Proposed Golf Course Development, Thredbo Alpine Resort
Biodiversity Development Assessment Report

Kosciuszko Thredbo Pty Ltd

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Template 2.8.1

Executive Summary

Eco Logical Australia Pty Ltd was engaged by Kosciuszko Thredbo Pty Ltd to prepare a BDAR for a proposed subdivision and re-design of the existing golf course, within Thredbo Alpine Resort.

This report has been prepared to meet the requirements of the Biodiversity Assessment Method 2020 established under Section 6.7 of the NSW *Biodiversity Conservation Act 2016* (BC Act).

The proposed development has been located to take advantage of existing disturbed areas within the golf course and minimize the required clearing. As a result, it is anticipated that the proposal will involve the clearing or further modification of 1.66 ha of native vegetation, most of which has been heavily modified in association with the existing golf course.

The development footprint or immediate surrounds support three Plant Community Types (PCT) PCT 644 Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion; PCT 679 Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion; and PCT 939 Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion. PCT 679 dominates the development site and occurs in three condition states. Neither PCT 644 or 679 conform to any Endangered Ecological Communities (EEC) listed under the NSW BC Act or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), however PCT 939 comprises the Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions EEC, which is listed under the BC Act.

Targeted surveys within the development site and immediate surrounds did not identify any threatened flora species as occurring within the development site. A number of other threatened fauna species are known to occur in adjoining habitats and/or have the potential to occur within the development site, such as *Petroica phoenicea* (Flame Robin), *Callocephalon fimbriatum* (Gang-gang Cockatoo), *Pachycephala olivacea* (Olive Whistler) and *Mastacomys fuscus* (Broad-toothed Rat). Whilst The Broad-toothed Rat was not detected within the development site and is not a candidate Serious and Irreversible Impact (SAII) species, offsets for the species have been provided to offset the impacts on potential habitat.

This BDAR outlines the measures taken to avoid, minimise and mitigate impacts to the vegetation and habitats present within the development footprint during the design, construction and operation of the development. The residual unavoidable impacts of the proposed development were calculated in accordance with the BAM by utilising the Biodiversity Assessment Method Credit Calculator. A total of 39 ecosystem credits and one species credit are required to offset the unavoidable impacts to the vegetation and habitats present within the development footprint.

Serious and Irreversible Impact (SAII) values have been considered as part of this assessment. The proposal will not result in any SAII.

Following consideration of the administrative guidelines for determining significance under the EPBC Act, it is concluded that the proposal is unlikely to have a significant impact on matters of National Environmental Significance (MNES) or Commonwealth land, and a referral to the Commonwealth Environment Minister is therefore not recommended.

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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
CEEC	Critically Endangered Ecological Community
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DPE	NSW Department of Planning and Environment
EEC	Endangered Ecological Community
ELA	Eco Logical Australia Pty Ltd
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
FM Act	NSW *Fisheries Management Act 1994*
GIS	Geographic Information System
GPS	Global Positioning System
IBRA	Interim Biogeographic Regionalisation for Australia
LGA	Local Government Area
NRAR	NSW Natural Resources Access Regulator
NSW	New South Wales
PCT	Plant Community Type
SEPP	State Environmental Planning Policy
TEC	Threatened Ecological Community
VIS	Vegetation Information System

1. Introduction

This Biodiversity Development Assessment Report (BDAR) has been prepared by Ryan Smithers, an Accredited Person (BAAS17061) to apply the Biodiversity Assessment Method (BAM) under the NSW *Biodiversity Conservation Act 2016* (BC Act). All credit calculations have been undertaken using the BAM Calculator (BAMC) version 2020 in case number 33206. Consistent with the BAM, the streamlined (small area) assessment module has been used for this assessment.

Definitions of terminology used throughout this report are presented in Appendix A.

1.1. General description of the development site

The development site comprises the existing golf course, within Thredbo Alpine Resort. Parts of the development site are already heavily modified in association with the existing fairways and greens and associated infrastructure.

This report includes two base maps, the Location Map (Figure 1) and the Site Map (Figure 2).

1.2. Brief description of the proposal

The proposed development comprises a subdivision to provide 19 building lots. The development includes the provision of municipal infrastructure, including a new 425 m long access road off Crackenback Drive, an additional 48 visitor carparks along the proposed road network, water, sewer, power, gas and telecommunications infrastructure, asset protection zones (APZ) to the proposed building lots, and an additional water storage tank to supply the proposed lots. The proposed subdivision also necessitates a re-design of the golf course to retain it as a nine-hole course.

The proposed subdivision is centred on the existing first, third and fourth fairway, however it encroaches into the adjacent remnant vegetation on the edges of the fairways. The golf course re-design will also require the clearing of some of the vegetation on the edge of the fairways. Three water retention devices e.g. Puraceptor units, would capture sediment and hydrocarbon pollutants from stormwater prior to discharge to Thredbo River.

The proposed works are expected to affect 1.66 ha of native vegetation in various condition states, and a further 2.76 ha of fairways and access roads, which comprise exotic grasses or bare ground.

The impacts of the proposed development can be summarized as follows:

- The clearing or further modification of 1.66 ha of native vegetation.
- Bulk earthworks including cut and fill.
- Construction of stormwater drains and trenching for other ancillary services (electricity, sewer, gas, potable water, communications).
- Construction of the proposed access road and carparks.
- Landscaping, revegetation and rehabilitation works.

The proposal is further identified in Figures 3-5 and Photo 1 – Photo 9.

Photo 1: The proposed subdivision is centred on existing fairways.

Photo 2: The proposed access road is aligned along the existing first fairway, as indicated by the red line. It will require the removal of part of the tree planting (*Eucalyptus perriniana* Dargo Gum) in the right foreground. Carparking spaces are planned on the edges of the existing fairway.

Photo 3: The subdivision is centred upon the fairways as identified indicatively by the red polygon.

Photo 4: The proposed subdivision will involve building lots, and associated clearing as identified indicatively by the red polygon.

Photo 5: The subdivision will involved the removal of this patch of trees which currently separates two fairways.

Photo 6: The golf course re-design will involve the removal of remnant vegetation along the edges of a number of existing fairways including parts of the seventh hole as shown indicatively above.

Photo 7: The golf course re-design originally involved a new tee in the adjoining wet heath. The proposal was modified to remove this and thus avoid and minimise impacts.

Photo 8: The redesign will involve clearing of the vegetation on the side of the proposed ninth fairway. Trees will be planted on the opposite of the fairway.

Photo 9: An additional water tank is proposed adjacent to the existing one in the approximate location identified above. The additional water tank is expected to have a disturbance footprint of 200 m^2.

1.3. Development site footprint

It is anticipated that the proposed development will result in the removal or further modification of 1.66 ha of native vegetation in various condition states, and a further 2.76 ha of fairways, which comprise exotic grasses.

The development site footprint is identified in Figure 2. The proposal is identified in Figures 3-5.

1.4. Sources of information used

The following data sources were reviewed as part of this report:

- BioNet Vegetation Classification
- BioNet Atlas Database
- Threatened Biodiversity Data Collection
- Additional GIS datasets including cadastre, contours, imagery and drainage.

1.5. Legislative context

Legislation relevant to the development site is outlined in Table 1.

Table 1: Legislative context

Name	Relevance to the project	Report Section
Commonwealth		
Environment Protection and Biodiversity Conservation Act 1999	Matters of national Environmental Significance (MNES) have been identified on or near the development site. This report assesses impacts to MNES and concludes that the development is unlikely to have a significant impact on MNES.	Appendix D
State		
Environmental Planning and Assessment Act 1979	The proposed development requires consent and is to be assessed under Part 4 of the EP&A Act. The EP&A Act places a duty on the determining authority to adequately address a range of environmental matters including the maintenance of biodiversity and the likely impact to threatened species, populations and communities.	-
Biodiversity Conservation Act 2016	The proposed development involves clearing of vegetation identified as high conservation value on the Biodiversity Values Land Map and thus requires submission of a Biodiversity Development Assessment Report.	-
Environmental Planning Instruments		
Precincts - Regional SEPP 2021	State Environmental Planning Policy (Precincts—Regional) 2021 (Precincts-Regional SEPP) facilitates a planning framework for Special Activation Precincts (Precinct/s) in regional NSW, streamlining planning processes and guiding the delivery of the precincts. The Precincts-Regional SEPP identifies the Minister for Planning as the determining authority for development within the NSW Alpine Resorts. Precincts-Regional SEPP requires the Minister for Planning to refer for comment any development application in the Alpine Resorts to the Director General of the NSW Department of Environment and Climate Change (DECC).	-
Snowy River Shire Local Environment Plan 2013	The subject site is zoned C1 National Parks and Nature Reserves under the Snowy River Shire Local Environment Plan 2013.	-

