat	0.8	11.00
Hieraaetus morphnoides / Little Eagle	0.8	5.00
Myotis macropus / Southern Myotis	0.8	7.00
Ninox connivens / Barking Owl	0.8	7.00
Tyto novaehollandiae / Masked Owl	0.8	7.00

Calyptorhynchus lathami/ Glossy Black-Cockatoo	838_VZ1_low	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW
Chalinolobus dwyeri/ Large-eared Pied Bat	838_VZ1_High	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Chalinolobus dwyeri/Large-eared Pied Bat	Any in NSW

Chalinolobus dwyeri/ Large-eared Pied Bat	838_VZ1_High	
	838_VZ1_low	**Like-for-like options**
		Only the below Spp / In the below IBRA subregions
		Chalinolobus dwyeri/Large-eared Pied Bat / Any in NSW
	838_VZ1_Moderate	**Like-for-like options**
		Only the below Spp / In the below IBRA subregions
		Chalinolobus dwyeri/Large-eared Pied Bat / Any in NSW
Hieraaetus morphnoides/ Little Eagle	838_VZ1_High	**Like-for-like options**
		Only the below Spp / In the below IBRA subregions
		Hieraaetus morphnoides/Little Eagle / Any in NSW

Hieraaetus morphnoides/ Little Eagle	838_VZ1_low	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Hieraaetus morphnoides/Little Eagle	Any in NSW
	838_VZ1_Moderate	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Hieraaetus morphnoides/Little Eagle	Any in NSW
Myotis macropus/ Southern Myotis	838_VZ1_High	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Myotis macropus/Southern Myotis	Any in NSW
	838_VZ1_low	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions

		Myotis macropus/Southern Myotis	Any in NSW
	838_VZ1_Moderate	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Myotis macropus/Southern Myotis	Any in NSW
Ninox connivens/ Barking Owl	838_VZ1_High	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Ninox connivens/Barking Owl	Any in NSW
	838_VZ1_low	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Ninox connivens/Barking Owl	Any in NSW

Ninox connivens/ Barking Owl	838_VZ1_low		
	838_VZ1_Moderate	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Ninox connivens/Barking Owl	Any in NSW
Tyto novaehollandiae/ Masked Owl	838_VZ1_High	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Tyto novaehollandiae/Masked Owl	Any in NSW
	838_VZ1_low	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Tyto novaehollandiae/Masked Owl	Any in NSW

Tyto novaehollandiae/ Masked Owl	838_VZ1_Moderate	**Like-for-like options**	
		Only the below Spp	In the below IBRA subregions
		Tyto novaehollandiae/Masked Owl	Any in NSW

BAM Biodiversity Credit Report (Variations)

Proposal Details

Assessment Id
00014304/BAAS18176/19/00014305

Proposal Name
Danjera Dam Campground - Streamlined Assessment

BAM data last updated *
04/01/2019

Assessor Name
Kylie Reed

Assessor Number
BAAS18176

BAM Data version *
6

Proponent Name(s)

Report Created
26/02/2019

* 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.

Candidate Serious and Irreversible Impacts

Nil

Species
Chalinolobus dwyeri / Large-eared Pied Bat
Chalinolobus dwyeri / Large-eared Pied Bat
Chalinolobus dwyeri / Large-eared Pied Bat

Additional Information for Approval

PCTs With Customized Benchmarks

No Changes

BAM Biodiversity Credit Report (Variations)

Predicted Threatened Species Not On Site

No Changes

Ecosystem Credit Summary

PCT	TEC	Area	Credits
838-Forest Red Gum - Thin-leaved Stringybark grassy woodland on coastal lowlands, southern Sydney Basin Bioregion	Not a TEC	0.8	7.00

Credit classes for 838	**Like-for-like options**			
	Any PCT in the below Class	And in any of below trading groups	Containing HBT	In the below IBRA subregions
	Coastal Valley Grassy Woodlands (including PCT's 116, 618, 760, 761, 762, 830, 834, 838, 849, 850, 1326, 1395, 1603, 1604, 1691)	Coastal Valley Grassy Woodlands - ≥ 70% - <90% cleared group (including Tier 4 or higher).	Yes	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	Variation options			
	Any PCT in the below Formation	And in any of below trading groups	Containing HBT	In the below IBRA regions/subregions

	Grassy Woodlands	Tier 4 or higher	Yes (including artificial)	IBRA Region: Sydney Basin, or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Area	Credits
Calyptorhynchus lathami / Glossy Black-Cockatoo	0.5	5.00
Chalinolobus dwyeri / Large-eared Pied Bat	0.8	11.00
Hieraaetus morphnoides / Little Eagle	0.8	5.00
Myotis macropus / Southern Myotis	0.8	7.00
Ninox connivens / Barking Owl	0.8	7.00
Tyto novaehollandiae / Masked Owl	0.8	7.00

Calyptorhynchus lathami/ Glossy Black-Cockatoo	838_VZ1_low	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Calyptorhynchus lathami/Glossy Black-Cockatoo	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act	In the below IBRA subregions

			showb below	
		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Chalinolobus dwyeri/ Large-eared Pied Bat	838_VZ1_High	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Chalinolobus dwyeri/Large-eared Pied Bat	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions
		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Chalinolobus dwyeri/ Large-eared Pied Bat	838_VZ1_low	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Chalinolobus dwyeri/Large-eared Pied Bat	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions
		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	838_VZ1_Moderate	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Chalinolobus dwyeri/Large-eared Pied Bat	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions

		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Hieraaetus morphnoides/ Little Eagle	838_VZ1_High	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Hieraaetus morphnoides/Little Eagle	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions
		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	838_VZ1_low	**Like-for-like options**		

		Only the below Spp	In the below IBRA subregions	
		Hieraaetus morphnoides/Little Eagle	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions
		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	838_VZ1_Moderate	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Hieraaetus morphnoides/Little Eagle	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions

		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Myotis macropus/ Southern Myotis	838_VZ1_High	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Myotis macropus/Southern Myotis	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions
		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	838_VZ1_low	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	

		Myotis macropus/Southern Myotis	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions
		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	838_VZ1_Moderate	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Myotis macropus/Southern Myotis	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions

		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Ninox connivens/ Barking Owl	838_VZ1_High	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Ninox connivens/Barking Owl	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions
		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	838_VZ1_low	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	

		Ninox connivens/Barking Owl	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions
		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	838_VZ1_Moderate	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Ninox connivens/Barking Owl	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions

		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Tyto novaehollandiae/ Masked Owl	838_VZ1_High	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Tyto novaehollandiae/Masked Owl	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions
		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	838_VZ1_low	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	

		Tyto novaehollandiae/Masked Owl	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions
		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
	838_VZ1_Moderate	**Like-for-like options**		
		Only the below Spp	In the below IBRA subregions	
		Tyto novaehollandiae/Masked Owl	Any in NSW	
		Variation options		
		Any Spp in the below Kingdom	Any species with same or higher category of listing under Part 4 of teh BC Act showb below	In the below IBRA subregions

		Fauna	Vulnerable	Ettrema,Bateman, Bungonia, Burragorang, Illawarra, Jervis and Moss Vale. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.