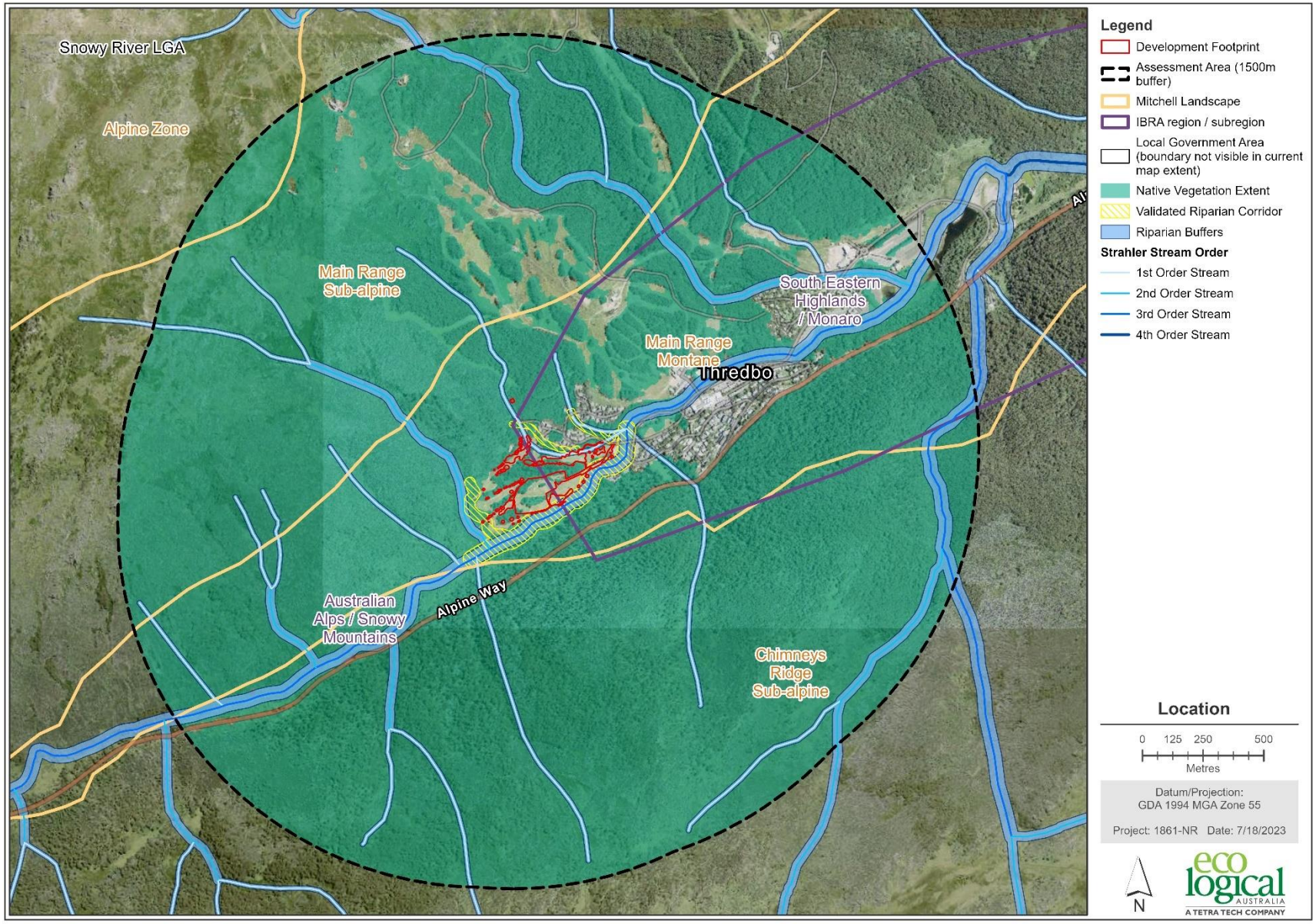

Figure 1: Location Map

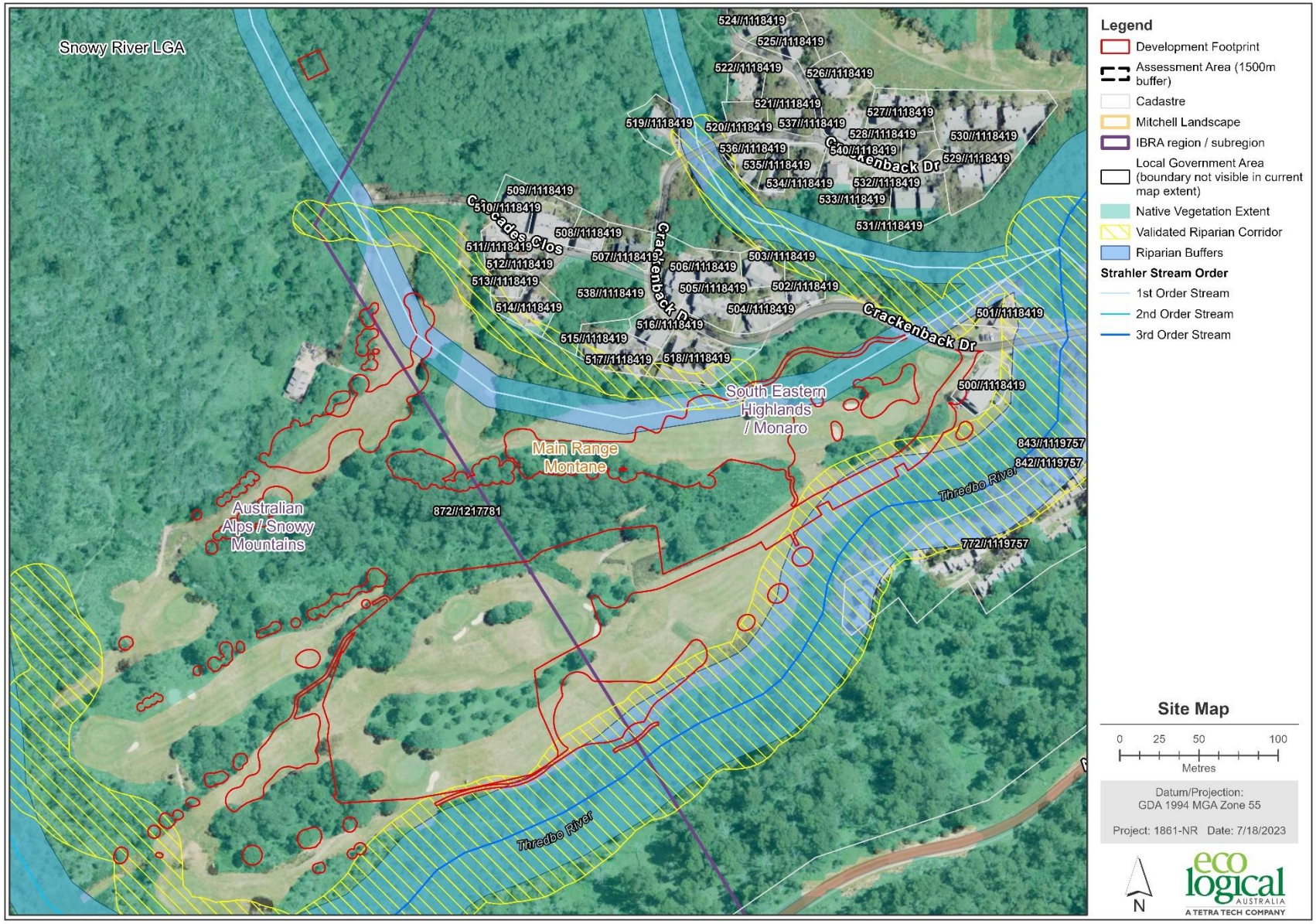

Figure 2: Site Map

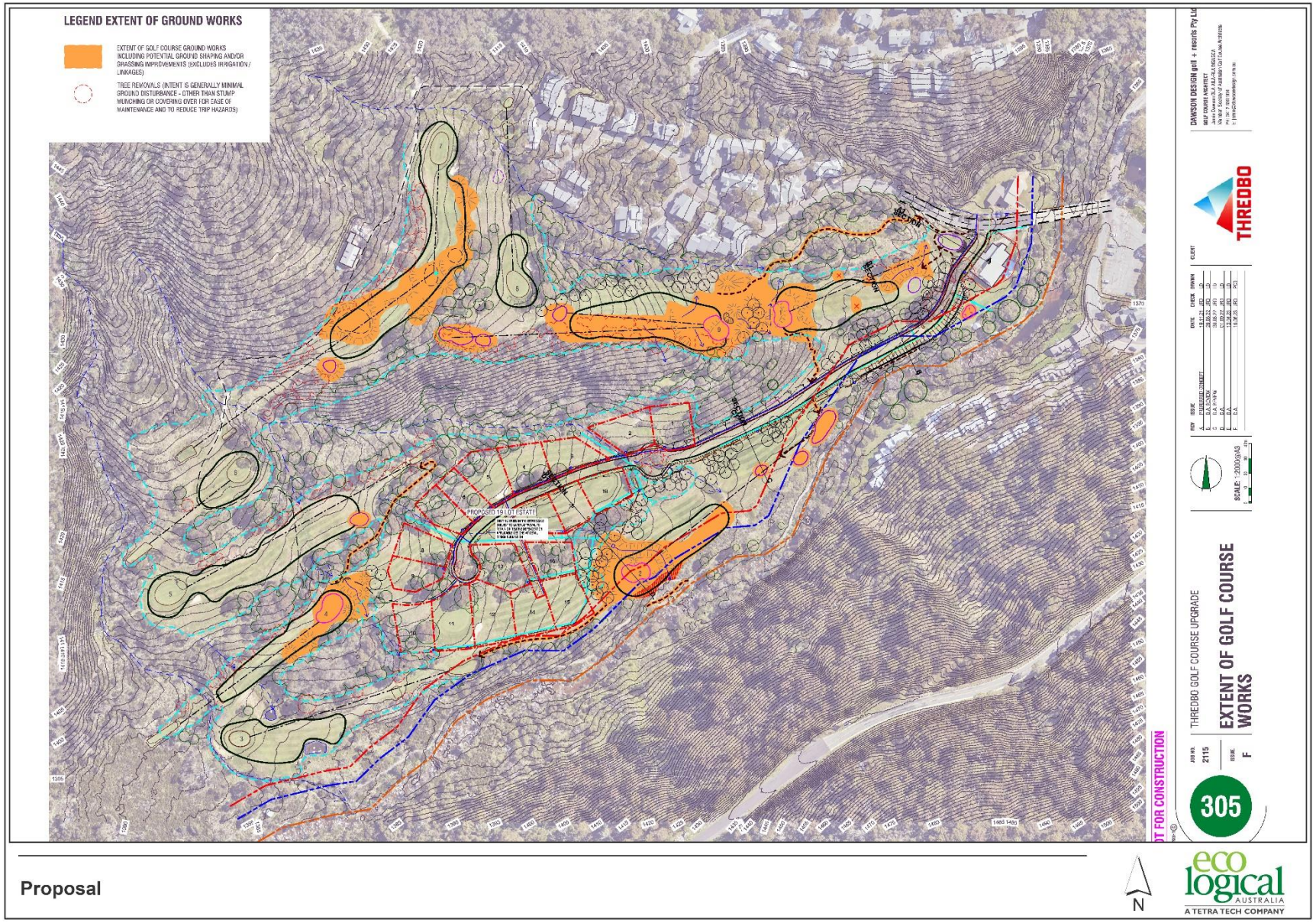

Figure 3: The proposal

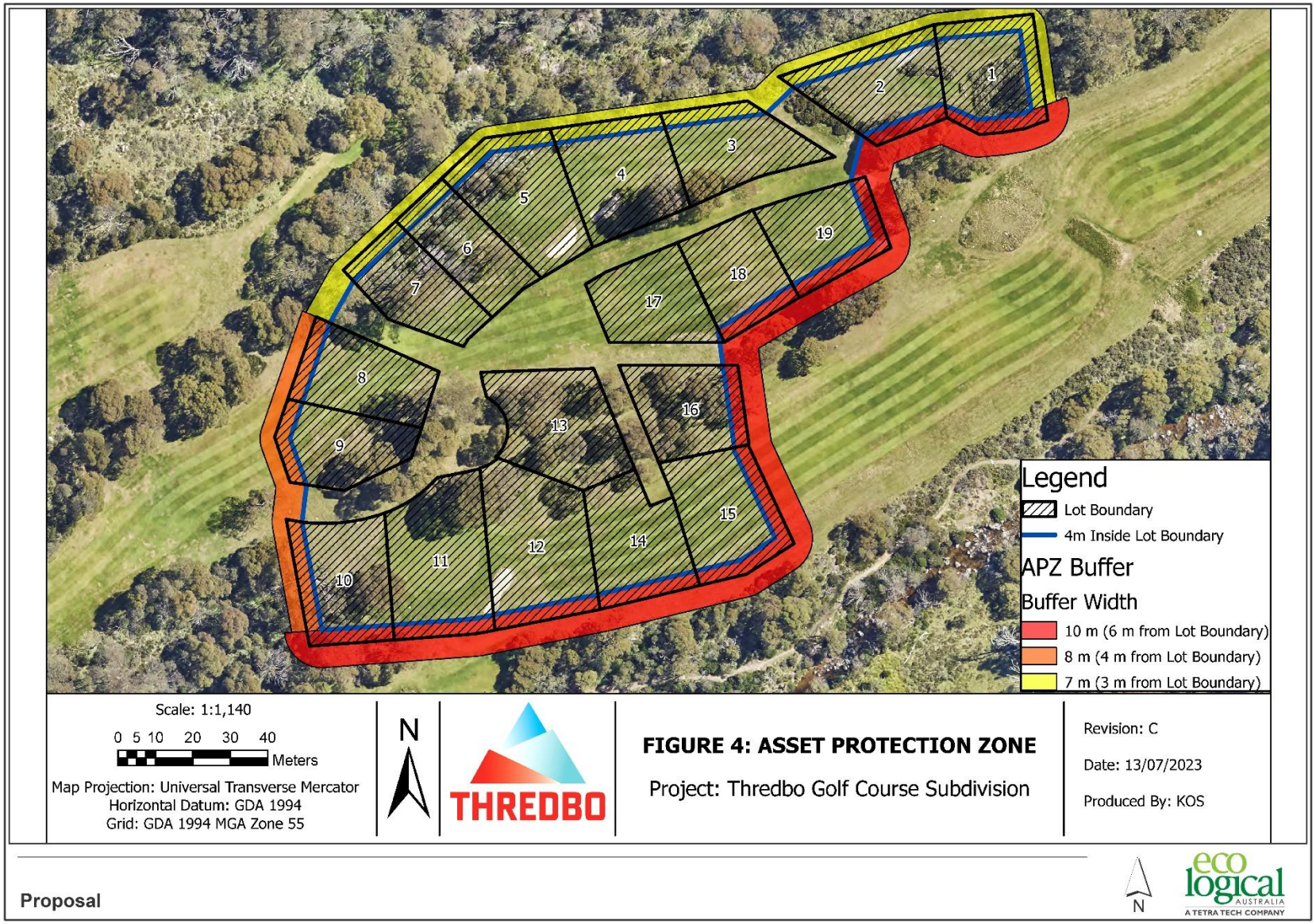

Figure 4: The APZ to the proposed building lots.

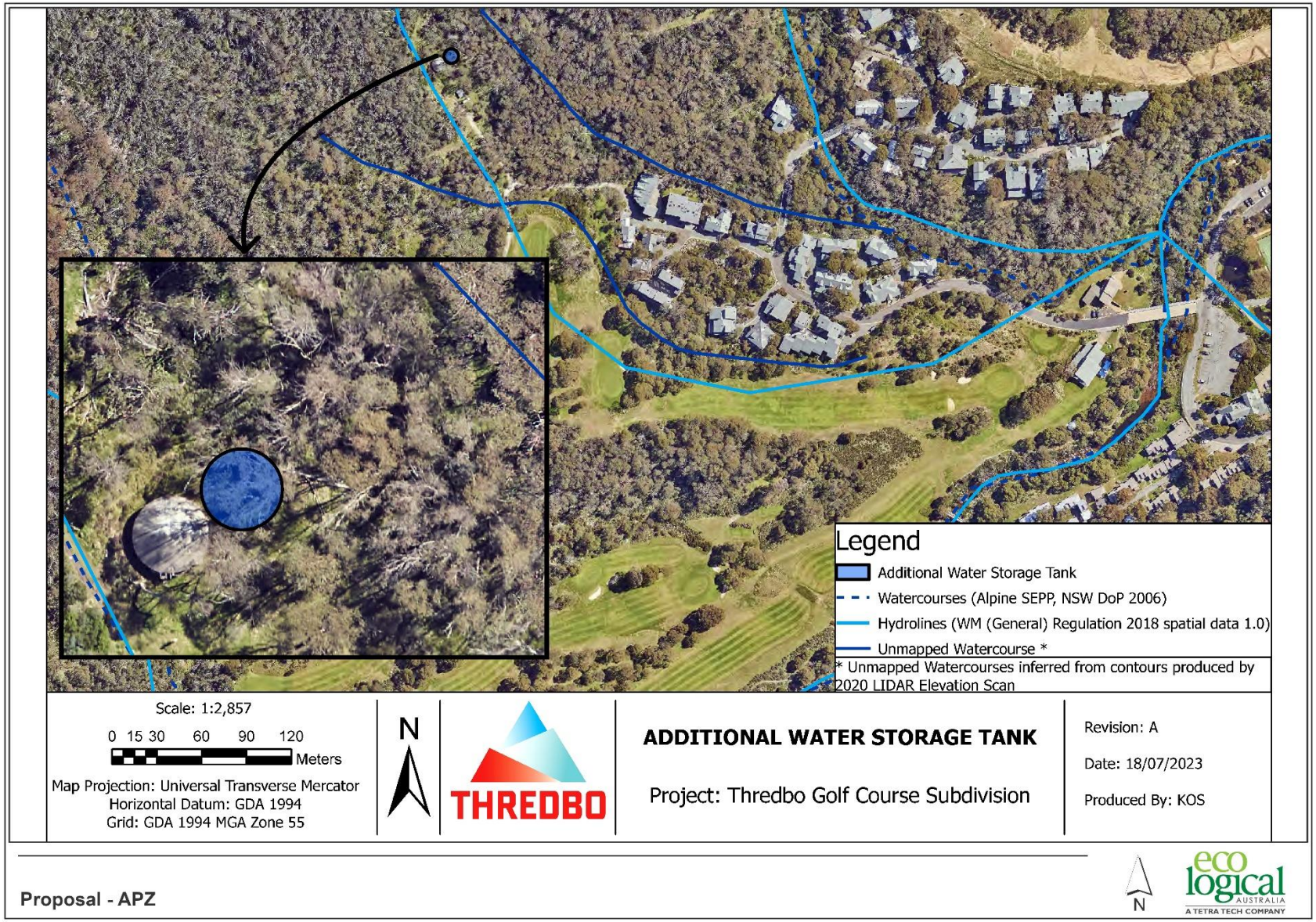

Figure 5: The proposed additional water tank.

2. Landscape features

The site-based method was applied for this assessment. As such, the assessment area is the 1,500 m buffer surrounding the outside edge of the development footprint.

The landscape features considered for this assessment are presented in Table 2, Figure 1 and Figure 2.

Table 2: Landscape features

Landscape feature	Development Site	Assessment Area	Data source
IBRA Region(s)	Australian Alps	Australian Alps	Interim Biogeographic Regionalisation for Australia, Version 7
IBRA subregion(s)	Snowy Mountains	Snowy Mountains	Interim Biogeographic Regionalisation for Australia, Version 7
Rivers and streams	Minor mapped and unmapped watercourses that are tributaries of the Thredbo River	The Thredbo River and tributaries	NSW LPI Waterway mapping
Estuaries and wetlands	The wet heath and bog to the immediate south of the development footprint is identified as a wetland on the Snowy River LEP	No	Snowy River LEP NSW directory of important wetlands
Connectivity of different areas of habitat	The development site is connected to vast areas of native vegetation.	No	Aerial imagery
Geological features of significance and soil hazard features	The minor rock outcropping in the development site is very typical of the locality and not of any particular geological significance.	No	Site observation
Areas of Outstanding Biodiversity Value	No	No	Register of Declared Areas of Outstanding Biodiversity Value (DPIE 2020)
NSW (Mitchell) Landscapes	Main Range Montane	-	NSW (Mitchell) Landscapes - version 3.1 (DPIE 2016)
Percent (%) native vegetation extent	92	There are no substantial differences between the mapped vegetation extent and the aerial imagery	Calculated using aerial imagery and ArcGIS software

3. Native Vegetation

3.1. Survey Effort

Vegetation survey was undertaken within the development site by Ryan Smithers on 27 April 2022 and 30 March 2023 (Figure 6).

Five full-floristic vegetation plots were surveyed to identify Plant Community Types (PCTs) and Threatened Ecological Communities (TECs) on the development site (Table 3). Five vegetation integrity survey plots were undertaken on the development site to assess the composition, structure and function components of each vegetation zone in accordance with the BAM.

All field data collected at full-floristic and vegetation integrity plots is included in Appendix B and Appendix C.

Table 3: Full-floristic PCT identification plots

PCT ID	PCT Name	Number of plots surveyed
644	Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	1
679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	3
939	Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion	1

3.2. Native vegetation extent within the development site

There are no substantial differences between the extent of native vegetation within the development site as identified in recent aerial imagery and that identified during the vegetation survey.

3.3. Plant Community Types present

Three PCTs were identified within the development site as shown in Table 3. Further detail with respect to the PCTs identified within the development site is presented in Table 4, and their distribution identified in Figure 6.

Table 4: Plant Community Types

PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Area within the development site (ha)	Percent cleared
644	Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	Subalpine Woodlands	Grassy Woodland	0.29	5
679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Subalpine Woodlands	Grassy Woodland	1.34	35
939	Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion	Montane Bogs and Fens	Freshwater Wetlands	0.03	50

3.3.1. Plant Community Type selection justification

In determining the PCTs for the development site, various attributes were considered in combination to assign vegetation to the best fit PCT. Attributes included dominant species in each stratum and relative abundance, community composition, soils and landscape position. Reference was made to the PCT descriptions in the BioNet Vegetation Classification. There are only a small number of PCTs in the montane and sub-alpine so there are very few PCT options, as shown in Table 5.

Table 5: Potential PCTs

Selected PCT ID	PCT Name	Other PCT options
644	Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	None
679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	None
939	Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion	None

3.4. Threatened Ecological Communities

PCTs 679 and 644 do not comprise any TEC which is listed on the BC Act or EPBC Act, as identified in Table 6. PCT 939 comprises the *Montane Peatland and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands* endangered ecological community (EEC) (hereafter referred to as the Montane Peatland and Swamps), which is listed on the BC Act.

Table 6: Threatened Ecological Communities

PCT ID	BC Act			EPBC Act		
	Listing status	Name	Area (ha)	Listing status	Name	Area (ha)
679	Not listed	-	-	Not listed	-	-
644	Not listed	-	-	Not listed	-	-
637	Endangered	Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	0.03	Not listed	-	-

3.5. Vegetation integrity assessment

3.5.1. Vegetation zones

Five vegetation zones were identified within the development site or immediate surrounds based on the broad condition states of the PCTs, as shown in Figure 7. A total of five vegetation integrity survey plots were collected within the development site or immediate surrounds, which is consistent with the BAM (Table 7). Descriptions of vegetation zones are provided in tables 8-12.

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3.5.2. Patch size

Patch size was calculated using available vegetation mapping for all patches of intact native vegetation on and adjoining the development site. Patch size was assigned to one of four classes (<5 ha, 5-24 ha, 25-100 ha or ≥100 ha). A patch size ≥100 ha was determined for the development site.

Table 7: Vegetation zones and vegetation integrity survey plots collected on the development site

Vegetation Zone	PCT ID	PCT Name	Condition	Area (ha)	Patch Size	Vegetation Integrity Survey Plots required	Vegetation Integrity Survey Plots collected
1	644	Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion	Good	0.29	101	1	1
2	679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Good	0.91	101	1	1
3	679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Moderate - Shrubland	0.04	101	1	1
4	679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Moderate - Under-scrubbed	0.39	101	1	1
5	939	Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion	Good	0.03	101	1	1
			Total	1.66	101	5	5

Table 8: Zone 1 PCT 644 Good Condition

644 - Alpine Snow Gum - Snow Gum shrubby woodland at intermediate altitudes in northern Kosciuszko NP, South Eastern Highlands Bioregion and Australian Alps Bioregion			
Vegetation formation	Grassy Woodlands		
Vegetation Class	Subalpine Woodlands		
Conservation status	Widespread and well conserved. Not listed as a TEC on the BC Act or EPBC Act.		
Description	This community is common in the locality and extensive on the mid-slopes of the Thredbo Valley.		
Characteristic canopy trees	*Eucalyptus niphophila*, *Eucalyptus pauciflora*		
Characteristic mid-storey	*Bossiaea foliosa, Olearia phlogopappa, Ozothamnus secundiflorus, Pimelea ligustrina, Tasmannia xerophila subsp. xerophila.*		
Characteristic groundcovers	*Hovea montana, Acaena novae-zelandiae, Asperula gunnii , Carex breviculmis, Lycopodium fastigiatum, Pimelea alpina, Poa fawcettiae, Poa ensiformis, Polystichum proliferum, Senecio gunnii.*		
Mean native richness	15		
Exotic species / HTW cover	*Acetosella vulgaris, Anthoxanthum odoratum, Rubus anglocandicans*		
Condition	Good		
Variation and disturbance	PCT 644 is in good condition within the zone with minor variations in shrub and weed cover.		
No. sites sampled	1		
Threatened flora species	-		
Fauna habitats	Broad-toothed Rat and Flame Robin, Olive Whistler, Gang-gang Cockatoo.		
Composition	**Structure**	**Function**	**Vegetation Integrity Score**
35.7	86.3	56.8	55.9

Table 9: Zone 2 PCT 679 Good Condition

679 - Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion			
Vegetation formation	Grassy Woodlands		
Vegetation Class	Subalpine Woodlands		
Conservation status	Widespread and well conserved. Not listed as a TEC on the BC Act or EPBC Act.		
Description	This community is common in the locality on the lower slopes of the Thredbo Valley.		
Characteristic canopy trees	*Eucalyptus stellulata*, *Eucalyptus pauciflora*		
Characteristic mid-storey	*Grevillea australis, Ozothamnus cupressoides, Prostanthera cuneata, Ozothamnus secundiflorus, Ozothamnus alpinus, Olearia phlogopappa, Oxylobium ellipticum*.		
Characteristic groundcovers	*Acaena novae-zelandiae, Asperula gunnii, Carex breviculmis, Pimelea alpina, Poa fawcettiae, Poa ensiformis, Polystichum proliferum, Senecio gunnii.*		
Mean native richness	18		
Exotic species / HTW cover	*Acetosella vulgaris, Agrostis capillaris, Anthoxanthum odoratum, Rubus anglocandicans, Festuca rubra*		
Condition	Good		
Variation and disturbance	PCT 679 is in good condition within the zone with minor variations in shrub and weed cover.		
No. sites sampled	1		
Threatened flora species	-		
Fauna habitats	Broad-toothed Rat and Flame Robin, Olive Whistler, Gang-gang Cockatoo.		
Composition	**Structure**	**Function**	**Vegetation Integrity Score**
49.1	82.7	80.2	68.8

Table 10: Zone 3 PCT 679 Moderate -Under-scrubbed Condition

679 - Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion			
Vegetation formation	Grassy Woodlands		
Vegetation Class	Subalpine Woodlands		
Conservation status	Widespread and well conserved. Not listed as a TEC on the BC Act or EPBC Act.		
Description	This community is common in the locality on the lower slopes of the Thredbo Valley.		
Characteristic canopy trees	*Eucalyptus stellulata*, *Eucalyptus pauciflora*		
Characteristic mid-storey	*Grevillea australis, Ozothamnus cupressoides, Prostanthera cuneata, Ozothamnus secundiflorus, Ozothamnus alpinus, Olearia phlogopappa, Oxylobium ellipticum.*		
Characteristic groundcovers	*Acaena novae-zelandiae, Asperula gunnii, Carex breviculmis, Pimelea alpina, Poa fawcettiae, Poa ensiformis, Polystichum proliferum, Senecio gunnii.*		
Mean native richness	18		
Exotic species / HTW cover	*Acetosella vulgaris, Agrostis capillaris, Anthoxanthum odoratum, Rubus anglocandicans, Festuca rubra*		
Condition	Good		
Variation and disturbance	PCT 679 has been modified within the zone by historic under-scrubbing and ongoing slashing and mowing for the golf course.		
No. sites sampled	1		
Threatened flora species	-		
Fauna habitats	Broad-toothed Rat and Flame Robin, Olive Whistler, Gang-gang Cockatoo.		
Composition	**Structure**	**Function**	**Vegetation Integrity Score**
47.8	35.4	47.4	43.1

Table 11: Zone 4 PCT 679 Moderate -Shrubland Condition

679 - Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion			
Vegetation formation	Grassy Woodlands		
Vegetation Class	Subalpine Woodlands		
Conservation status	Widespread and well conserved. Not listed as a TEC on the BC Act or EPBC Act.		
Description	This community is common in the locality on the lower slopes of the Thredbo Valley.		
Characteristic canopy trees	*Eucalyptus stellulata*, *Eucalyptus pauciflora*		
Characteristic mid-storey	*Grevillea australis, Ozothamnus cupressoides, Prostanthera cuneata, Ozothamnus secundiflorus, Ozothamnus alpinus, Olearia phlogopappa, Oxylobium ellipticum*.		
Characteristic groundcovers	*Acaena novae-zelandiae, Asperula gunnii, Carex breviculmis, Pimelea alpina, Poa fawcettiae, Poa ensiformis, Polystichum proliferum, Senecio gunnii.*		
Mean native richness	18		
Exotic species / HTW cover	*Acetosella vulgaris, Agrostis capillaris, Anthoxanthum odoratum, Rubus anglocandicans, Festuca rubra*		
Condition	Good		
Variation and disturbance	PCT 679 is in moderate condition within the zone and has been modified by historic tree removal such that is currently comprises a derived shrubland.		
No. sites sampled	1		
Threatened flora species	-		
Fauna habitats	Broad-toothed Rat and Flame Robin, Olive Whistler, Gang-gang Cockatoo.		
Composition	**Structure**	**Function**	**Vegetation Integrity Score**
35.5	71.3	38.9	46.1

Table 12: Zone 3 PCT 939 Good

939 - Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion			
Vegetation formation	Grassy Woodlands		
Vegetation Class	Subalpine Woodlands		
Conservation status	Widespread and well conserved. Not listed as a TEC on the BC Act or EPBC Act.		
Description	This community occurs patchily in the locality in relatively flat areas with impeded drainage and is scattered within the Thredbo Valley in association with the Thredbo River.		
Characteristic canopy trees	Scattered *Eucalyptus stellulata* and *Eucalyptus pauciflora*		
Characteristic mid-storey	*Baeckea gunniana, Callistemon pityoides, Epacris paludosa, Hakea macrocarpa, Oxylobium ellipticum, Podolobium alpestre.*		
Characteristic groundcovers	*Asperula gunnii, Carex bichenoviana, Carex iynx, Empodisma minus, Epacris microphylla, Gonocarpus micranthus* subsp. *Micranthus, Poa fawcettiae, Ranunculus lappaceus.*		
Mean native richness	18		
Exotic species / HTW cover	*Acetosella vulgaris, Agrostis capillaris, Anthoxanthum odoratum, Hypochaeris radicata*		
Condition	Good		
Variation and disturbance	PCT 939 is in good condition within the zone.		
No. sites sampled	1		
Threatened flora species	-		
Fauna habitats	Broad-toothed Rat and Flame Robin, Olive Whistler.		
Composition	**Structure**	**Function**	**Vegetation Integrity Score**
73	39.4	-	53.6

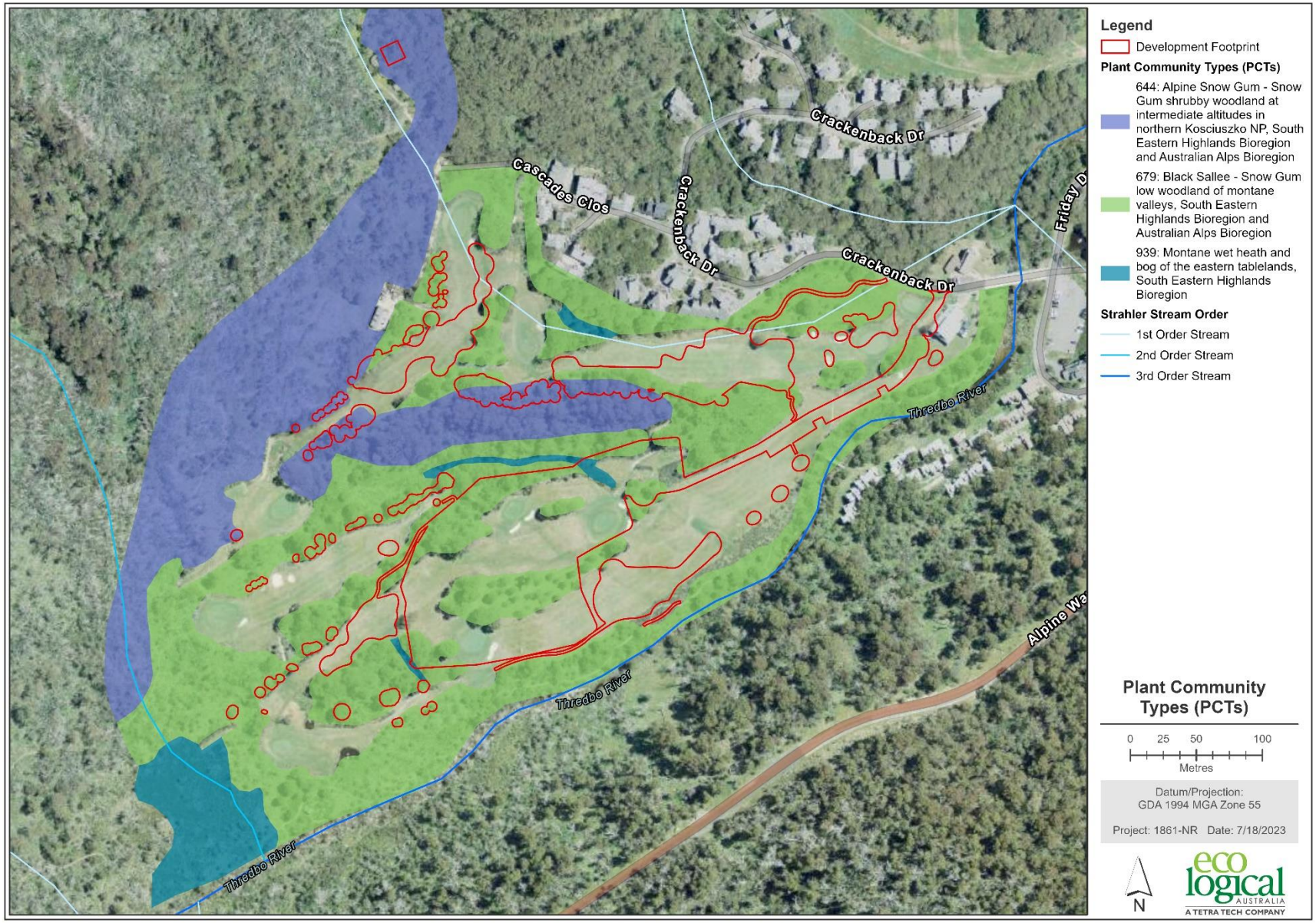

Figure 6: Plant Community Types

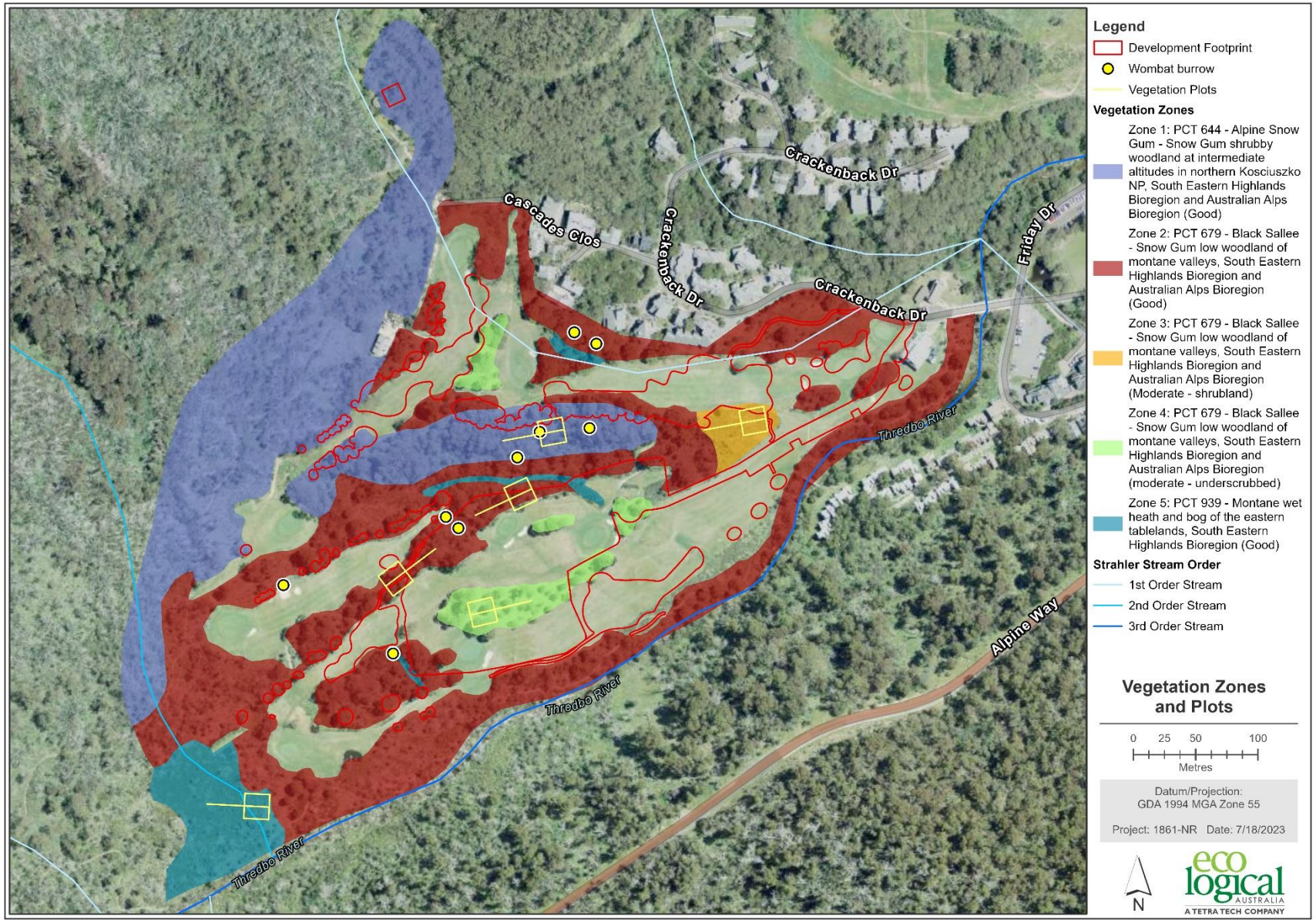

Figure 7: Vegetation Zones and Plots

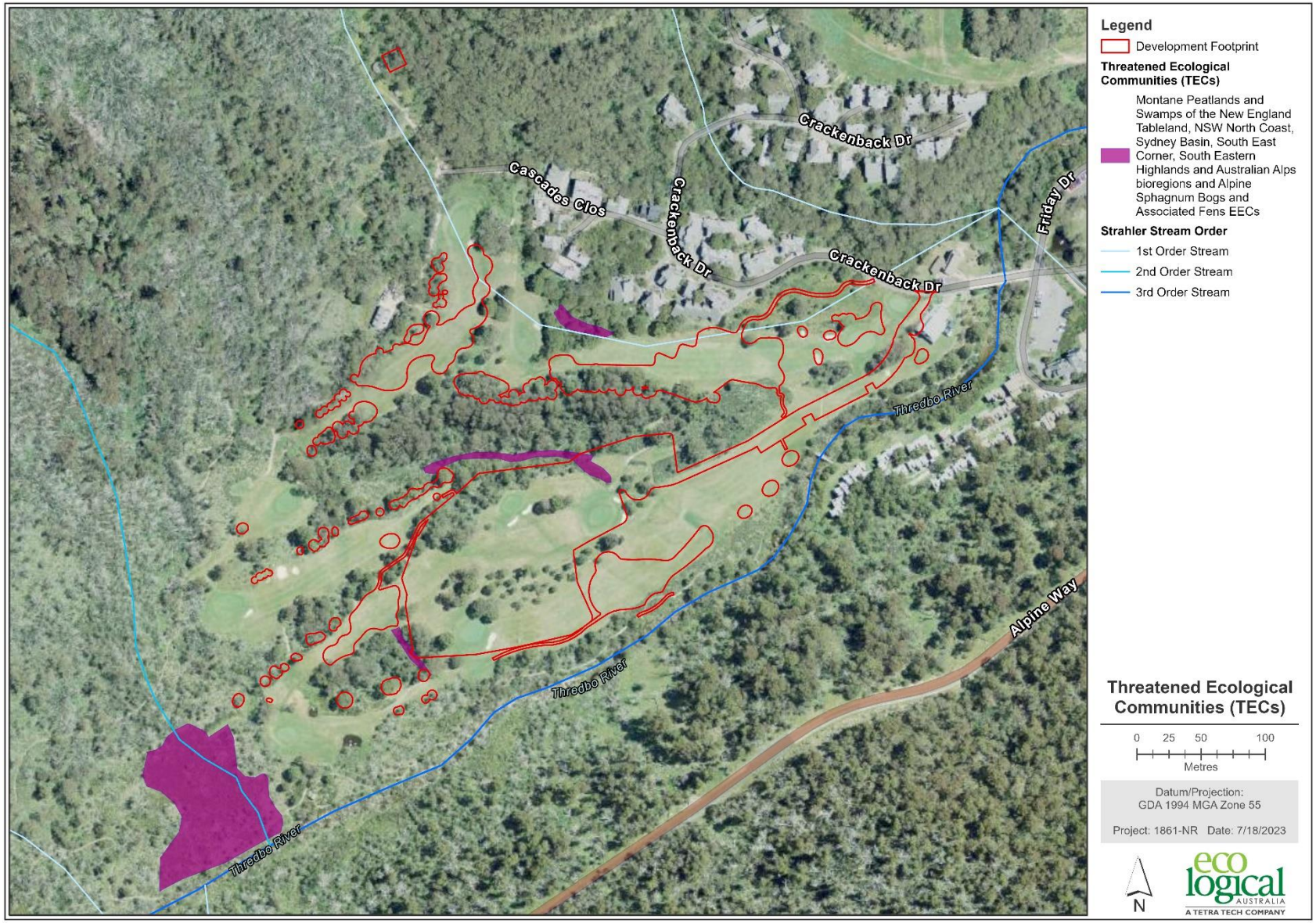

Figure 8: Threatened ecological communities

3.5.3. Assessing vegetation integrity

A vegetation integrity assessment using the BAM Calculator (BAMC) was undertaken and the results are outlined in Table 13.

Table 13: Vegetation integrity scores

Veg Zone	PCT ID	Condition	Area (ha)	Composition Condition Score	Structure Condition Score	Function Condition Score	Presence of Hollow bearing trees	Current vegetation integrity score
1	644	Good	0.29	35.7	86.3	56.8	No	55.9
2	679	Good	0.91	49.1	82.7	80.2	No	68.8
3	679	Moderate-Under-scrubbed	0.39	47.8	35.4	47.4	No	43.1
4	679	Moderate-Shrubland	0.04	35.5	71.3	38.9	No	46.1
5	939	Good	0.03	73	39.4	-	No	53.6

3.6. Use of local data

Use of local data instead of benchmark integrity scores is not proposed.

4. Threatened species

4.1. Ecosystem credit species

Ecosystem credit species predicted to occur within the development site are generated by the BAMC following the input of VI data and the PCTs identified within Chapter 3. Ecosystem credit species predicted to occur at the development site, their associated habitat constraints, geographic limitations and sensitivity to gain class are included in Table 14.

Table 14: Predicted ecosystem credit species

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status
Artamus cyanopterus cyanopterus	Dusky Woodswallow	-	-	Moderate	Vulnerable	Not Listed
Callocephalon fimbriatum (foraging)	Gang-gang Cockatoo	-	-	Moderate	Vulnerable	Endangered
Circus assimilis	Spotted Harrier	-	-	Moderate	Vulnerable	Not Listed
Daphoenositta chrysoptera	Varied Sittella	-	-	Moderate	Vulnerable	Not Listed
Dasyurus maculatus	Spotted-tailed Quoll	-	-	High	Vulnerable	Endangered
Falsistrellus tasmaniensis	Eastern False Pipistrelle	-	-	High	Vulnerable	Not Listed
Haliaeetus leucogaster (Foraging)	White-bellied Sea-Eagle	N/A|Waterbodies Within 1km of a rivers, lakes, large dams or creeks, wetlands and coastlines	-	High	Vulnerable	Not Listed
Hieraaetus morphnoides (Foraging)	Little Eagle	-	-	Moderate	Vulnerable	Not Listed
Hirundapus caudacutus	White-throated Needletail	-	-	High	Not Listed	Vulnerable
Miniopterus orianae oceanensis (Foraging)	Large Bent-winged Bat	-	-	High	Vulnerable	Not Listed
Pachycephala olivacea	Olive Whistler	-	-	Moderate	Vulnerable	Not Listed
Petroica boodang	Scarlet Robin	-	-	Moderate	Vulnerable	Not Listed
Petroica phoenicea	Flame Robin	-	-	Moderate	Vulnerable	Not Listed

4.2. Species credit species

4.2.1. Identification of species credit species

Species credit species that require further assessment within the development site (i.e. candidate species), their associated habitat constraints, geographic limitations and sensitivity to gain class are included in Table 15.

Table 15: Candidate species credit species

Species	Common Name	Habitat Constraints	Geographic limitations	Sensitivity to gain class	NSW listing status	EPBC Listing status
Calotis glandulosa	Mauve Burr-daisy	-	North of Eucumbene	Moderate	Vulnerable	Vulnerable
Euphrasia scabra	Rough Eyebright	Other Montane bogs or within 50 m	-	High	Endangered	Not Listed
Litoria castanea	Yellow-spotted Tree Frog	-	-	Very High	Critically Endangered	Endangered
Mastacomys fuscus	Broad-toothed Rat	-	-	High	Vulnerable	Vulnerable
Miniopterus orianae oceanensis (Breeding)	Large Bent-winged Bat	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	-	Very High	Vulnerable	Not Listed
Pseudophryne corroboree	Southern Corroboree Frog	NA/Swamps Within 200 m of high montane and sub-alpine bog or ephemeral pool environments	above 1000 m asl	Very High	Critically Endangered	Critically Endangered
Pseudophryne pengilleyi	Northern Corroboree Frog	-	above 700 m asl	Moderate	Critically Endangered	Critically Endangered
Pterostylis oreophila	Blue-tongued Greenhood	-	-	High	Critically Endangered	Critically Endangered

4.2.2. Assessment of habitat constraints and vagrant species

Justification for the exclusion of other candidate species credit species is provided in Table 16.

Table 16: Justification for exclusion of candidate species credit species

Species	Common Name	NSW listing status	EPBC Listing status	Sensitivity to gain class	Justification for exclusion of species
Calotis glandulosa	Mauve Burr-daisy	Vulnerable	Vulnerable	Moderate	The site is not north of Eucumbene and thus does not satisfy the species geographic limitations.
Litoria castanea	Yellow-spotted Tree Frog	Critically Endangered	Endangered	Very High	The species is known from one site near Yass, which supports vastly different habitats to the development site.
Miniopterus orianae oceanensis (Breeding)	Large Bent-winged Bat	Vulnerable	Not Listed	Very High	There are no suitable caves that could be used as breeding roosts within the development site.
Pseudophryne corroboree	Southern Corroboree Frog	Critically Endangered	Critically Endangered	Very High	The Southern Corroboree Frog is limited to sphagnum bogs of the northern Snowy Mountains, in a strip from the Maragle Range in the northwest, through Mt Jagungal to Smiggin Holes in the south. Its range is entirely within Kosciuszko National Park. This species is all but extinct in the wild. It is no longer present at its former southern limit at Smiggin Holes. It is considered highly unlikely that it would occur within the development site and it was not detected there opportunistically.
Pseudophryne pengilleyi	Northern Corroboree Frog	Critically Endangered	Critically Endangered	Moderate	The Northern Corroboree Frog does not occur within the locality, being limited to the northern parts of the Snowy Mountains and Brindabella Range

4.2.3. Candidate species requiring further assessment

Three species credit species required further assessment following site survey to assess the condition of the development site and the presence of microhabitats; *Mastacomys fuscus* (Broad-toothed Rat), *Euphrasia scabra* (Rough Eyebright) and *Pterostylis oreophila* (Blue-tongued Greenhood).

4.3. Targeted surveys

The streamlined assessment method only requires targeted surveys for candidate SAII species. The development site meets the habitat constraints of two candidate species credit species that are candidate SAII species; the Rough Eyebright and the Blue-tongued Greenhood. One species credit species, the Broad-toothed Rat, is known to inhabit the bogs, wet heaths and shrublands along the Thredbo River and was added as candidate species.

Targeted surveys for the Rough Eyebright and the Blue-tongued Greenhood were undertaken within the development site in the locations identified in Figure 9 and on the dates outlined in Table 17. The surveys extended beyond the development site to cover areas that were originally proposed for development but which were subsequently removed from it to avoid and minimise impacts.

Weather conditions during the targeted surveys are outlined in Table 18 and survey effort is outlined in Table 19.

Table 17: Targeted surveys

Date	Surveyors	Target species
14 December 2022	Ryan Smithers	Blue-tongued Greenhood
30 March 2023	Ryan Smithers	Rough Eyebright

Table 18: Weather conditions

Date	Rainfall (mm)	Minimum temperature 0C	Maximum temperature 0C
14 December 2022	-	6	7
30 March 2023		8	9

Table 19: Survey effort

Method	Habitat (ha)	Stratification units	Total effort	Target species
Targeted threatened flora searches	Approx. 0.25 ha	Suitable habitats within and immediately surrounding the development site	2 person hours	Rough Eyebright and Blue-tongued Greenhood

Neither the Rough Eyebright or the Blue-tongued Greenhood were detected within the development site or immediate surrounds during the field assessment. It is considered unlikely that these species would occur within the development site given the small area of marginal potential habitat and the absence of nearby records.

Targeted surveys were not undertaken for the Southern Corroboree Frog given the absence of suitable habitats for the species, including suitable bog breeding habitat. The extant populations of this species are currently well known and heavily monitored and are not in or near to the development site.

The Broad-toothed Rat was assumed to be present in the wet heath habitats given the presence of potentially suitable habitat and nearby records.

Following completion of field surveys, the species credit species included in the assessment are outlined in Table 20**.**

Table 20: Species credit species included in the assessment

Species	Common Name	Species presence	Geographic limitations	Habitat (ha) / count	Biodiversity Risk Weighting
Mastacomys fuscus	Broad-toothed Rat	Yes	-	0.03	2

4.3.1. Species credit species included in the assessment

One species credit species, the Broad-toothed Rat, has been included in the assessment as the proposed development will impact on habitat for these species. A species polygon for the Broad-toothed Rat, is included as Figure 10.

4.4. Identification of prescribed additional biodiversity impact entities

The proposed development does not include any prescribed additional biodiversity impact entities.

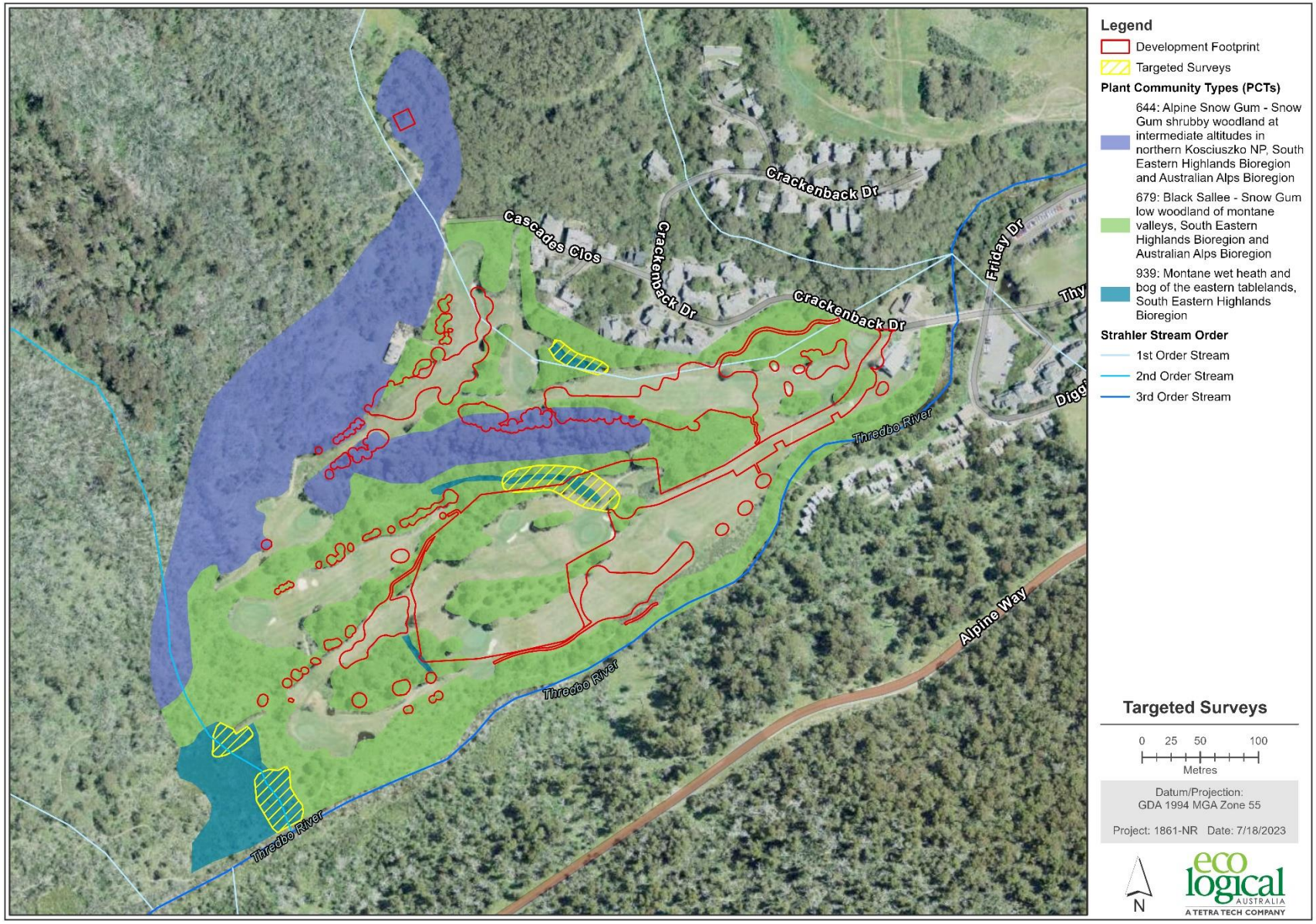

Figure 9: Targeted surveys

Figure 10: Species polygons

5. Avoiding and Minimising Impacts on Biodiversity Values

5.1. Locating a project to avoid and minimise impacts on biodiversity values

5.1.1. Direct and indirect impacts

The proposal has been designed to avoid and minimise direct and indirect impacts. In particular, this has involved:

- Locating the proposed development predominately in disturbed areas.
- Modifying the original proposal to avoid and minimise direct impacts on the Montane Peatland and Swamps EEC.
- Minimising the disturbance footprint associated with construction.
- Implementing a wombat management plan to minimise impacts on wombats during the construction phase of the proposal.
- Using low impact construction methods.
- Undertaking post construction rehabilitation.

5.1.2. Prescribed biodiversity impacts

The proposal does not involve any prescribed biodiversity impacts.

5.2. Designing a project to avoid and minimise impacts on biodiversity values

5.2.1. Direct and indirect impacts

The proposal has been designed to avoid and minimise direct and indirect impacts on biodiversity values as described in Section 5.1.1.

5.2.2. Prescribed biodiversity impacts

Prescribed biodiversity impacts have been avoided and minimised by incorporating the design features identified in Section 5.1.1.

6. Assessment of Impacts

6.1. Direct impacts

The direct impacts of the development on:

- Native vegetation are outlined in Table 21.
- Threatened species and threatened species habitat is outlined in Table 22.
- Prescribed biodiversity impacts is outlined in Section 6.4.

Note, consistent with the streamlined assessment method, the impacts on native vegetation, within the exception of TECs, have been grouped into the dominant PCT within the development site, PCT 679.

Table 21: Direct impacts to native vegetation

PCT ID	PCT Name	BC Act listing	EPBC Act listing	Direct impact (ha)
679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Not listed	Not Listed	1.63
939	Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion	Listed	Not Listed	0.03

Table 22: Direct impacts on threatened species and threatened species habitat

Species	Common Name	Direct impact number of individuals / habitat (ha)	BC Act listing status	EPBC Act Listing status
Mastacomys fuscus	Broad-toothed Rat	0.03	Vulnerable	Vulnerable

6.2. Change in vegetation integrity

The change in vegetation integrity as a result of the development is outlined in Table 23.

Table 23: Change in vegetation integrity

Veg Zone	PCT ID	Condition	Area (ha)	Current vegetation integrity score	Future vegetation integrity score	Change in vegetation integrity
1	644	Good	0.29	55.9	0	-55.9
2	679	Good	0.91	68.8	0	-68.8
3	679	Moderate-Shrubland	0.04	43.1	0	-43.1
4	679	Moderate-Under-scrubbed	0.39	46.1	0	-46.1
5	939	Good	0.03	53.6	0	-53.6

6.3. Indirect impacts

The indirect impacts of the development are outlined in Table 24. Given the nature of the proposed development, and the proposed mitigation measures, indirect impacts (in the form of increased light, noise and wind penetration) are anticipated to extend a maximum of 20 m into vegetation surrounding the proposed development site. Indirect impact zones are shown on Figure 11.

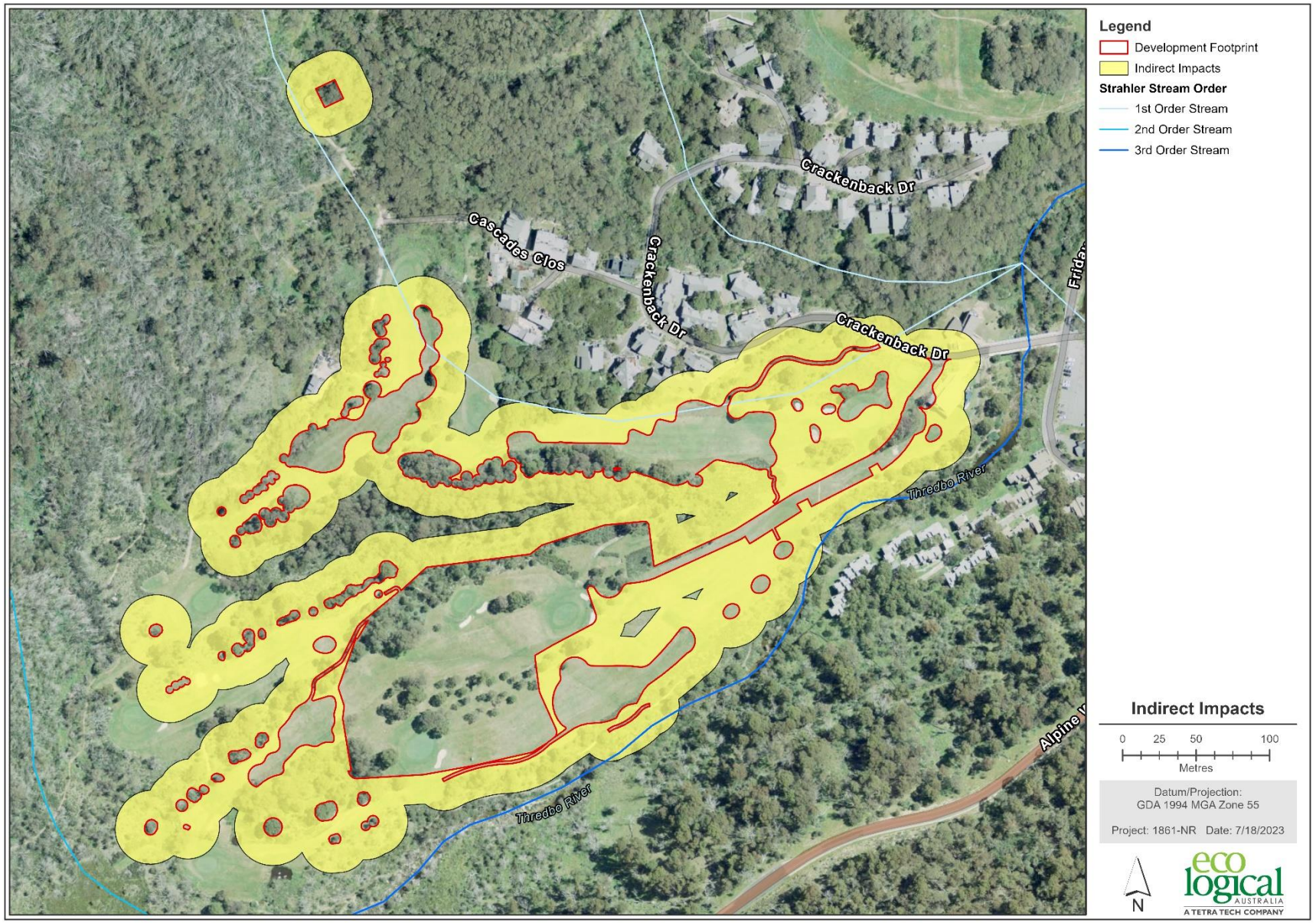

Figure 11: Indirect impact zones

Table 24: Indirect impacts

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
Sedimentation and contaminated and/or nutrient rich run-off	Construction and post construction	Potential for sedimentation during and immediately post-construction.	Minor	During and after any heavy rainfall	12 month maximum	Intermittently during and post construction phase
Noise, dust or light spill	Construction	Minor during and post construction.	Minor	Intermittently during and post construction phase	During and post construction	Intermittently during and post construction phase
Inadvertent impacts on adjacent habitat or vegetation	Construction	Minor. The construction methods used at Thredbo have been effective at preventing impacts on adjacent vegetation during the many developments that have been undertaken in recent years.	Minor	Not expected, but possible	During construction	Not expected
Transport of weeds and pathogens from the site to adjacent vegetation	Construction	Not expected. The development site includes and abuts areas that are already heavily modified and which support weeds which are common within the Thredbo Resort area and elsewhere within the NSW Alps. The proposal will include post construction rehabilitation and weed control.	Not expected	Not expected, but possible	Not expected	Not expected
Vehicle strike	Construction	Minor. It is considered unlikely that the proposal will include vehicle strike impacts. Vehicles will be travelling at very slow speeds within the development site during and post construction and the noise and vibration associated with vehicle movements is expected to deter any fauna within or adjoining the development site from the path of any vehicles.	Minor	Not expected, but possible	During and post construction	Minor
Trampling of threatened flora species	Construction	Minor. There are no threatened flora species within the development site.	Minor	Not expected	During construction	Not expected
Rubbish dumping	Construction	Not expected. Construction materials will be removed from the site regularly and no rubbish will be dumped or otherwise left to pollute the surrounding environment.	Not expected	Not expected	Not expected	Not expected
Wood collection	Construction	Not expected.	Not expected	Not expected	Not expected	Not expected

Indirect impact	Project phase	Nature	Extent	Frequency	Duration	Timing
Bush rock removal and disturbance	Construction	Minor. A relatively small amount of rock will be removed as part of the development. No additional indirect impacts are expected.	Minor	Intermittently during construction phase	During construction	Intermittently during construction phase
Increase in predatory species populations	Construction and post construction	Not expected. The proposed development occurs on the edge of an already disturbed area and will not increase the populations of predatory species such as foxes and cats.	Not expected	Not expected	Not expected	Not expected
Increase in pest animal populations	Construction and post construction	Not expected.	Not expected	Not expected	Not expected	Not expected
Increased risk of fire	Construction	Minor potential for increased risk of fire during construction.	Minor	Intermittently during construction phase	During construction	Intermittently during construction phase
Disturbance to specialist breeding and foraging habitat, e.g. beach nesting for shorebirds	Construction and post construction	Not expected as none are none are known to be present.	Not expected	Not expected	Not expected	Not expected

6.4. Prescribed biodiversity impacts

The proposal does not involve any prescribed biodiversity impact.

6.5. Mitigating and managing direct and indirect impacts

Measures proposed to mitigate and manage impacts at the development site before, during and after construction are outlined in Table 25.

6.6. Mitigating prescribed impacts

The development does not have any prescribed biodiversity impacts.

6.7. Adaptive management strategy

This section is required for those impacts that are infrequent, cumulative or difficult to predict. Impacts associated with the proposed development have been considered extensively and addressed in Section 5 and Section 6. Further consideration of infrequent, cumulative or difficult to predict impacts is not considered to be necessary.

Table 25: Measures proposed to mitigate and manage impacts

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Displacement of resident fauna	Medium	Low	A Wombat management plan should be developed to manage impacts on any active wombat burrows in close proximity to proposed works during the construction phase.	Fauna within the disturbance footprint should move and thus any injury to fauna species during construction should be avoided.	During construction	Thredbo
Timing works to avoid critical life cycle events such as breeding or nursing	Low	Low	None proposed.	NA	NA	NA
Instigating clearing protocols including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecologist or licensed wildlife handler during clearing events	Low	Low	None proposed.	NA	NA	NA
Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chainsaw, rather than heavy machinery, is preferable in situations where partial clearing is proposed	Medium	Low	Identify with flagging tape the limit of the disturbance footprint where it encroaches upon relatively undisturbed native vegetation, prior to construction. Clearly mark any trees requiring hand removal.	Risk of disturbance beyond proposed disturbance footprint is reduced.	Prior to construction	Thredbo
Sediment barriers or sedimentation ponds to control the quality of water released from the site into the receiving environment	Medium	Low	Sediment control measures as necessary such as fencing and hay bales.	Risk of sedimentation resulting in water quality impacts substantially reduced.	During and post-construction	Thredbo
Noise barriers or daily/seasonal timing of construction and operational activities to reduce impacts of noise	Low	Low	Restrict work to daylight hours.	Noise impacts mitigated.	During construction	Thredbo
Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill	Low	Low	Restrict work to daylight hours.	Light impacts mitigated.	During construction	Thredbo
Adaptive dust monitoring programs to control air quality	Low	Low	None proposed.	NA	NA	NA

Measure	Risk before mitigation	Risk after mitigation	Action	Outcome	Timing	Responsibility
Programming construction activities to avoid impacts; for example, timing construction activities for when migratory species are absent from the site, or when particular species known to or likely to use the habitat on the site are not breeding or nesting	Low	Low	None proposed.	NA	NA	NA
Temporary fencing to protect significant environmental features such as riparian zones	Low	Low	Identify with flagging tape the limit of the disturbance footprint where it encroaches upon relatively undisturbed native vegetation, prior to construction.	Protection of vegetation and habitats beyond the disturbance footprint.	Prior to and during construction	Thredbo
Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas	Medium	Low	Any machinery or vehicles involved with the proposed works that are not owned by Thredbo will be washed down to remove all soil and vegetative matter before entering the site to limit spread of weeds and disease such as *Phytophthora cinnamomi.*	Risk of weed or pathogen spread substantially reduced.	Prior to and during construction	Thredbo
Staff training and site briefing to communicate environmental features to be protected and measures to be implemented	Medium	Low	Brief all workers as to limit of disturbance footprint and other environmental safeguards.	Risk of disturbance beyond proposed disturbance footprint is reduced,	Prior to and during construction as necessary	Thredbo
Making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the development footprint	Medium	Low	Post construction rehabilitation consistent with standard Thredbo rehabilitation strategies.	Post construction vegetation within the development footprint with high medium-term recovery potential.	Immediately post construction	Thredbo
Monitoring	Low	Low	None proposed.	NA	NA	NA

7. Impact summary

Following implementation of the BAM and the BAMC, the following impacts have been determined.

7.1. Serious and Irreversible Impacts (SAII)

The development does not have any Serious and Irreversible Impacts (SAII).

7.2. Impacts requiring offsets

The impacts of the development requiring offset for native vegetation are outlined in Table 26 and shown on Figure 12. The impacts of the development requiring offset for species credit species and their habitats are outlined in Table 27 and on Figure 12.

Table 26: Impacts to native vegetation that require offsets

Vegetation Zone	PCT ID	PCT Name	Vegetation Class	Vegetation Formation	Direct impact (ha)
1&2	679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Subalpine Woodlands	Grassy Woodlands	1.2
3	679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Subalpine Woodlands	Grassy Woodlands	0.04
4	679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Subalpine Woodlands	Grassy Woodlands	0.39
5	939	Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion	Montane Bogs and Fens	Freshwater Wetlands	0.03

Table 27: Impacts on threatened species and threatened species habitat that require offsets

Species	Common Name	Direct impact number of individuals / habitat (ha)	BC Act listing status	EPBC Act Listing status
Mastacomys fuscus	Broad-toothed Rat	0.03	Vulnerable	Vulnerable

7.3. Impacts not requiring offsets

All the impacts of the development on native vegetation and on the Broad-toothed Rat require offsets. The impacts of the proposed development on non-native vegetation do not require offsets. Those impacts that do not require offsets area shown in Figure 13 and cover the already cleared areas.

7.4. Areas not requiring assessment

No parts of the proposed development do not require assessment.

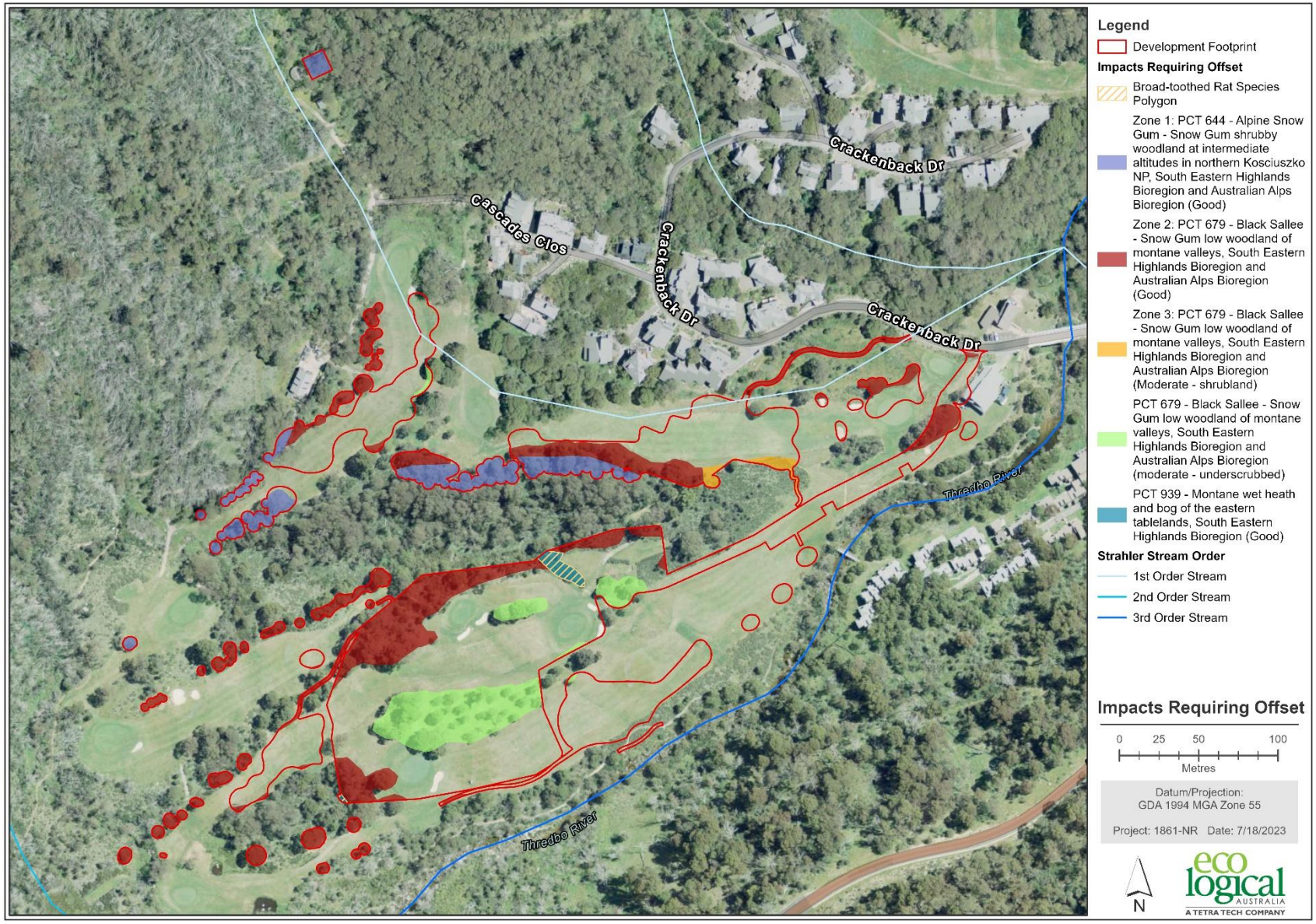

Figure 12: Impacts requiring offset

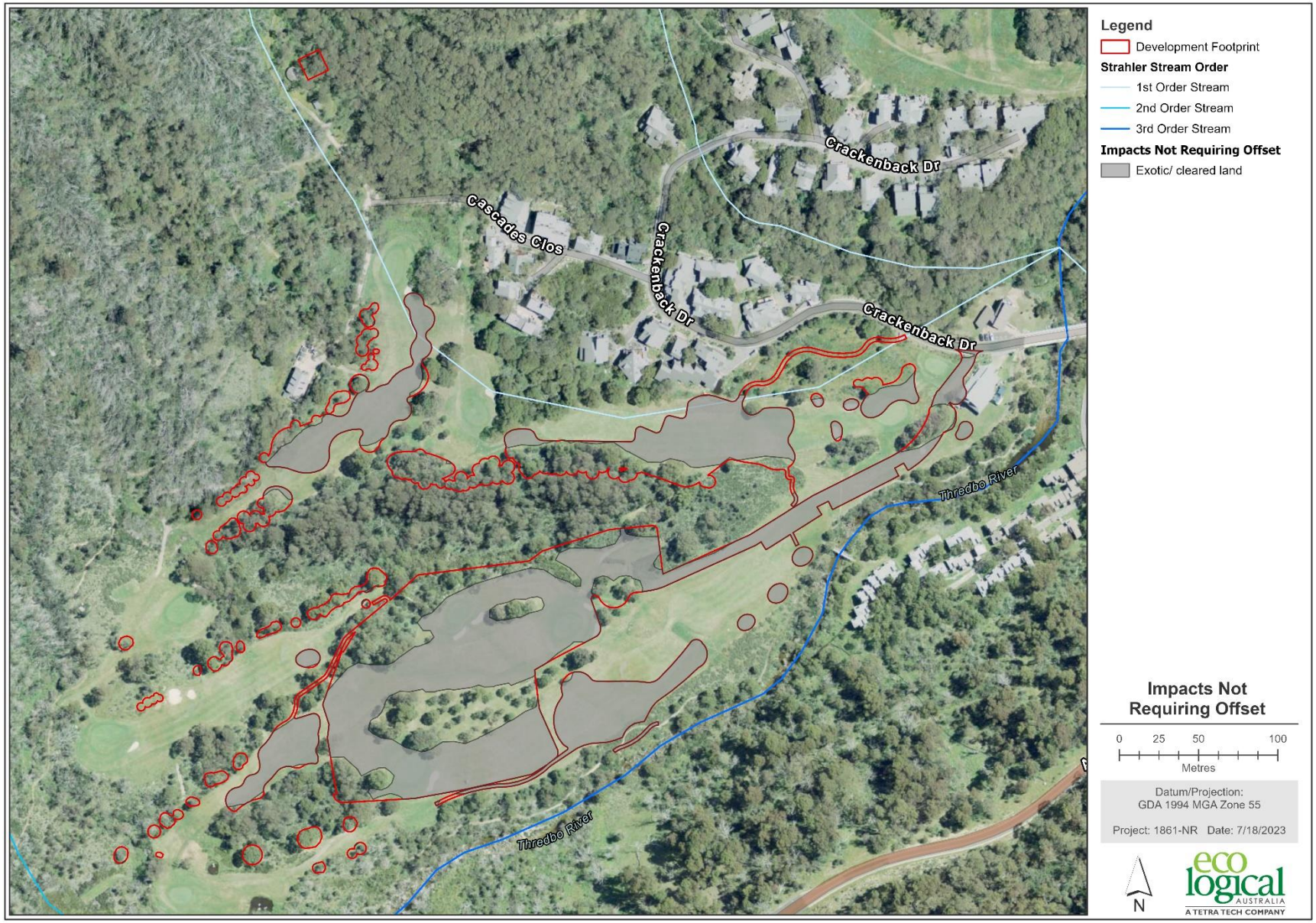

Figure 13: Impacts not requiring offset

7.5. Credit summary

The number of ecosystem credits required for the development are outlined in Table 28.

The number of species credits required for the development are outlined in Table 29.

A biodiversity credit report is included in Appendix F.

Table 28: Ecosystem credits required

Vegetation Zone	PCT ID	PCT Name	Condition	Credit Class	Direct impact (ha)	Credits required
1&2	679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Good	Subalpine Woodlands	1.2	31
3	679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Moderate-Under-scrubbed	Subalpine Woodlands	0.04	6
4	679	Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Moderate-Shrubland	Subalpine Woodlands	0.39	1
5	939	Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion	Good	Montane Bogs and Fens	0.03	1

Table 29: Species credit summary

Species	Common Name	Direct impact number of individuals / habitat (ha)	Credits required
Mastacomys fuscus	Broad-toothed Rat	0.03	1

8. Consistency with legislation and policy

8.1. Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*

An impact assessment under the EPBC Act was undertaken on MNES known to occur within the development footprint or immediate surrounds or with potential to occur there. These MNES were:

- Broad-toothed Rat
- Gang-gang Cockatoo.

The outcome of this assessment was that it is highly unlikely that the development would significantly impact on those MNES assessed (Appendix D).

A referral to the Commonwealth under the EPBC Act is not recommended.

9. Recommendations

To further ameliorate the potential impacts of the proposed development and to improve environmental outcomes, the following recommendations for impact mitigation and amelioration are suggested as modifications to the proposal and/or as conditions of consent.

- The mitigation measures identified in Table 25 should be incorporated into the proposal.

10. Conclusion

Eco Logical Australia Pty Ltd was engaged by Kosciuszko Thredbo Pty Ltd to prepare a BDAR for a proposed subdivision and re-design of the existing golf course, within Thredbo Alpine Resort.

This report has been prepared to meet the requirements of the BAM 2020 established under Section 6.7 of the BC Act.

This BDAR outlines the measures taken to avoid, minimise and mitigate impacts to the vegetation and habitats present within the development footprint during the design, construction and operation of the development. The residual unavoidable impacts of the proposed development were calculated in accordance with the BAM by utilising the BAMC. The BAMC calculated that a total of 39 ecosystem credits and one species credits are required to offset the unavoidable impacts to the vegetation and fauna habitats present within the development footprint.

SAII values have been considered as part of this assessment. The proposal will not result in any SAII.

Following consideration of the administrative guidelines for determining significance under the EPBC Act, it is concluded that the proposal is unlikely to have a significant impact on MNES or Commonwealth land, and a referral to the Commonwealth Environment Minister is therefore not recommended.

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Appendix A - Definitions

The following terminology has been used throughout this report for the purposes of describing the impacts of the proposal in the context of a biodiversity assessment in accordance with the NSW Biodiversity Assessment Method 2020. This terminology may or may not align with other technical documents associated with the proposed development.

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 BioNet Atlas (formerly known as the NSW Wildlife Atlas) is the OEH database of flora and fauna records. The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails) 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, and which calculates the number and class of biodiversity credits required to offset the impacts of a development or created at a biodiversity stewardship site.
Development	Has the same meaning as development at section 4 of the EP&A Act, or an activity in Part 5 of the EP&A Act. It also includes development as defined in section 115T of the EP&A Act.
Development footprint	The area of land that is directly impacted on by a proposed development, including access roads, and areas used to store construction materials.
Development site	An area of land that is subject to a proposed development that is under the EP&A Act.
Ecosystem credits	A measurement of the value of EECs, CEECs and threatened species habitat for species that can be reliably predicted to occur with a PCT. Ecosystem credits measure the loss in biodiversity values at a development site and the gain in biodiversity values at a biodiversity stewardship site.
Extent of occurrence (EOO)	Measures the spatial spread of a taxon to determine the degree to which risks from threatening factors could impact an entire population, and is not intended to be an estimate of the amount of occupied or potential habitat.
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.
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 minimum entrance width is at least 5 cm; (c) the hollow appears to have depth (i.e. you cannot see solid wood beyond the entrance); (d) the hollow is at least 1 m above the ground. Trees must be examined from all angles.
Important wetland	A wetland that is listed in the Directory of Important Wetlands of Australia (DIWA) and SEPP 14 Coastal Wetlands.
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).

Terminology	Definition
NSW (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.
Operational Manual	The Operational Manual published from time to time by DPIE, 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 100 m from the next area of native vegetation (or ≤30 m for non-woody ecosystems). Patch size may extend onto adjoining land that is not part of the development site or stewardship site.
Proponent	A person who intends to apply for consent to carry out development or for approval for an activity.
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 <5 cm within a vegetation zone.
Residual impact	An impact on biodiversity values after all reasonable measures have been taken to avoid, minimise or mitigate the impacts of development. Under the BAM, an offset requirement is determined for the remaining impacts on biodiversity values.
Retirement of credits	The purchase and retirement of biodiversity credits from an already-established biobank site or a biodiversity stewardship site secured by a biodiversity stewardship agreement.
Riparian buffer	Riparian buffers applied to water bodies in accordance with the BAM.
Sensitive biodiversity values 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.
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.
Subject land	Is land to which the BAM is applied in Stage 1 to assess the biodiversity values of the land. It includes land that may be a development site, clearing site, proposed for biodiversity certification or land that is proposed for a biodiversity stewardship agreement.
Threatened Biodiversity Data Collection	Part of the BioNet database, published by DPIE 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.

Terminology	Definition
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.
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 Floristic Plot Data

Table 30: Species recorded in the plots and incidentally elsewhere within the development site or immediate surrounds.

Family	Species	Common Name	Listing Status	Exotic	High Threat Weed	Growth Form Group	Plot 1			Plot 2			Plot 3			Plot 4			Plot 5		
							Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
Fabaceae (Mimosoideae)	Acacia obliquinervia	Mountain Hickory	,	-	-	Shrub (SG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rosaceae	Acaena novae-zelandiae	Bidgee-widgee	,	-	-	Forb (FG)	g	5	100	g	2	50	-	-	-	g	0.2	10	-	-	-
Rosaceae	Acaena ovina	Acaena	,			Forb (FG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polygonaceae	Acetosella vulgaris	Sheep Sorrel	,	Yes	Yes		g	0.2	100	g	0.1	20	g	0.1	50	-	-	-	g	0.1	20
Asteraceae	Achillea millefolium	Yarrow	,	Yes	Yes		-	-	-	-	-	-	-	-	-	-	-	-	g	0.1	20
Apiaceae	Aciphylla simplicifolia	Mountain Aciphyll	,	-	-	Forb (FG)	g	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ericaceae	Acrothamnus montanus	-	,	-	-	Shrub (SG)	m	0.1	1	-	-	-	-	-	-	-	-	-	-	-	-
Poaceae	Agrostis capillaris	Browntop Bent	,	Yes	Yes		g	15	2000	g	75	2000	g	0.1	20	-	-	-	g	0.1	100
Poaceae	Anthoxanthum odoratum	Sweet Vernal Grass	,	Yes	-		g	2	500	-	-	-	g	0.3	100	g	0.2	50	g	0.1	5
Rubiaceae	Asperula gunnii	Mountain Woodruff	,	-	-	Forb (FG)	g	1	50	g	0.2	20	g	0.2	50	g	0.3	100	g	2	500
Rubiaceae	Asperula sp.	Woodruff	,	-	-	Forb (FG)	g	0.1	20	-	-	-	-	-	-	-	-	-	-	-	-
Myrtaceae	Baeckea gunniana	Alpine Baeckea	,	-	-	Shrub (SG)	-	-	-	-	-	-	m	25	50	-	-	-	-	-	-
Blechnaceae	Blechnum penna-marina subsp. alpina	Alpine Water Fern	,	-	-	Fern (EG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fabaceae (Faboideae)	Bossiaea foliosa	Leafy Bossiaea	,	-	-	Shrub (SG)	m	30	50	-	-	-	-	-	-	m	70	50	-	-	-
Myrtaceae	Callistemon pityoides	Alpine Bottlebrush	,	-	-	Shrub (SG)	-	-	-	-	-	-	m	5	20	-	-	-	-	-	-
Cyperaceae	Carex appressa	Tall Sedge	,	-	-	Grass & grasslike (GG)	-	-	-	-	-	-	g	0.3	10	-	-	-	-	-	-
Cyperaceae	Carex bichenoviana	-	,	-	-	Grass & grasslike (GG)	-	-	-	g	0.2	50	g	0.5	500	-	-	-	g	0.3	100
Cyperaceae	Carex incomitata	-	,	-	-	Grass & grasslike (GG)	g	0.2	10	-	-	-	-	-	-	-	-	-	g	0.1	3
Cyperaceae	Carex iynx	-	,	-	-	Grass & grasslike (GG)	-	-	-	-	-	-	g	2	100	-	-	-	-	-	-
Caryophyllaceae	Cerastium sp.	-	,	Yes	-		g	-	-	g	0.1	20	-	-	-	-	-	-	-	-	-
Asteraceae	Cirsium vulgare	Spear Thistle	,	Yes	-		-	-	-	g	0.1	1	-	-	-	-	-	-	-	-	-
Asteraceae	Coronidium scorpioides	Button Everlasting	,	-	-	Forb (FG)	-	-	-	g	0.1	20	-	-	-	-	-	-	-	-	-
Asteraceae	Cotula alpina	Alpine Cotula	,	-	-	Forb (FG)	-	-	-	-	-	-	g	0.1	10	-	-	-	-	-	-
Poaceae	Dactylis glomerata	Cocksfoot	,	Yes	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Restionaceae	Empodisma minus	-	,	-	-	Grass & grasslike (GG)	-	-	-	-	-	-	g	30	500	-	-	-	-	-	-
Ericaceae	Epacris microphylla	Coral Heath	,	-	-	Shrub (SG)	-	-	-	-	-	-	g	2	50	-	-	-	-	-	-
Ericaceae	Epacris paludosa	Swamp Heath	,	-	-	Shrub (SG)	-	-	-	-	-	-	m	25	50	-	-	-	-	-	-
Onagraceae	Epilobium sp.	-	,	-	-	Forb (FG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Family	Species	Common Name	Listing Status	Exotic	High Threat Weed	Growth Form Group	Plot 1			Plot 2			Plot 3			Plot 4			Plot 5		
							Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
Asteraceae	Erigeron sp.	-	,	-	-	Forb (FG)	-	-	-	-	-	-	g	0.1	1	-	-	-	-	-	-
Myrtaceae	Eucalyptus pauciflora	White Sally	,	-	-	Tree (TG)	u	15	4	u	10	2	u	0.1	2	u	35	10	u	0.8	1
Myrtaceae	Eucalyptus perriniana	Spinning Gum	,	-	-	Tree (TG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myrtaceae	Eucalyptus stellulata	Black Sally	,	-	-	Tree (TG)	u	15	3	u	20	1	u	0.5	5	u	5	2	-	-	-
Asteraceae	Euchiton sp.	A Cudweed	,	-	-	Forb (FG)	-	-	-	g	0.1	20	-	-	-	-	-	-	-	-	-
Poaceae	Festuca rubra subsp. rubra	Red Fescue	,	Yes	-		g	5	1000	g	5	500	-	-	-	-	-	-	-	-	-
Geraniaceae	Geranium antrorsum	-	,	-	-	Forb (FG)	-	-	-	g	1	50	-	-	-	-	-	-	-	-	-
Geraniaceae	Geranium potentilloides var. potentilloides	-	,	-	-	Forb (FG)	g	0.3	20	g	1	50	-	-	-	-	-	-	-	-	-
Rosaceae	Geum urbanum	Herb Bennet	,	-	-	Forb (FG)	g	0.1	10	g	0.1	1	-	-	-	-	-	-	-	-	-
Haloragaceae	Gonocarpus micranthus subsp. micranthus	-	,	-	-	Forb (FG)	-	-	-	-	-	-	g	5	100	-	-	-	-	-	-
Haloragaceae	Gonocarpus montanus	-	,	-	-	Forb (FG)	-	-	-	-	-	-	-	-	-	g	0.1	2	-	-	-
Proteaceae	Grevillea victoriae subsp. nivalis	-	,	-	-	Shrub (SG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Proteaceae	Hakea microcarpa	Small-fruited Hakea	,	-	-	Shrub (SG)	-	-	-	-	-	-	m	0.5	5	-	-	-	m	15	50
Poaceae	Holcus lanatus	Yorkshire Fog	,	Yes	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fabaceae (Faboideae)	Hovea montana	-	,	-	-	Shrub (SG)	-	-	-	-	-	-	-	-	-	g	0.1	5	g	25	100
Apiaceae	Hydrocotyle algida	Pennywort	,	-	-	Forb (FG)	-	-	-	-	-	-	-	-	-	g	0.1	5	-	-	-
Asteraceae	Hypochaeris radicata	Catsear	,	Yes	-		-	-	-	g	0.2	50	g	0.1	1	-	-	-	-	-	-
Juncaceae	Juncus sp.	A Rush	,	-	-	Grass & grasslike (GG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myrtaceae	Leptospermum grandifolium	Woolly Teatree	,	-	-	Shrub (SG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myrtaceae	Leptospermum myrtifolium	-	,	-	-	Shrub (SG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Restionaceae	Lepyrodia scariosa	-	,	-	-	Grass & grasslike (GG)	-	-	-	-	-	-	g	0.5	50	-	-	-	-	-	-
Linaceae	Linum marginale	Native Flax	,	-	-	Forb (FG)	-	-	-	-	-	-	-	-	-	-	-	-	g	0.1	1
Juncaceae	Luzula sp.	-	,	-	-	Grass & grasslike (GG)	-	-	-	g	0.2	100	g	0.1	20	g	0.1	50	g	0.1	5
Asteraceae	Olearia sp.	-	,	-	-	Shrub (SG)	m	8	50	-	-	-	-	-	-	m	2	20	m	2	20
Cyperaceae	Oreobolus distichus	-	,	-	-	Grass & grasslike (GG)	-	-	-	-	-	-	g	0.1	20	-	-	-	-	-	-
Apiaceae	Oreomyrrhis eriopoda	Australian Carraway	,	-	-	Forb (FG)	-	-	-	g	2	500	-	-	-	-	-	-	-	-	-
Proteaceae	Orites lancifolius	Alpine Orites	,	-	-	Shrub (SG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fabaceae (Faboideae)	Oxylobium ellipticum	Common Shaggy Pea	,	-	-	Shrub (SG)	-	-	-	-	-	-	g	10	50	-	-	-	-	-	-
Asteraceae	Ozothamnus cupressoides	-	,	-	-	Shrub (SG)	-	-	-	-	-	-	m	1	10	-	-	-	-	-	-
Asteraceae	Ozothamnus thyrsoideus	-	,	-	-	Shrub (SG)	m	2	20	-	-	-	-	-	-	-	-	-	m	40	100

Family	Species	Common Name	Listing Status	Exotic	High Threat Weed	Growth Form Group	Plot 1			Plot 2			Plot 3			Plot 4			Plot 5		
							Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance	Stratum & Layer	Cover	Abundance
Poaceae	Poa ensiformis	Purple-sheathed Tussock-grass	,	-	-	Grass & grasslike (GG)	g	0.1	1	-	-	-	-	-	-	g	0.3	50	-	-	-
Poaceae	Poa fawcettiae	Smooth Blue Snowgrass	,	-	-	Grass & grasslike (GG)	g	25	2000	g	15	500	g	5	100	g	35	1000	g	50	2000
Poaceae	Poa helmsii	Broad-leaved Snowgrass	,	-	-	Grass & grasslike (GG)	g	1	10	-	-	-	g	0.3	2	-	-	-	-	-	-
Poaceae	Poa sp.	-	,	-	-	Grass & grasslike (GG)	g	0.1	1	-	-	-	-	-	-	-	-	-	-	-	-
Podocarpaceae	Podocarpus lawrencei	Mountain Plum Pine	,	-	-	Shrub (SG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fabaceae (Faboideae)	Podolobium alpestre	Alpine Shaggy Pea	,	-	-	Shrub (SG)	-	-	-	-	-	-	m	5	50	-	-	-	-	-	-
Araliaceae	Polyscias sp.	-	,	-	-	Shrub (SG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dryopteridaceae	Polystichum proliferum	Mother Shield Fern	,	-	-	Fern (EG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phyllanthaceae	Poranthera microphylla	Small Poranthera	,	-	-	Forb (FG)	-	-	-	-	-	-	-	-	-	-	-	-	g	0.1	1
Lamiaceae	Prostanthera cuneata	Alpine Mint-bush	,	-	-	Shrub (SG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ranunculaceae	Ranunculus lappaceus	Common Buttercup	,	-	-	Forb (FG)	-	-	-	-	-	-	g	0.1	1	-	-	-	g	0.1	5
Rosaceae	Rubus anglocandicans	Blackberry	,	Yes	Yes		m	3	5	-	-	-	-	-	-	m	2	5	-	-	-
Rosaceae	Rubus parvifolius	Native Raspberry	,	-	-	Shrub (SG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poaceae	Rytidosperma sp.	-	,	-	-	Grass & grasslike (GG)	-	-	-	-	-	-	-	-	-	-	-	-	g	1	100
Caryophyllaceae	Scleranthus biflorus	Two-flowered Knawel	,	-	-	Forb (FG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caryophyllaceae	Scleranthus diander	-	,	-	-	Forb (FG)	-	-	-	g	0.2	20	-	-	-	-	-	-	-	-	-
Asteraceae	Senecio sp.	Groundsel, Fireweed	,	-	-	Forb (FG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Asteraceae	Solenogyne sp.	-	,	-	-	Forb (FG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sphagnaceae	Sphagnum sp.	-	,	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Caryophyllaceae	Stellaria pungens	Prickly Starwort	,	-	-	Forb (FG)	g	0.5	20	g	0.1	1	-	-	-	g	0.2	20	g	0.1	5
Winteraceae	Tasmannia xerophila subsp. xerophila	Alpine Pepperbush	,	-	-	Shrub (SG)	m	0.2	1	-	-	-	-	-	-	m	0.1	2	-	-	-
Fabaceae (Faboideae)	Trifolium repens	White Clover	,	Yes	-		-	-	-	g	2	100	-	-	-	-	-	-	-	-	-
Violaceae	Viola sp.	-	,	-	-	Forb (FG)	-	-	-	-	-	-	g	0.1	20	-	-	-	-	-	-
Asteraceae	Xerochrysum subundulatum	Alpine Everlasting	,	-	-	Forb (FG)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Appendix C - Vegetation Integrity Plot Data

Table 31: Plot location data

Plot no.	PCT	Condition	Easting	Northing	Bearing
1	679	Good	616088	5958935	40
2	679	Moderate-under-scrubbed	616103	5958888	60
3	939	Good	615951	5958731	260
4	644	Good	616216	5959029	250
5	679	Moderate-shrubland	616351	5959034	270

Table 32: Vegetation integrity data (composition)

Composition (number of species)						
Plot	Tree	Shrub	Grass	Forb	Fern	Other
1	2	5	5	6	0	0
2	2	0	3	10	0	0
3	2	8	9	6	0	0
4	2	4	3	5	0	0
5	1	4	5	5	0	0

Table 33: Vegetation integrity data (Structure)

Structure (Total cover)						
Plot	Tree	Shrub	Grass	Forb	Fern	Other
1	30.0	40.3	26.4	7.0	0.0	0.0
2	30.0	0.0	15.4	6.8	0.0	0.0
3	0.6	73.5	38.8	5.6	0.0	0.0
4	40.0	72.2	35.4	0.9	0.0	0.0
5	0.8	82.0	51.5	2.4	0.0	0.0

Table 34: Vegetation integrity data (Function)

Function											
Plot	Large Trees	Hollow trees	Litter Cover	Length Fallen Logs	Tree Stem 5-9	Tree Stem 10-1 9	Tree Stem 20-29	Tree Stem 30-49	Tree Stem 50-79	Tree Regen	High Threat Weed Cover
1	4	2	28	29	1	1	1	1	1	1	18.2
2	4	1	17	0	0	1	0	1	1	0	75.1
3	0	0	18	0	1	0	0	0	0	1	0.2
4	1	0	46	20	1	1	1	1	0	1	2.0
5	0	0	58	0	1	1	0	0	0	1	0.3

Appendix D - EPBC Act Significant Impact Criteria

The EPBC Act Administrative Guidelines on Significance (DoE 2013) set out 'Significant Impact Criteria' that are to be used to assist in determining whether a proposed action is likely to have a significant impact on matters of national environmental significance. Matters listed under the EPBC Act as being of national environmental significance include:

- Listed threatened species and ecological communities
- Listed migratory species
- Wetlands of International Importance
- The Commonwealth marine environment
- World Heritage properties
- National Heritage places
- Nuclear actions
- Great Barrier Reef.

Specific 'Significant Impact Criteria' are provided for each matter of national environmental significance except for threatened species and ecological communities in which case separate criteria are provided for species listed as endangered and vulnerable under the EPBC Act.

The Commonwealth listed species which are known or considered to have the potential to occur within the study area are the:

- Broad-toothed Rat.
- Gang-gang Cockatoo

The relevant Significant Impact Criteria have been applied to determine the significance of impacts associated with the proposal.

Matters to be considered	Impact
Any environmental impact on a World Heritage Property or National Heritage Places	No. The proposed action does not impact on a World Heritage Property or a National Heritage Place - (listed natural: Australian Alpine National Parks and Reserves; nominated historic: Snowy Mountains Scheme NSW).
Any environmental impact on Wetlands of International Importance	No. The proposal will not affect any part of a wetland of international importance.
Any impact on Commonwealth Listed Critically Endangered or Endangered Species;	Yes. The study area does provide potential habitat for the following Commonwealth listed endangered species: the Gang-gang Cockatoo. The significant impact criteria for endangered species are discussed below: a. lead to a long-term decrease in the size a population of a species. The proposed action will only affect a very small (1.66 ha) amount of foraging habitat for the species in the context of the extent of potential habitat in the locality. The proposal will not affect any breeding or roosting habitat or otherwise adversely impact the species. Under these circumstances, it is considered highly unlikely that the proposed action will lead to a long-term decrease in the size of the Gang-gang Cockatoo population. b. reduce the area of occupancy of the species. The proposed action will be limited to the loss or further modification of 1.66 ha of native vegetation which is a small amount of habitat in the context of the extent of similar habitats in the locality generally. The proposed works will not affect any key habitat resources for the Gang-gang Cockatoo; nor affect the species' ability to access habitats within or beyond the study area.

Matters to be considered	Impact
	Under these circumstances, the proposed action is highly unlikely to reduce the area of occupancy of the local population of the Gang-gang Cockatoo. c. fragment an existing population into two or more populations The proposed action will be limited to the removal of a very small (1.66 ha) amount of vegetation in the context of the extent of these resources in the locality and is highly unlikely to affect any key habitat resources for the Gang-gang Cockatoo; nor affect its ability to access habitats within or beyond the development site. Under these circumstances, the proposed action will not fragment an existing population of the Gang-gang Cockatoo into two or more populations. d. adversely affect habitat critical to the survival of a species No habitat within the development site is considered likely to be critical to the survival of the Gang-gang Cockatoo. There are thousands of hectares of similar habitats in the montane and subalpine zones of the Australian alps, including elsewhere within the Thredbo Resort area. The Gang-gang Cockatoo continues to occur within the Thredbo Resort Area despite a long history of similar and more extensive disturbances. e. disrupt the breeding cycle of a population It is considered highly unlikely that the Gang-gang Cockatoo would breed within the development site given the absence of hollow-bearing trees. Under these circumstances, the proposed action will not disrupt the breeding cycle of a population of the Gang-gang Cockatoo. f. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline The proposed action will modify a small area of habitat for the Gang-gang Cockatoo, but this area is unlikely to be important to the species in the context of the extent of potential habitat in the locality. Under these circumstances it is highly unlikely that the proposed action would modify- destroy- remove or isolate or decrease the availability or quality of habitat to the extent that the Gang-gang Cockatoo is likely to decline. g. result in invasive species that are harmful to an endangered species becoming established in the endangered or critically endangered species' habitat The proposed action is unlikely to result in invasive species that are harmful becoming established in potential habitat of the Gang-gang Cockatoo. Species such as cats or foxes are already present in the landscape and are subject to control programs within the resort. h. introduce disease that may cause the species to decline The proposed action is unlikely to introduce disease that may cause the Gang-gang Cockatoo to decline. i. interfere substantially with the recovery of the species. As the proposed action is not considered to decrease or fragment any existing populations the recovery of the Gang-gang Cockatoo is unlikely to be adversely impacted.
Any impact on Commonwealth Listed Vulnerable Species;	Yes. The study area provides potential habitat for one Commonwealth listed vulnerable species: the Broad-toothed Rat. The significant impact criteria in terms of the vulnerable species are discussed below: a. lead to a long-term decrease in the size of an important population of a species. Whilst the proposed action will affect some known Broad-toothed Rat habitat, it will affect only a very small amount (0.03 ha) of the potential habitat for the species in the immediate area. As such, the proposed works are unlikely to adversely affect a significant proportion of the home range of one or more Broad-toothed Rat individuals and will not result in habitat fragmentation which could isolate individuals or a population of the Broad-toothed Rat. The noise and vibration associated with the proposed works is likely to temporarily deter any Broad-toothed Rat individuals that may be near the affected areas. As such, it is unlikely that any individuals would be killed during the implementation of the proposed action.

Matters to be considered	Impact
	Under these circumstances the proposed action will not lead to a long-term decrease in the size of an important population of the Broad-toothed Rat. b. reduce the area of occupancy of an important population It is highly likely that the Broad-toothed Rat will continue to occur within the development site after the implementation of the proposed action. The species continues to be locally common in the Thredbo Resort Area where there have been many similar and larger developments over many decades. As such, the proposed action is highly unlikely to significantly reduce the area of occupancy of the Broad-toothed Rat. c. fragment an existing important population into two or more populations The proposed action will not fragment an existing important population of the Broad-toothed Rat into two or more populations. The species population extends beyond the development site and the Thredbo Resort Area. d. adversely affect habitat critical to the survival of a species No habitat within the development site is considered to be critical to the survival of the Broad-toothed Rat. e. disrupt the breeding cycle of an important population The proposed action and affected area is too small to disrupt the breeding cycle of a population of the Broad-toothed Rat. f. modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline The proposed action will not modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the Broad-toothed Rat is likely to decline as the habitat to be affected is very small in the context of the available habitat within the Thredbo Resort Area and the proposal will not cause any additional fragmentation of habitat or barriers to movement. g. result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat The proposed action will not result in invasive species that are harmful becoming established in habitat for the Broad-toothed Rat. Invasive species, including foxes and cats, are already present. h. introduce disease that may cause the species to decline The proposed action is unlikely to introduce disease that may cause the Broad-toothed Rat to decline. i. interferes substantially with the recovery of the species. Whilst there have been documented declines in some Broad-toothed Rat populations within the Snowy Mountains, these declines have been attributed to factors such as major bushfire events and early snow thaws, and not impacts of the nature of those proposed. The local population of the Broad-toothed Rat appears to continue to be relatively large on the basis of the abundance of the species scat throughout the Thredbo Resort Area- including within the village, and in areas that have been subject to the sorts of activities proposed. As such, it is considered highly unlikely that proposed action will substantially interfere with the recovery of the Broad-toothed Rat.
Any impact on a Commonwealth Endangered Ecological Community	No endangered ecological communities occur within the development site.
Any environmental impact on Commonwealth Listed Migratory Species;	No. The proposed action will not have any adverse impacts on any listed migratory species.
Does any part of the Proposal involve a Nuclear Action;	No. The project does not include a Nuclear Action.

Matters to be considered	Impact
Any environmental impact on a Commonwealth Marine Area;	No. There are no Commonwealth Marine Areas within the study area.
In addition- any direct or indirect impact on Commonwealth lands	No. The project does not directly or indirectly affect Commonwealth land.

Appendix E - Staff CVs

CURRICULUM VITAE

Ryan Smithers

SENIOR ECOLOGIST

QUALIFICATIONS

BEnvSc (Land Resources Management)- University of Wollongong with 1st Class Honours 1995.
Accredited BBAM- FBA- and BAM Assessor
Alpine Ecology Course Australian Alpine Institute and La Trobe University
Senior First Aid- St. Johns Ambulance.

Ryan brings to ELA more than 25 years' experience in natural resource management. He has extensive practical experience in flora and fauna surveying- fire-fighting- planning and land management throughout southern NSW and has undertaken numerous flora and fauna surveys- biodiversity plans- environmental impact assessments- vegetation management plans- fire management plans and weed management plans.

Ryan has extensive experience in general and targeted fauna surveys using a diverse range of survey techniques. Ryan has undertaken many flora and fauna surveys on the NSW south coast- southern tablelands and in the Australian Alps- and in other parts of Australia including in the Northern Territory.

Ryan is an accredited Biobanking (BBAM)- Framework for Biodiversity Assessment (FBA) and Biodiversity Assessment Method (BAM) assessor and has undertaken may surveys using BBAM-BAM and DPIE Vegetation Survey Standard or very similar methodologies. Ryan project managed ELAs contributions to the Full-floristic Vegetation Survey and Condition Assessment for the South-east Highlands and Australian Alps of the Upper Murrumbidgee Catchment and South-east Corner Biometric Benchmark projects which involved the collection of more than 250 plots.

Ryan has particular ecological expertise in the NSW southern tablelands and Alps- gained from 15 years of survey and assessment across the Alps- including many assessments within the Charlotte Pass- Thredbo and Perisher Ski Resorts- and assessments on the Monaro including around Jindabyne.

Ryan has undertaken assessments in the region for a broad range of clients including NSW NPWS, Local Land Services, Biodiversity Conservation Trust, Kosciuszko Thredbo, Vail Resorts and Charlotte Pass Ski Resort.

RELEVANT PROJECT EXPERIENCE

Monaro and Werriwa Snow Gum Woodland and Grasslands Conservation Tender
Monaro Grasslands Conservation Tender
Kosi Walk Realignment Review of Environmental Factors
Diggings Campground Upgrade Review of Environmental Factors
Mount Perisher Chairlift Biodiversity Development Assessment Report
Merritts Gondola Biodiversity Development Assessment Report
Corin Forest Ski Slope Assessment
Montane Peatlands Strategic Action Plan
Perisher Guthega Skink Targeted Surveys
Numerous Mountain Bike Ecological Assessments at Thredbo
Leichardt Chairlift Ecological Assessment
Thredbo Masterplan Ecological Assessment
Guthega Quad Chair Flora and Fauna Assessment
Thredbo Chairlift Constraints Analysis
Friday Flat Ecological Assessment
Sponars Traverse Flora and Fauna Assessment
Lobs Hole Review of Environmental Factors
Lake Wallace Flora and Fauna Assessment for Cooma Monaro Shire at Nimmitabel
Numerous Impact Assessments in alpine and sub-alpine environments for OEH- Vail- Kosciuszko- Thredbo and Charlotte Pass Ski Resorts
Boco Rock Wind Farm Ecological Assessment and Offsets Analysis
South-east Highlands and Australian Alps of the Upper Murrumbidgee Catchment Full Floristic Survey and Condition Assessment
South-east Corner Biometric Benchmark Project
Queanbeyan Biodiversity Study
Mount Jerrabomberra Ecological Assessment
Eurobodalla Bio-certification Project
Jervis Bay Biodiversity Assessment
Broulee and South Moruya Biocertification Project
North Moruya Biodiversity Study
Eurobodalla Vegetation Mapping Validation
Eurobodalla Biodiversity Study for future Urban Expansion Lands
Merimbula STP Upgrade Terrestrial Ecological Assessment
Cobowra LALC Lands Biobanking Assessment
Upper Lachlan Shire Biodiversity Planning Framework
Parkes- Cabonne- Bland- Upper Lachlan and Temora Shires Biodiversity Assessment and NRM Projects
Old Comma Road deviation Species Impact Statement
Flora and Fauna Assessment Edwin Lane Parkway Extension
Ecological Studies – Proposed Googong township
Tarrawonga Biobanking Assessment – Boggabri
Katherine to Gove Pipeline – Mitchell Ranges fauna surveys
Darwin regional flora and fauna survey RAAF Darwin- defence establishment Berrimah and Shoal Bay receiving station.

Appendix F - Biodiversity credit report

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00033206/BAAS17061/22/00033207

Proposal Name
Thredbo Golf Course Development

BAM data last updated *
22/06/2023

Assessor Name
Ryan Smithers

Assessor Number
BAAS17061

BAM Data version *
61

Proponent Names

Report Created
30/08/2023

BAM Case Status
Finalised

Assessment Revision
0

Assessment Type
Part 4 Developments (Small Area)

Date Finalised
30/08/2023

BOS entry trigger
BOS Threshold: Biodiversity Values Map and area clearing threshold

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Nil

Additional Information for Approval

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
679-Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion	Not a TEC	1.6	37	1	38
939-Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion	Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions	0.0	0	1	1

BAM Biodiversity Credit Report (Like for like)

679-Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Subalpine Woodlands This includes PCT's: 644, 645, 650, 677, 679, 952, 1190, 1191, 1196, 1199, 3379, 3380, 3381, 3382, 3383, 3384, 3385	Subalpine Woodlands <50%	679_Good	Yes	31	Snowy Mountains, Bondo, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Subalpine Woodlands This includes PCT's: 644, 645, 650, 677, 679, 952, 1190, 1191, 1196, 1199, 3379, 3380, 3381, 3382, 3383, 3384, 3385	Subalpine Woodlands <50%	679_Moderate-underscrubb	Yes	6	Snowy Mountains, Bondo, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.
Subalpine Woodlands This includes PCT's: 644, 645, 650, 677, 679, 952, 1190, 1191, 1196, 1199, 3379, 3380, 3381, 3382, 3383, 3384, 3385	Subalpine Woodlands <50%	679_Moderate-shrubland	No	1	Snowy Mountains, Bondo, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

679-Black Sallee - Snow Gum low woodland of montane valleys, South Eastern Highlands Bioregion and Australian Alps Bioregion

939-Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion

Like-for-like credit retirement options

Name of offset trading group	Trading group	Zone	HBT	Credits	IBRA region
Montane Peatlands and Swamps of the New England Tableland, NSW North Coast, Sydney Basin, South East Corner, South Eastern Highlands and Australian Alps bioregions This includes PCT's: 518, 607, 637, 665, 681, 766, 788, 939, 1188, 1200, 1256, 1270, 1287, 1298, 1743, 1744, 1745, 3888, 3890, 3891, 3892, 3919, 3926, 3927, 3932, 3934, 3936, 3939, 3942, 3948, 3951, 3952	-	939_Good	No	1	Snowy Mountains, Bondo, Monaro, Murrumbateman, Snowy Mountains and South East Coastal Ranges. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

BAM Biodiversity Credit Report (Like for like)

939-Montane wet heath and bog of the eastern tablelands, South Eastern Highlands Bioregion

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Mastacomys fuscus / Broad-toothed Rat	**939_Good**	0.0	1.00

Credit Retirement Options

Like-for-like credit retirement options

Mastacomys fuscus / Broad-toothed Rat	Spp	IBRA subregion
	Mastacomys fuscus / Broad-toothed Rat	Any in NSW

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